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Abstracts

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Content

Keynote Lectures

Keynote Lecture I - Monday, March 27

What causes the capacity limit of working memory?

Klaus Oberauer (University of Zurich)

Working memory – the system holding representations available for processing – has a severely limited capacity. What causes this capacity limit? I will review the evidence for the three principal theoretical contenders that vie to explain why and how the capacity of working memory (WM) is limited: Time-based decay, limited resources, and interference. The review will cover two research traditions. In the older tradition, concerned with immediate serial recall of lists (i.e., simple and complex span tasks), decay-based theories and interference-based models are the main contenders. Experimental evidence shows that memory for verbal lists does not decay, whereas an interference model of list memory accounts well for a large range of data. In a more recent tradition, concerned with immediate memory for visual arrays, the theoretical debate concentrates on varieties of discrete and continuous resource models. I will present a new interference-based model of working memory for visual information, and show that it performs better than these resource models. In conclusion, principles of interference apply to the main experimental paradigms in both research traditions, and go a long way towards explaining the capacity limit of working memory.

Keynote Lecture II - Tuesday, March 28

Dissecting the Social Brain through Development, Psychopathology and Plasticity

Tania Singer (Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig)

The relatively new field of Social Neurosciences investigates how people understand and relate to each other. Thus far, at least two different routes on the understanding of others have been described: an affective-motivational route referring to our ability to feel with (empathy) and for (compassion) another person, and a more cognitive route allowing to infer other people's intentions, believes, and thoughts. The latter is also called Theory of Mind, mentalizing or cognitive perspective taking. Furthermore, people tend when projecting their own cognitive or affective states onto others during mentalizing or empathizing processes to judge the states of other people egocentrically, assuming that others will feel or think similar to them. Such cognitive or emotional egocentricity bias (EEB) occurs frequently in situations when others feel or think very differently to oneself. During my presentation, I will introduce and define the above-mentioned concepts and describe different neuronal routes underlying socio-affective (e.g., empathy and compassion) versus socio-cognitive processes (e.g., Theory of Mind) as well as our ability to overcome emotional versus cognitive egocentricity bias. Further, I will show how these two routes of social understanding develop during ontogeny and can dissociate in psychopathology such as autism. During the second part of my talk, I will present evidence for plasticity of the social brain based on the ReSource Project, a large-scale interdisciplinary one-year mental training project that aims at the cultivation of (1) attention and interoceptive awareness, (2) meta-cognition and perspective taking on self and others, and (3) empathy, compassion and prosocial motivation by means of three distinct training modules in more than 200 training subjects. I will present first training-module specific findings suggesting malleability of the social brain on the level of behavioral markers of attention, compassion and theory of mind, functional and structural brain plasticity, prosocial behavior and stress reduction and discuss their relevance for models of social cognition and society.

Keynote Lecture III - Wednesday, March 29

New approaches to volition and agency

Patrick Haggard (University College London)

We feel we decide for ourselves what to do. We also feel that our decisions and intentions lead to our physical actions. Indeed, our culture and society seem to be built upon a concept of individuals as autonomous, conscious, responsible agents. However, neuroscience has often struggled with the idea of voluntary action. One key problem for mechanistic accounts of volition arises in trying to define the origin of voluntary actions in the brain. Further, few neuroscientific accounts have captured the "sense of agency" that characteristically accompanies human goal-directed action. I will report recent experimental work that attempts to tackle both of these problems. I hope to show that intentional action is a neural mechanism in the human brain, and that it can be studied experimentally.

Contributions (in chronological order)

Symposium: New trends in cognitive modeling (Part I)

Time: Monday, 27/Mar/2017: 8:40am - 10:00am · *Location:* HS 401
Session Chair(s): Thorsten Pachur, Henrik Singmann

Seek and find in the social mind: Modeling the development of instance-based inference

Christin Schulze, Thorsten Pachur, Ralph Hertwig

Max Planck Institute for Human Development, Germany

Myriad choice situations require people to gauge the relative frequency of events in the world. One way to make inferences about event frequencies in the population is to search for relevant instances in one's personal social network stored in memory. Research on adult cognition has garnered much insight into the specific mechanisms that guide search in and retrieval from mnemonic sample spaces. Results suggest that people often restrict search to directly experienced instances in their social circles and that these social circles are searched sequentially. But how does search for information in the social mind develop ontogenetically? Do already children exploit their social memories to draw inferences about the frequency of events in the world? And if so, how much do they sample, which social spaces do they consider, and how do they integrate the information?

We took a Bayesian hierarchical latent-mixture modeling approach to address these questions. In a study, children and adults were asked to judge the relative frequency of common first names in Germany and, subsequently, to recall how many people with each of these names they knew personally. Based on these recalled instances of names in their social network, we modeled participants' frequency judgments and the underlying search behavior with a generalized process model. This model allows us to measure participants' preferred search order, their evidence threshold, and the noisiness of their inferences. We found striking developmental differences in participants' inference strategies: Compared to adults, children searched more broadly and more exhaustively for relevant instances, and they preferred to search their social circles in a different order. Our approach highlights the benefits of Bayesian hierarchical mixture modeling to illuminate developmental differences in cognitive search and decision processes.

Mapping the unknown: model-based and model-free approaches towards spatial reinforcement learning

Charley M. Wu[1], Eric Schulz[2], Maarten Speekenbrink[2], Jonathan D. Nelson[1], Björn Meder[1]

[1]Adaptive Behavior and Cognition, Max Planck Institute for Human Development; [2]Department of Experimental Psychology, University College London

How do people adaptively search for resources in unfamiliar environments? Is search behavior guided by a mental map of the world, and if so, which cognitive models best describe this process? We adapt the multi-armed bandit framework to investigate how people sequentially search unknown environments, where rewards are spatially correlated. The task was represented by a two-dimensional grid with 121 different options. We compared search behavior across different payoff structures (average reward or

largest reward), search horizons (20 or 40 clicks), and types of environments (smooth or rough). Our results show that participants adapt to the assigned payoff structure, balancing both exploration and exploitation when the goal is to maximize average rewards, and prioritizing exploration when the goal is to uncover the largest reward. Surprisingly, participants did not achieve higher average rewards when given longer search horizons. To model search behavior, we considered both local and global models of learning. We describe local learning using a Kalman filter as a type of associative learning model that learns the rewards of each arm independently, and describe global learning using Gaussian Process regression, which we use as a non-parametric Bayesian model of how people form beliefs about the world. We combine each learning model with one of three different decision models, which convert beliefs about the expectation and attached uncertainty for each option into predictions about where a participant will click next. Using cross-validated maximum likelihood estimates, we find that human search behavior is best described as making global but very limited inferences about unexplored regions, combined with a search strategy that explicitly trades off between exploiting high expected rewards and exploring to reduce uncertainty.

Older but bolder? Linking computational modeling and attentional measures to understand age differences in risky choice

Thorsten Pachur[1], Michael Schulte-Mecklenbeck[2]

[1]Max Planck Institute for Human Development, Germany; [2]University of Bern, Switzerland

Decision making under risk requires an evaluation of payoff and probability information and is known to tap into various cognitive and affective resources. How are risky decisions affected in older age? We asked a group of younger (mean age 24 years) and older (mean age 69 years) adults to indicate their preferences on a large set of monetary lottery problems (in the gain, loss, and mixed domain). The older adults' risky choices differed from those of the younger adults in two main ways: they showed a) lower decision quality and b) lower (higher) risk aversion in the gain (loss) domain. To examine the psychological underpinnings of these age differences, we combine computational modeling with cumulative prospect theory and process tracing with the Mouselab methodology. Cumulative prospect theory allows to decompose individual differences in observed choice into latent psychological constructs such as outcome sensitivity, loss aversion, probability sensitivity, optimism/pessimism, and response noise. In previous work, we have shown that variability on these constructs is related to variability in regularities in attention allocation during predecisional search, as measured with Mouselab. For instance, participants with higher loss aversion tend to spend more time processing loss outcomes relative to gain outcomes, and participants with lower probability sensitivity tend to spend less time processing probability information. In the present work, we show how the age differences in decision quality and risk aversion map onto age differences in CPT's parameters (e.g., probability weighting, response noise) and examine to what extent the latter are linked with younger and older adults' attention allocation. Our approach demonstrates how latent psychological constructs estimated with computational modeling can be meaningfully related to regularities in cognitive processing.

Quantum cognition quo vadis? A classic-probability account of mirrored order effects in human judgments

Henrik Singmann[1], David Kellen[2], William H. Batchelder[3]

[1]University of Zurich, Switzerland; [2]Syracuse University, USA; [3]University of California, Irvine, USA

Using a large data corpus, Wang, Solloway, Shiffrin, and Busemeyer (2014, PNAS) showed that order effects in the responses given to pairs of agree/disagree related questions presented in succession follow a specific pattern termed QQ-equality. The fact that QQ-equality corresponds to a parameter-free prediction of a proposed quantum-probability model, together with the failure of several alternative classic-probability accounts, led Wang et al. to conclude that it constitutes strong evidence for the quantum nature of human judgments. We question Wang et al.'s conclusion by showing that the class of one of the alternative models they originally dismissed is able to yield the QQ-equality as a parameter-free prediction (or a very-likely prediction a priori) and provides an account of other aspects of the data that is comparable to their quantum model. Finally, we argue that the assumption of participant homogeneity is problematic as it can lead to spurious rejections of simpler candidate models.

Symposium: Recent developments in person perception (Part I)

Time: Monday, 27/Mar/2017: 8:40am - 10:00am · *Location:* 101
Session Chair(s): Corrina Maguinness, Katharina von Kriegstein

Famous face and voice recognition disorders in Semantic Dementia patients with a prevalent atrophy of the right and left temporal lobes

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Background

The study of patients with right and left temporal lobe atrophy (TLA) has shown that familiarity feelings and semantic retrieval from face are mainly impaired by right TLA, whereas face naming is mainly affected by left TLA. Some data suggest a similar impairment of voice recognition by right TLA and of voice naming by left TLA. The present investigation aimed to evaluate famous face and voice recognition disorders in SD patients with a prevalence of right and left TLA.

Methods

Subjects. The study comprised 13 SD patients (8 with predominantly right and 5 with predominantly left TLA). At the disease onset almost all patients with left TLA had presented anomia, whereas patients with right TLA had shown prosopagnosia and behavioural disorders. PET was available in 12 of these patients.

The experimental battery. Fourthy-nine photos and 30 voices of famous Italian people were used to construct the experimental battery, which consisted of 2 naming (faces and voices) and 2 recognition tasks: face-name matching (F-NM) and voice- name matching (V- NM).

Results

Comparison between SD patients with right and left ATL atrophy on the person recognition tasks. Results obtained by SD patients with right-sided atrophy were systematically lower than those obtained by SD patients with left-sided atrophy and results obtained with voice stimuli were always worse than those obtained with face stimuli. The difference between patients with right- and left-sided atrophy was, however, not significant for the naming tasks

Correlation of PET results with face and voice knowledge. In ROI-based analyses a strong correlation was found between right temporal cortex and both face-to-name matching test ($r = 0.73$; $p = 0.007$) and voice-to-name matching test ($r = 0.83$; $p = 0.002$), whereas the correlation between the left temporal cortex and the two tests was not significant.

Conclusion

Our data confirm a greater representation of face and voice in the right TL and of name in the left TL

Voice-identity processing deficits are induced by lesions in the temporal and inferior parietal lobe

Claudia Roswandowitz[1,2], C Kappes[1], H Obrig[1,3], Katharina von Kriegstein[1,4]

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Human voice recognition is an essential skill for social interactions. The mechanisms that the human brain uses for voice recognition are to-date unknown. According to studies in patients with brain lesions, voice recognition critically involves the bilateral temporal lobe and the right inferior parietal lobe. In contrast, functional magnetic resonance imaging (fMRI) studies suggest that primarily the right temporal lobe contributes to voice recognition. In order to systematically investigate brain regions required for voice recognition, we conducted a voxel-based lesion symptom mapping (VLSM) study. The study included a comprehensive behavioural test battery, neuropsychological assessment and high-resolution structural brain images. We tested 58 patients having unilateral focal brain lesions on unfamiliar and familiar voice recognition as well as face recognition skills. VLSM analysis revealed three key findings. (i) A strong association between right temporal and right inferior parietal lobe lesions and voice-recognition deficits. (ii) Only the association of the right temporal lobe with voice-recognition deficits remained significant when we controlled for face-recognition performance. (iii) Unfamiliar voice-recognition deficits were associated with lesions in the right temporal lobe as well as in the right inferior parietal lobe. The ability to recognise familiar voices was associated with left posterior temporal lobe lesions. Our results help to explain the discrepancies between previous lesion and fMRI findings. They show that both the right temporal lobe and the parietal lobe play critical roles for voice-recognition abilities. The right temporal lobe might be key for the representation of the voice and speaker identity, while the parietal lobe might be involved in a more multimodal representation of person identities.

Temporal voice areas exist in autism spectrum disorder but are dysfunctional for voice identity recognition

Stefanie Schelinski[1], Katharina von Kriegstein[1,2]

[1]Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; [2]Humboldt University of Berlin, Berlin, Germany

The ability to recognise the identity of others is a key requirement for successful communication. Brain regions that respond selectively to voices exist in humans from early infancy on. Currently it is unclear whether dysfunction of these voice-sensitive regions can explain voice identity recognition impairments. Here, we used two independent functional magnetic resonance imaging (fMRI) studies to investigate voice processing in a population that has been reported to have no voice-sensitive regions and difficulties in voice identity recognition: autism spectrum disorder (ASD). Our results refute the earlier report that individuals with ASD have no responses in voice-sensitive regions: Passive listening to vocal, compared to non-vocal, sounds elicited typical responses in voice-sensitive regions in the high-functioning ASD group and controls. In contrast, the ASD group had a dysfunction in voice-sensitive regions during voice identity but not speech recognition in the right posterior superior temporal sulcus/gyrus (STS/STG)– a region that has been previously implicated in processing acoustic voice features and unfamiliar voices. The right anterior STS/STG correlated with voice identity recognition performance in controls but not in the ASD group. The findings suggest that right STS/STG dysfunction is critical for explaining voice recognition impairments in high-functioning ASD and show that ASD is not characterised by a general lack of voice-sensitive responses. We provide evidence that voice-sensitive regions in the brain play a critical role in the recognition of vocal identity, beyond their role in discriminating voices from non-vocal sounds. Furthermore, our results suggest that it is the posterior temporal lobe voice region that integrates the acoustic characteristics of the voice into a coherent percept.

Voice distinctiveness influences unfamiliar face recognition

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Face and voice are two preeminent physical cues describing a person. In unimodal face studies, faces are believed to be represented in a psychological multidimensional space built around a norm face. This norm-based framework is purely visual and can account for the recognition advantage of distinctive faces. Could this visual framework be extended to include voices? First, we investigated whether face distinctiveness can be of multi-modal nature. Participants saw faces paired to distinctive or typical auditory stimuli during a learning phase. Thereafter their recognition performance was tested with the learned faces presented alone among new faces. We assessed whether their recognition was affected by the distinctiveness of the auditory stimuli. Further, we asked whether the type of auditory stimuli paired to the faces (voices or other sounds) mattered. We found that recognition performance was better for faces previously paired with distinctive than with typical voices while no such distinctiveness effect was observed after face-sound pairing. These findings suggest that facial distinctiveness can be indeed of a multi-sensory nature as the memory for faces can be modified by the perceptual quality of related vocal information. Second, we investigated whether faces and voices are integrated early on to form a multisensory representation of a person in memory. We used a similar learning phase followed by a crossmodal priming paradigm to test whether a face familiarity decision could be primed by voices. We found that voice primes facilitated the recognition

of their paired faces. Our results suggest a strong early association between voices and faces in memory. Furthermore, we found no evidence of priming with paired sounds, thus confirming the special status of the face-voice pairing for person identification.

Symposium: Neuroplasticity of the motor system: Age, training and non-invasive brain stimulation

Time: Monday, 27/Mar/2017: 8:40am - 10:00am · *Location:* 103
Session Chair(s): Vanessa Krause, Bettina Pollok

The neural underpinnings of skilled sensorimotor performance in sports

Andreas Mierau[1,2], Thorben Hülsdünker[2], Heiko Strüder[2]

[1]International University of Health, Exercise and Sports (LUNEX), Luxembourg; [2]Institute of Movement and Neurosciences, German Sport University Cologne

Athletes can achieve extraordinary sensorimotor skills following years of extensive sports training. The development of such expert performance levels is associated with a substantial structural and functional reorganisation of the brain. This is particularly true for the sensory and the motor brain regions as well as for their interaction, because optimal motor control requires successful sensorimotor integration.

This talk aims to present recent findings on the neural substrates of highly skilled sensorimotor behavior in sports. In doing so, a special emphasis will be placed on EEG experiments in badminton; a sport where it is essential to perceive visual cues in the field of view and initiate a targeted motor response under critical time pressure. The results indicate superior visuomotor performance in badminton athletes is related to motion perception in the visual cortex and visuomotor transformation in premotor and supplementary motor cortical regions (Brodmann area 6). Earlier visual perception in athletes only in response to visual motion but not in response to contrast stimuli suggests selective adaptations in the visual system depending on the visual demands of the sport. In contrast, the athletes' faster visuomotor transformation may reflect a more general adaptation independent of the visual signal.

However, for a more comprehensive view on sports-induced neuroplasticity of the sensorimotor system, this talk will include a number of other important findings obtained from different methodological approaches. Therefore, adaptations at different neurobiological levels and time scales will be addressed, and this will be discussed against the background of the "neural efficiency hypothesis" in athletes.

Polarity-specific impact of tDCS on precise sensorimotor timing

Vanessa Krause, Bettina Pollok

Institute of Clinical Neuroscience and Medical Psychology, Heinrich-Heine-University Düsseldorf, Germany

Background

Precise timing is required for numerous everyday activities with most prominent value in professional sports and music. The neuronal underpinnings of sensorimotor timing rely on functional interaction within a cerebello-thalamo-cortical network. Drummers show superior synchronization with respect to a regular auditory pacing signal. This behavioural advantage is accompanied by stronger interaction between the posterior parietal cortex

(PPC) and the thalamus suggesting that precise timing is particularly mediated by the PPC.

Methods

In order to elucidate its causal involvement we transiently modulated left PPC excitability by non-invasive anodal and cathodal transcranial direct current stimulation (tDCS). We focused on behavioural after-effects of tDCS and the underlying neuronal mechanisms. Sensorimotor timing was assessed by a synchronization task requiring right-handed participants to synchronize their finger taps with a regular auditory pacing signal. A simple reaction time task served as control condition.

Results

The behavioural data suggest that polarity-specific tDCS to the PPC promotes neuroplastic alterations within the motor system via an impairment of synchronization by anodal tDCS and an improvement by cathodal tDCS. To further characterize the neuronal underpinnings of behavioural changes, the combination of tDCS with electroencephalography (EEG) provides detailed insights into tDCS-induced neuroplastic effects. Recent behavioural and EEG data from thirteen participants suggest that impaired synchronization performance following anodal PPC tDCS might be associated with altered neuronal activity within the motor system.

Conclusion

To this end, the presented set of experiments links the PPC to precise timing possibly by its relevance for matching between anticipated and real sensorimotor feedback.

Motor sequence learning and its neural dynamics: Insights from healthy aging and Parkinson's disease

Sarah Nadine Meissner[1], Vanessa Krause[1], Martin Südmeyer[1,2], Christian Hartmann[1], Bettina Pollok[1]

[1]Heinrich-Heine-University Düsseldorf, Germany; [2]Ernst von Bergmann Hospital Potsdam, Germany

Background: Implicit motor sequence learning refers to the ability to incidentally acquire knowledge of sequences of events and actions and is suggested to change across the adult life span. At the neural level, the modulation of motor-cortical oscillatory activity in the alpha and beta frequency band is assumed to play a crucial role in this type of learning in young healthy adults. More specifically, the ability to suppress beta oscillations seems to facilitate learning and may be involved in the stabilization of movement patterns. In Parkinson's disease (PD) there is strong evidence that oscillatory activity within corticobasal ganglia circuits including motor cortical areas is altered. Increased beta synchronization has received particular attention as it is associated with PD motor symptoms such as bradykinesia. The present study investigates motor sequence learning in PD patients and age-matched healthy controls (HC) to determine the significance of motor-cortical beta oscillations for motor sequence learning.

Methods: 20 PD patients and 20 age-matched HC were trained on a serial reaction time task. To assess motor sequence learning, reaction times were determined during learning as well as after presentation of interfering randomly varying trials. Neuromagnetic activity was recorded throughout the task using a 306-channel whole-head magnetoencephalography system. We analyzed the data regarding oscillatory activity with particular focus on beta power. We further examined whether oscillatory power and its dynamic modulation are related to the acquisition and stabilization of motor sequences.

Results: Preliminary results suggest better learning as well as stronger modulation of beta power in healthy adults as compared to PD patients.

Conclusions: The data are in line with the hypothesis that the modulation of beta oscillations is crucial for motor sequence learning.

Motivation in action: Increasing self-directed training in stroke patients

Bettina Studer[1,2]

[1]St. Mauritius Therapieklinik Meerbusch, Germany; [2]Institut of Clinical Neuroscience and Medical Psychology, Heinrich Heine University Düsseldorf, Germany

Brain injury through stroke or other causes often leads to impairments in physical and cognitive functions. These impairments can be significantly reduced by high-intensive neurorehabilitation: The more training and repetitions patients conduct, the larger and faster is their functional recovery. One strategy to maximise training intensity during neurorehabilitation is to complement therapist-directed training with “self-directed“ or “patient-led” training. A major challenge of this resource-friendly approach is that self-directed training demands high levels of motivation, drive, effort and persistence, which in turn are frequently diminished following stroke. Indeed, patients’ adherence to self-directed training schedules is observed to be low in clinical practice. Novel approaches to enhance motivation, training intensity and training frequency in rehabilitation settings are thus warranted.

In this talk, I will explore potential motivation enhancement strategies and present our recent proof-of-concept study in 93 stroke patients undergoing neurorehabilitation, which demonstrated that adding an element of competition to the exercise programme is one viable and efficient approach to increase self-directed training (Studer, Van Dijk, Handermann & Knecht, 2016, Progress in Brain Research).

Symposium: Evaluative conditioning I: Processes of preference acquisition (Part I)

Time: Monday, 27/Mar/2017: 8:40am - 10:00am · *Location:* 105
Session Chair(s): Frederik Aust, Tobias Heycke, Christoph Stahl

Does CS liking without explicit US memory depend on US evocativeness in MPT studies?

Olivier Corneille[1], Adrien Mierop[1], Christoph Stahl[2], Mandy Hütter[3]

[1]Catholic University of Louvain, Belgium; [2]University of Cologne, Germany; [3]University of Tübingen, Germany

Multiple Process Tree (MPT) studies suggest the possibility of CS liking without explicit US memory. Presumably, this "implicit" evaluative conditioning effect results from the implicit misattribution (IM) of the US valence to the CS. IM processes are assumed to be more likely to operate when US evocativeness is low than high. Therefore, MPT studies should reveal a higher A parameter (i.e., CS conditioning without CS-US pairing memory) for US of low than high evocativeness. The latter prediction was examined in two MPT studies where US evocativeness was manipulated. In Study 1, explicit memory for CS-US pairings was higher for US of high than low evocativeness. More important, a significant A parameter was observed independently of US evocativeness. Hence, contrary to the IM account, CS conditioning without CS-US pairing memory was equally likely to emerge for US of high and low evocativeness. Study 2 was designed to examine the replicability of

this effect, this time switching to a within-Ps manipulation of evocativeness and further reducing the evocativeness of the low-evocativeveness US.

Evaluative Conditioning is Sensitive to Memory Reactivation of the US

Anne Gast, Borys Ruszpel

University of Cologne, Germany

Evaluative conditioning is a change in the valence of a stimulus (CS) that is due to previous pairings, typically with positive or negative stimuli (USs). We tested whether the new CS valence that is acquired over a range of pairing trials is mentally represented as an overall summary valence or in a number of learning episodes that can still be accessed separately. To investigate this, CSs were paired both with positive and with negative USs during the conditioning phase. In the measurement phase, one positive and one negative stimulus was presented along with each measured CS. In order to specifically trigger retrieval of the learning episodes that included one of the USs, one of these valent stimuli was identical to one of the USs that was paired with the CS in the conditioning phase. As predicted, CS valence was in line with the US that was shown both in the conditioning and in the measurement trials. This result suggests that the valence of a stimulus that results from pairings with a range of valent stimuli is represented in individually accessible episodes.

Distributed practice can boost evaluative conditioning by increasing memory for the stimulus pairs

Jasmin Richter, Anne Gast

University of Cologne, Germany

Background: When presenting a neutral stimulus (CS) in close temporal and spatial proximity to a positive or negative stimulus (US) the former is often observed to adopt the valence of the latter, a phenomenon named evaluative conditioning (EC). It is already well established that under most conditions, contingency awareness is important for an EC effect to occur. In addition to that, some findings suggest that EC effects are strongly related to memory for the pairings that is still available during the measurement phase. Previous research has shown that memory is better after temporally distributed (spaced) than after contiguous (massed) repetitions. The current studies test whether also EC effects are moderated by distributed practice manipulations.

Methods: In two online studies we manipulated the temporal distribution of the pairings in the conditioning phase within-participants and between-participants. Afterwards, memory for pairings and evaluation of CSs were assessed.

Results: With successful distributed practice manipulations on memory, we show that also the magnitude of the EC effect was larger for pairs learned under spaced compared to massed conditions. Both effects, on memory and on EC, are found after a within-participant and after a between-participant manipulation. However, we did not find significant differences in the EC effect for different conditions of spaced practice.

Conclusion: These findings are in line with the assumption that EC is based on similar processes as memory for the pairings.

Reversed dissociation between CS evaluation and US expectancy through explicit reference to learning contexts

Frederik Aust[1], Julia Haaf[2], Christoph Stahl[1]

[1]University of Cologne, Germany; [2]University of Missouri

Evaluative conditioning (EC) is a change in liking of neutral stimuli (conditioned stimulus, CS) following pairings with positive or negative stimuli (unconditioned stimulus, US). Theories of EC differ in the number of underlying processes they postulate. Single-process theorists argue that one learning process suffices to explain EC related findings. Advocates of dual-process theories argue for a second learning process, e.g., because participants' US expectancy is decreased by repeated encounters of CS without US (extinction) but CS evaluation is not affected. Dual-process theories invoke an automatic associative learning process that underlies CS liking in addition to a deliberative propositional learning process that underlies US expectancy. In two experiments, we tested a competing single-process explanation of the evaluation-expectancy dissociation. We found evidence supporting the proposition that ratings of liking and expectancy are based on a single representation of past experiences but that these representations are used differently depending on the rating task. Expectancy ratings, assumedly due to their predictive nature, reflect recent events while liking ratings reflect information integrated across a wider range of past experiences. In line with this account, we were able to reverse the evaluation-expectancy dissociation by instructing participants to base liking ratings on recent experiences and expectancy ratings on a wider range of past experiences.

Symposium: Eye tracking as a window to cognition (Part I)

Time: Monday, 27/Mar/2017: 8:40am - 10:00am · *Location:* HS 304
Session Chair(s): Christina Pfeuffer, Stefanie Aufschnaiter

Test-retest reliabilities of attention capture effects measured by manual responses and eye movements

Hanna Weichselbaum, Christoph Huber-Huber, Ulrich Ansorge

University of Vienna, Austria

We analyzed the temporal stability or test-retest reliability of bottom-up and top-down attention capture effects as well as intertrial priming of attention by using a visual search paradigm. Participants searched for a target having one specific color in most of the trials and reported a stimulus inside the target. In some trials, distractors were presented. Top-down matching distractors had the same color as the searched-for target; non-matching distractors had a different color than the target. In addition, we used trials with a color-singleton target including no distractor. Bottom-up capture was reflected in a difference between trials with a non-matching distractor and trials without a distractor. Top-down capture was reflected in a difference between trials with a matching distractor and trials with a non-matching distractor. Top-down matching distractors were either primed or unprimed by the target of the preceding trial. We analyzed bottom-up, top-down, and priming of attention capture with manual response times and target fixation latencies of non-instructed eye movements on two different points in time, separated by several days. Correlations based on linear mixed models revealed that bottom-up and top-down attention capture effects showed high temporal stability at individual and group levels when including intertrial priming effects.

The influence of change size on transsaccadic shape prediction

Cassandra Philine Köller, Arvid Herwig

Bielefeld University, Germany

Due to the inhomogeneity of our visual system only foveated objects are processed with a high spatial resolution, whereas objects in the peripheral visual field are only coarsely represented. Nevertheless, we succeed in guiding our eye movements task-dependently to peripheral objects which probably requires a first guess about their identity. It was recently suggested that peripheral object recognition uses transsaccadic predictions made on the basis of previously established transsaccadic associations (Herwig, & Schneider, 2014, JEPG). Until now, only little is known about the conditions and mechanisms influencing the acquisition and application of transsaccadic associations. Here, we investigated the influence of change size during the acquisition of transsaccadic associations on transsaccadic shape predictions. First, unfamiliar transsaccadic associations were established by systematically changing the shape of one object during the saccade (either from more circular to more squarish or vice versa), varying the change size between participants. As control condition, a second object was not changed. Subsequently, testing peripheral shape recognition revealed a learning effect indicated by a judgement shift toward previously associated foveal input. Importantly, this learning effect depended on the change size during the acquisition of transsaccadic associations. Supporting previous research, these results provide evidence for the assumption that on the basis of past experience the visual system makes predictions of the perceptual consequences of saccades. The present findings reveal change size as an important factor influencing transsaccadic predictions and thus, offer a more detailed prospect of learning mechanisms underlying the acquisition and application of transsaccadic associations.

Pupil Size Changes Indicate Intended Targets in Multiobject Selections

Christoph Strauch, Jan Ehlers, Anke Huckauf

Ulm University

Human computer interaction could be supported by changes in activity indicated by peripheral physiological variables. Still, only few physiological-computing applications exist that can be supposed to be usable. Besides long latencies, also the low specificity of signal changes hinders the development of usable applications. One exception might be pupil sizes: their temporal resolution is high and pupil size changes may be attributable to specific cognitive processes such as decision making. Given that object selections produce comparable signal changes, this may provide a new way interaction concept computers. In a task with circularly arranged objects, objects could be selected by a simple mechanism relying on the change in pupil size. Signal dynamics were collected for each correct object selection. The tracked signal dynamics reveal that intended objects are indeed accompanied by specific pupil size changes which can be observed already within the first half second.

A Look into the Future: Spontaneous anticipatory saccades reflect processes of anticipatory action control

Christina Pfeuffer[1], Andrea Kiesel[1], Lynn Huestegge[2]

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According to ideomotor theory, human action control employs anticipations of one´s own actions´ future consequences, that is, action effect anticipations, as a means of triggering actions that will produce desired outcomes (e.g., Hommel, Müsseler, Aschersleben, & Prinz, 2001). Using the response-effect compatibility paradigm (Kunde, 2001), we demonstrate that the anticipation of one´s own manual actions´ future consequences not only triggers appropriate (i.e., instructed) actions, but simultaneously induces spontaneous (uninstructed) anticipatory saccades to the location of future action consequences. In contrast to behavioral response-effect compatibility effects which have been linked to processes of action selection and action planning, our results suggest that these anticipatory saccades serve the function of outcome evaluation, that is, the comparison of expected/intended and observed action outcomes. Overall, our results demonstrate the informational value of additionally analyzing uninstructed behavioral components complementary to instructed responses and allow us to specify essential mechanisms of the complex interplay between the manual and oculomotor control system in goal-directed action control.

Talk Session: Working memory I

Time: Monday, 27/Mar/2017: 8:40am - 10:00am · *Location:* 201
Session Chair(s): Markus Conci

The effect of refreshing and elaboration on working memory performance and their contribution to long-term memory formation

Lea Maria Bartsch, Klaus Oberauer

University of Zurich, Switzerland

The maintenance of information in working memory (WM) is assumed to rely on processes such as attentional refreshing – defined as briefly thinking of an item just after the stimulus is no longer physically present but while a representation is still active (Johnson, 1992) – or elaboration of the to-be-remembered material. The benefits of enriching the memory representation of an item by activating associated representations in long-term memory (LTM) are well documented (e.g. Craik & Tulving, 1975) and refreshing hints to also improve LTM (Johnson et al., 2002). We are interested in the extent to which elaboration and refreshing are distinct in WM in terms of their contribution to WM and LTM retrieval. For that purpose we conducted an experiment in which immediate memory performance of a list of six sequentially presented words is compared under four different maintenance processing conditions: After initial encoding of all of the memory items, either the first or the last three words of a study list were shown again, refreshed, elaborated or refreshed and elaborated simultaneously. Our results show no effect of elaboration on WM compared to a read condition and a decline in immediate memory for refreshed items. LTM retrieval was highest for elaborated items, proving a successful manipulation of maintenance processes at encoding in our paradigm. Refreshing had no significant effect on LTM performance. These findings are discussed in light of current theories of working memory that assume that maintenance depends on activation through attentional focussing and lead to question the immediate effect of elaboration on memory.

Can mind wandering account for time-related forgetting in working memory?

Alexander Soemer

University of Potsdam, Germany

Background

Interference between memory representations is traditionally considered as one of the main explanations for forgetting in working memory. Because pure interference accounts predict that no forgetting should occur without interference, they have difficulties explaining data showing that memory performance declines over time in unfilled retention intervals (RI). One way to explain such time-related forgetting from an interference viewpoint is to assume that participants 'mind wander' during unfilled RIs and thereby create interference internally.

Method

To test this hypothesis, an experiment was conducted that combined a probe recognition paradigm with the experience sampling approach dominantly used in mind wandering research. Participants retained three sounds over unfilled RIs of either 6 or 12 seconds and then judged whether or not a subsequently presented probe sound matched one of the remembered sounds. At the end of some trials, participants were asked to report whether or not they had mind wandered during the RI.

Results

The results of this experiment showed that probe recognition performance was lower in 12s-RI compared to 6s-RI trials replicating previous experiments. Furthermore, more mind wandering reports followed 12s-RI trials compared to 6s-RI trials. However, contrary to the predictions of the mind wandering hypothesis, there was no evidence that recognition performance in mind wandering trials was worse compared to 'on-task' trials, nor was there evidence for the prediction that time-related forgetting was limited to mind wandering trials.

Conclusions

Overall, the results suggest that although more mind wandering occurs during longer RIs, this mind wandering does not seem to be associated with time-related forgetting. This finding is unexpected from the viewpoint of pure interference accounts and, instead, suggests that something other than interference accounts for time-related forgetting in unfilled RIs.

Non-Converging Evidence for a Single-Item Focus of Attention in Working Memory

Marcel Niklaus, Klaus Oberauer

University of Zurich, Switzerland

The focus of attention privileges a representation in working memory. This privilege is thought to result in greater accessibility of the most recently presented item in a Sternberg recognition task (recency benefit) as well as improved recognition performance when an item held in memory is retro-cued for an upcoming recognition task during the retention interval (retro-cue benefit). If both empirical phenomena result from the same mechanism of the focus of attention, the retro-cue benefit should be diminished for the most recently presented item. We report two experiments that merged the two procedures in order to test this hypothesis. We applied the response-signal speed-accuracy trade-off procedure to recognition tasks in which items were presented serially and in some trials a memory

item was retro-cued during the retention interval. Participants were cued to immediately respond to a response signal which was presented at various times (deadlines) after probe onset. With increasing deadlines, participants move from a period of chance performance to a period of increasing accuracy before reaching an asymptotic level. Using Bayesian hierarchical modeling, we fitted the data with an exponential approach to a limit in order to measure three parameters that capture these periods: 1) an intercept that indicates the point of time when accuracy departs from chance, 2) the rate at which accuracy approaches the asymptote, and 3) the level of asymptotic accuracy. For non-cued trials, we found a benefit for the most recently presented item on the intercept. Moreover, all serial positions showed a retro-cue benefit on the intercept. Importantly, this benefit was not diminished for the most recently presented item, despite the fact that this item should be in the focus of attention already. These findings suggest that recency and retro-cue effects are not solely driven by the same mechanism of the focus of attention.

Storage of hierarchical objects in visual working memory

Markus Conci, Hermann J. Müller, Qi-Yang Nie

Ludwig-Maximilians-Universität München, Germany

When remembering a natural scene, both detailed information about specific objects and summary representations such as the gist of a scene are encoded. However, formal models of change detection that are used to estimate working memory capacity, typically assume observers simply encode and maintain memory representations that are treated independently from one another without considering the (hierarchical) object or scene structure. To overcome this limitation, we present a hierarchical variant of the change detection task that attempts to formalize the role of object structure, thus, allowing for richer, more graded memory representations. We demonstrate that detection of a global-object change precedes local-object changes of hierarchical shapes to a large extent. Moreover, when systematically varying object repetitions between individual items at a global or a local level, memory performance declines mainly for repeated global objects, but not for repeated local objects, which suggests that ensemble (i.e., summary) representations are likewise biased towards a global level. In addition, this global memory precedence effect is shown to be independent from encoding durations, and is mostly not due to differences in saliency or shape discriminability at global/local object levels. Overall, this pattern of results is suggestive of a global/local difference occurring primarily during memory maintenance. Together, these findings challenge visual-working-memory models that propose that a fixed number of objects can be remembered regardless of the individual object structure. Instead, our results support a hierarchical model that emphasizes the role for structured representations among objects in working memory.

Talk Session: Selective attention: Social and emotional factors

Time: Monday, 27/Mar/2017: 8:40am - 10:00am · *Location:* 204
Session Chair(s): Juergen Goller

The influence of relationship status and sociosexual orientation on the visual exploration of facial attractiveness

Aleksandra Mitrovic[1], Juergen Goller[1], Pablo Tinio[2], Helmut Leder[1]

[1]University of Vienna, Faculty of Psychology, Austria; [2]Montclair State University, Department of Educational Foundations, USA

Facial attractiveness influences our everyday interactions in that it catches and binds attention and therefore modulates our visual exploration. In this study, we tested how the perceivers' relationship status and sociosexual orientation affect processing of facial attractiveness. We expected that (1) more attractive faces would in general receive more attention (operationalized as longer fixation duration and higher number of fixations) as compared to less attractive faces, (2) this behavioral effect would be stronger for participants who are looking for a partnership as compared to participants who already are committed to a romantic partnership, (3) and for participants who score high on the "Sociosexual Orientation Inventory". As stimuli we used pictures of urban real world scenes depicting two people who differed in facial attractiveness (ranging from subtle to pronounced). While participants looked at these pictures, we recorded their eye movements. In a following block, participants rated the attractiveness of all presented faces. We used the ratings as an explicit measure of attractiveness and linked them to the eye movement patterns which served as implicit measure. We found that attractive faces were generally looked at longer than less attractive faces. Additionally, perceiver variables had modulating effects on the attention towards attractive faces. We conclude that the importance of attractiveness is modulated by perceivers' motives and goals.

Gaze Behavior and Liking in Faces and Artworks

Juergen Goller[1], Aleksandra Mitrovic[1], Vanessa Mitschke[2], Helmut Leder[1]

[1]University of Vienna, Austria; [2]University of Würzburg

In a series of eye-tracking studies we examined how individual liking influences gaze behavior in a free-viewing paradigm. We presented two faces or artworks simultaneously and recorded various eye-tracking parameters, which we then linked to measures of liking. We found a strong and stable relation between liking and gaze behavior in that higher liking increased visual attention. This relation appeared for artworks, street art, and for female and male faces regardless of the sex of the perceiver. We discuss our results in regards to evolutionary and motivational aspects along the dimension of approach and avoidance. We also address the question whether liking is driving gaze behavior unidirectional or if gaze behavior also affects liking. Our findings are a further step to a generalized theory of valence affecting visual attention in real life vision.

On his or my left side? Studying spatial coding with multiple reference frames in a Simon task

Pamela Baess, Christina Bermeitinger

University of Hildesheim, Germany

Previous studies have shown that multiple spatial codes can be formed in a Simon Task. However, these Simon effects due to multiple reference frames were only present when an external object was given next to the target. In a series of three experiments, we applied a version of a Simon Task using ecologically significant stimuli, namely stick-figure manikins. The manikins were presented on the either side of the screen (egocentric reference frame). Moreover, the manikins were holding a ball in either hand (allocentric reference frame). In contrast to previous research, both reference frames were present at the same time and most importantly, did not require an external reference point. Further, the amount of manikins on the display was varied; presenting the manikin either alone (1-manikin condition) or within a set of nine identical manikins (9-manikin condition). Spatial codes were formed on both, egocentric and allocentric reference frame, but the size of the Simon effect varied: larger Simon effects were obtained for the spatial codes based on the egocentric perspective in the 1-manikin condition compared to the 9-manikin condition. No such effect was observed for the spatial codes based on the allocentric reference frame. These results offer new perspectives for linking social and spatial cognition.

Symposium: Experimentelle Ästhetik / Experimental Aesthetics (Part I)

Time: Monday, 27/Mar/2017: 8:40am - 10:00am · *Location:* HS 403
Session Chair(s): Thomas Jacobsen

Disentangling Beauty and Attractiveness - Portrait Paintings from an Empirical Aesthetics Perspective

Gregor Uwe Hayn-Leichsenring, Jana Katharina Schulz, Christoph Redies

FSU Jena, Germany

For centuries, portraits have been one of the most prominent subjects of art paintings. An interesting aspect of portrait paintings is the simultaneous display of two different kinds of hedonic qualities. These are (a) the artistic beauty of the image, which relates to image composition and painting style, and (b) the attractiveness of the depicted person. We argue that perception of attractiveness is driven by basic bottom-up processing to a large extent, while the perception of artistic beauty is, at least partly, based on cognitive processing. To test this hypothesis, we conducted several behavioral experiments. In a gist study (Experiment 1), we found that ratings on artistic beauty were higher after long-term presentation (3000ms) than after ultra-rapid presentation (50ms), while the opposite pattern was the case for attractiveness. In an adaptation study (Experiment 2), we showed that the perceptual contrast effect was weaker for artistic beauty than for attractiveness. These results suggest that evaluating artistic beauty is modulated partially by cognition, while processing of attractiveness is predominantly driven perceptually. The dichotomy between cognitive and perceptual processing of different kinds of beauty suggests that they are mediated by different neuronal mechanisms.

Pictorial balance and aesthetic preference: Their relation depends on the image type

Martin G. Fillinger, Ronald Hübner

University of Konstanz, Germany

Pictorial balance is known as a fundamental structural feature of pictorial compositions. Balance influences aesthetic appreciation substantially, which is also acknowledged in art theory. Hence, for empirical aesthetics it is important to investigate perceptual balance to understand its underlying mental mechanisms. Previous research with simple stimulus material has confirmed the strong relation between aesthetic preference (liking) and balance ratings. Until now, however, it is not clear whether this strong relation also holds for more complex pictorial compositions. To answer this question, two experiments with more complex pictures were conducted, in which participants had to judge the stimuli with respect to liking and balance. In the first experiment, Japanese calligraphy served as stimulus material. The results show no significant connection between liking and balance ratings on a picture-level. Moreover, different objective measures of balance failed as predictors of the balance ratings. In the second experiment art pictures from the Visual Aesthetic Sensitivity Test (VAST) had to be rated. Also for these stimuli we did not find significant relations between balance, liking, and objective measures of balance. However, we identified three different image types and analysed them separately. The analysis revealed that the largest correlation occurred for images including elements whose arrangement can be interpreted as balanced in the sense of physical stability. Our findings show that the often proposed link between pictorial balance and aesthetic preference does not hold generally. Rather, pictorial balance is a concept with different meanings, depending on the image content or context. It seems that participants apply different concepts of balance, of which only some relate to liking.

Individual Differences in Aesthetic Judgments of Symmetry

Andreas Gartus, Helene Plasser, Helmut Leder

University of Vienna, Austria

It is well known that for novel abstract graphic patterns, symmetry is an important predictor of aesthetic judgments (e.g., Eisenman, 1967). However, it is also known that, while this is true on average, there exist substantial individual differences (Jacobsen & Höfel, 2002).

We investigated general and individual preference for symmetry in two experiments: In an online study, 80 participants rated 250 abstract black-and-white patterns differing in symmetry and complexity (similar to the stimuli used in Gartus & Leder, 2013) for liking. In addition, participants completed the 16-NCCS questionnaire of Schlink and Walther (2007) measuring individual need for cognitive closure (NCC). NCC is conceptualized as desire for definite knowledge and rejection of ambiguity. It is assumed to vary between individuals and situations (Webster & Kruglanski, 1997). The second experiment was conducted in the lab and 108 participants rated the same stimuli and filled out the same questionnaires as in the first experiment.

For each stimulus pattern, a continuous measure of mirror symmetry was calculated (Hübner & Fillinger, 2016). In both experiments, we found a significant interaction between individual NCC and mirror symmetry scores of the stimuli: While on average, participants preferred symmetric over less symmetric stimuli, the higher the NCC score was, the higher was also the preference for symmetry. This is in line with theory, since a high NCC is also associated with increased preference for order and structure.

A relation between NCC and preference for figurative and realistic over abstract and nonrealistic paintings has been shown recently (Chirumbolo et al., 2014; Ostrofsky & Shobe, 2015; Wiersema et al., 2012). Here, we found additional evidence that NCC is also positively related to preference for symmetry. Therefore, the results of our research further support the relevance of need for cognitive closure for predicting individual differences in aesthetic preferences.

Entropy of Edge Orientations in Traditional Art, Abstract Art and "Bad Art"

Christoph Redies, Anselm Brachmann

Jena University Hospital, Friedrich Schiller University Jena, Germany

In a previous study (Redies, Brachmann and Wagemans, manuscript submitted), we asked whether "good composition" or "visual rightness" in artworks manifest themselves in a particular arrangement of edge orientations. To this aim, we studied large sets of traditional artworks from different cultural backgrounds (Western, Islamic and East Asian). For each image, we measured the relative orientations of edge pairs across the image. Results for artworks were compared to results for other types of images (photographs of man-made objects and natural scenes). For traditional artworks, we showed that the orientation of a given edge in an image does not correlate with the orientations of other edges in the same image, except for nearby edge pairs, which tend to be collinear. In other words, the entropy of edge orientations is high in traditional artworks. Moreover, complexity (i.e., edge density) assumes intermediate values in traditional artworks. Here, we extended our analysis to abstract artworks and to artworks from the Museum of Bad Art, Needham, MA, USA, which collects artworks that are considered to be of lesser importance. The entropy of edge orientations in these two sets of artworks is lower on average than those of the traditional artworks, although there is a considerable degree of overlap. Also, complexity varies more widely than in traditional artworks. These results suggest that, on the one hand, traditional artworks from different cultural backgrounds represent a subset of artworks that is rather distinct with respect to the measured properties. On the other hand, images of modern artworks and "bad art" show a much larger variability. In conclusion, we obtain evidence for similarities for traditional artworks across cultures. At the same time, our results underscore the special characteristics of some (post-)modern art genres, as exemplified by abstract artworks.

Talk Session. Decision making under risk and uncertainty

Time: Monday, 27/Mar/2017: 8:40am - 10:00am · *Location:* HS 405
Session Chair(s): Stefan Ehrlich

Safe is easy! The role of option complexity in measuring age differences in risk attitudes

Veronika Zilker, Thorsten Pachur

Max Planck Institute for Human Development, Germany

Previous studies comparing risk attitudes in younger and older adults have often found that older adults have a lower tendency to choose a risky gain than younger adults, and have interpreted this as reflecting age differences in risk attitude. Many of these studies, however, relied on tasks that involved a choice between a safe and a risky option. We argue that using such items confounds the riskiness of the options and their complexity: evaluating safe options that are defined by a single, easily understandable outcome

requires less elaborate mental operations than evaluating risky options, that consist of several probabilistic outcomes. Due to their impaired fluid cognitive capacities, in particular older adults may gravitate towards more easily comprehensible safe options. In a set of studies we tested this hypothesized influence of task complexity on risky choice and attempted to obtain a measure of age differences in risk propensity that is less contaminated by age-related differences in responses to task complexity.

Toward that end, we created a set of lottery problems that disentangle risk and complexity and presented it to a sample of 80 younger (age 18-35) and 80 older (age 55-71) adults.

The results show that, as predicted, safe gains become less attractive when they are presented in a more complex format, apparently decreasing risk aversion. This effect emerged for both younger and older adults, but it was more pronounced for older adults. Furthermore, on choices between two equally complex risky gains—a measure not confounded by complexity—younger and older adults showed similar levels of risk aversion.

These results suggest that the frequently reported result of increased risk aversion in older adults may be largely due to the experimental stimuli used in the previous literature. Taking into account age-related differences in the preference for complex vs. simple stimuli, age difference in genuine risk attitudes disappear or even reverse.

Making people reflect on options interferes with decision making under risk

Silke M. Müller[1], Johannes Schiebener[1], Matthias Brand[1,2]

[1]University of Duisburg-Essen, Duisburg, Germany; [2]Erwin L. Hahn Institute for Magnetic Resonance Imaging, Essen, Germany

Considering possible consequences related to different options is a key process when making decisions. Studies showed that reflective processes like deliberating about options, using executive functions, and applying calculative strategies favour advantageous decision making under risk (e.g. Schiebener & Brand, 2015; Buelow, 2015). We hypothesized that triggering reflective processes by asking participants to answer questions about task contingencies and to rate choice options during a complex decision-making task may lead to superior decision-making performance.

In an experimental study we invited 109 participants to do a complex decision-making task under objective risk conditions (i.e. the Cards and Lottery Task; Mueller et al., 2016) that requires consideration of opposing short- and long-term consequences. One group (n=54) repeatedly received interposed questions assessing consciously accessible knowledge about the task's contingencies, while the other group performed the task in the standard version.

On average, participants performed equally well in both groups. However, in contrast to the group answering questions during the task, good performance in the standard version was associated with executive functions. It also correlated positively with the use of a calculative strategy and negatively with intuitive decision making. Interestingly, the results show that individuals who reported to use a mathematical strategy performed significantly weaker in the group where reflection should be stimulated than participants in the standard version.

Thus, explicitly asking to reflect about different decision-options may lead intuitive deciders to more advantageous choices, but it can interfere with calculative strategies and even lead some persons to overall less advantageous decisions. Our findings underline the

assumptions of decision-making models which suggest external input and cognitive functions to interactively determine the quality of decision making.

Risk is reward: Exploiting the environment's risk-reward structures in decisions under uncertainty

Christina Leuker, Timothy J. Pleskac, Thorsten Pachur, Ralph Hertwig

Max Planck Institute for Human Development, Germany

In many domains in the environment, the higher payoffs that people desire are unlikely to occur (Pleskac & Hertwig, 2014). This negative risk-reward relationship seems natural for people to exploit to infer missing probabilities for uncertain prospects. How do people (1) adapt to different risk-reward environments and (2) subsequently use these risk-reward relationships in decisions under uncertainty? To test this, we exposed participants to different risk-reward environments using monetary gambles of the form “p chance of winning x, otherwise nothing” across three laboratory studies (N = 350). In a between-subjects design, we manipulated the gambles’ payoffs and probabilities such that they were (1) negatively correlated, (2) positively correlated or (3) uncorrelated.

In a subsequent test phase, we studied how exposure to the different environments influences decisions under uncertainty. For instance, when choosing between a sure outcome (i.e., probability 100%) and a gamble with a twice-as-large payoff, but unknown probability, participants who had been exposed to a negative risk-reward relationship were less likely to pick the gamble when the gamble’s payoff was high. These results are consistent with data from an explicit estimation task, in which participants in this condition estimated low probabilities for high payoffs and vice versa. This pattern was reversed, but less pronounced, for participants who had been exposed to a positive risk-reward relationship. In the uncorrelated condition, participants’ choices and probability estimates did not depend on the payoff magnitudes. Overall, these results suggest that people are sensitive to different risk-reward ecologies and exploit the relationship that is present in the particular environment.

Modelling Risky Choice and Personality

Andreas Glöckner[1,33], Thorsten Pachur[2]

[1]University of Hagen, Germany; [2]MPI Berlin; [3]MPI Bonn

In previous work we have shown that risky choice behavior in simple tasks can be best predicted by Cumulative Prospect Theory including parameters for risk aversion, loss aversion, and probability weighting. Elaborating on this work, we simultaneously model the influence of HEXACO personality, numeracy, cognitive reflection and (in one of the studies also) intelligence on all of these parameters. The analysis is run on the data from three studies, with a total sample size of more than one-thousand. Results indicate reproducible relations between parameters for modelling risky choice and personality.

Talk Session: Visual perception

Time: Monday, 27/Mar/2017: 8:40am - 10:00am · *Location:* HS 301
Session Chair(s): Matteo Toscani

Illusory Peripheral Vision

Matteo Toscani, Matteo Valsecchi, Karl Gegenfurtner

University of Giessen, Germany

Despite poor resolution and distortions in peripheral viewing, the visual scene appears uniform. We hypothesize that, peripheral appearance is extrapolated based on foveal information. In the present study we aim to test this hypothesis in the particular case of brightness perception: specifically, we investigate whether the brightness of shaded objects at peripherally viewed locations is influenced by the foveal content. We rendered a matte cylinder in a gray room in order to test whether perception of peripherally viewed local brightness (i.e. most of the perceived luminance distribution) of the virtual surface is affected by the fixated luminance. Naïve observers were forced to look at a certain dark (DF) or light (LF) region of the surface. A gaze-contingent display forced the observers to fixate the chosen locations, i.e. they could see the scene image only when fixating the selected fixation spot. Observers were asked to adjust a uniform circle on the right side of the computer screen to have the same luminance as the area of the cylinder surface indicated by a small (.5° radius) red open circle. Fixation of the light points lead to brighter matches compared to fixating the dark points. We also tested whether the influence of the foveal content on the peripherally perceived brightness is occurring independently on the content of the scene or it is selectively applied within an object´s boundary, where extrapolation is reasonable. To do so, observers fixated other two fixation points matched in luminance with the previous dark or light region, but presented on the background of the virtual room instead of being part of the cylinder surface. In this latter case the fixation condition did not affect brightness matches. Results indicate that our visual system uses the brightness of the foveally viewed surface area to estimate the brightness of areas in the periphery, and that this mechanism is selectively applied within an object´s boundary. The difference between foveal and peripheral sampling is a fundamental aspect of the architecture of the visual system. Hence we speculate that the extrapolation mechanism that we demonstrated for brightness perception is a general principle of vision, and further investigations should test to what extent it applies to other domains of visual perception.

Surface lightness affects the perceived layout of interior space

Christoph von Castell, Heiko Hecht, Daniel Oberfeld

Johannes Gutenberg-Universität Mainz, Germany

With regard to small objects, previous studies have reported that the lightness contrast between an object and its background modulates the object's perceived distance: lower lightness contrasts led to larger perceived distances than higher contrasts. With regard to interior space, in contrast, previous studies have reported that a room's perceived height is influenced by the lightness of the ceiling, but not by the lightness contrast between ceiling and walls: brighter ceilings appeared higher than darker ceilings, irrespective of wall lightness or floor lightness. However, these studies focused mainly on perceived height and used solely achromatic colors. Here, we report two experiments in which we extend the previous findings to effects of surface lightness on perceived depth and width (Experiment 1) and to effects of chromatic ceiling colors (Experiment 2). In both experiments, we presented stereoscopic room simulations on an Oculus Rift DK2. In

Experiment 1, we varied the lightness of the rear wall, side walls, and ceiling. We found that rooms with a lighter rear wall appeared deeper than rooms with a darker rear wall, and that rooms with lighter side walls appeared wider than rooms with darker side walls. In Experiment 2, we varied the hue (red, green, blue), saturation (low, high), and lightness (light, dark) of the ceiling. We found the previously reported ceiling lightness effect to apply also to chromatic colors: subjects judged lighter ceilings to be higher than darker ceilings, irrespective of hue and saturation. The remaining color dimensions had only a very small effect (hue) or virtually no effect (saturation) on perceived height. In sum, our results confirm that the perceived extent of a given spatial dimension is affected by the lightness of the room's bounding surfaces (e.g., the side walls for perceived width), but is less affected by hue and saturation or by the lightness contrast between the bounding surfaces and the other surfaces.

The link between individual differences in colour perception and the dress

Christoph Witzel

Justus-Liebig-Universität Gießen, Germany

The photo of the colour-switching dress (known as #theDress) revealed striking individual differences in colour perception. Are these individual differences an idiosyncratic phenomenon, or are they due to more general differences in colour perception? This study compares results from an experiment on the dress with results from an experiment on colour constancy. Colour constancy is the recognition of colours across illumination changes. On the one hand, the experiment on the dress showed that the perceived colours of the dress are related to the observers' assumptions about the illumination, and in particular to whether observers thought the dress is in the shadow or in direct light. It also showed that the perception of the dress can be changed by manipulating the observers' prior assumptions about the illumination of the scene in the photo of the dress. On the other hand, the experiment on colour constancy revealed systematic differences in colour constancy across observers (in an asymmetric matching task). The results suggest that different observers expect different colour changes when the illumination changes. The differences in colour constancy were strongly correlated to the perception of the dress. These results reveal that the strong individual differences in the perception of the dress are a general feature of colour constancy. These findings highlight that colour perception is inherently variable and relative to the individual observer. They also suggest that the individual differences in colour constancy that have been attributed to measurement noise in previous studies, are likely to be due to systematic individual differences in the way observers identify colours across illumination changes. Additional findings from an ongoing study will be presented that clarify which specific aspects of colour constancy are at the source of those individual differences.

The influence of color distance perception on the red-attractiveness effect

Alica Bucher, Veronika Lerche, Malte Schott, Andreas Voss

Heidelberg University, Germany

In mostly all studies revealing a significant enhancing effect of the color red on attractiveness judgements, an evolutionary perspective was used as a possible explanation. The color phenomenon, termed chromostereopsis, has not yet been

considered as potential mediating factor. More specifically, red is the color with the largest wavelength which could be shown to lead to a lower distance perception in comparison to other colored objects in the majority of people. In our first study, we investigated if the association between color and distance perception also occurs for target persons wearing red versus blue shirts. In our second study, we hypothesized these differences to mediate the effect of red on attractiveness judgements. In both studies, targets wearing a red shirt were perceived significantly closer compared to targets with a blue shirt. The second study, however, revealed no difference in attractiveness ratings between targets wearing red or blue shirts. The moderate attractiveness of the targets used in this study is discussed as an influential factor affecting the results.

Symposium: New trends in cognitive modeling (Part II)

Time: Monday, 27/Mar/2017: 10:30am - 12:00pm · *Location:* HS 401
Session Chair(s): Thorsten Pachur, Henrik Singmann

Modeling Choices in Delay Discounting

Dirk U. Wulff[1,2], Wouter van den Bos[2]

[1]University of Basel; [2]Max Planck Institute for Human Development

In a recent article, Ericsson and colleagues (2015) compared traditional utility-discounting models with a set of heuristic models of intertemporal choice using a cross-validation approach. Consistent with earlier reports, Ericsson and colleagues concluded that heuristic models (specifically their novel intertemporal choice heuristic or ITCH model) explain intertemporal choices better than discounting models do. More surprisingly, their results showed that all discounting models performed nearly at chance level, and did not outperform even the baseline model. In this article, however, we demonstrate that these conclusions are premature. Specifically, we reanalyzed the Ericson et al. (2015) data under different, arguably more appropriate, conditions and found that models of both classes are rather good at predicting choice. We conclude that the jury is still out on which (type of) model is best and end by making suggestions towards conducting more informative model comparisons.

Accumulating Advantages: A New Approach to Multialternative Forced Choice Tasks

Don van Ravenzwaaij

University of Groningen, Netherlands, The

Accumulator models have a relatively long history of application to choice and response time, especially for binary choice. When the number of response options is greater than two, these models usually posit one accumulator per response option. In this talk, I propose a theoretical framework in which there is one accumulator for every ordered pairwise difference between choices, each quantifying the evidence for one response over another ("advantages"). I instantiate and test this framework in the computationally tractable advantage linear ballistic accumulator model (ALBA). I present three model architectures that differ in terms of stopping rules: conditions on accumulator completions that have to be met for a response to be chosen. I then present fits of each model architecture to a multiple-choice data set, and select the model architecture that provides the best account of Hick's law (Hick, 1952). Finally, I discuss a recent claim by Teodorescu and Usher (2013) that accumulator models require response competition in order to account for the effect of strong distractors in their multi-alternative forced choice data. Counter to that assertion, I show how this effect naturally emerges from the independent accumulation of advantages, and that their data are at least as well fit by the ALBA as any of the response-competition models they considered.

Jointly modeling discrete and continuous variables: A generalized processing tree framework

Daniel W. Heck, Edgar Erdfelder

Universität Mannheim, Germany

Often, psychological theories assume that distinct cognitive processes may result in identical responses. Multinomial processing tree (MPT) models directly reflect such assumptions by allowing for a finite number of latent states that determine the possible observed responses jointly. However, this model class is limited to discrete response categories, even though the hypothesized latent processes might simultaneously affect continuous dependent variables such as response times, eye fixation durations, pupil diameters, or various psycho-physiological measures as well. Therefore, we propose a generalized class of statistical models based on the assumption that not only discrete observation categories, but also a fixed set of continuous variables follow finite mixture distributions. Importantly, both types of variables are linked by the same mixture probabilities that are constrained by the core MPT structure, that is, by the probabilities of the latent processing paths. Depending on the type and dimensionality of continuous data, the latent components can be modeled by normal, ex-Gaussian, or other – possibly multivariate – continuous distributions with either separate or shared parameters across states. Using an adapted Expectation-Maximization (EM) algorithm for maximum-likelihood parameter estimation, both simulations and an empirical application show the benefits of jointly modeling discrete and continuous data.

A Simple Method for Comparing Complex Models: Bayes Factors for Hierarchical Multinomial Processing Tree Models

Quentin Frederik Gronau, Dora Matzke, Udo Boehm, Alexandra Sarafoglou, Alexander Ly, Helen Steingroever, Maarten Marsman, Eric-Jan Wagenmakers

University of Amsterdam, Netherlands, The

Multinomial Processing Tree (MPT) models (Riefer & Batchelder, 1988) form a popular class of cognitive models for measuring and disentangling cognitive processes that underlie observable, categorical data. MPT models have been applied in a number of substantive areas of cognitive psychology such as human memory, visual and auditory perception, and logical reasoning. In many applications, the scientific question of interest is the comparison between two or more (possibly non-nested) models. The Bayesian solution to this problem is to compute the Bayes factor which allows us to quantify evidence for the competing models on a continuous scale. However, in the context of MPT models this is complicated by the fact that there are usually no closed-form solutions to obtain the Bayes factor. Here we present a powerful technique called bridge sampling (Meng & Wong, 1996) which, to our knowledge, has not been applied in the MPT context before. Bridge sampling enables accurate computation of the Bayes factor and is fairly easily implemented once posterior samples for the model parameters have been obtained. It is an appealing method because it allows generalization to hierarchical MPT models such as models with participant and/or item effects. We explain the relevant steps for implementing bridge sampling for MPT models and we illustrate the method with examples from the MPT literature.

Symposium: Recent developments in person perception (Part II)

Time: Monday, 27/Mar/2017: 10:30am - 12:00pm · *Location:* 101
Session Chair(s): Corrina Maguinness, Katharina von Kriegstein

The face-sensitive pSTS facilitates auditory-only speaker recognition in high levels of auditory noise

Corrina Maguinness[1], Katharina von Kriegstein[1,2]

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When listening to someone's voice we often also view their corresponding moving face. The perceptual system utilizes these audio-visual correspondences. For example, there is ample evidence that listeners are more accurate at recognising the identity of a speaker from the voice alone, when that speaker has been previously learned by face, in comparison to a control condition. This behavioural enhancement has been termed the "face-benefit" and it relies on the fusiform face area (FFA), a visual region sensitive to facial form and identity. Learned visual cues are particularly important for supporting speaker recognition under noisy listening conditions. However, whether the face-benefit in different levels of noise is supported by responses only in the FFA or also by a more extended face network remains unclear. To address this question, we used functional magnetic resonance imaging to examine responses in face-sensitive regions while participants recognised auditory-only speakers (previously learned by face or visual control) in high and low levels of auditory noise. We observed that in low-noise conditions the behavioural face-benefit was associated with increased FFA responses. Conversely, in high-noise conditions the recognition of face-learned speakers engaged the right face-sensitive posterior superior temporal sulcus (pSTS), a region implicated in the processing of dynamic facial cues. The face-benefit score also correlated positively with increased functional connectivity between the right pSTS and voice-sensitive regions in the right anterior/mid STS. We interpret these results within the framework of an audio-visual model of communication, where stored visual cues are used in an adaptive manner to assist in constraining and resolving the incoming auditory signal. In high levels of auditory noise listeners may try to rely more on dynamic aspects of the voice for recognition, while in low-noise recognition may rely on more static properties of the voice. This process may be complemented with dynamic or static facial identity cues encoded during audio-visual learning. Taken together, these findings provide further evidence for the adaptive nature of cross-modal responses under unisensory listening conditions.

Neural processing of facial motion cues about identity and expression

Johannes Schultz[1,2], K Kaulard[2], P Pilz[2], K Dobs[2,3], I Bülthoff[2], A Fernandez-Cruz[2], B Brockhaus[2], J Gardner[3], H Bülthoff[2]

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Much can be learned about a person from static face cues, yet the faces we encounter everyday move and deform in characteristic ways. This facial motion is a highly salient, natural stimulus that contains information about a person's emotions, their focus of attention, their speech and even their identity. In behavioural experiments using video

displays, we found that even subtle facial expressions can be reliably distinguished when faces are presented with their natural facial motion, and that recognition performance of such subtle expressions varies more strongly as a function of the autistic traits of healthy participants than observed with displays of basic emotions. In behavioural experiments using animated avatar faces displaying natural facial motion, we found that observers are highly sensitive to deviations from the natural motion of faces and that complex everyday face movements carry more information about the identity of a person than basic emotions. In neuroimaging (fMRI) experiments, we found that parts of the posterior superior temporal sulcus 1) are sensitive to natural facial motion while ventral temporal visual regions are not; 2) contain neural representations of subtle facial expressions; and 3) contain representations of basic emotions and face identity that are boosted by attention. Overall, our data suggest that natural facial motion stimuli engage the neural mechanisms involved in everyday social interactions particularly well, and that using such stimuli in controlled displays opens new avenues for the investigation of the social brain.

Auditory, visual, and audio-visual emotion recognition in cochlear implant recipients

Ineke Fengler[1], E Nava[1,2,3], P Delfau[1], A Villwock[1,4], B Röder[1]

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Visual and auditory information is commonly used to judge the emotional state of interaction partners. Yet we do not know whether the combined use of both modality inputs depends on experience with such crossmodal cues during early development. Investigating audio-visual emotion perception in cochlear implant (CI) recipients who had suffered a profound deafness from birth offers the opportunity to address this question. We hypothesized that adult congenitally deaf CI users weight visual emotional cues higher than hearing controls and that they maintain higher visual emotion perception skills. Twenty-seven adult CI users with congenital, early (<3 years), and late deafness onset as well as three groups of age- and gender-matched hearing controls were tested in an emotion discrimination task with auditory, visual, and audio-visual emotionally congruent and incongruent non-sense speech stimuli. All CI users performed worse in discriminating affective prosody and experienced higher interference from incongruent facial expressions as compared to the controls, irrespectively of their age at deafness onset. The congenitally and early deaf CI users benefitted more than the controls from congruent facial cues for affective prosodic discrimination. In a second experiment, congenitally deaf CI users who did or did not acquire sign language from birth as well as age- and gender-matched hearing controls were tested in the same emotion discrimination task. We found that the native signers, but not the non-native signers, gained more than the controls from congruent facial information to discriminate affective prosody. In sum, our data suggest that multisensory emotion perception recovers at least to some degree after a period of congenital auditory deprivation, despite of a persisting dominance of the visual input. Furthermore, sign language proficiency may be beneficial for functional recovery of the ability to use congruent facial information to improve prosody recognition.

How prior expectations influence perception of degraded speech: Prediction errors but not sharpened signals simulate multivoxel fMRI patterns

Helen Blank, M H Davis

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Successful speech perception depends on combining sensory input with prior knowledge. However, the underlying mechanism by which these two sources of information are combined is unknown. Two different functional mechanisms have been proposed for how expectations influence processing of speech. Traditional models suggest that expected features of the speech input are enhanced or sharpened via interactive activation (Sharpened Signals). Conversely, Predictive Coding suggests that expected features are suppressed such that unexpected features are processed further in form of Prediction Errors. Here, we aimed at distinguishing between these two accounts. To investigate the effect of prior knowledge on speech perception, we collected fMRI while participants read neutral ("XXX") or matching written words before hearing degraded spoken words (noise-vocoded at 4- and 12-channel). In catch trials, participants said aloud the previous written or spoken word. By combining behavioural, univariate and multivariate fMRI measures of how sensory detail and prior expectations influence speech perception, we tested computational models that implemented simulations of Predictive Errors or Sharpened Signals. Behavioural results showed that both increased sensory detail and informative expectations improve the accuracy of word report. Univariate fMRI analysis revealed a main effect of matching vs. neutral prior knowledge on BOLD response magnitude in the left pSTS. Mean beta values extracted from this region showed a reduction during match in contrast to neutral conditions. Our simulations of Sharpened Signals and Prediction Errors could both explain these behavioural and univariate fMRI observations. However, multivariate fMRI analyses revealed that sensory detail and prior expectations have interacting effects on how speech is represented in the pSTS: Increased sensory detail enhanced the amount of speech information in multivoxel patterns only when prior knowledge was absent. In contrast, increased sensory detail reduced the amount of speech information with informative prior expectations. This interaction was uniquely modelled by simulations of Predictive Errors and not by Sharpened Signals.

Symposium: Task choice in multitasking paradigms

Time: Monday, 27/Mar/2017: 10:30am - 12:00pm · *Location:* 103
Session Chair(s): Victor Mittelstädt, Jovita Brüning, Sebastian Kübler

Dissociating two types of task-order control mechanisms in dual-task situations.

Sebastian Kübler[1,2], Christina Reimer[2,1], Tilo Strobach[3], Torsten Schubert[2,1]

[1]Humboldt-Universität zu Berlin, Germany; [2]Martin-Luther-Universität Halle-Wittenberg; [3]Medical School Hamburg

Dual-task situations often involve a capacity limitation that induces serial processing of two temporally overlapping tasks. As a result, dual-task processing requires additional task-order control (TOC) processes that regulate the processing order of the two component tasks. These TOC processes can be investigated when comparing the performance in dual-task blocks with a constant order of both tasks (i.e., fixed-order blocks) and in blocks with a variable order of both tasks (i.e., random-order blocks). On this block level, order-mixing costs are indexed by impaired performance in random- compared to fixed-order

blocks. In addition, within random-order blocks, order-switching costs are indicated by improved performance in same-order trials (i.e., trials with the same task-order as in the previous trial) compared to different-order trials (i.e., trials with a reversed task-order compared to the previous trial). While earlier research could show the occurrence of these different types of costs, the nature and the mechanisms involved remain mostly unknown and are a matter of debate. Here, we propose that order-mixing costs arise due monitoring based, deliberate TOC processes, whereas order-switching costs seem to reveal TOC mechanisms that guide the processing order based on the pre-activation of an episodic memory trace.

To test this assumption, in two dual-task experiments, we applied two different order-instructions: In a free-order instruction, participants could freely decide about the processing order of both tasks, whereas in a sequential-order instruction, participants had to match the processing order of both tasks to the order of stimulus presentation.

As main results, we found in both experiments that only order-mixing costs were affected by the order-instruction: As expected, order-mixing costs were lower under the free-order compared to the sequential-order instruction. In contrast, order-switching costs did not differ between the two order-instructions.

These results confirm our assumption that order-mixing costs reflect deliberate TOC and planning processes, whereas order-switching costs arise due to the automatic priming of TOC structures from an episodic memory trace of previous task experience.

Self-organized task switching

Victor Mittelstädt[1], Jeff Miller[2], Andrea Kiesel[1]

[1]University of Freiburg, Germany; [2]University of Otago, New Zealand

Many studies have demonstrated that humans respond more slowly when switching than repeating tasks. So far, however, little is known about how we adapt to our individual task-switching performance limitations (i.e., switch costs) in our actual behavior. In the voluntary task switching paradigm (Arrington & Logan, 2004) subjects' task choice is restricted due to the global instructions (i.e., random task selection). We present a new paradigm to investigate self-organized task-switching. The key manipulation of our paradigm is that the chosen task appears delayed and this delay increases with task repetitions. Thus, if subjects choose to repeat a task, they have to wait longer for the stimulus and the stimulus-onset asynchrony (SOA) increases the more often they repeat. We conducted four experiments to investigate how subjects trade off their switch costs against the decreasing availability of the stimulus needed for a task repetition. Results showed that the tendency to avoid task switching was positively correlated with switch costs across subjects. This suggests that subjects took into account their individual switch costs when selecting tasks. Overall, the present studies demonstrate that our new paradigm is well-suited to investigate cognitive mechanisms involved in self-organized task-switching.

Arrington, C. M., & Logan, G. D. (2004). The cost of a voluntary task switch. Psychological Science, 15(9), 610-615.

Task Organization Strategies in Concurrent Dual-Tasking – Impact of strength of resource overlap

Jovita Brüning, Dietrich Manzey

Technische Universität Berlin, Germany

Recently, Reissland and Manzey (2016) provided evidence that individuals prefer one of three distinct task organization strategies in the context of multitasking. The authors used a concurrent dual-task, which required the participants to perform two threads of simple cognitive tasks simultaneously. Individuals using the serial blocking strategy preferred to work for a long sequence on one task before switching to the other. A second group exhibited a switching strategy, repeatedly shifting from one task to the other after short sequences. Finally, a third group used a strategy of response grouping, that is, they processed the current stimuli of the two threads before responding to both in close succession.

In the current study, we investigated to what extent the individually preferred strategies and their efficiency are influenced by a low vs. high strength of resource overlap in the concurrently performed tasks. In the condition of low resource overlap, the two concurrent threads of tasks involved verbal processing in one task and spatial processing in the other. In this case, the access to two different resource types enhances the overall scope of available resources. In contrast, the condition of high resource overlap contained two tasks, which both involved either only verbal or only spatial processing. Here, the risk of interference between the two threads of tasks increases, while the scope of available resources is comparably narrowed. Data of a preliminary sample (n = 16) showed that the choice of individual strategies was not much affected by the extent of resource-overlap between the tasks. Consequently, the individual preference seems to be more essential for choice of strategy than the influence of the task characteristics. With respect to the efficiency of strategies, however, an effect of task characteristics was found. Individuals preferring a switching or alternating strategy benefitted more from a low resources overlap than a strictly serial processing, probably because they took advantage of the availability of more resources during task-interleaving and overlapping processing in this condition. The blocking strategy, which is less prone to interference, was slightly more efficient than both other strategies during high resource overlap.

Individual strategies and preferences across different multitasking paradigms

Andrea Kiesel[1], Jovita Brüning[2], Sebastian Kübler[3], Dietrich Manzey[2], Victor Mittelstädt[1], Torsten Schubert[4]

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Recent considerations on multitasking stressed the omnipresence of multitasking in daily life. Consequently, the research focus shifted from limitations in multitasking to strategies and preferences of processing modes when engaging in multitasking. Here we present data of a collaboration project that attempts to elaborate on strategies regarding task order control processes in dual tasks contexts (see Kübler et al., in thisSymposium) and free choice of task order in two variants of the voluntary task switch paradigm. In the first variant, stimulus presentation for repeated tasks is increasingly delayed (see Mittelstädt et al., in thisSymposium) and in the second variant stimuli for both tasks are presented concurrently as in dual task settings (see Brüning & Manzey, in thisSymposium). By comparing results of participants in all three experimental variants, we aim to elaborate on

individual strategies and preferences across different multitasking paradigms. Most importantly, we are interested in whether data reveal an intra-individually stable pattern of multitasking strategies or whether participants choose different multitasking strategies depending on the current task context.

Symposium: Evaluative conditioning I: Processes of preference acquisition (Part II)

Time: Monday, 27/Mar/2017: 10:30am - 12:00pm · *Location:* 105
Session Chair(s): Frederik Aust, Tobias Heycke, Christoph Stahl

Extinction in Evaluative Conditioning: The role of evaluative responses during extinction training

Adrien Mierop[1], Mikael Molet[2], Olivier Corneille[1]

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Evaluative conditioning (EC) is defined as a change in the liking of a conditioned stimulus (CS) (e.g., a new product) following its pairing with an affective [unconditioned] stimulus (US) (e.g., a pleasant image). One of the most controversial issue in EC over the past 30 years is whether EC is sensitive to extinction (e.g., DeHouwer et al., 2000; Diaz et al., 2000). Notably, ‘extinction’ has three distinct meanings (Rescorla, 2004): (1) as a procedure, it means that the original conditions of learning are disrupted by presenting a CS alone; (2) as a behavioural output, it means that the initially learned response is attenuated; and (3) as a process, it refers to the learning mechanism inferred when the procedure reduces the learned response. To date, all three claims have been challenged in EC research. The goal of the present research was to show that the ongoing controversy over the extinction of EC might be due to the use of an inappropriate extinction procedure, based on the proposition that a response is necessary for extinction (i.e., Response Theory of Extinction, Rescorla, 1997). In Experiment 1, CSs were paired with USs during acquisition, and the CSs were then presented without the USs. We compared three extinction conditions. For the "response measured only once" group, the evaluative response was measured only after extinction; for the "response measured twice" group, the evaluative response was measured twice, once after the acquisition and once after the extinction, and for the "response continoulsy measured" group, the evaluative response was measured continuously after the acquisition and thus during the extinction. We predicted that extinction would be highest in the third group, and possibly non-significant in the first group.

The impact of ambivalent conditioned stimuli on evaluative conditioning.

Katharina Theresa Berger, Mandy Hütter

University of Tübingen, Germany

Ambivalent attitudes are characterized by the simultaneous presence of both positive and negative attitude components concerning an attitude object. In attitude research, however, ambivalent attitudes are often not taken into account and methodologically inseparable from neutral attitudes. This appears problematic, because neutral and ambivalent stimuli may differ in their potential for attitude acquisition and change as well as the underlying mechanisms. In a first study, we showed that some of the stimuli commonly used as neutral stimuli in attitude research are in fact ambivalent. Based on these results, we

selected truly neutral and ambivalent stimuli to investigate differences in attitude acquisition in a second study. For this study, we used an evaluative conditioning (EC) paradigm. In a within-participants design, we manipulated whether neutral or ambivalent conditioned stimuli (CS) were repeatedly paired with positive or negative unconditioned stimuli (US). We expected stronger evaluative shifts (EC effects) and a memory advantage for ambivalent CSs based on theoretical considerations according to which individuals try to resolve ambivalence and process information more deeply. The results revealed no significant difference in the size of the EC effect, but a significant memory advantage for CS-US pairings that included ambivalent CSs. We are currently conducting a third study to investigate effects of ambivalence for both attitude acquisition and change. The results of this study will be included in the talk. Theoretical implications for acquisition mechanisms and practical implications of this research will be discussed.

How the number of evaluative conditioning trials affects subjective ratings and pupillary response

Ferdinand Pittino, Katrin M. Kliegl, Anke Huckauf

Ulm University, Germany

Evaluative conditioning refers to the change in liking of a stimulus (CS) due repeated spatio-temporally contingent presentations with an affective stimulus (UCS). Even though evaluative conditioning proved to be a reliable effect, the underlying processes of this phenomenon are still unclear. One fundamental parameter of the conditioning procedure is the number of conditioning trials, in which the CS is repeatedly paired with the respective UCS. In a series of experiments, this number of conditioning trials was varied (15 vs. 75 vs. mere instruction of the relationship between CS and UCS). Besides assessing the evaluative conditioning effect in subjective ratings of valence and arousal, the pupillary reaction towards the CS was recorded. In subjective ratings, evaluative conditioning effects were observed for each of the chosen numbers of conditioning trials: The CS conditioned with negative stimuli was rated more negative and with higher arousal than the CS conditioned with neutral stimuli. However, larger pupil sizes for the negatively compared to neutrally conditioned CS were only observed for the medium number of 15 conditioning trials. These results will be discussed in regard to the underlying processes of evaluative conditioning.

Evaluative conditioning in a dichotic listening paradigm

Julia Haaf[1], Tobias Heycke[2], Christoph Stahl[2]

[1]University of Missouri, USA; [2]University of Cologne, Germany

Evaluative Conditioning (EC) is defined as a change in the evaluation of an originally neutral stimulus (CS) due to the pairing with a valent stimulus (US). A major research question is whether EC requires awareness of the CS-US co-occurrences. If EC can be found but contingency awareness can be ruled out, this would be strong evidence for the independence of EC and contingency awareness. One way to manipulate contingency awareness is to present either CS or US preconsciously (i.e., with stimuli clearly visible but unattended, so that they are not consciously processed) as in the dichotic-listening paradigm. In this paradigm, two streams of auditory stimuli are presented simultaneously, one to each ear, and attention is directed toward a filler stream and diverted away from the critical stream. We used this methodology within an EC paradigm to investigate the possibility of preconscious EC. We presented different words to participants' left and right

ears via headphones. The stream of words they heard on the right included neutral filler words and valent USs. The stream of words participants heard on the left included neutral filler words and CSs. Participants were instructed to repeat the auditory stream of words they heard on their right ear. This shadowing of an auditory stream resulted (I) in a conscious processing of the US and (II) in a preconscious processing of the CSs that were presented to the left ear. In two studies, we found no EC effect for preconsciously presented CSs.

Symposium: Eye tracking as a window to cognition (Part II)

Time: Monday, 27/Mar/2017: 10:30am - 12:00pm · *Location:* HS 304
Session Chair(s): Christina Pfeuffer, Stefanie Aufschnaiter

Processing bottlenecks in oculomotor control

Aleks Pieczykolan, Lynn Huestegge

University of Würzburg, Germany

In the present study, we addressed the issue of structural and content-based interference in dual-task control by investigating oculomotor responses in the context of concurrent response processing demands. Previous research suggested that oculomotor responses may be able to bypass central resource limitations, thus representing a special case which deviates from characteristics of other motor control domains. Across three experiments, we combined a manual and an oculomotor task in the psychological refractory period (PRP) paradigm and focused on effects of task order as well as crosstalk. Our results showed clear evidence for both structural and content-based interference in terms of a response selection bottleneck (that is, an effect of stimulus onset asynchrony on response times of the second response) and crosstalk (in terms of longer RTs in spatially incompatible vs. compatible tasks), respectively. Based on these results, we reject the notion that oculomotor control is generally able to bypass central processing limitations. While most of our results are in line with a hybrid processing account suggesting (partially) parallel response-related processing prior to a serial response selection stage, some aspects of the results also point to more flexible, strategic processing based on task characteristics.

Eye-tracking opens a window on the reconfiguration of task-relevant spatial attention

Cai S. Longman, Heike Elchlepp, Aureliu Lavric, Stephen Monsell

University of Exeter, United Kingdom

Among the potential, but neglected, sources of task-switch costs is the need to reallocate attention to different stimulus attributes or locations. We have extensively examined the dynamics of attention in a task-cueing paradigm using eye-tracking. Digits were presented simultaneously at three locations. A cue preceded this stimulus by a variable interval, instructing the participant to perform one of three classification tasks (odd-even, high-low, inner-outer) each consistently associated with a location, so that attentional preparation could be tracked via fixation of the task-relevant location. Task-switching led to a delay in fixating the relevant location and a tendency to misallocate attention to the previously relevant location. These effects predicted RT switch costs within and over participants. The attentional ‘pull’ of the previously relevant location was reduced but not eliminated by extending the preparation interval, suggesting that ‘attentional inertia’ contributes even to the ‘residual’ switch cost. A control experiment, using identical displays but only one task,

showed that these effects could not be attributed to the (tiny) delays or inertia observed in shifting attention between locations independently of a task change. In a subsequent experiment we cued by location, possibly prioritising attentional orientation over other components of task set. This eliminated the delay in orienting and attentional inertia but substantially increased the switch cost, suggesting reconfiguration of attention was now decoupled from that of other task-set components. Combining eye-tracking with EEG in a third experiment yielded evidence that that task-set is reconfigured in a serial order with orientation preceding other components. Finally, giving participants control over the timing of the target stimulus eliminated the tendency to fixate the previously relevant location, but not the delay in fixating the relevant stimulus attribute, nor the residual switch cost.

Eye Movements Reveal the Temporal Dynamics of Time-based Task Expectancy

Stefanie Aufschnaiter, Christina Pfeuffer, Roland Thomaschke, Andrea Kiesel

University of Freiburg, Germany

Previous research has shown that humans are able to implicitly form time-based task expectancies and use them for task preparation. When an interval predicted the upcoming task, participants performed better in trials with expected combinations of interval and task than in trials with unexpected combinations of interval and task. Here, we investigated time-based task expectancy by measuring the time course of eye movements towards tasks appearing at a left or right location depending on a preceding short or long interval. Crucially, the interval predicted the upcoming task (magnitude or parity judgement) with 90% validity. Results showed that participants were able to form time-based task expectancies as evidenced by significantly faster responses for frequent combinations of interval and task than infrequent combinations. Moreover, without having any explicit knowledge about the interval-task combinations, in the time course of a trial participants first moved their eyes to the task location of the short interval and then looked towards the task location of the long interval (if no stimulus had been presented in this trial, yet). Importantly, these eye movements reflected time-based task expectations and not just mere time-based location expectations. Beyond behavioral results, eye-tracking provides an online measure that can be used to investigate the time course of time-based task expectancy.

Talk Session: Working memory II: The fate of ignored auditory infomation

Time: Monday, 27/Mar/2017: 10:30am - 12:00pm · *Location:* 201
Session Chair(s): Christoph Witzel

Semantic processing of irrelevant speech: Larger disruption of serial recall by unexpected words

Jan Philipp Röer, Raoul Bell, Ulrike Körner, Axel Buchner

Heinrich Heine University Düsseldorf, Germany

There is ongoing debate about whether task-irrelevant, to-be-ignored speech is processed semantically, or not. In the present series of experiments, we compared the disruption of serial recall by two categories of distractor sentences, (1) sentences with semantically expected endings and (2) sentences with semantically unexpected endings. Opposing

predictions can be derived from theories of memory and attention as to the amount of disruption these sentences should produce. According to an automatic account of interference, the disruptive effect of irrelevant speech is only determined by acoustic and not semantic features. According to a functional view of auditory distraction, by contrast, irrelevant speech is routinely processed semantically in order to determine its relevance for the individual. Sentences with unexpected endings produced a larger amount of disruption than sentences with expected endings, thus providing evidence that semantic features of irrelevant speech are processed, and that this processing can interfere with the pursuit of current behavioral goals.

The irrelevant speech effect is modified by emotional prosody

Wolfgang Ellermeier, Florian Kattner, Sarah Hanl

TU Darmstadt, Germany

While affective words have been shown to increase the distracting effects of irrelevant speech, there is little evidence as to whether the emotional intonation of irrelevant-speech utterances has similar effects. The present experiments were designed to address this issue by presenting participants with irrelevant background speech either pronounced in (1) a neutral voice, (2) an angry voice, or (3) as a neutral utterance in which one word was replaced by the same word from the 'angry' sequence. Twenty-five and twenty-six subjects were exposed to these sounds while performing either a serial-recall task or a non-serial, short-term memory task requiring identification of a 'missing-item', respectively. The results showed reliable irrelevant-speech effects in that all conditions involving speech deteriorated performance with respect to a pink-noise control regardless of the task. Moreover, in the serial-recall task, performance dropped with respect to the neutral condition, when the sentences were pronounced in an angry voice, while remaining unaffected in the missing-item task. In contrast, introducing a 'deviant' emotion produced a performance decrement in the missing-item task as compared to both the neutral and 'angry' utterances. These results are largely consistent with the duplex-mechanism account of the irrelevant speech effect, suggesting that prosody-based emotion is automatically detected in speech thereby interfering with serial recall. Unexpected changes in emotional tone appear to further divert attention from the memory task.

The neural fate of attended and ignored speech

Malte Wöstmann, Sarah Tune, Jonas Obleser

Department of Psychology, University of Lübeck, Germany

Acoustic environments are rich in information from both relevant and irrelevant sound sources. Human speech comprehension is particularly vulnerable to distraction by irrelevant sound. We will present evidence for how listeners neurally encode target speech but also disengage brain areas processing distracting speech. In two magneto-/electroencephalography (M/EEG) studies, we recorded listeners' neural responses to attended versus ignored speech signals (total n = 42). We quantified two electrophysiological signatures of speech processing: first, the phase of slow neural oscillations (~1–5 Hz), which faithfully tracks speech signals; and second, the power of alpha oscillations (~8–12 Hz), which reflects inhibition of irrelevant distraction. When listeners heard two spatially separated speech streams, their slow neural oscillations phase-locked to the speech input. Spatial attention to only one speech stream induced a hemispheric lateralization of parietal and auditory alpha power, which fluctuated in synchrony with ongoing speech and predicted the ability to successfully attend to the target

speech stream. Critically, alpha power fluctuations lagged auditory phase-locking, suggesting that high alpha power acts as a spatiotemporal filter to block the read-out of distracting auditory content. In a second experiment, we established that the alpha response is under top-down control. In an irrelevant-speech paradigm, listeners ignored an acoustically degraded speech distractor. It is well known that alpha power decreases when better acoustics facilitate comprehension of attended speech. In our experiment we found the reverse pattern for ignored speech: alpha power increased as better acoustics of task-irrelevant speech aggravated distraction. In sum, auditory attention to speech utilises two complementary neural oscillatory mechanisms of low-frequency, phase-locked speech tracking versus alpha power-mediated top-down attentional filtering.

Inhibitory after-effects in auditory distractor processing

Malte Möller[1], Susanne Mayr[1], Axel Buchner[2]

[1]Universität Passau; [2]Heinrich-Heine-Universität, Düsseldorf

Responding to a stimulus at a location that was previously occupied by a distractor (ignored repetition trial) is typically impaired as compared with responding to a location that was not occupied in the previous presentation (control trial). This phenomenon—termed spatial negative priming (SNP) effect—is widely used to investigate the mechanisms that prevent irrelevant spatial information from gaining access to behavior.

Theoretical accounts of the SNP effect in vision assume that correct responding is achieved by an inhibitory mechanism that either suppresses the representation of distractor-occupied locations or their task-assigned responses. While several empirical findings favor the response inhibition account in vision, no evidence of this mechanism has been found in related studies in the auditory modality.

The present study was set out to further investigate the contribution of response-related inhibition to action control in audition. In the present task, four speakers were arranged in a semi-circle in front of the participants. Two speakers on the left (right) of the participant were assigned to a common response key on the left (right) side of a response box. Each trial consisted of two subsequent presentations: a prime followed by a probe which each contained a single stimulus. Participants were instructed to withhold their response to the stimulus in the prime and to indicate the location of the probe stimulus by pressing the appropriate response key. In addition, sound identity repetition was systematically varied between prime and probe. Performance was compared among ignored repetition, control trials, and so-called response control trials in which the probe stimulus requires the execution of the previously withheld response but appears at another location than the prime stimulus. Moreover, the stimulus-onset asynchrony between prime and probe was systematically varied between 300 ms and 900 ms to assess the time course of the after-effects of prime processing.

The results revealed no evidence for response-related inhibition in the 300-ms SOA condition. Instead, responding was only delayed (as compared with the respective control) when the probe stimulus was presented at the location of the irrelevant prime stimulus. This indicates the operation of location-based inhibition which was also obtained in the 900-ms condition. However, evidence for response-related inhibition was found in the 900-ms condition, indicating that this mechanism also contributes to correct responding in the auditory modality, but takes time to develop.

Talk Session: Selective attention to emotional and motivational stimuli

Time: Monday, 27/Mar/2017: 10:30am - 12:00pm · *Location:* 204
Session Chair(s): Aleksandra Mitrovic

Differential attentional exploration of disgust and fear stimuli in the context of obsessive-compulsive symptoms

Jakob Fink, Frederike Buchta, Cornelia Exner

University of Leipzig, Germany

Impairments in disgust-specific emotion regulation seem to contribute to the development and maintenance of contaminated-based obsessive-compulsive disorder (C-OCD). Few is known about the specific processes in disgust-related information processing that predispose people to experience higher contaminated-based obsessive-compulsive (C-OC) symptoms. In the present study 53 healthy participants performed a visual search task to measure attentional disengagement problems elicited by validated neutral, disgust- and fear-specific pictorial material. Thereby, participant had to find a target picture within five neutral distractor pictures randomly presented on six different locations in a 3x4 matrix. In 128 trials the task was to decide whether the target was unpleasant or not by pressing corresponding keys. In randomly selected 1/8 of the trials with fear and disgust pictures, participants were further asked about the content of the picture and the certainty of their answer. The results show that the reaction time to decide whether the target was unpleasant or not did significantly differ between disgust and neutral as well as fear and neutral pictures. Though, participants were significant more confident in answering questions referring to fear pictures compared to disgust pictures. This effect was amplified in participants with higher rates of C-OC symptoms. We therefore discuss and propose the cost and benefit hypothesis, which postulates that disgust evolutionarily elicits stronger uncertainty, because of the ambiguous nature of the stimuli, compared to fear. Increased uncertainty might be an important, but underestimated maintenance factor for pathological disgust experience.

Guns on the streets and snakes in the grass – The role of the context on visual threat detection

András Norbert Zsidó[1], Ákos Arató[1], Diána Stecina[1], Adrienn Losonci[1], László Bernáth[2]

[1]University of Pécs, Hungary; [2]Eötvös Loránd University, Hungary

Previous research suggests that fear-relevant stimuli (e.g. spiders, snakes, knives, guns) have a temporal advantage in visual processing. The well-established visual search paradigm used by these studies, however, was met with criticism. It has been claimed that the results are mixed and confounding, moreover, this methodology cannot lead to a final conclusion, thus a new task is needed.

Therefore, we propose a new paradigm, using real-life scenes (evolutionary related, and modern ones), that can also be threatening or neutral. There was always a target (fear-relevant or non-threatening) present on these scenes, that could be evolutionary old (e.g. snake, bird) or modern (e.g. gun, cell-phone). All pictures were rated on three scales: Valence, arousal, and threat. All stimuli had been normalized on the low-level visual features (contrast, spatial frequency, brightness). Respondents' fear of snakes and spiders were also assessed. Participants had to detect and indicate the place of the target using a touch-screen monitor.

Our results show that respondents were faster to detect modern fear-relevant cues than evolutionary old ones. However, further analysis revealed a significant interaction with the valence of the background. Modern threats were found faster on neutral scenes, and evolutionary old ones on negative pictures; regardless of the evolutionary relevance of the background.

Thus, we claim that our results support the threat superiority effect, i.e. people tend to find the most threatening cue in faster than neutral ones. However, the findings on the valence of the background also show the importance of the context in which a stimulus is presented.

Oculomotor capture by signals of reward and threat

Tom Nissens[1,2], Michel Failing[2], Jan Theeuwes[2]

[1]Justus-Liebig-University Giessen, Germany; [2]Vrije Universiteit Amsterdam, The Netherlands

It is well known that eye movement patterns are influenced by both goal- and salience-driven factors. Recent studies, however, have demonstrated that objects that are nonsalient and task irrelevant can still capture our eyes if moving our eyes to those objects has previously produced reward. In the first study we demonstrate that training such an association between eye movements to an object and delivery of reward is not needed. Instead, an object that merely signals the availability of reward captures the eyes even when it is physically nonsalient and never relevant for the task. Furthermore, we show that oculomotor capture by reward is more reliably observed in saccades with short latencies. We conclude that a stimulus signaling high reward has the ability to capture the eyes independently of bottom-up physical salience or top-down task relevance and that the effect of reward affects early selection processes. In the second study we extend these findings to the context of threat processing. In this study we examine whether overt selection is affected by the presence of an object that signals threat. We demonstrate that stimuli that signal the possibility of receiving an electric shock capture the eyes more often than stimuli signaling no shock. Capture occurs even though the threat-signaling stimulus is neither physically salient nor task relevant at any point in the experiment. Crucially, even though fixating the threat-related stimulus makes it more likely to receive a shock, results suggest that participants cannot help but doing it. Our findings therefore indicate that the presence of a stimulus merely signaling the possibility of receiving a shock, is prioritized in selection, and exogenously captures the eyes even when this ultimately results in the execution of the threat (i.e., receiving a shock). We show that oculomotor capture by threat is particularly pronounced for the fastest saccades which is consistent with the idea that threat influences visual selection at an early stage of processing, when selection is mainly involuntarily.

Attentional bias to angry faces in the general population

Benedikt Emanuel Wirth, Dirk Wentura

Saarland University, Germany

Dot-probe studies usually find an attentional bias to threat only in anxious participants. In four experiments, we investigated under what conditions such a bias occurs in unselected samples. In Experiment 1, we tested the hypothesis that non-anxious participants only show a bias when an attentional control setting tuned to threat is activated. Participants performed a dot-probe task with angry (threat set) and neutral (control set) schematic faces as targets. Surprisingly, we found an attentional bias to angry cue faces in non-

anxious participants that was not moderated by attentional control settings. Since Experiment 2 showed that Experiment 1 was suitable to detect effects of attentional control settings, we investigated two alternative explanations for these results. First, we presented two stimuli on the target screen in Experiment 1 (a necessity to induce attentional control settings), but most dot-probe studies only employ a single target. Therefore, we conducted Experiment 3 to investigate whether attentional bias is contingent on target competition in the general population. Participants performed a dot-probe task involving presentation of a stand-alone target or a target competing with a distractor. We found an attentional bias towards angry faces only when targets were competing with a distractor. Second, the target stimuli of Experiment 1 were schematic faces and thus socially meaningful. In Experiment 4 we investigated whether these targets induced a social processing mode in participants causing a bias to angry faces. Participants performed a dot-probe task with socially meaningful (schematic faces) and socially meaningless (scrambled schematic faces) targets. An attentional bias towards angry faces only occurred when participants had to classify socially meaningful targets. These results suggest that attentional bias to angry faces might be contingent on both target competition and the activation of a social processing mode in unselected samples.

Symposium: Experimentelle Ästhetik / Experimental aesthetics (Part II)

Time: Monday, 27/Mar/2017: 10:30am - 12:00pm · *Location:* HS 403
Session Chair(s): Thomas Jacobsen

Decorated objects and symmetric patterns: species differences in gazing patterns and cultural differences in aesthetic preferences – eye-tracking with orang-utans and two human cultural groups

Cordelia Mühlenbeck[1,2], Carla Pritsch[2], Katja Liebal[2], Thomas Jacobsen[3]

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Objects from the Middle Paleolithic period colored with ochre and marked with incisions represent the beginning of non-utilitarian object manipulation in different species of the Homo genus. Furthermore, symmetric structures are known to be of importance in relation to aesthetic preference. To test whether markings and symmetry are treated differently in visual perception and aesthetic evaluation, we conducted two cross-cultural (Namibian hunter-gatherers and German town dwellers) and cross-species (humans, orang-utans) eye-tracking-studies and tested whether symmetric or non-symmetric patterns and marked or not-marked stones and sticks had a longer fixation duration and, in addition, asked the human participants to give their aesthetic evaluation to the objects and patterns. We expected that, first, marked objects and symmetric patterns receive more attention, because they present an already existing order that is easier to process; second, an aesthetic appreciation might match with the fixation preference. The results showed that the fixation preference for symmetric patterns and marked objects was shared by the two human cultural groups. On the contrary, orang-utans only tended to fixate longer on the markings when the objects were known to them (i.e. sticks) and they did not differentiate between symmetric and non-symmetric patterns. Furthermore, in the human participants the aesthetic evaluation did not match with the fixation preference, of which can be

concluded that the two types of preferences (fixation preference and aesthetic preference) did not covary substantially.

The pleasures of Semantic Instability (SeIns) in art: if an artwork challenges our perceptual habits, insights are joyful and the promise of insights raises interest

Claudia Muth[1,2], Claus-Christian Carbon[1,2,3]

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Artworks are often open to multiple meanings and contradict our perceptual habits in various ways. Still, we are fascinated by Mona Lisa's enigmatic smile, by fragmented Gestalts in Cubist paintings (Muth, Pepperell, & Carbon, 2013), and we are affected by and interested in modern and contemporary art if it is ambiguous rather than "easy" to process (e.g., Jakesch & Leder, 2009; Muth, Hesslinger, & Carbon, 2015). Our studies point to the potential of such Semantic Instability (SeIns; Muth & Carbon, 2016) to allow for a rewarding "Aesthetic Aha!" (Muth & Carbon, 2013) and to heighten interest if we experience complexity together with a promise of insight—motivating deeper engagement. As an empirical approach we assessed continuous evaluations of an artistic movie in which figural forms are continuously transformed into random forms or new Gestalt. When participants suddenly detected clear Gestalt, they liked the according phase of the movie significantly more (Cohen's d = 0.47). Furthermore, the scene was evaluated as more interesting already 1.5 seconds before this "Aesthetic Aha!" (Cohen's d = 0.85; Muth, Raab, & Carbon, 2015). The effect of insight was strengthened in a follow-up study with another version of the movie in which the detectability of the identifiable Gestalts was very difficult at first but increased over time. It revealed that we enjoy insights even more if they follow perceptual challenge (Cohen's d = 1.50; Muth, Raab, & Carbon, 2016). We suggest that the specific pleasure that we gain by semantically unstable experiences with art might be grounded partially in these dynamic processes of rewarding insight and interesting potentials for new insight and not exclusively in our preferences for features or rewards by a final "mastering" of art.

"Ein Rätsel bist Du mir in manchen Dingen." Linking Linguistic Structure, Processing Fluency, and the Aesthetic Effect of Poetic Language

Valentin Wagner[1], Stefan Blohm[1,2], Winfried Menninghaus[1]

[1]Max-Planck-Institut für empirische Ästhetik, Germany; [2]Johannes Gutenberg-Universität Mainz, Germany

The present study investigates whether both facilitating and fluency-reducing features of poetic language are reflected in readers' judgements of the poetic quality of sentences. Regular sound patterning facilitates the online processing of poetic texts, enhances their memorization, and increases their aesthetic appeal. In contrast, linguistic features of poetic texts that deliberately deviate from the rules and principles of natural language deautomatize and hinder the comprehension process. This occurrence of complementary processing factors supports recent proposals in psychological aesthetics that aesthetic

appeal may increase with both fluency and disfluency at distinct stages of stimulus processing.

Using a single-item two-alternative forced-choice paradigm, we tested whether the aesthetic evaluation of prosodic and syntactic variants of a rather inconspicuous sentence yield this complementary pattern of processing (dis)fluency. In a grammatical evaluation task (acceptability, n=120), participants showed a clear-cut preference for an easy-to-comprehend syntax, while the (ir)regularity of prosodic rhythm had no effect. In contrast, participants in the aesthetic evaluation task (poeticity, n=120) showed the expected preference for fluent (rhythmically regular) prosody and disfluent (hard-to-comprehend) syntax. The results bridge the gap between the aesthetic evaluation of highly rhetorical and ordinary language and provide further support for the idea that fluency and disfluency jointly increase aesthetic appeal.

Flow experiences during fiction reading

Birte Ann-Kathrin Thissen

Max-Planck-Institute for Empirical Aesthetics, Germany

Background

This study examined flow states (Csikszentmihalyi, 1975) during fiction reading as a potential key variable for reading pleasure. In order to provide evidence for flow to occur in this context a) a measurement device was adapted and statistically tested and b) the differentiability of flow from other states during reading was verified.

Methods

A total of 229 novel readers (mean age 35.6 years; 79 % female) completed an online survey on potentially pleasurable states during reading. Participants read in a self-chosen novel for 20 minutes and filled in scales measuring states of flow, presence, identification, suspense and cognitive mastery. Flow was assessed using a 13-item questionnaire with subscales for absorption and smooth, automated processing, suited to the context of fiction reading.

Results

Psychometric analysis and a confirmatory factor Analysis (CFA) revealed a satisfactory internal consistency of .81 and a sound model-fit for the single-factor solution (CFI=.99; RMSEA=.06). Substantial correlations with self-rated reading enjoyment, reading motivation and trait reading self-efficacy as well as with general proneness for and frequency of flow during reading, supported the scale's convergent validity (r=.28-.58). CFAs including all state measures accounted for its discriminant validity, with the multi-factor model showing a significantly better fit than the single-factor model. High correlations (r=.21-.69) suggested that flow in fiction reading is closely related to the other states assessed here, but the limited amount of shared variance in the CFAs indicated that it clearly has to be considered an independent construct.

Conlusion

Based on the results and on Csikzentmihalyis' flow theory (1975), a model with flow being a mediator for other states is presented, that allows for predictions of multidimensional reading pleasure experiences and experimental design to test them.

Talk Session: Decision-making in social contexts

Time: Monday, 27/Mar/2017: 10:30am - 12:00pm · *Location:* HS 405
Session Chair(s): Björn Schott

The role of social distance on cooperation: Does self-other overlap hinder 'rational' decisions?

Pinar Ugurlar[1,2], Ann-Christin Posten[1]

[1]University of Cologne, Germany; [2]Middle East Technical University, Turkey

Humans have a natural tendency to trust and cooperate with close others. We suggest a cognitive computational bias as an explanation for cooperation with close others. Our hypothesis is based on the argument that the overlap between the mental representations of the self and the other increases by closeness, making it harder to differentiate between the concept of the self and the close other. This, in turn, hinders the cost-benefit analysis of a transaction to the self, particularly when a person decides intuitively. In two experiments we tested how decisions and cognitive processing during interpersonal transactions differ depending on the closeness to the interaction partner. Both of the experiments involved economic games in which participants identified self or other benefiting options in an economic two-person resource-allocation game. The partner in the game was either a close or a non-close person. In Study 1 (N = 254) participants searched for the information about the game options behind closed boxes by mouse movements. In Study 2 (N=198) participants viewed every pair of options in a game for two seconds and recalled the correct option at the end of the game. Both experiments showed that deciding on the correct option takes more time when interacting with a close other. Importantly, we observed this effect in both self-interested and altruistic tasks. Data supports our claim that interacting with close others hinders information processing during economic money allocation games suggesting a cognitive bias as well as motivations as an explanation for cooperation.

From spontaneous cooperation to spontaneous punishment – Distinguishing the underlying motives driving spontaneous behavior in first and second order public goods

Dorothee Mischkowski[1,2], Andreas Glöckner[1,33], Peter Lewisch[4]

[1]University of Hagen, Germany; [2]University of Göttingen, Germany; [3]Max Planck Institute for Research on Collective Goods, Germany; [4]University of Vienna, Austria

Background

Rand, Greene and Nowak (2012) presented findings supporting their hypothesis concerning the intuitive nature of cooperation by showing that cooperative behavior is related to shorter decision times. Elaborating on their work, we tested the generality of their findings, by investigating the relation between response time and punishment behavior.

Methods

In two lab studies (N = 277) participants played a public goods game (PGG) in groups of four. After each round, a punishment option was given to each player (second-party punishment) with a cost-to-impact ratio of 1 to 4. We measured dispositional social preferences (i.e., Social Value Orientation) up to 24 hours before the lab session and captured the affective responses towards the cooperation behavior of the other players after the PGG via the PANAS.

Results

Similar to a spontaneous cooperation effect, we find that the invested resources to punish decrease with increasing decision time. The underlying motives of spontaneous punishment, however, differ from those driving spontaneous cooperation. The latter is moderated by Social Value Orientation (SVO) in that it is only valid for prosocials, who gain positive utility from increasing other persons' welfare. The effect of spontaneous punishment, though, is independent of SVO. Rather, we find a significant three-way interaction in that spontaneous punishment is only valid for above-average contributors that are highly upset.

Conclusion

Even though the mere behavior of spontaneous punishment follows a pattern similar to that of spontaneous cooperation, the different moderators underlying both effects point out the different motivations. Spontaneous cooperation is driven by dispositional prosociality whereas spontaneous punishment is rather driven by the recent group interaction and is used in an affect regulative manner of situational high contributors to compensate subjectively perceived injustice.

Self-other Decision Making in the Medical and Monetary Domain: The Affect Gap in Choices for Others

Nathalie Popovic[1], Thorsten Pachur[2], Wolfgang Gaissmaier[1]

[1]Universität Konstanz, Germany; [2]Max Planck Institute for Human Development

Recent studies provide evidence that people tend to choose differently and to neglect probability information in affect-rich choices (e.g., choices between medical treatments) compared to affect-poor choices (e.g., choices between lotteries) – a phenomenon referred to as affect gap. Moreover, it has been found that people are less emotionally involved when deciding for another person than when deciding for themselves, and that differences in self-other decision making increase with the affective involvement of the participants. Building on these findings, we analyze in two experiments the affect gap in decisions for others by making use of the sampling paradigm. Our results are in line with past findings on the affect gap: People tend to apply more heuristic decision strategies, show decreased probability sensitivity and search for less information in choices involving medical side effects compared to choices involving financial losses. Moreover, it seems like discrepancies between medical and monetary decisions even translate into choices made for somebody else.

Overcoming the Tragedy of Personnel Selection? Studies On Number-Based Altruist and Egoist Detection

Niels Braus[1], Momme von Sydow[2]

[1]University of Heidelberg, Germany; [2]LMU München, Germany

In social-dilemma situations (public-good games) people may pursue their local, egoistic interests and thereby lower the global, overall payoff of their group and, paradoxically, even their own resulting payoff. One may also speak of intra-individual dilemmas, when people pursue local goals at the expense of their overall utility. The presented experiments transfers this idea to the context of personnel selection were participants are put in the position of a neutral third party, a human resources manager, who should select workers who optimize the overall profit for a company, rather than only their specific individual

payoffs. The existence of prosocial or even altruistic behavior has been rehabilitated by modern models in evolutionary biology and behavioral economics. Also in organizational psychology recent decades have witnessed an acknowledgement of the vital importance of prosocial or altruistic behavior for the success of companies. (e.g. OCB research).We here extend on previous work on the Tragedy of Personnel Evaluation (von Sydow & Braus, 2016), suggesting that most, albeit not all, participants tended to focus on directly comparing individuals without considering their overall contribution to a team. Thus employees with the best overall effects for a company were evaluated the most negatively. We here present new evidence, suggesting that this effect is not due to an inability to derive a worker's overall impact only based on the group level information (given varying group configurations). Moreover, we explore the stability of this phenomenon for 'egoist detection', i.e. negative interactors, who perform individually best, but who nonetheless have a large negative impact on a team's overall performance. Finally, we briefly sketch an experiment, were participants could evaluate workers working in two alternative teams. The consequences of these results are discussed practically (e.g., maladaptive HR-systems) and theoretically (e.g., cheater detection).

Talk Session: Time perception and reproduction

Time: Monday, 27/Mar/2017: 10:30am - 12:00pm · *Location:* HS 301
Session Chair(s): Zhuanghua Shi

The influence of digit magnitude on time reproduction in the (sub-)second range

Stefan Pichelmann, Thomas Rammsayer

University of Bern, Switzerland

Background. The estimation of time is essential for many tasks in our everyday life but the estimate seems to be influenced by current nontemporal sensory input. In 2003, Walsh proposed his theory of magnitude (ATOM), which suggests an underlying common mechanism for the processing of different magnitudes (e.g., time and quantity). In accordance with ATOM, several studies (e.g., Lu, Hodges, Zhang, & Zhang; Rammsayer & Verner, 2016) found evidence for an influence of digit magnitude on perceived duration, but all of them either used the extremes of the digit set (e.g., 1, 2 vs 8, 9) or analyzed durations in the supra-second range where counting might bias the relationship.

Methods. To address these limitations, we conducted an experiment where 50 participants took part in a time reproduction task. Arabic numerals (range 1-9) were presented for 800, 1000, or 1200ms on a monitor screen. A fixation cross appeared 900ms after the presentation of the digit stimulus. The participants were asked to press a designated key as soon as the cross had been presented for the same duration as the digit before. Each combination of digit and target interval was presented 10 times in a random order. Our results provide further evidence for a common mechanism of magnitude processing.

Results. Besides the positive effect of target duration on the reproduced duration, we found a significant effect of digit magnitude on duration judgements, resulting in longer reproduced durations for higher digit magnitudes.

Conclusion. Our results provide further evidence for an underlying connection between time and digit magnitude processing.

Is there a relationship between perceive of time and cognitive functioning? The association between time perspective, cognitive control and intelligence.

Joanna Witowska

University of Warsaw, Poland

In this talk will be presented the relationships between time perspectives and cognitive abilities. Time perspective is the characteristic way in which an individual partitions the flow of personal experiences into time-bound categories. In according to time perspective theory there are five basic time perspectives: Past Negative, Past Positive, Present Hedonism, Present Fatalism, Future and an adaptive time perspective profile calling Balanced Time Perspective. Time perspective was assessed with the Zimbardo Time Perspective Inventory. In the current study cognitive abilities refers to cognitive control and fluid intelligence. Cognitive control were assessed with tasks that require deliberate inhibition of prepotent, automatic responses (Antisaccade and Go/no go) and fluid intelligence were measured with two tests (Raven's Advanced Progressive Matrices and Cattell's Culture Fair Intelligence Test). A total of 233 subjects took part in the study. The results indicate relationships between variables. Past Negative and Present Fatalism are negatively associated with specific cognitive abilities (Past Negative with Cattell's test and Anisaccade task; Present Fatalism with both measures of intelligence and both tasks of cognitive control). However, Balanced Time Perspective is positively connected with scores in intelligence tests and one cognitive control task. The obtained results suggest that TPs may play a significant role in cognitive tests performance and cognitive functioning.

Temporal reproduction within and between sensory modalities: Testing the predictions of the pacemaker-counter model

Daniel Bratzke, Rolf Ulrich

Universität Tübingen, Germany

We tested the predictions of the pacemaker-counter model in a temporal reproduction task with auditory and visual stimuli. Auditory stimuli are usually perceived as being longer than visual stimuli of the same duration. A common explanation for this modality difference in temporal perception is that a pacemaker runs faster for auditory than for visual stimuli. In our experiment, participants had to reproduce standard intervals by terminating a reproduction stimulus. The sensory modalities of the standard stimulus and the reproduction stimulus were either auditory or visual and varied orthogonally. In order to test the predictions of the model for the sub- and the supra-second range we used standard durations of 800 and 2,400 ms. The model predicts that mean reproductions should be shorter for auditory reproductions of visual standards than for visual reproductions of auditory standards whereas the congruent conditions (visual-visual and auditory-auditory) should not differ from each other. Regarding the variability of reproductions, in the incongruent conditions the model predicts the same pattern as for reproductions: variability should be smaller for visual-auditory than for auditory-visual conditions. In contrast to the mean reproductions, however, variability should be smaller for auditory-auditory than for visual-visual conditions. Additionally, the model predicts small congruency effects for both mean reproductions and variability. That is, mean reproductions should be on average shorter and also less variable when the modalities of the standard stimulus and the reproduction stimulus are identical compared to when they are different. The results are discussed in light of these predictions.

Inability to maintain modality-specific priors for auditory and visual duration reproduction

Zhuanghua Shi[1], Xuelian Zang[1,2], Hermann J. Müller[1,3]

[1]Psychology Department, LMU Munich, Germany; [2]College of Psychology and Sociology, Shenzen University, China; [3]Department of Psychological Science, Birkbeck College, University of London, UK

Our brain often uses contextual knowledge to boost the reliability of perceptual judgments (Shi, Church, & Meck, 2013, Shi & Burr, 2016). However, incorporating a priori knowledge also engenders systematical biases, such as the regression effect. That is, large magnitudes are underestimated and small magnitudes overestimated, a phenomenon of regressing to the mean. To date there is still lack of understanding whether the regression effect comes from single or multiple modality-specific prior statistical information when stimuli are multisensory or multiple dimensions. To tackle this we used classic duration reproduction task with mixed auditory and visual intervals. One modality was assigned to the short (600-1000 ms) range and the other to the long (800-1200 ms) range separately. When the short and long ranges were separated and blocked, two separate regression effects were centered around the mean of the short and long ranges. However, when the short and long modalities were randomly mixed together, only one grand regression effect was observed, which was centered at the grand mean of the whole range. This was also the case even participants were explicit informed the short and long modalities. We then compared Bayesian inference models with one and two priors, and found the model with one prior is the most parsimony one. Our findings suggest that the brain can only maintain one statistical information for a general task, which is a balanced outcome between the reliability and complexity during the decision making.

Poster session: Attention

Time: Monday, 27/Mar/2017: 2:00pm - 3:00pm

M-1. Searching for Feature Singleton Targets Within and Across Sensory Modalities: New Evidence for a "Modality-Weighting" Account

Jan Nasemann[1], Zhuanghua Shi[1], Hermann J. Müller[1,2], Thomas Töllner[1]

[1]Department of Psychology, Ludwig-Maximilians-Universität München; [2]Department of Psychological Sciences, Birkbeck College, University of London

The modality-shift effect (MSE) refers to a speed-up in reaction time (RT) when the target is defined within the same (e.g., visual>visual), as opposed to a different (e.g., tactile>visual), perceptual modality as on the previous trial (Spence, Nicholls, & Driver, 2001). Recently, the anterior N1 event-related potential (ERP) wave has been identified to index the MSE, pointing to a re-adjustment of attentional weight-settings from the old to the new target-defining modality (Töllner, Gramann, Müller, & Eimer, 2009). From this study, however, it remained controversial whether switching between dimensions that belong to different sensory modalities occurs at the same hierarchical level as intra-modality dimension switches. This is equivalent to the question whether modality weighting and dimension weighting involve one-and-the-same limited-capacity resource, or whether each modality has its 'own' resource limitation. To approach this issue, we developed a new cross-modal pop-out search paradigm, which required participants to indicate via foot pedals the location (left versus right) of a visual or tactile feature-singleton target. As expected, previous trial analyses of behavioural performance revealed no RT difference between (intra-dimensional/-modality) feature changes versus repetitions across trials. Switching across sensory modalities, by contrast, resulted in a RT cost that was significantly larger than switching between dimensions within the same modality. Overall, this set of findings is consistent with a separate modality-specific selection level, providing new evidence in favour of the hierarchical processing architecture advocated by the modality-weighting account (MWA). The corresponding ERP findings will be presented on the poster.

M-2. Does advance knowledge of a distractor's feature in visual search lead to active inhibition of that feature?

Verena Carola Seibold

Eberhard Karls University Tübingen, Germany

Recent visual search experiments show that advance knowledge about a distractor feature impairs search for a target. In the present study, it was investigated whether this detrimental effect arises because the distractor feature must be actively inhibited before attention can be deployed to the target. Therefore, a search task was combined with a probe task to measure active feature inhibition. In the search task, participants discriminated a colored target among three colored distractors. One of the distractors was either compatible or incompatible with respect to the target, thereby leading to conflict. The color of this distractor was either cued (cued-color condition) or not (neutral condition). In the subsequent probe task, participants responded to probes which had either the same color as the distractor or a neutral color. As expected, performance in the probe task was worse when the probe had the same color as the distractor. This effect, however, was not specific to the cued-color condition. Instead, it was specific to the incompatible distractor condition. Summarized, the present results are inconsistent with an explanation in terms

of active feature inhibition. Instead, they can be explained in terms of passive feature inhibition following conflict.

M-3. The dynamics of feature-based (color-based) selective attention

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Due to learning, goal-irrelevant stimulus features often automatically activate associated responses, which might result in response conflicts. One prominent mechanism to resolve such conflicts is spatial attention. However, it is effective only if stimulus features are separated in space. If this is not the case, then feature-based attention must be used for control. Unfortunately, little is known about the properties of feature-based attention. Therefore, we conducted a study in which participants had to decide whether a cloud of dots of a certain color is vertically symmetric or not. In addition to the relevant dots, however, we also presented task-irrelevant dots of a different color that were scattered in between. These were either arranged symmetrically or randomly. Obviously, a spatial mechanism such as a 'spotlight' of attention could not be used for target selection. Although the participants were able to accomplish the task, there were relatively large congruency effects. Moreover, as in the common flanker task, the congruency effect in the latencies strongly increased with the response times. However, different from the flanker task, the congruency effect in accuracy hardly decreased with response time. These results suggest that feature-based (color-based) attention is less effective than spatial attention. Possible implications are discussed.

M-4. Distractor-induced color blindness

Lars Michael

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The conscious perception of the visual features motion and orientation changes can be modulated by the presence of distracters. In the distracter-induced blindness paradigm, the detection of coherent motion is impaired when task-irrelevant motion distracters are presented prior to the target. Likewise the detection of orientation changes is impaired when task-irrelevant orientation distracters are presented. Aim of this study was to examine this effect for one further visual feature, color. Distracters and targets were defined by changes in background color while subjects attended a central cue. In two experiments we show that comparable distracter-induced blindness effects occur for red and blue targets in dependence from the color and number of the respective distracters.

M-5. Value-based attentional capture exists independently of target search history.

Janina Rebecca Machner[1,2], Claudia Preuschhof[1]

[1]Otto-von-Guericke-Universität Magdeburg, Center for Behavioral Brain Sciences Magdeburg, Germany; [2]Psychologische Hochschule Berlin

Background: During the last few years an extensive amount of research reported value-driven attentional capture by task irrelevant stimuli previously associated with reward. Recently, Sha and Jiang (2016) outlined that value-driven attentional capture could, at least partly, reflect target search history instead. To further examine conflicting findings we modified the original paradigm of Anderson, Laurent & Yantis (2011) by including a third neutral condition to rule out attentional capture by former targets.

Methods: In a training phase, 49 healthy participants learned to associate colours (red, green, blue) with reward (10 cents, 2 cents, or no money). In the subsequent test phase, distraction by previously encountered reward-associated and neutral stimuli was measured during goal-directed visual search.

Results: In the training phase of the experiment we found a significant linear effect of feedback type on response time and accuracy. In the test phase we also found a significant linear effect of condition on response time. For the total sample, high-reward distractors slowed down responses significantly compared to trials without a distractor but not compared to neutral distractors. Importantly, when analysing only N37 participants whose performance improved according to feedback type during training, high-reward distractors slowed down responses compared to neutral distractors representing target search history. This effect disapeared when excluding participants who were aware of the stimulus-reward-associations.

Conclusion: The present results confirm that value representations guide attention in a visual search task. In participants who learned the feedback associations, we found evidence for value-based attentional capture in addition to an effect of search history. In line with Sha and Jiang, our results suggest that the value-based attentional capture reported in previous studies might be confounded by the effect of target search history on attention and, in addition, depends on the level of consciousness of the learned stimulus-reward associations.

M-6. Learned visual attention biases withstand top-down control

Hanna Kadel[1], Tobias Feldmann-Wüstefeld[2], Anna Schubö[1]

[1]Philipps-University Marburg, Germany; [2]University of Chicago

In the long-standing debate on attentional control mechanisms, the importance of associative learning history has recently been emphasized and investigated more thoroughly in addition to bottom-up and top-down mechanisms. In an electrophysiological study we examined to which extent top-down mechanisms interact with an observer's individual learning experience in guiding attention. To induce associative learning, a categorization learning task was combined with an additional singleton search task in the same experimental blocks. A high degree of top-down preparation was enabled by complete predictability of a fixed continuous task sequence. Event-related potentials and behavioral performance measures served as indicator of attention deployment. Results showed that attention deployment during search was biased by the individual experience in the learning task: When a distractor was defined in the same dimension that observers had experienced as being predictive in the categorization learning task, it impaired visual search more strongly than when the dimension was unpredictive in the learning task. Critically, top-down preparation did not modulate this effect, so that learning effects remained even under best preparation conditions. These results indicate that associative learning experience considerably shapes attention deployment and may significantly oppose or even undermine preparatory top-down efforts.

M-7. The effects of appetitive food stimuli on attention.

Irena Domachowska, Hannes Ruge, Annette Bolte, Thomas Goschke

Technische Universität Dresden, Germany

The control of visual attention during goal directed action requires focused attention on goal-relevant information and inhibition of distractors. The more desirable the goal (e.g. delicious food), the more focused attention it should elicit. Indeed, studies examining the

attentional consequences of approach motivated affective states have shown that positive food stimuli resulted in more local attentional focus than neutral stimuli, as measured with a Navon task (e.g. Gable & Harmon-Jones, 2008). We hypothesized that presenting appetitive food pictures (compared to neutral pictures) would lead to a narrowed attentional breadth and improved goal shielding. To test our hypothesis we used two different attentional paradigms: a Navon task and a Visual Search Task.

We found the expected effects in the Navon task: food primes narrowed attention, as indicated by slower responses to global targets (Domachowska et al., 2016). However, this effect did not show in the Visual Search Task, suggesting that spatial attention might be less responsive to modulation by affective cues or that the effects of positive affect are sensitive to the type of task used and the role of distractors.

M-8. Can't take my eyes off of you! How irrelevant food stimuli influence different processes of attentional selection – an EEG study

Jessica Sänger

Heinrich-Heine University, Germany

Background: By means of the event-related potentials (ERPs) the present study investigated how the different stages of processing of attentional selection are altered by the participants' motivated state depending on their saturation level.

Methods: Twenty-two normal-weight (mean BMI: 22.00 ±2.9), healthy participants between the ages of 19 and 34 were assigned to a condition of hunger or satiety. While participants performed a central oddball task, task-irrelevant pictures (food vs. neutral) were presented laterally. Additionally, the participants' eating and nutrition behaviour as well as their current level of hunger were assessed by self-report measures.

Results: While on the behavioural level groups did not show any differences, 100-200 ms after stimulus onset ERPs hungry participants reveal an enhanced early parieto-occipital activity (N1pc) for food pictures - particularly if it was high-calorie food. Furthermore, amplitudes of the N1pc co-varied significantly with the participants' subjective feeling of hunger. In the following time window, 200-300 ms, hunger was associated with a lack of differential processing of the food and neutral stimuli. Later on, between 300 and 400 ms, food pictures were associated with an enlarged centro-parietal positivity (P300) in hungry compared to satiated participants - especially if it was high-calorie food.

Conclusion: From the perspective of motivated attention, the results of the present study show that hunger may induce a heightened state of attention for food stimuli. By that, food stimuli become more salient. This had an influence on early automatic attentional selection as well as on later and rather intention-driven processes of attentional "de-selection" and stimulus maintenance in normal-weight.

M-9. Mechanisms of feature-based attention in visual short-term memory

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It is widely accepted that visual short-term memory (VSTM) representations degrade across time and that spatial retro-cues (directing attention after the disappearance of a stimulus) protect them from decay and visual interference from subsequent stimuli. Recently, we have provided evidence that feature-based attention is effective in VSTM (Kalogeropoulou, Jagadeesh, Ohl, & Rolfs, 2016), but little is known about the underlying

mechanisms. We investigated this question with a continuous scale report task. Participants had to keep in memory the orientations of two differently colored and spatially interspersed sets of Gabors and—after a variable retention interval—report the orientation of one of them by rotating a new set of Gabors to match the remembered orientation (report screen). One second after the presentation of the stimulus, we presented a color cue, either indicating which set of Gabors will have to be remembered (valid cue), or not providing this information (neutral cue). To investigate the evolution of memory performance across time, we systematically varied the duration between the retro-cue and the report screen between 0 and 3000 ms. For uncued stimuli (neutral condition), accuracy did not deteriorate but remained constant across time, indicating that decay played a negligible role in our memory task (possibly due to the small set size of two orientations). In contrast, accuracy for cued stimuli (valid condition) increased continuously, suggesting that the deployment of feature-based attention in VSTM protects stimuli from visual interference caused by subsequent stimuli (here, the set of Gabors displayed in the response screen). These findings shed light onto the mechanisms of feature-based attention in VSTM and generalize previous work on spatial retro-cueing in VSTM to another domain of covert attention.

M-10. Studying the Role of Language During Top-Down Contingent Capture of Attention

Diane Baier, Ulrich Ansorge

University of Vienna, Austria

Does top-down search for colors depend on verbal working memory? According to the contingent-capture hypothesis, attention capture depends on the match between the stimulus and top-down search templates. Attention capture by a cue is reflected in validity effects – shorter search times for validly than invalidly cued targets – and contingent capture shows in selective validity effects for top-down matching cues. Top-down search templates might consist of feature representations in visual working memory or they might at least be supported by rehearsal in verbal working memory. To decide if this could be the case, I compared effects of color cues and color-word cues on search times and accuracies during top-down search for colors (experiment 1) and color-words (experiment 2). My results showed no evidence of word-based templates: In experiment 1, color-word cues impeded search in the short intervals when they were in valid positions, especially if they corresponded to the target color. In experiment 2, color cues had no influence on search times. In both experiments, validity effects of matching but not non-matching cues supported contingent attentional capture for cues of the same stimulus category as the target (color stimuli/color-word stimuli). Additional experiments will show, if combining both color and color-word targets in one experiment or expanding the investigation to the auditory modality allows for more evidence of language-mediated templates.

M-11. Adult Age Differences in Alpha Oscillatory Activity Pre- and During Processing of Competing Auditory Information

Liesa Ilg, Susanne Passow, Shu-Chen Li

TU Dresden, Germany

Previous studies revealed older adults' difficulties in focusing attention on relevant auditory information and ignoring concurrent salient irrelevant auditory inputs. These aging-related deficits are characterized both by compromised attentional control and an exaggerated reliance on perceptual saliency. Related psychophysiological evidence showed that in

younger adults a late negative ERP deflection (approx. 450 ms poststimulus) was sensitive to attentional demand and was associated with task performance; however, no such effects were observed in older adults. Pre- and peri-stimulus modulations of alpha oscillatory activity (8-12 Hz) have been associated with successful auditory selective inhibition in challenging listening situations. The present study investigated how aging may affect alphas oscillatory activity in modulating selective auditory processing of competing sensory inputs. We conducted time-frequency analysis of an existing EEG data set of younger (N=20) and older (N=20) adults recorded during an attention and intensity modulated dichotic listening task. In line with previous findings, we found a lateralized pattern of pre-stimulus (-200-0 ms) alpha oscillatory activity, i.e. stronger alpha power contralateral to the to-be-ignored auditory input in younger. The lateralization of alpha power modulation was associated with task performance and may reflect a successful blockage of in-depth processing of the to-be ignored auditory input. Critically, this pattern was not present in older adults. Furthermore, peri-stimulus analysis also showed adult age differences in the early (0-200 ms) and later (200-500 ms) time window reflecting deficient modulation of alpha oscillator activity in conditions with high attentional demands. These results indicate that older adults' difficulties in challenging listening situations may derive from deficient brain oscillatory activity at the alpha range during the anticipation and actual processing of auditory signals.

M-2. Head fake or Blicktäuschung? Investigating the source of information conflict during fake action in sports

Iris Güldenpenning[1], Mustafa Alhaj Ahmad Alaboud[1], Yvonne Steggemann-Weinrich[1], Wilfried Kunde[2], Matthias Weigelt[1]

[1]University of Paderborn, Germany; [2]University of Würzburg, Germany

To deceive their opponents, basketball players often gaze in one direction (action irrelevant compo-nent), but pass the ball into the opposite direction (action relevant component). This kind of fake action is termed head fake in the English literature and Blicktäuschung in the German literature. Experimental research has shown that responses to head fakes are slower and more error prone than responses to direct passes (e.g. Kunde, Skirde, & Weigelt). The aim of the present study is to inves-tigate whether the fake effect is based on the head orientation (head fake), the gaze orientation (Blicktäuschung), or a combination of both factors. Therefore, 36 participants (M = 22.52 years; SD = 3.18 years, 20 female) took part in a reaction time experiment with stimuli depicting a basketball player either passing to the right side or to the left side. Congruency of the head orientation and of the gaze orientation was manipulated independently and presented in separated blocks: In the first block, head orientation was congruent (no fake) or incongruent (head fake) to the pass direction (the gaze orientation was always congruent with the pass direction). In the second block, gaze orienta-tion was congruent (no fake) or incongruent (Blicktäuschung) to the pass direction (the head orien-tation was always congruent with the pass direction). In the third block, gaze and head orientation were either both congruent or both incongruent with the pass direction. The task was to react as fast as possible to the pass direction and to ignore the gaze direction/head orientation. A one-way ANOVA with the factor pass (direct pass, pass with head fake only, pass with Blicktäuschung only, pass with head fake and Blicktäuschung) indicated a main effect for pass [$F(3,105) = 8.818$, $p < .001$; $\eta p2 = .201$]. Participants were similarly deceived for passes with head fake only [$t(35) = 5.410$; $p < .001$] and when both head orientation and gaze direction were incongruent with the pass direc-tion [$t(35) = 4.919$; $p < .001$]. There was no fake effect with only an incongruent gaze direction [$t(35) = -.342$; $p > .05$]. Therefore, the fake effect seems to be based on the incompatible head ori-entation and

not on the incompatible gaze orientation. Hence, the well-known Blicktäuschung is rather a head fake.

Poster session: Cognitive control and executive functions

Time: Monday, 27/Mar/2017: 2:00pm - 3:00pm

M-13. Conflict regulation through task choice

Heiko Reuss

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I combined voluntary task switching with a priming paradigm to investigate how the task choice is influenced by a possible resolution of prime-target-conflict. Participants freely chose in each trial to perform either a parity task or a magnitude task on a target number. A preceding prime number was always congruent within one of the two tasks in this trial, and incongruent within the other task. Thus, by task choice, participants could either avoid conflict by making the prime a congruent, facilitating stimulus, or face conflict by making it an incongruent, conflicting stimulus. I analyzed the frequency with which participants chose either the conflict-ridden or the conflict-free task, and how their response time to the target was influenced by this choice. Strikingly, I found that the conflict-ridden task was chosen more often than the other task. Additionally, I found a reversed congruency effect: responses were faster after incongruent primes rather than congruent primes. Overall, the results show that the task choice is influenced by a stimulus with conflict potential that depends on the task. However, the direction of the effect is surprising, with a tendency to "create" a conflicting stimulus rather than a harmonious stimulus, and faster responses after conflicting stimuli. Especially the latter finding may hint to a possible explanation: the occurrence of an inhibitory mechanism that reverses an initial activation, which then manifests not only in the RT pattern (a finding which can be observed in priming with particular timing conditions), but also in the counterintuitive task choice.

M-14. The unity and diversity of inhibition-related functions: a latent-variable analysis

Anne Gärtner, Alexander Strobel

TU Dresden, Germany

Background. Inhibitory control represents a central component of EF and focusses on the ability to actively inhibit or delay a dominant response to achieve a goal. Although various tasks exist to measure inhibitory control, correlations between these tasks are rather small. The most vexing problem is the task-impurity problem, i.e., systematic variance is attributable to non-EF processes associated with the specific task context. To alleviate this problem, a latent-variable approach has been frequently applied. Using confirmatory factor analysis and structural equation modeling, previous research identified at least 2 inhibition-related functions that are closely related to each other yet separable: prepotent response inhibition and resistance to distractor interference.

Methods. The goal of our study was a) to replicate these functions and b) extend previous literature by additionally controlling for speed-accuracy tradeoffs, thereby potentially increasing explained variance in the investigated latent factors. Therefore, N = 190 participants completed six inhibitory control tasks (response inhibition: Stroop, Go/NoGo, Stop-Signal; distractor interference: Antisaccade, Shapematching, Wordnaming). Analyses were conducted using standard scores (response times) as well as inverse efficiency scores (combining response times and error rates).

Results. In contrast to previous studies, confirmatory factor analysis and structural equation modeling revealed a single latent variable, covering both prepotent response inhibition and resistance to distractor interference. Furthermore, only four out of six tasks demonstrated satisfying factor loadings. Correlations among tasks were generally small or non-significant, but higher when inverse efficiency scores were used, suggesting a substantial benefit when response times and error rates are considered.

Conclusion. Our results highlight that prepotent response inhibition and resistance to distractor interference might be stronger related to each other than previously assumed. However, insufficient factor loadings and small correlations between tasks are in contrast to the described unity/diversity pattern among inhibition-related functions and challenge its replicability and generalizability.

M-15. Dopamine turnover modulates the effects of L-DOPA on goal-directed control

Michael N. Smolka,Ying Lee, Shakoor Pooseh, Liane Oehme, Bettina Beuthin-Baumann, Thomas Goschke, Nils B. Kroemer

Technische Universität Dresden, Germany

Background: Adaptive behavior requires a balance between habitual and goal-directed modes of action control. On the one hand, “model-free” (MF) control is based on direct reinforcement of successful actions via reward prediction errors. It is computationally efficient because it operates retrospectively on cached values, yet it comes at the cost of flexibility. On the other hand, “model-based” (MB) control is based on a learned model of the task structure, which allows agents to deliberate and plan actions ahead of time by simulating their potential outcome. Here, we tested a hypothesized dopaminergic modulation of the arbitration between MF and MB modes of control using a pharmaco-imaging design.

Methods: We investigated the effect of enhancing tonic dopamine levels via L-DOPA on performance of a two-stage Markov decision task while we recorded brain responses using fMRI (randomized cross-over). Additionally, we investigated the mediating effect of dopamine synthesis capacity and dopamine washout (turnover=washout/synthesis) using Fluorodopa PET. To this end, we tested 60 healthy adults, who were sampled to be representative of the general population.

Results: On average, L-DOPA had no significant effect on the balance between MF and MB control (p=.10). However, individuals with low dopamine washout in the ventral striatum showed increases in MB control (as captured by the Reward x Transition effect) after receiving L-DOPA (p=.015) and were also more goal-directed on average (p=.026).

Conclusion: Collectively, our results support the hypothesis that dopamine modulates the arbitration between MF and MB control modes. Nevertheless, facilitating effects of increases in dopamine tone were only observed when endogenous dopamine washout was low suggesting that elevated post-synaptic dopamine levels may tip the balance towards more goal-directed behavior.

M-16. How does response preparation affect response conflict in the Eriksen flanker task?

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The present study explored how response preparation modulates the effects of response conflict as induced by irrelevant flanker stimuli. In Experiments 1 and 2, an unreliable response cue (i.e. valid in 75% of trials, but invalid in 25% of trials) preceded the stimulus display containing a target stimulus and different types (i.e., identical, neutral, compatible, or incompatible) of flanker stimuli. In Experiment 3, a fully reliable response cue (i.e. valid in 100% of trials) or a neutral cue preceded the stimulus display. There were two major findings. First, valid response cues always improved performance in terms of speed and accuracy, when compared to invalid or neutral cues, indicating that the cues were used to selectively prepare the indicated response. Second, response preparation with unreliable response cues did not modulate flanker-induced response conflict in RTs (and not consistently in error percentages), whereas response preparation with reliable cues eliminated flanker-induced response conflict. According to these results, only extreme levels of response preparation modulate (flanker-induced) response conflict. The results of computer simulations suggest some boundary conditions for our conclusion.

M-17. Shielding or relaxation: Is it adaptation to conflict or adaptation to non-conflict?

Anja Maria Berger, Gesine Dreisbach

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According to one of the most prominent theories of cognitive control, the conflict monitoring theory (Botvinick et al., 2001), cognitive control is triggered by the experience of conflicting response tendencies. Support comes from many studies showing that congruency effects following a conflict trial (e.g., Simon-, Flanker-, Stroop-conflict) are smaller than congruency effects following a non-conflict (congruent) trial. Compton et al. (2012) recently questioned the role of conflict for conflict adaptation by showing that the Stroop interference was smaller after both incongruent (“blue” written in red) and neutral trials (“dog” written in red) than after congruent Stroop trials (“red” written in red) suggesting that the adaptation is actually driven by congruent trials. To further examine the role of congruent trials in sequential adaptation, we used a number-Simon task with digits presented laterally to the left and right (creating response congruent and incongruent trials) and in the middle of the screen (creating neutral trials). Results show the typical conflict adaptation effect: The Simon effect was smaller following incongruent trials and larger following congruent trials. Most critically, the Simon effect following neutral trials was in-between and different from both. Our results thus suggest that sequential conflict adaptation in the number-Simon task consists of two processes: adaptation to incongruent (conflict) trials by increased shielding and adaptation to congruent trials by relaxation.

M-18. Beyond inhibition: valuation as a neurocognitive mechanism of real-life self-control

Klaus-Martin Krönke, Max Wolff, Anja Kräplin, Michael N. Smolka, Gerhard Bühringer, Thomas Goschke

TU Dresden, Germany

Self-control failures (SCFs) are frequent events of everyday life, but the neurocognitive mechanisms underlying real-life SCFs are insufficiently understood. Whereas previous studies showed that SCFs are associated with BOLD activity in regions associated with performance monitoring and cognitive control, the relationship of SCFs and the process of valuation as a potential mechanism for self-controlled decision making remains largely unknown. Here we investigated whether (i) valuation during decision making is reflected by brain activity in the ventromedial prefrontal cortex (vmPFC) and (ii) whether individual differences in the weighting of long-term consequences during valuation are related to real-life self-control. Following a brain-as-predictor approach, we combined experience sampling of daily SCFs with functional magnetic resonance imaging (fMRI) in a decision making task. In our sample of 194 participants (i) goal value was reflected in vmPFC activity and (ii) proneness to real-life SCFs was reliably predicted by a reduced impact of long-term consequences on the value signal in the vmPFC during decision making. This suggests that, besides impairments in performance monitoring and cognitive control, real-life SCFs may result from differences in valuation, leading to insufficient representation of long-term consequences and short-sighted behavior, conflicting with superordinate goals.

M-19. The time course of distractor-based response activation with predictable and unpredictable target onset

Kerstin Jost[1,3], Mike Wendt[2], Aquiles Luna-Rodriguez[3], Andreas Löw[3], Thomas Jacobsen[3]

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Nominally task-irrelevant stimuli, referred to as distractors, often influence performance. Most prominently, responses are slower when the distractor is associated with a different response as the target (i.e., incongruent condition) than when distractor and target are associated with the same response (i.e., congruent condition). This congruency effect is usually attributed to distractor-based response activation. Presenting the distractor in advance of the target offers the possibility to investigate pure distractor-related response activation (by means of the lateralized readiness potential of the EEG, LRP). Previous studies showed that both the extent and the timing of distractor-based response activation can be adjusted to contextual factors, when participants can (reliably) predict distractor utility and target onset. In the current study, we examined the timing of distractor-based response activation when target onset is unpredictable by varying the stimulus-onset asynchrony (SOA) between distractors and targets within blocks. Unlike in a previous study, the distractor-based LRP occurred early in both trials with short and long SOA. When the SOA was long, however, the initial rise of the LRP was followed by a marked decrease and a subsequent second rise, reaching a high level when the target occurred. These LRP effects were again larger when the proportion of congruent trials was high and the distractor, thus, highly predictive of the target/response (i.e. high distractor utility). Our findings suggest that strategic usage of distractor information under conditions of unpredictable target onset (at the time of distractor processing) is enabled by an early rise of response activation to ensure an appropriate bias for responding when the target occurs

early. In case this activation turns out to be premature, response activation is temporarily inhibited and then regained in a usefully timed way (rather than being maintained until target occurrence).

M-20. From bump to bump: The continuity of goal representations in representational space and time

Simon Frisch[1], Maja Dshemuchadse[2], Stefan Scherbaum[1]

[1]Technische Universität Dresden, Germany; [2]University of Applied Sciences Zittau/Görlitz

Most theories of cognitive control assume that goals play a key role in human behaviour as they are thought to guide perception and action towards information relevant to our needs. A question that received little attention in the past, however, is what these core pieces of volition actually look like, that is, how precisely goals are represented in the cognitive system. The research presented here addresses this question by testing a perspective on the nature of goal representations that has been referred to as bump attractor dynamics in the past. This perspective is drawn from the larger theoretical framework of Dynamic Field Theory (DFT) which conceptualizes neural representations in general – and goal representations in particular – as population-coded peaks (or bumps) of neural activation that spread continuously in representational space and time. To test this predicted continuity of goals in space and time empirically, we developed a set-shifting paradigm in which participants shifted their attention between different colour goals with consecutive goals varying systematically in their distance in representational (i.e. colour) space. In three experiments, we found (1) that previously goal-relevant information continued to affect behaviour after goal switches and (2) that the extent of this persisting bias decreased with increasing distance in colour space. These findings highlight DFTs assertion that goals can be modelled as bumps of activation that are continuous in both representational space and time. Implications for theories of goal-directed action and their empirical investigation are discussed.

M-21. The relationship of core executive functions to reflective thinking ability

Thomas Maran[1,2], Marco Furtner[1], Simon Liegl[1], Lucas Haraped[1], Pierre Sachse[1]

[1]Leopold-Franzens University of Innsbruck, Austria; [2]Alpen-Adria University of Klagenfurt, Austria

Cognitive reflection plays a significant role in decision making in everyday life. To not trust the compelling but often wrong first response our “gut”-feeling gives us and to rather rethink a problem to potentially solve it right can protect us from fatal mistakes. The Cognitive Reflection Test (CRT), a task to measure a person’s tendency to override an intuitively attractive response that is incorrect and to engage in additional reflection in order to accomplish a correct response. It distinguishes between intuitive and reflective thinking using a question based performance measure. Reflective thinking is correlated with measures of intelligence, numeracy and metacognitive skills. Furthermore, there where findings of negative associations to superstitious and paranormal beliefs. Although the CRT is a strong predictor of a person’s ability to make unbiased, rational decisions in various contexts, little is known about which executive processes are involved in this type of decision making. The current study aimed to investigate the relationship of core executive functions to rational thinking ability as measured by the CRT. Core executive functions were measured using an antisaccade task (inhibition, shifting), a n-back task (updating), and a recency probes task (interference resolution). 152 participants were tested in two sessions. Consistent with our predictions multiple linear regression analyses revealed that reflective thinking was best predicted by inhibition. By contrast updating,

shifting and interference resolution did not explain a further significant proportion of variance. We argue that since the CRT triggers intuitively attractive but wrong answers, the contribution of inhibition might reflect the ability to inhibit the initial incorrect responses. The results indicate that reflective thinking differentially relates to core executive functions. These findings are discussed along with other recent findings about the relation of reflective thinking and cognitive abilities, and directions for future research are suggested.

M-22. Affect Regulation and Cognitive Conflict: Situation Modification in a Stroop Task

Constantin Schmidts, Wilfried Kunde

University of Würzburg, Germany

Cognitive conflict is assumed to cause negative affect. Regulation strategies commonly applied to affective situations may also help regulating behavior in conflict tasks. Here we looked at one such strategy derived from the process model of emotion regulation, namely situation modification. A preference to change situations towards positive rather than negative affective states would render the production of congruent (positive) situations faster than the production of incongruent (negative) situations.

Participants carried out a color-word Stroop task. In a positive block responses to congruent and incongruent Stroop targets always produced a congruent Stroop stimulus, whereas in the negative block responses caused an incongruent Stroop stimulus as effect. To assess any residual affect we employed an affective misattribution procedure (AMP) after each trial.

Reactions times were indeed lower in the positive block compared to the negative block indicating situation modification preferences can play a role in conflict tasks. Curiously, there was no effect on the AMP, neither by congruency, nor to-be-produced situation.

As affect may have been leveled by presentation of the effect stimuli we devised a comparative AMP (cAMP) to explore changes of affect from response selection to response effect presentation.

We replicated the effect of to-be-produced situations on reaction times and found that participants experienced more negative affect before rather than after responses to conflicting stimuli. This effect tended to be stronger in blocks that produced conflict stimuli rather than non-conflict stimuli. Thus, whereas it is easier to change a conflict situation to a non-conflict situation rather than the other way round, such situation modifications might not be so closely related to affective changes as previously believed.

M-23. Dissociable effects of monetary reward on preparatory control

Ulrike Schulz, Hannes Ruge, Annette Bolte, Thomas Goschke

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It becomes increasingly clear that reward can enhance cognitive performance in terms of increasing preparatory or proactive control. But some studies suggest that the effects may diverge depending on the task relevance of rewarding stimuli. Here, we investigated how task-relevant and random monetary incentives influenced active context maintenance in a variant of the AX-continuous performance task. We found considerable distinct effects between both reward conditions. Random reward did not significantly change the utilization of contextual information. In contrast, performance-contingent reward enhanced preparatory control in a sustained and a transient manner. In conclusion, the present results together with recent studies indicate that reward may have variable effects on

cognitive control. Further, the task-relevance of rewarding stimuli seems to play an important role in the modulation.

M-24. If it's hard to understand, try harder! Auditory (dis-) fluency triggers processing adjustments

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An increasing amount of studies indicates that experiencing increased task demands triggered for example by conflicting stimulus features or low perceptual fluency lead to processing adjustments. While these demand triggered processing adjustments have been shown for different paradigms (e.g., response conflict tasks, perceptual disfluency, task switching, dual tasking), most of them are restricted to the visual modality. By adapting the experimental design of the initial processing-fluency-paradigm by Dreisbach and Fischer (Psychological Research, 75, 376–383 (2011)) to the auditory modality, the present study investigated as to whether listening to vocoded speech – as compared to clean speech – would also lead to processing adjustments. To that end, we used spoken number words (one to nine) that were either displayed with high (clean speech) or low (vocoded speech) perceptual fluency. Participants had to judge the spoken number words as smaller or larger than five. Results show that the fluency effect (performance difference between clean and vocoded) was smaller following disfluent words. Thus, if it's hard to understand, you try harder.

M-25. Stronger reward associations with congruent (than with incongruent) stimuli

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Research has shown that reward reinforces stimulus-response associations but the impact of reward feedback on cognitive control is not all that definite. A prominent paradigm to investigate cognitive control is the proportion congruency (PC) effect. The PC effect describes a modulation of the size of the congruency effect (CE: incongruent – congruent) by the ratio of congruent to incongruent stimuli presented in a block of trials. Typically, the CE is reduced for mostly incongruent blocks of trials, while the CE is increased for mostly congruent blocks.

In the present study, we investigated whether asymmetric reward schedules can induce a reward-PC effect. The task involved a typical flanker task. For each of the two reward-PC blocks, we varied the probability of response contingent reward (e.g. incongruent [congruent] stimuli reward in 80%, congruent [incongruent] stimuli reward in 20% of the cases). Importantly, the congruency level throughout each block of the experiment was always constant.

Although there was no significant reward-PC effect, a main effect of congruency and more interestingly, a main effect of the reward - congruency level mapping was observed. More precisely, in highly rewarded congruent blocks, reaction times were significantly faster than in highly rewarded incongruent blocks. Additional analysis of a forced-choice awareness check revealed that none of the participants guessed the reward schedule above chance level, suggesting that participants were not aware of the reward manipulation.

The present study supports the idea that conflict acts as a cost for reward learning and that item-reward associations are easier established without conflict.

M-26. Cardiac regulation and executive functioning in unipolar affective disorders

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Objectives: Performance impairments in various cognitive domains have been repeatedly observed in unipolar affective disorder. In addition, autonomic nervous system dysregulation has been reported in affected patients. The present study explored cardiac autonomic control during executive function processing in unipolar affective disorder.

Methods: ECG recordings were performed during rest and during execution of four classical executive function tasks (number-letter task, n-back task, continuous performance test, and flanker task) in 36 patients with unipolar affective disorder and 36 healthy subjects. Heart rate variability (HRV) was quantified in the high and low frequency bands using fast Fourier transformation. Results: The disordered group exhibited lower HRV during all phases of the experiment. Increased error rates and slower reaction times in depressed individuals were observed in the number-letter task as well as increased error rates in the n-back task. There were no differences between groups in the continuous performance test and the flanker task. In the total sample, a positive correlation of HRV with the reaction time in the switching condition of the number-letter task arose. Conclusions: The study confirms the presence of reduced executive function performance, particularly concerning more complex task sets, in unipolar affective disorders. The findings regarding HRV point toward diminished parasympathetic cardiac drive during executive function processing in affected individuals. Finally, the association between HRV and task performance indicates that autonomic dysregulation may be involved in the cognitive impairments associated with unipolar affective disorder.

M-27. Domain general conflict adaptation from syntactic to non-syntactic tasks

Till Pachalli, Barbara Kaup, Hartmut Leuthold, Carolin Dudschig

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According to the conflict monitoring theory conflict resolution in an incongruent trial n is enhanced after the detection of conflict in an incongruent trial n-1. Typically, these so-called conflict adaptation effects are reported within specific tasks, such as the Flanker or the Stroop tasks. Recent studies have investigated conflict adaptation between inherently different tasks in order to examine the domain generality of conflict adaptation. For example, Kan et al. (2013) used garden-path sentences, which represent high conflict trials due to the need of overriding an initial sentence analysis in favor of a less supported analysis. These tasks were intermixed with standard Stroop tasks. Conflict adaptation was found from sentences to Stroop tasks, but not vice versa. In our first study, we conducted an experiment using a Stroop task and garden path sentences in German in order to replicate the findings reported by Kan et al. Conflict adaptation effects were found from sentence tasks to Stroop tasks. In a second experiment, we used the same reading task combined with an Eriksen flanker task, which – unlike the Stroop tasks – does not have a linguistic dimension. No conflict adaptation effects were found in this experiment. Implications of these findings for the conflict monitoring system will be discussed.

Kan, I. P., Teubner-Rhodes, S., Drummey, A. B., Nutile, L., Krupa, L., & Novick, J. M. (2013). To adapt or not to adapt: The question of domain-general cognitive control. Cognition, 129(3), 637-651.

M-28. It's time to expect – The influence of SOA differences on self-generated and cue-induced stimulus expectations

Yvonne Daschowski[1,2], Maike Kemper[1], Robert Gaschler[1,22], Torsten Schubert[1,3], Sabine Schwager[1]

[1]Humbold-Universität zu Berlin; [2]Fernuniversität Hagen; [3]Martin-Luther-Universität Halle-Wittenberg

Expectations about future events enable preparatory processes and influence performance related to the expected event. Participants respond faster and more accurately if their expectation is fulfilled than if the occurring event/ stimulus does not match the expectation (mismatch effect). Previous studies have shown that performance differences related to expectations were much stronger for self-generated expectations compared to cue-induced expectations. Effect differences between the types of expectations have been shown for RTs, error rates and event related brain potentials. Although differences have been shown in multiple studies, most have kept the timing (SOA: stimulus onset asynchrony) between expectation prompt and stimulus presentation constant. In the current study we tested how self-generated vs. cue-induced expectations about an upcoming stimulus were influenced by varying the SOA in a within-subject design. Results indicate a stable mismatch effect in behavioral parameters for self-generated expectations whereas the mismatch effect for cue-induced expectations decays over time.

M-29. Can repetition priming explain sequential effects in temporal preparation? Evidence from a roving foreperiod paradigm.

Florian Scharf, Dagmar Müller, Anna Marzecová, Sabine Grimm, Erich Schröger

Universität Leipzig, Germany

Background:

The human ability to use temporal information in order to optimise the reaction to a target is often investigated in so called variable foreperiod paradigms. In this paradigm, each trial starts with an uninformative cue succeeded by a target stimulus with a varying inter-stimulus interval (foreperiod, FP). It is usually observed that responses are faster for long FPs (FP effect) and after short FPs in the previous trial (sequential effects). Recently, sequential effects were explained in the framework of repetition priming – that predicts faster responses for repeated foreperiods irrespective of the duration of the foreperiod.

Methods:

To systemically investigate this possibility, we developed a roving foreperiod paradigm in which the FP is repeated in a train of successive trials. A black square in the centre of the screen served as visual cue, a 440-Hz sine-tone as target. The participants were instructed to respond by button press as fast as possible after the detection of the target. In three experiments, we compared the roving and the variable FP paradigm (Exp. 1), investigated the impact of catch trials and sound intensity (Exp. 2), and conducted an extended replication of Experiment 2 (Exp 3).

Results:

We observed strong sequential effects for short FPs, independently of whether the sound intensity of the targets was near or clearly above threshold. In the absence of catch trials (Exp. 1), the predicted repetition-based sequential effects were not observed at long FPs. However, we observed faster responses for repeated long FPs when catch trials were part

of the design (Exp. 2 and 3). Additionally, sequential effects tended to be stronger the longer the preceding repetition train was.

Conclusion:

All in all, a repetition priming approach to sequential effects can be called plausible based on the present data. The roving foreperiod paradigm offers a possibility to systematically investigate sequential effects in temporal preparation.

Poster session: Face processing

Time: Monday, 27/Mar/2017: 2:00pm - 3:00pm

M-30. Unfamiliar Face Recognition: Impact of the Vertical Camera Perspective from CCTV Images

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Recent research has shown that unfamiliar face recognition is highly prone to error, as well in case of identification by high quality CCTV. Some recent research connect recognition of dynamic scenes or still images with the concept of canonical view to show that this benefits the recognition performance. As evidence from research on horizontal camera perspective shows that recognition performance benefits from a horizontal canonical view, it is hypothesized that the notion of vertical canonical view may also influence the recognition performance of unfamiliar faces. The current experiment (N= 66) has been realized in a 2x3 within-subject design and was conducted to explore the impact of low-, eye-level and high-angle (camera perspective as independent variable) on matching test performance with unfamiliar faces. The other independent variable was target person present vs. absent in line-ups. Six CCTV Videos were simulated with male target persons, filmed in high quality to conform a practical implementation. Photo line-ups for each target person were also conduced as normally used by the police. The results show, that the eye-level angle may the best perspective to identify human faces from CCTV Videos and still images using two-alternative matching tasks. Overall, findings suggest, that the eye-level view could be the vertical canonical view for face recognition and increases identification accuracy.

M-31. Familiarity abolishes right-hemispheric bias in face perception

Katja Weibert, Veronika M. Müller, Jessica Sänger

Heinrich Heine University, Germany

Perception of unfamiliar faces is right-lateralised. However, familiar faces are processed differently, activating the left hemisphere more strongly than unfamiliar faces. This difference has been proposed to reflect higher processing of verbal information associated with familiar faces such as the name. It remains unclear whether this increase in left-hemispheric processing for familiar faces potentially affects their early perception. Therefore my study investigated, which effect familiarity had on the right-hemispheric bias in face perception. To address this question, chimeric faces of unfamiliar and familiar people (celebrities participants could name) were used. Chimeric faces were created by splitting a face image into a left and right half, and then mirroring each, which resulted in two new images. One image contained solely information of the left image half of the original, which is processed by the right hemisphere (left chimeric). The other image contained solely information of the right image half of the original, which is processed by the left hemisphere (right chimeric). To measure lateralisation of face perception,

participants were asked to choose which chimeric face looked more like the original face. In line with previous literature, for unfamiliar faces participants preferred the left chimeric face suggesting a right-hemispheric bias in face perception. However, familiar faces did not elicit a bias in perception: no preference for either chimeric face emerged. Thus, familiarity seems to change how faces are perceived. Familiar faces seem to be perceived more bilaterally, potentially due to an increased activation of the left hemisphere.

M-32. Psychometric criteria of computer recognition software for classification of facial expressions of emotions

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Hamburg University, Germany

Background: Automated software analysis of facial expressions open up new opportunities for investigating designs in psychological research in a shrewd and economic way. The reliability and validity of these measures are still unknown.

Methods: In the present study we examined reliability of Emotient FACET by digital manipulation of well-established and validated databases for emotional expressions, using the Amsterdam Dynamic Facial Expression Set (ADFES) and for facial action units from the Facial Action Coding System (FACS) we used the Face Video Database of the MPI for Biological Cybernetics. Following this, we wanted to clarify whether the software measures are equivalent to other measurements of facial movements, like electromyography (EMG), we tested 46 participants in two classical paradigms for cognitive control using facial expressions as responses, with a response priming task and a response switching task in a within subject design.

Results: Considering manipulation of the factors distance, angle vertical, angle horizontal, resolution and brightness, intraclass correlations show a great performance for emotions (ICC = .85) and a poorer performance for action units (ICC = .56). Signal detection analysis of the original video material of both databases confirms an excellent discriminability of emotions (AUC > .99) and a very good discriminability for action units (AUC = .91). Experimental effects of cognitive inhibition and switching costs could be shown with EMG and FACET.

Conclusion: These results demonstrate software analyses using FACET as an adequate alternative to EMG measurements of emotional facial expressions in classical experimental tasks. At least evidence scores for emotions can be interpreted as a highly reliable and valid measurements of facial expressions.

M-33. Adaptation aftereffects in human faces can be partially extended to alternative natural categories

Antonia Reindl

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To recognize familiar objects, it is commonly assumed that incoming perceptual object information is matched against representations of these objects stored in memory. While earlier memory theories implicitly claimed that these representations are stable and accurate, recent demonstrations showed that representations are flexible and subject to immediate adaptation following exposure to new information (e.g., Carbon et al., 2007; Strobach & Carbon, 2013, Webster & MacLeod, 2011). Moreover, adaptation to other, conceptually related visual stimuli can still elicit measurable aftereffects (e.g., Ganis, Shendan, 2008; Ghuman et al., 2010; Cziráki et al., 2010). However, so far, the demonstration of flexible representations is largely limited to human faces and evidence

of adaptation effects in alternative categories is lacking. Therefore, the purpose of the study was to test whether adaptation effects could be extended to visual representations of complex natural objects beyond human faces. In this case, animal categories, i.e. crabs and lobsters were examined in adaptation paradigms previously used with human faces. Our results show not only adaptation but also priming effects, therefore, only a partial overlap with human faces. Based on these findings, we extend the phenomenon of flexible memory representations of complex natural objects, and indicate the unique nature of human faces.

Poster session: Language I

Time: Monday, 27/Mar/2017: 2:00pm - 3:00pm

M-34. Does our native language determine what we pay attention to? A cross-linguistic study of gaze behaviour between Korean and German speakers.

Florian Goller[1], Ulrich Ansorge[1], Soonja Choi[1,2]

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Languages differ in how they categorise spatial relations: While German differentiates between containment (in) and support (auf) with distinct spatial words – (a) den Kuli IN die Kappe (‘put pen in cap’); (b) die Kappe AUF den Kuli stecken (‘put cap on pen’) –, Korean uses a single spatial word (KKITA) collapsing across (a) and (b) into one semantic category, particularly when the spatial enclosure is tight-fit. Korean uses a different word (e.g., NEHTA) for loose-fits (e.g., apple in bowl). We tested whether these differences influence the attention of the speaker. In a cross-cultural study, we compared native German speakers with native Korean speakers. Participants rated the similarity of two successive video clips of several scenes where two objects were joined or nested (either in a tight or loose manner). The rating data show that Korean speakers base their judgement of similarity more on tight versus loose fit, whereas German speakers base their judgements more on containment and support (in vs. auf). Throughout the experiment, we also measured participants’ eye movements. Korean speakers looked equally often at the moving figure object and the stationary ground object equally often, whereas German speakers were more biased to look at the ground object. Additionally, Korean speakers also fixated more on the region where the two objects touched than did German speakers. We discuss our data in the light of cross-linguistic semantics and psychological theories of attention.

M-35. Is message congruency modulated by target and distractor modality? – Congruency facilitation effects in picture and sound categorization tasks.

Stefan Wöhner, Jörg D. Jescheniak, Andreas Mädebach

Leipzig University, Germany

Verbally categorizing a picture (e.g., picture: duck, response: bird) is facilitated by congruent compared to incongruent distractor words (e.g., distractor: duck vs. hammer). This facilitation effect has been attributed to response congruency of target and distractor processing. Previous studies suggest that response congruency effects are larger with visual than with auditory distractor words in picture categorization. From this observation one can derive the more general hypothesis that response congruency effects increase

when distractor words and targets are presented in the same modality (Hantsch, Jescheniak, & Schriefers, 2009). In the present study we tested this hypothesis by manipulating both target and distractor modality. Participants verbally categorized either pictures or natural sounds (e.g., picture: duck or sound: quaking, response: bird). Targets were presented with visual or auditory distractor words, which were either congruent (e.g., distractor word: duck) or incongruent to the response (e.g., distractor word: hammer). Responses were generally faster with congruent distractor words. Importantly, this facilitation was larger with visual distractor words than with auditory distractor words, regardless of target modality. These results suggest that response congruency effects in categorization tasks are not increased when distractor and target are presented in the same modality. Instead response congruency effects appear to be generally larger with visual distractor words.

M-36. Neurophysiological correlates of the interaction between language processing and motor control

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The Embodied Semantics Theory (EST) describes the dependence of human language comprehension on action and perception processes. According to this theory, processing of semantic information is embedded in primary and secondary motor and sensory brain areas. Therefore, the comprehension of semantic representations is only possible by including sensorimotor information of objects and actions (Gallese & Lakoff, 2005). In this study, we investigated whether even minimal semantic information without any link to concrete actions is multi-modally processed and whether it interacts with the planning and initiation of motor actions.

Various letter strings were presented to the participants (N=31, M=23J., 20w, all right-handed). For words, which represented a small (e.g., “cherry”) or big (e.g., “bottle”) graspable object of the real environment, the participants were instructed to grasp, lift and put down a cubical object placed in front of them corresponding to the word position on the display. The grip type (power or precision grip) depended on the object size (small/big). We collected behavioral data (i.e., reaction time (RT) and movement time (MT)) and event-related potentials (ERP) over the anterior premotor cortex.

We found a significant effect of word type for RTs and MTs. RTs and MTs were significantly lower after a 'big' word was presented. Furthermore, congruency effects (word type x grip type) were found for RTs and MTs and also for ERPs at different latencies. The interaction effect between language processing and motor behavior indicates that semantic processing activates cortical resources which are also involved in motor planning and execution. Our results support the EST. However, further studies are needed to investigate whether the observed interaction effects depend on motor facilitation or interfering effects.

M-37. The N400 and turn-taking - Neural underpinnings of language processing during dialogue

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Neurolinguistic setups usually assess one participant while listening to speech or reading text. Natural language usage, however, is interactive and characterized by constant turns between speaker and listener(s) [1]. The scarce number of studies assessing neural correlates of language during conversations [2] is mainly due to the challenge of combining the constraints of the neuroimaging device with the open nature of dialogues [3].

We here present a paradigm that enables to study some aspects of a dialogue while preserving sufficient constraints for the analysis of neural data. We measure the N400 effect [4], the difference in N400 amplitude between semantically expected and unexpected words, and the effect of a turn take (an essential part of dialogues) on its detectability. Since turn-taking can be active (i.e., oneself takes the turn) or passive (i.e., one listens to someone else taking the turn), both scenarios were assessed. We predict (1) that semantic violations lead to an N400 effect, (2) independent of the speaker-switch for the critical word, and (3) in both scenarios (active and passive).

Sixteen participants were measured in a passive (listening) and active (reading aloud) scenario with a wireless EEG system [5]. Sentences with semantically expected (75%) and unexpected (25%) final words were presented. Each final word had a speaker-switch (i.e., a turn take). In the reading aloud scenario the participant would read aloud the first seven words of the sentence and in the listening scenario he would listen to the first seven words of the sentence. In both scenarios the eighth (final and critical) word was presented auditorily by a different speaker.

We found a significant N400 effect (increased N400 for unexpected words compared to expected words) despite the speaker-switch for the critical word. As predicted, the N400 did not significantly interact with the scenario. An unexpected finding was an enhanced P200, significantly increased in the active scenario compared to the passive scenario. We attribute this finding to the salient auditory input [6], i.e. the speaker-switch, which is enhanced in the active scenario due to a switch in sound source (mouth vs. loudspeaker) and sound generation (internally vs. externally).

The presence of an N400 effect during a speaker-switch shows that this ERP can be used to study language in a conversational setup including turn takes. The speaker-switch during a turn take, however, might influence earlier components of the EEG. This study is a small step towards the understanding of language usage during conversations.

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M-38. Are there effector-specific experiential simulation effects beyond the word level?

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Theories of embodied language processing have gained support by studies showing that the processing of words associated with the hands or the feet (e.g., cup/shoe) have differential effects on hand and foot responses. Hand responses are faster to hand- than foot-words and foot responses are faster to foot- than hand-words. This finding can be explained by assuming that participants mentally simulated the word meaning, thereby facilitating responding when the effector associated with the word and the response effector matched. To support the claim that these simulations play a role in meaning composition, simulation effects beyond the level of individual words need to be shown. In the current experiment, participants made sensibility judgements to sentences using their hand or foot to respond. We used three types of sentences: sentences describing hand actions (events), sentences matched to these sentences and using the same verb but describing a state instead of an event, and sentences describing foot actions (events). If there were simulation effects beyond the word level, we would expect a similar effect of response effector on language processing as for the hand- and foot-words for the two kinds of event sentences but not for the state sentences. Preliminary data (N = 40) do not show such an interaction, arguing against effector-specific simulations on the sentence-level. However, participants responded faster to state sentences than to the matching event sentences, indicating that events might be overall harder to process than states.

M-39. Conflict during language processing

Carolin Dudschig, Barbara Kaup

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Human thought is traditionally considered as abstract, amodal and symbolic, alternative views assume that high-level human cognition is directly linked to basic, modal biological systems such as sensorimotor areas. Despite this influential representational debate very little is known regarding whether the mechanisms involved in controlling basic sensorimotor processing are also part of higher cognitive processes, for example language comprehension. Here we investigated negation processing to address two key questions (1) Does negation result in a conflict-like representation activating the to-be negated and the factual state of affairs? (2) Does negation trigger conflict adaptation effects in a similar manner to those known from general information processing conflict (e.g., Simon, Flanker)? Electrophysiological data indicated that negation results in initial activation of the to be negated information, suggesting that negation also triggers conflict-like information processing. Additionally, trial-by-trial adaptation patterns in both behavioral

and electrophysiological data were similar to the effects known from standard information processing paradigms. In summary, negation processing results in a standard conflict situation and recruits similar cognitive processes to other types of information processing conflict.

M-40. Grammatical-gender effects in noun-noun compound production: Evidence from picture-naming latencies and ERPs

Anna Maria Stroemich[1], Andreas Mädebach[2], Stefanie Regel[1], Rasha Abdel Rahman[1], Antje Lorenz[1]

[1]Humboldt Universität zu Berlin, Germany; [2]Universität Leipzig

Background: It is still a matter of debate whether the morphological structure of complex words, such as compounds, determines their lexical representation and processing. In the current study we examined how German compound nouns (e.g., Vogelhaus [birdhouse]) and their syntactic properties are lexically stored and processed in speech production using behavioural (picture naming latencies) and electrophysiological measures (EEG).

Methods: In order to examine whether the constituents are stored and processed independently at a syntactic level (i.e., the lemma level) we used gender-marked auditory determiner primes (der(masc), die(fem), das(neut) [the]) in a picture naming task with noun-noun compounds as targets. Compound targets with underlying constituents of different gender were included, such as Vogelhaus (Vogel: masc; Haus: neuter). Related determiner primes were congruent with either the head (das Haus) or the modifier (der Vogel) of the compound target (Vogelhaus), and their effects on compound naming were compared to gender-incongruent control determiners (die).

Results: The behavioural data revealed faster naming latencies for head-congruent determiners compared to gender-incongruent control determiners. However, no effects were obtained for modifier congruency.

Conclusion: The behavioural data, thus, does not corroborate constituent-specific representations of compounds at lemma level but is in line with holistic compound lemmas. The EEG data is in the process of being analysed and will be presented.

M-41. Producing "duck" and activating "bird": Do prior naming episodes shape lexical activation patterns in word production?

Franziska Kurtz[1], Herbert Schriefers[2], Andreas Mädebach[1], Jörg D. Jescheniak[1]

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Recent studies have shown that during object naming alternative object names, which are not produced by a speaker, become nevertheless phonologically co-activated during speech planning (e.g., the name "bird" when the produced name is "duck" and vice versa). The present study investigated whether the co-activation of such naming alternatives can be attenuated, when speakers consistently only use one particular name for a picture in a number of naming episodes. In two picture-word interference experiments we measured the phonological co-activation of basic-level naming alternatives when pictures were named at the subordinate-level (Experiment 1) and of subordinate-level naming alternatives when pictures were named at the basic-level (Experiment 2). We implemented 25 repetition cycles and measured the phonological co-activation of naming alternatives at 4 different points in time. If the pattern of lexical activation is shaped by previous naming episodes, then the phonological co-activation of the non-target naming alternatives should decrease over repetitions. Contrary to this prediction, phonological co-activation effects

remained stable across the whole experiment. This suggests that, at least for fully adequate alternative object names, lexical activation patterns are largely unaffected by recent naming episodes.

M-43. Does explicit instruction facilitate the acquisition of a novel language? Insights from cross-situational statistical learning

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When learning a new language, the role of instruction is to optimize the learning process. A frequently discussed question in this context is whether explicit instruction about the target structure promotes learning. Various studies came to different conclusions about the role of explicit grammar instruction, mostly arguing for a beneficial effect (e.g. Rogers, Révéz & Rebuschat, 2014, Ellis, 2015).

We investigated whether explicit instruction promotes different aspects of language learning and if so, which kind of explicit instruction is most promising. We used the cross situational learning paradigm (CSL, e.g. Yu & Smith, 2007, Monaghan et al. 2015) with Latin sentences (subject, object, verb with varying word endings for singular/plural and subject/object) in a natural language learning setting. Participants were presented with two pictures while hearing a sentence, and were asked to indicate which of the pictures matched the meaning of the sentence. Participants did not receive feedback with regard to the accuracy of their response; they learned to map sentences and pictures by keeping track of cross-trial statistics.

We tested three groups of participants (N = 90). The implicit group performed the CSL task without knowing about the target structure. The partially-explicit group was informed that the endings of the words in the sentence indicated agent-patient assignment. The fully-explicit group was pre-taught the morphological endings and their function. Learning of vocabulary, morphology and syntax was assessed by a battery of tests.

Preliminary results revealed that all groups acquired the syntax and the vocabulary. The fully-explicit group outperformed the other groups in the vocabulary test. All groups were able to distinguish singular from plural forms, even though no group had received instruction about numerus. In contrast, only the fully-explicit group was able to correctly identify subject and object endings.

These findings suggest that explicit instruction about grammatical structures promotes their acquisition, even if this knowledge is not required for successfully performing the task. In addition, such an explicit instruction about the grammatical structures also seems to facilitate vocabulary acquisition. Implications for models of language learning will be discussed.

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M-44. Predicting naming speed performance in Thai children based on attention, gender, and family income.

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The naming speed is one of the most important predictors for reading skills in children. It relates to semantic decoding, word identification, and attention. This study explores

naming speed and performance in the attention network test (ANT) in combination with gender, attention and family income of 129 children (aged 5-7 years) in Thailand. We found no impact for gender on either naming speed or ANT performance. A regression analysis revealed that the naming speed could be predicted by accuracy and reaction time in The ANT, gender, and monthly family income. Income was the most significant factor in naming speed. However, adding the accuracy of ANT and gender to the regression model increased the prediction in naming speed, by contrast reaction time was excluded from this model. The final model was statistically significant, revealing that attention network, gender, and family income could explain for 18.8 percent of the variance in naming speed (adjust R2 = .118, p<.05). The interpretation of relationship is helpful to better understand which children may have reading difficulties in the future.

Poster session: Memory

Time: Monday, 27/Mar/2017: 2:00pm - 3:00pm

M-45. Part-List Cuing Effects in Older Adults' Episodic Memory

Alp Aslan, Thomas John

Martin Luther University Halle-Wittenberg, Germany

The presentation of a subset of previously studied information as a retrieval cue at test (= part-list cuing) can affect memory for the remaining information. Specifically, research with young adults has shown that the mnemonic effect of part-list cuing depends on study context access, being detrimental when context access is maintained, but beneficial when context access is impaired. The present study examined these two opposing effects of part-list cuing in older age, using listwise directed forgetting to manipulate study context access. Younger and older adults (55-80 years) studied an item list consisting of predefined target and nontarget items and, after study, were asked to either forget or continue remembering the list. After presentation of a second list, participants' memory for the target items from the first list was tested, either in the presence or absence of the list's remaining (nontarget) items serving as part-list cues. The presentation of part-list cues impaired recall of to-be-remembered target items in both age groups, but improved recall of to-be-forgotten target items only in the younger but not the older adults. The results suggest an age-related dissociation between the two opposing effects of part-list cuing, indicating earlier decline of the beneficial than the detrimental effect with older age.

M-46. The Effects of Part-List Cuing in Children

Thomas John, Alp Aslan

Martin Luther University Halle-Wittenberg, Germany

Providing a subset of previously learned information as a retrieval cue at test can affect memory for the remaining information. In particular, previous work with adults has shown that the mnemonic effect of such part-list cuing depends on study context access, being detrimental when context access is maintained, but beneficial when context access is impaired. The present study examined these two opposing effects of part-list cuing in children. Using listwise directed forgetting to manipulate study context access, second and fourth graders and young adults studied a list of items and, after study, were asked to either forget or continue remembering the list. After presentation of a second list, participants were tested on predefined target items from the original list, either in the presence or absence of the list's remaining (nontarget) items serving as part-list cues. Results revealed that although part-list cuing impaired recall of to-be-remembered target

items regardless of age, it facilitated recall of to-be-forgotten target items only in the adult but not the two children groups. The present findings suggest a developmental dissociation between the two opposing effects of part-list cuing, indicating that elementary school children show the one (detrimental) but not the other (beneficial) effect of part-list cuing.

M-47. Effects of Acute Stress on Emotional Memory in Children

Yee Lee Shing[1,2], Destina S. Ay[1], Johannes Falck[1], Friederike Fenski[1], Mara Mather[3], Christine Heim[4,5]

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When encountering a scene with emotional content, our memory for the emotional component often is enhanced, whereas memory for peripheral, neutral details is reduced. This trade-off effect has been investigated in young and old adults, but not in children. Therefore, the aim of the current study was to examine children's memory for scenes with emotional content. Furthermore, we tested to what extent the experience of stress prior to encoding may enhance the trade-off effect, due to the amplifying effects of arousal-induced norepinephrine on prioritised representations, such as those with emotional content (Mather et al., 2015). Here, 6- and 7-year-old children (n = 101) incidentally encoded objects of positive, neutral or negative valence on a neutral scene background. Before encoding, stress was elicited by administering the Trier Social Stress Test for Children (TSST-C). Memory for both objects and scenes was tested the next day in a recognition task. In line with previous research, our results showed that objects with higher negative valence are remembered better, and the memory for the corresponding neutral scene was worse. Preliminary results also suggest a positive relationship between the extent of experienced stress (based on the experimenter's rating of stressed behaviour during TSST-C) and the memory trade-off effect. Further analyses will include cortisol reactivity to TSST-C as a predictor of memory performance.

M-48. Acute social stress before the planning phase improves memory performance in a complex real life-related prospective memory task

Katharina Glienke

University of Witten/Herdecke, Germany

Successful execution of intentions, but also the failure to recall are common phenomena in everyday life. The planning, retention, and realization of intentions are often framed as the scientific concept of prospective memory. The current study aimed to examine the influence of acute stress on key dimensions of complex "real life" prospective memory. To this end, we applied a prospective memory task that involved the planning, retention, and performance of intentions during a fictional holiday week. Forty healthy males participated in the study. Half of the subjects were stressed with the Socially Evaluated Cold Pressor Test (SECPT) before the planning of intentions, and the other half of the participants underwent a control procedure at the same time. Salivary cortisol was used to measure the effectiveness of the SECPT stress induction. Stressed participants did not differ from controls in planning accuracy. However, when we compared stressed participants with controls during prospective memory retrieval, we found statistically significant differences in PM across the performance phase. Participants treated with the SECPT procedure

before the planning phase showed improved prospective memory retrieval over time, while performance of controls declined. Particularly, there was a significant difference between the stress and control group for the last two days of the holiday week. Interestingly, control participants showed significantly better performance for early than later learned items, which could be an indicator of a primacy effect. This differential effect of stress on performance was also found in time- and event-dependent prospective memory.

Our results demonstrate for the first time, that acute stress induced before the planning phase may improve prospective memory over the time course of the performance phase in time- and event- dependent prospective memory. Our data thus indicate that prospective memory can be enhanced by acute stress.

M-49. Evidence for a massive storage capacity for object details in haptic long-term memory

Fabian Hutmacher, Christof Kuhbandner

Universität Regensburg, Germany

It has previously been demonstrated that our visual long-term memory is capable of storing details of a vast number of objects (e.g. Brady, Konkle, Alvarez, & Oliva, 2008). We wanted to know whether the same applies to our haptic long-term memory. Hence, our blindfolded participants haptically explored a wide range of real-world objects (e.g. a pen). Afterwards, their memory for these objects was tested using a two-alternative forced choice task (2AFC). The participants performed both an immediate and a delayed test: Memory for half of the objects was tested directly after exploring the objects; memory for the other half was tested one week later. During the 2AFC, the previously presented object was paired with an object of the same basic-level category, that is, the participants had to decide whether they had touched this pen or that pen before, for instance. Performance was remarkably high and remained well above chance even after one week, indicating that not only our visual but also our haptic long-term memory has a massive storage capacity for object details.

M-50. Is foreign language attrition a special case of retrieval-induced forgetting?

Anne Mickan, Kristin Lemhöfer, James McQueen

Donders Institute for Brain, Cognition and Behavior, Nijmegen, The Netherlands,

While mechanisms of foreign language (L2) acquisition are currently intensively investigated, knowledge regarding the process of L2 attrition, the phenomenon of forgetting words from a foreign language, is scarce. Previous research on attrition has prioritized the formal documentation of the phenomenon, but has done little to unravel its underlying cognitive mechanisms. This study takes a memory perspective on the issue and, for the first time, assesses domain-general theories of forgetting in their application to L2 lexical attrition.

Most applicable to the L2-scenario are competition-based theories of forgetting. They posit that retrieval inability for a given memory is primarily driven by interference and competition from other memories. Repeated retrieval of a set of items, for example, is known to lead to impaired recall for semantically related, but unpracticed items; an effect known as retrieval-induced forgetting (RIF). Regarding L2 attrition, the question arises whether it is the repeated retrieval of and thus the interference from translation equivalents in other languages, like the dominant mother tongue (L1) or other foreign languages (L2+), that causes subsequent forgetting / retrieval failure for L2 words.

In a two-day design, we manipulated the presence of L1/L2+ interference and assessed its consequence for L2 vocabulary retention. Dutch native speakers first learned a set of new Spanish words. A day later, after consolidation, they were asked to name half of these items again in either Dutch or English (L2+). In a final test, memory for all items was tested again in Spanish. If interference is responsible for L2 attrition, recall scores should be significantly worse for words that received interference than for words that did not. Furthermore, performance comparisons of the two language groups will shed light on whether the language of interference makes a difference and if so, which interferes the most: the dominant L1 or a much weaker L2+.

M-51. Testing the resting effect with second language learning material

Markus Martini, Benjamin Riedlsperger, Pierre Sachse

University of Innsbruck, Austria

Evidence exists that brief wakeful resting after learning enhances memory over the long term. In the present study (N = 31) we tested the resting effect with second language learning material. Participants with German as their first language were presented with two stories written in English; one story was followed by a 8 –min period of wakeful resting, and the other was followed by a 8-min period during which participants performed a visual error search task. A surprised free recall test took place after 7 days. Our results showed that wakeful resting did not lead to a significant enhancement of memory after 7 days. Memory for story details learned in the second language was not affected by the cognitive activity participants were engaged in shortly after new learning. Our findings significantly contribute to a better understanding of the resting effect in younger adults.

M-52. False recognition in short-term memory is in part due to encoding errors

Philipp Musfeld, Frederik Aust, Christoph Stahl

University of Cologne

False recognition is a robust phenomenon often accompanied by strong feelings of confidence. False memories can also be elicited in short-term memory (STM), as shown recently with DRM lists and photographs of faces and objects. The short presentation times used in STM experiments raise the question if false recognition effects in these studies are indeed caused by retrieval errors or by imperfect encoding. In a preregistered experiment using a sequential Bayesian analysis we estimated the contribution of encoding errors by minimizing STM demands. We briefly presented words (images) pre-masked by one, two, or three and post-masked by one non-word (unrelated image). Presentation times corresponded to those reported in STM false recognition experiments. Participants were immediately probed with the previously presented, a similar, or an unrelated item in an old-new-recognition task. We observed false recognition for categorized word lists and photographs immediately following masked presentation of a single category exemplar; there was evidence against false recognition for DRM lists. Our findings suggest that false recognition in STM is in part due to imperfect encoding, i.e. occurs with single exemplars and brief unfilled retention intervals, and in part due to retrieval errors.

M-53. Does Semantic Organization underlie the Mere Ownership Effect? Evidence from Clustering in Free Recall.

Charlotte Diekmann[1], Julia Valerie Englert[1,2], Dirk Wentura[1]

[1]Saarland University; [2]FernUniversität in Hagen

If an object is arbitrarily assigned to the self it is more likely to be remembered. A meaningful connection to one's person does not appear necessary – mere ownership is sufficient for a memory advantage (Mere Ownership Effect; Cunningham et al. 2008). Typically, the Mere Ownership Effect is demonstrated in the context of a recognition task. A theoretical question is whether or no the Mere Ownership effect can be interpreted in a similar way as the classic Self-reference Effect (Rogers, Kuiper & Kirker, 1977). This memory advantage produced by self-referential encoding is typically understood within the framework of Levels of processing theory (Craik & Lockhart, 1972) – as a result of "deeper" and more elaborate processing during encoding.

Earlier experiments by Englert & Wentura (2016b) could show that "semantic processability" of the learning material appears to be a prerequisite for the Mere Ownership effect. However, we did not obtain independet evidence of enhanced semantic elaboration of self-assigned stimuli. Another mechanism that is thought to partially drive the self-reference effect and for which tentative evidence has been found in the context of the Mere Ownership Effect, is semantic organization, i.e. the structuring of the to-be-leanred material either by linking the individual stimuli with each other or by linking them to their superordinate categories (Einstein & Hunt, 1980; Klein & Kihlstrom, 1986). This organization allows stimuli of the same category to function as retrieval cues for each other. Thus, semantic organization should manifest itself in a greater likelihood for stimuli been thus associated to be re-produced in close proximity to each other at retrieval (Clustering). Using free recall as the retrieval task, we could demonstrate a mere ownership effect in a different memory paradigm. In addition, there was evidence for semantic organisation: Objects that had been assigned to the self showed greater clustering than objects that had been assigned to another or no person (Englert & Wentura, 2016b).

M-54. A comparison of different methods for the estimation of individual differences in young and older adults' hindsight bias

Nina R. Arnold[1], Julia Groß[2]

[1]University of Mannheim, Germany; [2]Heinrich-Heine Universität Düsseldorf

Once we have acquired new knowledge about facts, it is difficult to accurately recall our prior knowledge of these facts. Specifically, we tend to overestimate what we knew beforehand. In a typical study investigating hindsight bias, participants provide judgments to difficult questions (e.g., "How long is the Panama Canal (in km)?") and must later recall these judgments. For experimental items, as opposed to control items, the correct solution is provided before recall. In this case, participants typically recall their prior judgments with lower probability (recollection bias), and they typically reconstruct their prior judgments with bias towards the solution, if recollection fails (reconstruction bias). The multinomial processing tree (MPT) model of hindsight bias (Erdfelder & Buchner, 1998) can separate the contribution of both biases to hindsight bias. With recent developments in hierarchical MPT modeling, researchers are able to obtain individual parameter estimates and analyze their relationship with external predictors. However, it is currently not known whether the

various existing hierarchical MPT approaches produce comparable results when applied to the same empirical data. Here we present results of three modeling approaches that we applied to hindsight-bias data of young and older adults (Groß & Bayen, unpublished data): the latent-trait approach (Klauer, 2010), the beta-MPT approach (Smith & Batchelder, 2008), and a regression-based approach (Coolin et al., 2015). We present individual and age-group parameter estimates of recollection and reconstruction bias, and their relationship with solution requests - an indicator of an intentional task-execution strategy. We compare the conclusions of each modeling approach and discuss applicability to hindsight-bias data.

Poster session: Motivation and volition

Time: Monday, 27/Mar/2017: 2:00pm - 3:00pm

M-55. Testing different methods to manipulate participants' belief in free will

Wiebke Melcher, Marie Kristin Wett, Katharina Stöber, Hans-Rüdiger Pfister, Rainer Höger

Leuphana University of Lüneburg, Germany

Belief in free will has been shown to have impacts on cognitive functions, behavior, emotions and attributions of moral responsibility, e. g. cheating (Vohs & Schooler, 2008), helping behavior (Baumeister, Masicampo, & DeWall, 2009), preconscious motor preparation (Rigoni, Kuhn, Sartori, & Brass, 2011), action monitoring (Rigoni, Wilquin, Brass, & Burle, 2013), conformity (Alquist, Ainsworth, & Baumeister, 2013), gratitude (MacKenzie, Vohs, & Baumeister, 2014), and support for retributive punishment (Shariff et al., 2014). Published replication studies on these findings as well as empirical evidence from German speaking samples are sparse. Three experiments were conducted to manipulate belief in free will in a German speaking sample. The manipulation methods were adapted from Vohs & Schooler (2008) who induced disbelief in free will in two different ways, reading of text passages and a classic Velten-style mood induction procedure (Velten, 1968). Participants answered either two items on a visual analogue scale or completed the FAD–Plus (a 27-item measure of lay beliefs in free will, Paulhus & Carey, 2011), serving as measures of manipulation effectiveness. In experiment 1, participants read either a text claiming that free will is just an illusion (experimental group, n=35) or a neutral text (control group, n=36). In Experiment 2, participants were asked to rewrite deterministic statements (n=25), statements endorsing free will (n=24) or neutral statements (n=26). Similar statements were used in experiment 3, but the experiment was conducted online resulting in a higher sample size (deterministic group: n=87; free will group (n=104); control group: n=118). Significant differences between experimental groups with respect to belief in free will and belief in determinism were found only in experiment 3. Demographic differences between the samples as well as implications on further research will be discussed.

M-56. Power-ap(p): A motivating application for strength training and stress reduction

Konstantin Tristan Daniel Schenkel, Katrin Neuheuser, Joachim Vogt

TU Darmstadt, Germany

The increase of psychological loads and strains was reported repeatedly. However, regular physical exercise can support health resources. A health-application was

developed to train and activate physical and mental health using a program for body and mind. The goal was to motivate smartphone users to perform strength training and relaxation sustainably. It is assumed that well-being, health-status and sleeping-quality will be improved by motivating strength and relaxing training. For an improved body perception the participants might develop an enhanced motivation and volition to succeed and pursue strength training. Based on a Motivation and Volition-concept the exercise program encompasses motivational and volitional strategies to initiate, perform, and keep up physical and stress-reducing exercises. Here, 14 healthy subjects attended a four weeks lasting program performing strength and relaxation trainings twice per week using outdoor sports equipment. Participants trained the entire body within one week, repeated weekly. Motivational objectives were set to gain ones sporting success. A significantly improved vitality (indicating body perception), significantly increased well-being, a trend for better mental and stress relieved health status, but no diversification of physical health status were confirmed. Partially improvement on motivation and volition could be proved, e.g. the initiation of self-efficacy was significantly increased. Sleeping quality was not affected. The results indicate that the intervention has a major effect on physical and mental health. Future research should consider extended sample size with more heterogeneous subjects varying in age and physical conditions. Effects of sustainability should be measured in follow-up-surveys.

M-57. HAVING motivation or BEING motivated? Carryover effects of having and being goals on intrinsic and extrinsic motivation.

Olga Skrebec, Jessica Lang, Jens Förster

Ruhr-University Bochum, Germany

The current study addresses the question whether having and being goals engender intrinsic and extrinsic motivation. We suggest that focusing on being goals increases intrinsic motivation while focusing on having goals enhances extrinsic motivation, specifically work related motivation. Procedural priming including these goals should thus induce different types of motivation in following goal-unrelated tasks. To test this hypothesis two separate primings for each type of goal were designed consisting of three elements. First, participants were instructed to write down their personal having or being goals and prioritize them regarding their subjective importance in a second step. Participants were then asked to imagine the first three goals as realistically as possible to enhance the priming effect. Since the study was conducted online we put emphasis on the intensity of the priming by using three different instructions. 121 employees were recruited. Intrinsic motivation was measured by using a visual searching task to assess the time participants spent on solving the picture puzzle, especially on highly difficult and insolvable items. In addition self-reported interest, perceived competence, perceived choice and felt pressure were rated. Another behavioral indicator was a choice participants made between working on further picture puzzles and reading an article. Extrinsic and intrinsic work motivation was assessed with additional questionnaires. The behavioral measures showed that accessibility of being goals enhanced intrinsic motivation significantly. Moreover participants reported more interest in the searching task after focusing on their being goals. In contrast higher accessibility of having goals increased extrinsic work motivation. To conclude having and being goals have different impacts on motivational processes which points to a connection between being and intrinsic motivation as well as having and extrinsic motivation.

M-58. Regulatory Focus Theory and the Endorsement of Material Values

Stephanie Hanke, Jens Förster

Ruhr University Bochum, Germany

Materialism refers to a set of centrally held beliefs about the importance of possessions in one's life. That is, materialists place possessions and their acquisition at the center of their lives and view possessions and their acquisition as essential to their satisfaction and well-being. Researchers argue that materialism may serve as a coping mechanism for individuals whose need for self-worth, safety, and competency is unsatisfied. Moreover, individuals often focus on materialistic values when they experience self-doubt and are tormented by feelings of self-inadequacy. Human motivation plays a major role when it comes to the endorsement of personal values. One well-established area of research in motivation is the regulatory focus theory which proposes two fundamental motivational orientations individuals can pursue during self-regulation: a promotion focus which relates to accomplishments and hopes, and a prevention focus which relates to safety and responsibilities.

The present research investigates the effects of regulatory focus on the endorsement of material values. In this study, a promotion/prevention focus was experimentally induced by giving participants an anagram task with a promotion focus framing, or a prevention focus framing, respectively. Following the experimental manipulation, subjects indicated their agreement with several materialistic statements. As expected, participants in an induced promotion focus showed greater materialistic tendencies compared to promotion focused individuals. Further results are discussed. The results indicate that self-regulatory theory offers new opportunities for the prediction and the influencing of materialistic orientations, and might open up new perspectives for the prediction of consumer behavior.

M-59. How to induce and physiologically measure appetite

Annegret Börner, Christian Kaernbach

Christian-Albrechts-Universität, Germany

Scales of appetite usually apply to subjective ratings or questionnaires. This study provides a physiological measure of appetite using changes of salivary responses in men and women. If salivation increases in appetizing encounters, swallowing frequencies should rise as well. Therefore participants were exposed to pictures of palatable food or neutral landscapes and the number of swallows between these two sections was compared. Furthermore electromyographical activity of the digastricus and infrahyoid muscles were monitored to allow for technical counting of the swallows. To verify the gain of salivation induced only by individually high rated food pictures we also quantified the amount of salivation during each type of stimulation in a second session. Participants had to opress swallowing for ten minutes and collect their saliva in a small cup. Results indicate that changes in swallowing frequency can be used as a sensitive measure for appetite and salivation.

Poster session: Perception

Time: Monday, 27/Mar/2017: 2:00pm - 3:00pm

M-60. Real-world Motion Responses in Scene Responsive Regions

Didem Korkmaz-Hacialihafiz[1,2,4], Andreas Bartels[2,3,4]

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We perceive scenes as stable even when eye movements induce retinal motion, for example during pursuit of a moving object. Mechanisms mediating perceptual stability have primarily been examined in motion regions of the dorsal visual pathway. Here we examined whether motion responses in human scene regions are encoded in eye- or world centered reference frames. We recorded brain responses in human participants using fMRI while they performed a well-controlled visual pursuit paradigm previously used to examine dorsal motion regions. In addition, we examined effects of content by using either natural scenes or their Fourier scrambles. We found that parahippocampal place area (PPA) responded to motion only in world- but not in eye-centered coordinates, regardless of scene content. The occipital place area (OPA) responded to both, objective and retinal motion equally, and retrosplenial cortex (RSC) had no motion responses but responded to pursuit. Only PPA's objective motion responses were higher during scenes than scrambled images, although there was a similar trend in OPA. These results indicate a special role of PPA in representing its content in real-world coordinates. Our results question a strict subdivision of dorsal "what" and ventral "where" streams, and suggest a role of PPA in contributing to perceptual stability.

M-61. Stimulus probability and task requirements modulate visually induced auditory expectations

Maria Viktoria Stuckenberg[1,2], Andreas Widmann[1], Erich Schröger[1]

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The human auditory system establishes sensory representations of expected auditory events based on predictive visual information. The amplitude of the N1 auditory evoked potential, observed around 100 ms after sound onset, has been shown to be enhanced in response to unexpected compared to expected but otherwise identical sounds. This amplitude difference was interpreted as enhanced prediction error signal for unexpected sounds in the predictive coding framework and termed Incongruency Response (IR). Here we examined the impact of sound probability and task requirements on the elicitation of the IR. Each sound was preceded by a note symbol either presented above or below a fixation cross followed by a tone of either high or low pitch (stimulus-asynchrony 600 ms). In 90% of the trials the visual symbol correctly predicted the pitch of the upcoming sound (congruent sounds), whereas in 10% of the trials the sound was predicted incorrectly (incongruent sounds). High and low pitch sounds were presented with equal (50% each) probability in one condition and with different probabilities (83.3 vs. 16.7%) in another condition (balanced across subjects). Subjects had to discriminate low vs. high pitch sounds in half of the blocks and congruent vs. incongruent sounds in the other half. In both

task conditions subjects were asked to use the visual symbol to prepare for the sound in order to respond as fast as possible. Results show that the task had only minor impact on the IR. Importantly, a significant IR for unexpected (rare visual cue before frequent tone) compared to expected (frequent visual cue before frequent tone) sounds was confined to the condition with unequal stimulus probabilities. We suggest that the IR only elicited in the unequal probability condition results from mismatching an improved visually induced expectation for frequent stimuli: it is easier to induce an auditory expectation by a visual cue when an established auditory representation can be re-activated.

M-62. Should priming, prime discrimination, and prime visibility be measured on the same trial? Loss of double dissociations under triple-task conditions.

Melanie Schröder, Thomas Schmidt

Technische Universität Kaiserslautern, Germany

In masked priming experiments, speeded responses to the target, prime discrimination performance, and awareness ratings are sometimes measured within the same trial (Peremen & Lamy, 2014). We compared performance in this triple task with those in single tasks administered in separate trials. Participants discriminated the shapes of primes and targets (square or diamond), and performed subjective visibility ratings under metacontrast masking at varying prime-target SOAs. In the triple task condition, mean response times were about 150 ms slower compared to single task performance. Additionally, priming effects and prime visibility ratings increased simultaneously in the triple task condition. In contrast, in the single task condition prime discrimination performance decreased while priming effects increased with SOA. Strikingly, this double dissociation was lost under triple task conditions because prime discrimination now increased with SOA. We conclude that the requirements of triple task performance cause massive cognitive costs that evoke qualitative changes in the effects, making it more difficult to detect evidence of unconscious perception.

M-63. MMN and predictive coding: The role of local and global tone probabilities

Merle Deutschmann, Ian Grant Mackenzie, Hartmut Leuthold

University of Tübingen, Germany

The mismatch negativity (MMN) is a negative going ERP potential occurring approximately 100-150 ms following the onset of a tone that typically deviates in a physical sound feature from the preceding sequence of repeated standard tones. Traditional paradigms (and theoretical models) conceptualise the MMN as a form of deviance detection (i.e., standard vs. deviant) with a larger MMN being elicited by deviants compared to frequently occurring tones. However, the MMN can also be elicited by standard tones that are unexpected. Such results highlight that the MMN is likely to index properties that extend beyond basic stimulus input features such as probability and additionally, index higher-order level features such as local and global predictability. Indeed, recent models of MMN adopt the framework of predictive coding, assuming that MMN amplitude indexes the size of the error between the internal prediction and the subsequent stimulus input. We tested the predictions of the predictive coding model of the MMN in two experiments. Experiment 1 investigated MMN amplitude within short 5 tone sequences. The standard sequence (33334) was presented frequently (85%) whereas the deviant sequences (33333, 33332, 33331) were infrequent. If the MMN indexes a prediction-type signal, an MMN should be observed to the less probable (3, 2, 1) compared to the probable final tone (4) and MMN

amplitude should increase with the distance from the prediction. Experiment 2 adopted the same rationale whilst keeping the local probabilities across the stimulus sequences equal by using predictably alternating 6 tone sequences (e.g., 121212, 434343) and sequences that violate this prediction (e.g., 121213, 414142). The experimental manipulations resulted in MMN amplitudes that varied according to both the generated expectancy and the size difference between the expected input and the actual input. The results are discussed within the framework of predictive processing in relation to MMN amplitude.

M-64. The influence of automatic spatial attention on object correspondence in the Ternus display

Madeleine Stepper, Elisabeth Hein

Universität Tübingen, Germany

Our visual system is able to establish associations between images across time and to maintain the identity of an object despite ambiguous information on the retina. Solving this correspondence problem can be influenced by a variety of factors including higher-level factors such as visual working memory (Hein, Hollingworth & Moore, 2013). This influence might be mediated by attention (Hein & Moore, 2014). To test the influence of spatial attention on solving correspondence we directed attention automatically with exogenous cues to particular elements of the Ternus display (Ternus, 1926; Pikler 1917). The Ternus display is an ambiguous apparent motion display, in which dependent how correspondence is solved either the elements can be perceived as moving together as a group (group motion) or one element jumping across the others (element motion). We expected that a stronger weighting of the attended element would lead to a change in the proportion of perceived group motion depending on which element was attended. The results, however, showed no effect of exogenous attentional shifts on correspondence. This lack of an influence could indicate that exogenous attention operates at another processing level than correspondence and thus does not necessarily provide evidence against an attention mediated correspondence process.

Acknowledgement

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M-65. How the context influences direct and indirect measures of correspondence in the Ternus display

Elisabeth Hein, Bettina Rolke, Madeleine Stepper

University of Tübingen, Germany

The visual system is able to create stable object representations by interpreting different instances of an object across space and time as one and the same object. This correspondence process has been shown to be dependent on low-level factors, as for example luminance contrast, but also on higher-level factors as for example the perceived lightness of the objects. Unfortunately, most manipulations of higher-level factors affect low-level factors as well. In two experiments, we tried to separate the influences of the two levels of factors by manipulating the context prior to presenting the same physical stimuli. To study correspondence we used the Ternus display, an ambiguous apparent motion display, in which three elements are presented from one frame to the next, shifted by one position and separated by a variable inter-stimulus interval (ISI). Depending on the ISI the elements can be perceived as one element jumping across the other two (element motion) or as three elements moving together as a group (group motion). What specific motion percept is seen indicates how correspondence between the elements had been resolved.

We manipulated the context of the Ternus elements by presenting a short movie in the beginning of each trial. In this movie either all Ternus elements moved together along the same random motion trajectory across the screen (common context) or the elements each moved independently following different motion trajectories (separate context). After the movie the to be judged Ternus display was presented. In Experiment 1 we asked participants to directly indicate whether they perceived element or group motion, while in Experiment 2 we used a discrimination task as an indirect measure for the motion percept. We found an influence of the context in both experiments, which suggests that higher-level factors can indeed influence correspondence even if low-level factors are identical across conditions.

Acknowledgement: This research was supported by DFG project HE 7543/1-1

M-66. Phase coupling between posterior EEG theta and gamma as a signature of predictive coding

Anna Lena Biel, Tamas Minarik, Barbara Berger, Paul Sauseng

Ludwig-Maximilians-Universität München, Germany

Cross-frequency synchronization between theta and gamma band EEG oscillations has been proposed to serve matching processes between prediction and sensation in visual perception. In this study, we investigated how matching of mental templates from working memory to sensory input is affected by the certainty about which activated template must be matched. In a visual search paradigm, we compared cross-frequency phase coupling for conditions where participants had to keep either one or multiple templates in mind for successful search. We find that memory matching appeared as a transient posterior phase-synchronization between EEG theta and gamma oscillations in an early time window after search display presentation, around 100-150 ms. Our results suggest a stronger transient phase-synchronization of theta and gamma over posterior sites contralateral to target presentation for conditions where one mental template was required than for multiple templates. This is understood in line with previous theoretical accounts, lending promising support for such transient phase coupling between posterior theta and gamma as a neuronal correlate of matching of incoming sensory information with memory contents from working memory.

M-67. Learning when to blink: Environmental statistics guide blinking behavior.

David Hoppe[1], Stefan Helfmann[1], Constantin A. Rothkopf[1,2,3]

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Our eyes blink 15 – 17 times per minute [1] and during this time the stream of visual information is interrupted for 100-400 ms [1] leading to perceptual gaps every two to three seconds. There are numerous situation in which these gaps can lead to negative outcomes including in motor control, fight and flight scenarios, and social interaction [2]. Hence, choosing carefully when to blink should be advantageous compared to blinking at random.

Various studies indicate a connection between the current behavioral situation and blinking. Blinking rates have been found to decrease during reading but to increase during conversations [3] and when fatigued [4]. Further, blinking behavior is influenced by task difficulty [5] and whether the visual input is meaningful to a person [6]. While there exist a

lot of empirical work pointing to the connection between blinking and the visual environment, the environmental regularities are usually complex and unknown.

We present a controlled blinking experiment with parametrically generated environmental statistics. In our study, subjects directed their gaze to a grey dot moving on a circular trajectory (100 laps per block) in order to detect events (50 ms in duration). Hence, a normal blink could lead to missing an event. By probabilistically drawing events from spatial probability distributions we could investigate the relationship between event-statistics and blinks.

Our results show a clear connection between blinking rates and environmental statistics. Subjects were able to learn regularities in the event generating process and as a consequence adapted their behavior. In addition to the behavioral results we investigated the blinking process by developing a computational model. We show that uncertainty about the statistics as well as costs for blink suppression are sufficient to reproduce key characteristics of the blinking behavior. Remarkably, our computational model predicts various aspects of the visual behavior such as the distribution of time intervals between blinking.

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Poster session: Working memory

Time: Monday, 27/Mar/2017: 2:00pm - 3:00pm

M-68. Working memory capacity does not predict distraction by changing-state or deviant sounds

Ulrike Körner, Raoul Bell, Jan Philipp Röer, Axel Buchner

Heinrich Heine University Düsseldorf, Germany

The duplex-mechanism account states that there are two fundamentally different types of auditory distraction. The disruption by a sequence of changing auditory distractors (the changing-state effect) is attributed to the obligatory processing of the to-be-ignored information, which automatically interferes with short-term memory. The disruption by a sequence with a single deviant auditory distractor (the deviation effect), in contrast, is attributed to attentional capture. This account predicts that working memory capacity (WMC) is differentially related to the changing-state effect and to the deviation effect: The changing-state effect is assumed to be immune to cognitive control and thus to be unrelated to WMC. The deviation effect, in contrast, is assumed to be open to cognitive control and thus to be negatively related to WMC. This hypothesis was tested in the present study, which included several methodological improvements over previous studies (large sample sizes, a composite measure of WMC, and a direct statistical comparison of

the correlations). There was no evidence of a dissociation between the changing-state effect and the deviation effect. WMC was unrelated both to the size of the changing-state effect and to the size of the deviation effect, irrespective of whether simple stimuli (letters, Experiment 1) or complex stimuli (words and sentences, Experiment 2) were used as auditory distractors. The results disconfirm the idea that the two types of auditory distraction show a differential relationship with WMC.

M-69. The German translations of the complex span tasks: Reliability, validity, and a test of measurement equivalence with the original task versions

Jan Rummel[1], Lena Steindorf[1], Ivan Marevic[1], Daniel Danner[2]

[1]Heidelberg University, Germany; [2]GESIS Mannheim, Germany

Working memory capacity (WMC) is the mental ability to maintain and manipulate information at the same time. WMC has not only been shown to be an important predictor of higher-order cognition, such as intelligence or problem solving skills, but also to be related to performances in a variety of basic cognitive tasks. Over recent years, experimental psychologist have thus become more and more interested in assessing and controlling for WMC in their studies. Different tasks can be used to assess WMC but the most widely used indicators of WMC are the so called complex span tasks that require participants to store pieces of information (e.g., letters) that are provided bit by bit and in alternation with an intervening task (e.g., solving math problems). In 2005, Unsworth, Engle and colleagues developed automated (computer-based) versions of three different complex span tasks (i.e., operation span, reading span, and symmetry span tasks) that have been proven to be very reliable and valid WMC measures. Since then, these tasks (or ad-hoc translations of it) have been widely used by psychology researchers from different areas as tools for the assessment of WMC. However, it is questionable whether ad-hoc translations have the same psychometric properties as the original versions. Therefore, we translated the complex span tasks from Unsworth et al. (2005), investigated the tasks' reliability and validity within a German sample, and also employed a test of measurement invariance between the original and our translated task versions. Our results demonstrate that the measurement output of our translated tasks is equivalent to the one from the original English tasks and can thus be used and interpreted analogously to them.

M-70. Action-related updating of visual working memory: Internal deployment of spatial attention to representations corresponding to action goals

Anna Heuer[1], J Douglas Crawford[2], Anna Schubö[1]

[1]Philipps-Universität Marburg, Germany; [2]York University, Toronto, Ontario, Canada

Visual working memory contents can be weighted to reflect differences in task-relevance. This is typically studied by presenting so-called retrocues during the retention interval, but under natural conditions, the importance of certain aspects of our visual environment is mostly determined by intended actions. Here, we tested whether information maintained in visual working memory is also weighted according to its potential action-relevance. In a combined memory and movement task, participants memorized a number of items and performed a pointing movement during the retention interval. The test item in the memory task was subsequently presented either at the movement goal or at another location. We found that performance was better for test items presented at a location that corresponded to the movement goal than for test items presented at action-irrelevant locations. This

effect was sensitive to the number of maintained items, suggesting that preferential maintenance of action-relevant information becomes particularly important when the demand on visual working memory is high. We argue that the weighting according to action-relevance is mediated by the deployment of spatial attention to action goals, with representations spatially corresponding to the action goal benefitting from this attentional engagement. Performance at locations next to the action goal was still better than at locations farther away, suggesting that there is an attentional gradient spreading out from the action goal. These findings show that our actions continue to influence visual processing at the mnemonic level, ensuring the preferential maintenance of information that is relevant for current behavioural goals.

Symposium: The neurobiological signatures of fear, anxiety, and anxiety disorders – translational lessons learned from a collaborative research center (CRC-TRR58)

Time: Monday, 27/Mar/2017: 3:00pm - 4:20pm · *Location:* HS 401
Session Chair(s): Ulrike Lueken, Jan Haaker

(Therapy-)epigenetics of anxiety disorders

Christiane Ziegler[1], Miriam Schiele[1], Udo Dannlowski[2], Leonie Kollert[3], Marina Mahr[3], Agnieszka Gajewska[3], David Bräuer[4], Jürgen Hoyer[4], Alexander Gerlach[5], Volker Arolt[2], Peter Zwanzger[6], Jürgen Deckert[3], Katharina Domschke[1]

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Introduction. Anxiety disorders are common, disabling mental disorders with a complex genetic background which interacts with environmental factors to shape the risk for disease development. Twin studies support a considerable impact of genetic factors on the etiology of anxiety disorders with an estimated heritability of 30 to 60%.

Methods. Given the genetic background and the emerging role of epigenetic mechanisms such as DNA methylation in the pathology of anxiety disorders, translational subprojects of the CRC-TRR58 “Fear, Anxiety, Anxiety Disorders” focused on the role of genetic variants and DNA methylation patterns of common risk genes for anxiety disorders, e.g. the monoamine oxidase A (MAOA) gene and the oxytocin receptor (OXTR) gene. Besides association with dimensional and categorical phenotypes of anxiety, genetic variants and DNA methylation patterns were investigated regarding their impact on neural networks, neuroendocrine measures and therapeutic response.

Results. Genetic variants and epigenetic patterns were found to be associated with panic disorder (PD) and social anxiety disorder (SAD), respectively. DNA methylation patterns of the OXTR gene were – for the first time - shown to be implicated in different phenotypes of SAD on a categorical, neuropsychological, neuroendocrine as well as on a neural network level. With regard to PD, MAOA methylation patterns could be associated with the categorical phenotype per se, were shown to be influenced by recent life events, and to constitute an epigenetic predictor of pharmacotherapy response and dynamic correlate of response to cognitive behavioral therapy.

Discussion. Taken together, a better understanding of the multidimensional interplay between genetic variants, epigenetic patterns and environmental risk factors might contribute to establishing innovative targeted preventive interventions and new personalized pharmacological and therapeutic treatment options for SAD and PD.

Endocannabinoids in distinct pathways of the extended amygdala determine fear responsiveness to predictable and unpredictable threat

MD Lange[1], T Daldrup[1], F Remmers[2], HJ Szkudlarek[1], S Guggenhuber[2], B Lutz[2], HC Pape[1]

[1]Institute of Physiology I, Westfälische Wilhelms-University Münster (Germany); [2]Institute of Physiological Chemistry, Johannes Gutenberg University Mainz (Germany)

Introduction. The response to a threat can shift from a rapid phasic state of fear to a more sustained anxious apprehension, particularly in face of diffuse cues with unpredictable environmental contingencies. Unpredictability, in turn, is considered an important variable contributing to anxiety disorders.

Methods. Here, we show that the endocannabinoid system acting in circuits of the extended amygdala can explain the shift in fear responsiveness.

Results. Using fear training with unpredictable cues in mice, combined with local and cell-type-specific deficiency and rescue of cannabinoid type 1 (CB1) receptors, we found that presynaptic CB1 receptors on distinct amygdala projections to the bed nucleus of the stria terminalis (BNST) are necessary and sufficient for controlling the transition between phasic and sustained components of fear.

Discussion. These results thereby demonstrate that the endocannabinoid system acts on distinct pathways in the extended amygdala, and identify a circuit mechanism that determines the individual fear profile in response to a discrete or more diffuse threat, reminiscent of anxiety symptoms in humans.

Neuropharmacological models of socially acquired fear

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Introduction. Many of our fearful expectations are shaped by observation of aversive outcomes to others. Yet, the neurochemistry shaping such indirect, social learning is unknown. Previous research has shown that during direct (Pavlovian) threat learning, information about personally experienced outcomes is regulated by the release of endogenous opioids, and activity within the amygdala and periaqueductal gray (PAG).

Methods. We used opioid receptor blockade (150mg Naltrexone N=22, Placebo N=21) during fMRI acquisition to examine the opioidergic contribution to observational fear conditioning.

Results. We found that the blockade of opioid receptors enhanced observational learning through activity within the amygdala, midline thalamus and the PAG. In particular, temporal dynamics in PAG coding the observed aversive outcomes to other (observational US) predicted anticipatory responses to learned threat cues (CS), and were functionally connected to the superior temporal sulcus. Moreover, blockade of opioid receptors enhanced amygdala responses towards the observational US that correlated with the enhanced expression of threat responses 72 hours after learning. A supervised machine learning algorithm successfully classified individual pharmacological group status (i.e. Naltrexone or Placebo) during the expression of conditioned threats with a kernel restricted to brain regions that were responsive to the observational US.

Discussion. Our results reveal an opioidergic circuit including the amygdala and PAG that converges the observed aversive outcomes to others into threat responses and long-term memory in the observer. Research on pharmacological social learning mechanisms might

thus be promising to reveal insights how fear responses are shaped through the experiences of others.

Translating mechanisms into predictions: neurobiological markers of treatment response in the anxiety disorders

Ulrike Lueken[1], Tim Hahn[2], Hans-Ulrich Wittchen[3], Tilo Kircher[4], Jürgen Deckert[1]

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Introduction. Due to their high prevalence and early onset, anxiety disorders exhibit an exceptionally high individual and societal burden. Although first-line treatments exist, these do not work equally well for all patients. Neurobiological signatures may partly account for these different response profiles. Functional magnetic resonance imaging (fMRI) is increasingly being used to gain a better understanding of the neurofunctional pathways by which cognitive behavioral therapy (CBT) may unfold its effects. Supplementing this group-based perspective, multivariate pattern recognition embedded within a machine-learning framework yields predictions on the individual patient level.

Methods. We present fMRI data from a subsample based on the German multicenter research initiative “Panic-Net” comprising a randomized controlled treatment study on exposure-based CBT in panic disorder with agoraphobia. Fourty-nine quality-controlled datasets were suitable for the analysis of neural markers of treatment response. A differential fear conditioning task was used as a neurofunctional probe of interest within a genetic imaging approach.

Results. Prior to therapy, non-responders were characterized by enhanced neural activation in networks subserving defensive reactivity (amygdala, hippocampus, anterior cingulate cortex; ACC) during the processing of a safety signal. Further, they showed a relative decoupling of functional ACC-amygdala connectivity; a circuit that is implicated in emotional regulation and fear extinction. Connectivity in this network was modulated by the serotonin transporter genotype. Using machine learning, whole brain activation yielded high predictive potential for treatment outcome of the individual patient with an accuracy of 82%.

Conclusion. Findings show that neuroimaging research may both inform theory (e.g., mechanisms) and clinical expert decisions (single-patient predictions), thus bringing patient stratification and precision medicine into reach.

Symposium: Lying and cheating (Part I)

Time: Monday, 27/Mar/2017: 3:00pm - 4:20pm · *Location:* 101
Session Chair(s): Roland Pfister, Anna Foerster

Lead us (not) into temptation: How payoffs determine the willingness to lie

Benjamin E. Hilbig, Isabel Thielmann

University of Koblenz-Landau, Germany

Traditional approaches to dishonest behavior routed in economic theory emphasize the importance of individual payoffs for the decision to cheat, lie, or engage in any kind of

unethical behavior. Whereas this clearly implies that dishonesty should increase with increasing incentives, extant empirical findings do not confirm this hypothesis. However, extant findings are based on relatively small payoffs, the potential effects of which are solely analyzed on the aggregate level. We designed an adaptive multi-trial die-rolling paradigm to pinpoint how large a payoff it will take to make any single individual lie consistently (offering substantial incentives of up to 154€). Results show that incentive sizes indeed matter for ethical decision making, though primarily for a subset of "corruptible" individuals. Others ("brazen liars") are willing to cheat for practically any non-zero incentive whereas still others ("incorruptible") only cheat to a limited extent, even for large payoffs. By implication, the influence of payoff magnitude on ethical decision making is often obscured on the aggregate and with insufficiently tempting payoffs.

The frame of the game: Loss-framing increases dishonest behavior

Simon Schindler[1], Stefan Pfattheicher[2]

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Occasionally, people trade monetary gains for moral costs and engage in dishonest behavior. Based on research showing that people react more sensitively toward a possible loss compared to a possible gain (i.e., loss aversion), the present contribution examines the idea that people will more likely engage in dishonest behavior to reduce the extent of a loss compared to increasing the extent of a gain. In the two experimental studies, participants could engage in dishonest behavior either to avoid a loss (loss condition) or to approach an equivalent gain (gain condition). To assess dishonest behavior, a die-under-the-cup paradigm (Study 1) and a coin-toss task (Study 2) was applied. Results of both studies demonstrated the predicted effect of framing, supporting the idea that people show more dishonest behavior to avoid a loss compared to approaching an equivalent gain.

Hard-"earned" gains: The psychological costs of dishonesty

Isabel Thielmann, Benjamin E. Hilbig

University of Koblenz-Landau, Germany

Psychological accounts to dishonest behavior propose that dishonesty may not only incur material costs (i.e., sanctions), but also psychological costs due to threating individuals' moral self-image. Although empirical findings are compatible with this assumption, they are restricted to an indirect test of psychological costs. Therefore, we devised a more direct test of the psychological costs of lying. Specifically, if the mere act of lying is psychologically costly, individuals should treat gains obtained through dishonesty in much the same way as gains obtained through accepting other costs such as investing time or effort. Correspondingly, we compared individuals' allocation decisions in a Dictator Game (DG) with different experimentally-manipulated mechanisms generating the to-be-shared monetary endowment: In the baseline DG, participants were lucky to receive a windfall endowment; in the effort DG, participants earned their endowment through solving cognitively demanding tasks; in the cheating DG, participants gained their endowment through lying in a coin-tossing task. Supporting that lying is indeed psychologically costly, participants were as unwilling to share their endowment when obtained through lying than when earned through exerting effort. In other words, participants treated gains obtained through lying as if they were hard-earned. As such, our findings complement psychological accounts to dishonesty with a more direct test of the psychological costs of lying.

Deception in experiments. Empirical evidence from 490 studies.

Philipp Gerlach[1], Kinneret Teodorescu[2], Ralph Hertwig[1]

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Philosophers have long been speculating about the conditions under which humans behave dishonestly. In more recent times, researchers have begun to experimentally investigate these boundary conditions. In this talk, I will meta review experimental paradigms that tempted participants to materially profit from misreporting private information and then measured the degree as to which participants could not resist. In die roll tasks, for example, participants earn more money from reporting higher outcomes of an anonymous die roll. The degree of dishonest behavior can be estimated by comparing the actual reports to the expected distribution of outcomes of fair die rolls. Meta-analytical integration of more than 27,000 observations from 93 die roll tasks, 131 coin flip tasks, 103 matrix tasks, and 162 cheap talk games revealed great variety in the rates of dishonest behavior, from virtually 0% to 100% dishonest responses. We present the results of moderator analyses that assessed the boundary conditions of dishonest behavior, showing that both experimental aspects (e.g., the incentive to misreport) and participant characteristics (e.g., students vs. non-students) play a major role.

Symposium: Cognition and emotion in human-machine-interaction (Part I)

Time: Monday, 27/Mar/2017: 3:00pm - 4:20pm · *Location:* 103
Session Chair(s): Stefan Brandenburg, Anna Katharina Trapp

The moderating role of arousal on the seductive detail effect

Sascha Schneider, Maria Wirzberger, Yannik Augustin, Günter Daniel Rey

Technische Universität Chemnitz, Germany

Research on multimedia learning continues its shift towards a more complex understanding of af-fective impacts on cognitive processing. For example, arousal has been found to increase learners' attentional resources. In contrast, interesting but learning-irrelevant information, also called seduc-tive details, are considered to distract attention away from relevant information. However, a possi-ble moderating role of arousal on seductive details has not been examined yet. In the present study, 71 participants were randomly assigned to a 2 (with or without seductive details) x 2 (low arousal vs. high arousal) between-subjects design. Subjective assessments of arousal were used as manipulation check. Data on learning performance, cognitive load, motivation, heart rates and electro-dermal activity were collected. Results showed learning- inhibiting effects for seductive de-tails and learning-enhancing effects for higher states of arousal. In addition, learning performances were less limited through seductive details when arousal was high. Less aroused learners with se-ductive details reported significantly higher extraneous cognitive load scores than all other groups. Interestingly, heart rates and electro- dermal activity were lower for the group with seductive de-tails and high arousal or the group without seductive details and low arousal. Results indicate that seductive details are moderated by affective variables like arousal.

Time – Space – Content? Interrupting features of hyperlinks in multimedia learning

Maria Wirzberger, Sascha Schneider, Stefanie Dlouhy, Günter Daniel Rey

TU Chemnitz, Germany

Hyperlinks as interactive network structures of knowledge have become a gradually inherent part in multimedia learning settings. On the one hand, they are claimed to foster deeper understanding and enhance information acquisition. On the other hand, they are prone to overstrain learners' cognitive resources and impair the construction of coherent mental models. Based on these con-trasting perspectives, the present study focuses on selected features of hyperlinks that may hold interrupting potential during learning processes and possibly influence learners' resource de-mands. Such comprise temporal delays, aside spatial presentation of linked information and link content unrelated to the actual subject. A total of 114 student participants (Mage = 23.32, SDage = 3.54, range = 18-39, 79 female) completed a learning task on metabolism and energy generation, containing textual and pictorial elements and links referring to additional content. The resulting 2 x 2 x 2 between-subjects design manipulated link loading times (1 vs. 5 s), spatial format of links (separate page vs. pop-up window), and match of link and learning page content (congruent vs. incongruent) as independent variables. Learning performance (retention, transfer) and cognitive load facets (intrinsic, extraneous, germane load) were recorded as dependent variables, whereas previous knowledge and working memory span served as control variables. Results indicate a mar-ginally significant three-way interaction of all interrupting features on retention performance. Moreover, negative effects of incongruent content on intrinsic and extraneous load as well as a negative effect of spatially separated link format on intrinsic load resulted. The lack of significant main effects on performance might be explainable by higher resource investment that compen-sates for inappropriate design. In summary, the investigated hyperlink features did not show the potential to crucially impair knowledge acquisition.

A new paradigm to study mental representations in uncertain technical environments

Johanna Renker, Gerhard Rinkenauer

Leibniz Research Centre for Working Environment and Human Factors, TU Dortmund Germany

The Occluded Visual Spatial Search Task (OVSST) was developed to investigate the development of mental representations during the interaction with uncertain technical environments via behavioral responses and eye movement patterns. The OVSST enables to manipulate factors that are also relevant when dealing with interfaces: location uncertainty, discriminability of target objects, dis-traction and practice. Participants had to predict at which of three exits of a quadratic room target objects (circle, triangle, square) will reappear and to react on changes of the color intensity during the reappearance of the object. In order to perform the task accurately participants had to learn the underlying probability concept of the task: each object was associated to one of the exits with a higher probability. After the experiment participants were asked to estimate the probabilities via questionnaire. Different experiments revealed that practice generally causes increasing task per-formance and an increasing focusing of the eye movements, viz. fixation frequency, fixation dura-tion and the number of gaze shifts between areas of interest around the exits decreased. If the background was distracted by an unstructured but stable gray-white- pattern, participants showed more fixations and were able to improve memory retrieval presumably due to the use of land-marks. If the background was gray-colored

and objects consisted of different Gabor-patterns, par-ticipants made less correct predictions as the encoding of the objects seem to be more demanding. Overall, participants were able to estimate the implicit probabilities almost accurately and the eye movement patterns informed about the stage of learning and the degree of participants' task un-certainty during the development of the probability representation. In sum our findings suggest that eye movement patterns might be suitable to detect individual learning success during the in-teraction with uncertain technical environments.

The Distribution of Selective Attention in Augmented Reality

Andrea Schankin, Daniel Reichert, Matthias Berning, Michael Beigl

Karlsruhe Institute of Technology, Germany

Augmented reality (AR) systems allow enhancing the environment by additional information. For example, a pilot with a see-through system mounted on his head does not only see a river, a city or an airport below him but also gets information about their names or distances. Although this addi-tional information is useful, such a system may shift the focus of attention away from the environ-ment toward the virtual data – an effect that may result in lower response times and even acci-dents when objects of the environment were recognized too late.

In the current experiment, we examined whether the visualization techniques used to present the additional information may have a positive effect on the simultaneous perception of virtual and real objects. Therefore, we compared two basic visualization methods: screen-stabilized and world-fixed. Screen-stabilized information is presented always at a fixed position in the field of view, whereas world-fixed information connects real-world objects with virtual data. In a field study, 20 participants wore smart glasses while standing on top of a building. They were instructed to indi-cate the color of green and blue dots that were presented either screen-stabilized or world-fixed in their glasses or by LED powered multicolor spots at the bottom of the building. Response times and accuracy rates were recorded.

There was no difference in accuracy but participants were significantly faster in responding to the virtual signals presented in the see-through system than to the signals in the real environment. However, when virtual signals were presented world-fixed, this effect was significantly reduced. The results indicate that there might be a one-sided focus of attention onto virtual data. However, this effect depends on the visualization method. We hypothesize that a world-fixed presentation leads to a better fusion of real and virtual data that helps prevent drawing attention away from the environment.

Symposium: Advances in the New Statistics – Effect sizes, replications, and power

Time: Monday, 27/Mar/2017: 3:00pm - 4:20pm · *Location:* 105
Session Chair(s): Thomas Schäfer

Presentation of effect sizes in statistics software and publications: Requirements, options, and practice

Rainer Leonhart

University of Freiburg, Germany

It's been forty years that the development of meta-analysis (e.g. Glass, 1976) clearly demonstrated the need for effect size estimation and the advantages of standardization.

Effect sizes can be used to make results comparable between studies and can thus be used in meta-analysis. The demands and requirements of selecting appropriate parameters were emphasized by scientific associations such as the APA, the DGPs, and the CONSORT-statement. A primary goal of teaching inference statistics is to underline the need for effect sizes in analysis and presentation. The necessity of presenting effect sizes has been agreed upon for a long time but what is the status quo nowadays? The open questions today pertain to the implementation of effect size estimation in standard statistics software and the reporting of effect sizes in publications. Does the status quo reflect good scientific practice or is there still a gap between recommendations and reality? And if there is a gap, is it a problem of teaching (e.g. textbooks), statistics software (e.g. SPSS, Stata, R), or presentation in scientific publications (e.g. Experimental Psychology)? The use of effect sizes will be discussed from these different perspectives.

Cohen 2.0 – Empirical redefinition of the conventions for interpreting effect sizes in psychology

Thomas Schäfer

TU Chemnitz, Germany

There is a longstanding discussion in psychology on the usefulness and merits of effect sizes. Since 2001, the APA requests authors of scientific manuscripts to provide effect sizes as a measure of the magnitude of what they have discovered. Yet, what has been under debate since then is the question of how to interpret effect sizes. When is it appropriate to speak of a small, medium, or large effect? Cohen (1969/1988) has formulated rules of thumb to interpret effect sizes, which became very prominent and are widely used in psychology. Yet, Cohen grounded his recommendations in his own experiences and impressions. It has thus remained an open question if his recommendations actually reflect the distribution of effect sizes researchers really find in psychological studies. To answer this question, we randomly draw studies from all areas of psychology from the beginning of psychological research until today, in order to collect 1,000 empirical effect sizes. Based on the distribution of these effect sizes, we provide empirically grounded recommendations for the interpretation of effect sizes in psychology. Different psychological disciplines and different kinds of effect sizes are considered separately.

Heterogeneity, significance, and the necessity of direct replications

Frank Renkewitz

Universität Erfurt, Germany

Most psychological meta-analyses are heavily affected by heterogeneity; that is, the true effect size of the summarized primary studies is not a constant but varies. While this may be explained with differences between the studies included in a meta-analysis, more recently, ‘registered replication reports’ have demonstrated that substantial heterogeneity may even occur when multiple replications use the same, very detailed study protocol. Apparently, the respective experimental paradigms are not able to produce a constant effect size. The ubiquitous reference to possible ‘hidden moderators’ in reactions to failed direct replications suggests furthermore that many psychologists deem it plausible that very subtle changes in experimental procedure cause extreme changes in true effect size.

Heterogeneity has severe theoretical, practical, and statistical consequences that still receive too little attention in the current debate of replicability problems. Using Monte-Carlo

simulations, I will illustrate some of these consequences. Most importantly, heterogeneity inflates the proportion of statistically significant results that are neither theoretically interpretable nor of any practical relevance. In addition, heterogeneity alters the influence of publication biases on effect size estimates and may lower the sensitivity of different methods for the detection of publication bias. In turn, publication biases reduce the chances to detect heterogeneity. A central conclusion is that we should be informed about the degree of heterogeneity associated with different experimental paradigms and, therefore, need pre-registered, direct replications to assess variability in true effect sizes.

Power in multilevel models: A user guide

Matthias Georg Arend

Technische Universität Chemnitz, Germany

In times when the reproducibility of psychological research appears strongly debatable, conducting studies with sufficient statistical power is indispensable. For numerous statistical tests, ways to calculate statistical power have been explored and implemented in power tables and computer programs. Yet, for more complex methods such as multilevel models which account for data that are hierarchically structured (i.e., lower-level units are clustered within higher-level units), power computation becomes increasingly complex. Hence, the aim of the present research was to provide a comprehensive overview of the methods for computing power in two-level models. Consequently, a review of the literature that deals with power in multilevel models was performed. The methods for power calculation that were identified can be subdivided into approximate formulas and simulations for power estimation of fixed effects and cross-level interaction effects. I provide a summary of all methods, create power tables for the most common multilevel effects/models and emphasize the necessity for computing power in multilevel models. Limitations of the present work and directions for future research are discussed.

Symposium: The Remote Associate Task - A paradigm for investigating creative, metacognitive, insightful, and intuitive processing mechanisms (Part I)

Time: Monday, 27/Mar/2017: 3:00pm - 4:20pm · *Location:* HS 304
Session Chair(s): Thea Zander

Two sides of the same coin? Impaired and enhanced intuition in Major Depression.

Carina Remmers[1], Sascha Topolinski[2], Johannes Michalak[3]

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In complex situations or under time pressure, people are well-advised to rely on their intuitions. It is widely acknowledged that intuitive judgments and decisions ground on the operation of parallel, associative processes of spreading activation resulting in a preliminary perception of coherence, which can be described with the phenomenon of knowing without knowing how one knows. There seem to be conditions, however, in which people have difficulties to use intuitive hunches. Major Depression is one of these states and indecisiveness is often reported by depressed patients. Is the capacity to decide intuitively thus impaired in patients with depression? Indeed, preliminary evidence supports this hypothesis. By continuing the investigation of the depression-intuition

interplay, we found in two studies that depressed patients' intuition was impaired in the RAT that requires holistic processing of semantic material. In contrast, depressed patients had no impairment or even a benefit (compared to healthy controls) in an intuition task that measures coherence detection in the visual domain. The dissociation between semantic and visual coherence detection in depression will be discussed from a clinical as well as from a theoretical point of view and directions for future research will be presented.

Integrative Gut Feelings- A Novel Perspective on the Semantic Coherence Task

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Background. Intuition has always been associated with the detection of hidden relations between concepts. Thus, it is not surprising that the Semantic Coherence Task (SCT), a task in which participants have to detect hidden coherence between seemingly unrelated word triads, has attracted much attention in intuition research. The SCT has been derived from the Remote Associates Test, which test people's ability to find denominators for seemingly unrelated word triads. In contrast, the SCT investigates people's ability to intuitively detect coherence without knowing the actual denominator. Recent findings stress the importance of intuitive gut feelings for the detection of hidden coherence. However, while the affective processes have been investigated thoroughly, few efforts have been made to research the cognitive origins of people's coherence judgments. In five studies, we tested a new model on semantic coherence detection that expands traditional reasoning on this task. Traditionally, focus lied on the subconscious activation of the hidden denominator as a source of coherence feelings. In our model, however, we suggest that people have a simpler, but more adaptive strategy: To estimate coherence, they rely on the associative network that is created by the relatedness of the three presented words.

Method and results: In three studies, we successfully predicted coherence judgments of published data using semantic relatedness. In the fourth study, we tested the role of the associations between the word triads and the hidden denominator. We found no incremental effect of the hidden denominator on coherence judgments. In the last study, we experimentally manipulated the relation between semantic relatedness and triads' coherence. In line with our assumption, people relied on the semantic relatedness of the triads rather than the actual coherence.

Conclusion. Findings suggest that people rely on the semantic relatedness rather than the actual coherence to make their judgment. In contrast to traditional views, they do not rely on the activation of a denominator, but integrate the semantic relatedness between the presented words into an overall gut feelings. Implications of our model are discussed.

Coherence judgements in the Remote Associates Task are faster when people believe that another human has seen the triad before

Romy Müller

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Although gaze transfer has been investigated for some years, there is little evidence about the underlying mechanisms. When overlaying a person's eye movements on visual stimuli, for instance as a means of instruction or during remote cooperation, how do observers interpret this information? How can we find out whether they try to infer the intentions of

the person producing the eye movements, and whether they search for meaningful relations in the things being looked at?

The Remote Associates Task provides a means of investigating whether people judge information as semantically coherent. Turning the argument around, one could hypothesize that if people assume that gazed-at information is semantically related, they might judge word triads as coherent more readily after having seen another human looking at them.

In the present study, subjects saw a cursor moving across a matrix of 20 words, resting on three words consecutively. In one condition, they were informed that the cursor represented the eye movements of another person performing coherence judgments. In a control condition, they saw the same cursor but were told that it represented a computer-generated dot. Afterwards, they were asked to judge the semantic coherence of a word triad – either the one that the cursor had just been dwelling on, or another triad. In fact, all triads were semantically coherent.

Contrary to the hypotheses, in the gaze condition subjects did not judge traids as coherent any more often than in the dot condition. However, their responses after seeing gaze were faster in cases where they judged the triad as coherent but could not report the solution. This result suggests that gaze transfer can make observers infer more readily that there is a a meaningful relation between the observed objects, particularly when they do not see this relation by themselves.

Intuition and anxiety: The distinct influence of different mood inductions on intuitive decision-making.

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Anxiety can have detrimental effects on cognitive functioning, one of which is to impair decision-making. Here, we were interested in examining the effects of anxiety on intuitive decision-making because intuition is a capacity that aids people in making daily-life decisions and may be impaired under anxiety. Intuitive processing has been described as non-conscious, fast, experience-based, and action initiating. It is based on the holistic and associative process of automatically spreading activation. Research has shown that it depends on people's mood state: Specifically, positive mood enhances intuition while negative mood diminishes it. However, the impact of distinct mood states such as anxiety on intuition has not been examined yet. Therefore, in a between-subject design, we induced different mood states (anxious, positive, neutral) by using a multi-modal induction procedure. After a manipulation check, participants performed spontaneous judgments of coherence by intuitively assessing the connectedness of semantically (in)coherent word triplets. Results revealed a significant effect of mood on intuitive responses: Compared to the positive and neutral mood conditions, experimentally induced anxiety significantly reduced the ability to detect coherence intuitively. In contrast, explicit solutions were not affected by mood. These findings offer preliminary evidence on the impairing effect of anxiety on intuitive decision-making.

Symposium: Contextualized decision making: Mediators and moderators (Part I)

Time: Monday, 27/Mar/2017: 3:00pm - 4:20pm · *Location:* 201
Session Chair(s): Arndt Bröder

Exploiting the wisdom of crowds sequentially: A case for conservative judgment updating

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Simply averaging several judgments usually yields high accuracy. Consequently, the conservative weights individuals assign to other's judgments when updating their own judgment have been considered a substantial shortcoming in the existing literature. However, we suggest that the reference frame used so far, namely a single instance of judgment updating, is largely irrelevant to judgment updating outside the laboratory. Rather, we suggest that judgment updating is a sequential process that consists of several instances. Based on the two premises that (a) an individual accumulates information by updating his or her judgment over several instances and (b) that the function of 1/N (for true averaging of N judgments) rapidly approximates 0 for increasing N, we claim that for such a sequential updating, assigning low weights to additional judgments actually yields high accuracy. A simulation supports this claim and shows that for an increasing number of judgments smaller weights outperform updating by higher weights. Consequently, what appears a shortcoming given the specific laboratory situation is actually highly adaptive given the real world analog.

Feeling-based cognitive tuning of mental abstraction: Empirical findings and theoretical considerations

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University of Mannheim, Germany

The fact that individuals can apply different information processing strategies to deal with situations they encounter entails the question which factors actually determine the selection of processing strategies. In the present talk, we discuss recent empirical findings and theoretical developments pertaining to the claim that feelings play a crucial role in the selection of information processing strategies. Parting from a functional perspective that holds that processing strategies need to be adjusted to the requirement of the situation, we argue that feelings carry information about the benign versus problematic nature of the situation, which is used by individuals to regulate cognitive processing. In particular, we propose that mental abstraction is the crucial dimension of feeling-based cognitive tuning and that feelings that signal a benign situation (e.g., positive mood) contribute to a processing style that is characterized by a key role of prior knowledge in the form of general knowledge structures, whereas feelings that signal a problematic situation (e.g., negative mood) elicit a processing style that is linked to attention to details and consideration of new situation-specific information. The former entails higher levels and the latter entails lower levels of mental abstraction. Against this background, current theoretical debates on the nature of the influence of feelings on information processing styles will be addressed and extensions of the proposed rationale to contextual variables other than feelings will be discussed.

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76% Fairtrade chocolate? Feature vs. Dimension Framing in a persuasive context

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Based on the Pragmatic Persuasion Perspective (Wänke & Reutner, 2010) we assume that recipients are affected by the perceived goal with which an information is communicated. Assuming that advertisers present positive product attributes to stimulate purchase, recipient have been shown to believe any additional information advertised on a package to represent a positive argument. Yet, information about an attribute can either describe the presence of a feature (e.g. “Fairtrade”) or provide additional information referring to the degree to which the attribute dimension is present (e.g. “76% Fairtrade ingredients”). We predict that the additional information provided by a dimensional framing results in more favorable judgments as compared to the less rich feature information. In a 2 x 2 mixed design (N = 295) we varied the framing of the claim on a chocolate bar (dimension = “76% Fairtrade ingredients” vs. feature = “Fairtrade”) as a within factor and the brand image of the presented chocolate brands (low likelihood of being Fairtrade vs. high likelihood of being Fairtrade) as a between factor. Results reveal a preference regarding the purchase interest and brand image for the chocolate brand with the dimensional framed claim. Further analysis indicate that familiarity with the Fairtrade label which is typically presented as a feature moderate the effect. Results regarding the inferences were mixed. Yet, in line with the hypotheses, consumers who did not know the Fairtrade sign, tended to rate the dimensional framed chocolate bar to contain more Fairtrade ingredients.

The effect of neuroticism on use of the recognition heuristic is moderated by task relevance

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When faced with a recognized and an unrecognized object, decision makers can either use the recognition heuristic (RH), that is, choose the recognized object without considering any additional information, or rely on further knowledge. Previous research has shown that the probability of RH-use differs substantially between individuals. Trying to explain these individual differences in terms of personality traits, Hilbig (2008) found a positive effect of neuroticism on RH-use. According to Hilbig, participants high in neuroticism avoid using their knowledge and refer to the RH instead to avoid a diagnostic test of their abilities. Extending this theoretical rationale, we hypothesized that the influence of neuroticism on RH-use is moderated by task relevance: Neuroticism influences strategy selection (RH versus knowledge) only when the task is personally relevant. In two experiments, participants first provided measures of neuroticism and then worked on an inferential task assessing RH-use that was either framed as relevant for the participant or not. As predicted, we found a positive effect of neuroticism on RH-use only when the task was framed as relevant. Thus, the results of both experiments support the hypothesis that the effect of neuroticism is moderated by task relevance.

Symposium: Prospective memory – current trends and theoretical advances (Part I)

Time: Monday, 27/Mar/2017: 3:00pm - 4:20pm · *Location:* 204
Session Chair(s): Marcus Möschl, Philipp Schaper

How action-coordination processes are affected by earlier processing stages of event-based prospective memory

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Event-based prospective memory (PM) is the ability to remember to perform an intended action in response to a pre-defined environmental cue. Remarkably, in most event-based PM situations, the cue occurs while the individual is actively involved in another ongoing task which thus has to be interrupted (temporarily) for successful PM fulfillment. To gain insights into the processes associated with coordinating the PM task and the ongoing task, we recently proposed to experimentally vary the amount of response overlap between both tasks and showed that PM performance is better for high-overlap situations compared to low-overlap situations (Rummel, Wesslein, & Meiser, 2016). Note that according to microstructure models of event-based PM, this effect takes place at Stage 4, which comprises the processes associated with the coordination of the intended action with the demands of any currently ongoing task. We also found evidence that these Stage-4 processes are largely independent from the cognitive processes of Stages 1 to 3, namely (1) cue-noticing, (2) retrieval of the intended action, and (3) verification of the context. In the present research, we corroborate and extend these findings by showing that the response-overlap effect is affected by the conditions under which the participants habituate to the PM response (Experiment 1). Further, we combine the manipulation of response overlap with established PM manipulations of cue-focality (Experiment 2), expecting the response-overlap effect to be unaffected by the manipulation of cue-focality.

Goal-directed future thinking & prospective memory: the importance of 'point-of-view'

Judith Ann Ellis[1], Katherina Schnitzspahn[3], Matthias Kliegel[2], Laurie Butler[1]

[1]University of Reading, United Kingdom; [2]University of Geneva; [3]University of Aberdeen

Background:

Mental simulation of future intentions is an example of the goal-directed future thinking (Gerlach, Spreng, Gilmore & Schacter, 2011) that comprises most of our everyday future-oriented thoughts (D'Argembeau, Renaud & Van der Linden, 2011).

Method:

Although intention completion is important for the development and maintenance of an independent lifestyle (Ellis & Freeman, 2008; Kliegel, Mackinley & Jäger, 2008), the role and nature of imagery has been relatively neglected (Schacter, Addis & Buckner, 2008). We address this lacuna in two experiments using different paradigms to investigate the benefits of visual imagery and a non-imaginal plan at encoding for future intention completion.

Results:

Findings from two studies demonstrate that imagining performing a future intention is as effective as forming a non-imaginal implementation intention for enhancing cue detection (Study 1) and increasing action completion (Study 2). Moreover, the imagery perspective that we take influences the benefits of visual imagery for the enactment of an important subset of goal-directed events – future intentions.

Conclusion:

Our findings offer some clarification of when and why imagery at encoding benefits cue activation in prospective memory performance.

Does midday sleep improve prospective memory?

Mateja F. Böhm, Ute J. Bayen, Reinhard Pietrowsky, Christine Albrecht, Vaishnavi Nagesh

Heinrich-Heine-Universität Düsseldorf, Germany

Studies have shown that nighttime sleep benefits prospective memory (PM), which involves forming and executing intentions (Diekelmann, Wilhelm, Wagner, & Born, 2013; Grundgeiger, Bayen, & Horn, 2013; Scullin & McDaniel, 2010). We investigated whether these effects are transferable to shorter midday sleep. In contrast to studies involving nighttime sleep, midday sleep is not confounded by effects of sleep deprivation. In the present study, participants performed an ongoing color-matching task. If they encountered one of five previously learned targets during this task, they were asked to interrupt their activity and press a different key (PM task). Between target study and performance of the ongoing task, the sleep group (n = 30) slept, whereas the wake group (n = 29) played a computer game for one hour. Multinomial modeling revealed that the sleep group had a higher retrospective component, thus remembered the targets better than the wake group. A statistical trend suggested that the sleep group may have also been better regarding the prospective component, i.e. remembering that they had to execute a PM task besides the ongoing task. Additionally, the sleep group had a higher probability of succeeding in the ongoing task. The results suggest that even short periods of sleep benefit the retrospective component of PM, which is in line with studies showing a midday sleep benefit for retrospective memory (Lahl, Wispel, Willigens, & Pietrowsky, 2008).

Effects of acute stress on prospective memory and intention deactivation

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In everyday life we frequently rely on our abilities to postpone intentions until later occasions (prospective memory; PM) and to deactivate completed intentions even in stressful situations. Yet, little is known about the effects of acute stress on these abilities. We will present findings from two studies on the effects of acute stress on PM and intention deactivation under varying task demands. In both studies, participants underwent a standardized stress-induction protocol (i.e., Trier Social Stress Test or Maastricht Acute Stress Test), or a standardized control situation, before performing a computerized PM task.

In the first study, we investigated the impact of acute stress on PM under increased demands on PM cue detection (monitoring for non-salient, non-focal PM cues).

In contrast to previous reports of unaffected PM under low demands (non-salient, focal PM cues), when demands on PM cue detection were sufficiently increased, acute stress led to a reduction in PM-monitoring costs while leaving PM performance intact. These findings suggest that, under high demands, acute stress shifts PM performance towards resource-saving processing strategies. At the same time, however, this shift might come at a cost of increased commission errors when processing demands during intention deactivation are increased (salient, focal PM cues).

Finally, we will show data from a second study, in which we investigated whether acute stress affects PM and intention deactivation under increased demands of concurrently performed ongoing tasks and will report on whether acute stress differently affects a) PM cue detection (prospective component of PM) and b) remembering the content of a delayed action (retrospective component of PM).

Symposium: Experimentelle Ästhetik / Experimental aesthetics (Part III)

Time: Monday, 27/Mar/2017: 3:00pm - 4:20pm · *Location:* HS 403
Session Chair(s): Thomas Jacobsen

Does it sound right? Perception of “correctness” in music

Pauline Larrouy-Maestri[1], Simone Franz[1], R Muralikrishnan[1], David Poeppel[1,2]

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Listeners make reliable judges when evaluating melodies and can easily say if a singer sounds “right”. However, as is true for several types of judgments (e.g., beauty or obscenity), the definition of “correctness” in music lacks precision and the foundation of such definition remains unclear. Recent studies highlighted the relevance of pitch interval deviations along melodies (i.e., compression or enlargements of intervals) when evaluating pitch accuracy of singing performances. We present here a series of experiments designed to clarify the definition of “correctness” in music and to understand how “correctness” is perceived. For this purpose, we use psychophysics to examine what means “in/out-of-tune” or “on/off-beat” in different musical contexts and to observe how this information is processed (i.e., continuous or categorical perception phenomenon). Altogether, these experiments focus on higher order categories relative to “correctness” and more generally address the question of listeners’ appreciation of artistic performances.

Rhyme and Meter as Cognitive Handicaps

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Previous research on rhyme and meter in written or spoken language has largely focused on their cognitive benefits for prosodic processing, attribution of positive values, and memorability. The present research focuses on the complementary hypothesis that rhyme and meter can also act as cognitive handicaps during sentence reading. To that end, we investigate reading times and subjective ratings of a corpus of proverbs. The original version of these proverbs feature both, rhyme and meter. These versions were re-written

to either contain only rhyme and no meter, only meter and no rhyme, or none of these features. All four proverb versions were presented to participants in a self-paced reading paradigm.

Using these proverbs, Study 1 reports effects on three dependent measures: perceived ease of comprehension, perceived degree of ambiguity, and average word reading time. Generally, the original proverbs were more difficult, ambiguous and took longer to read than their de-rhetorized versions. Interestingly, rhyme qua rhyme yielded an adverse effect on cognitive processing only via interaction with meter, but not on its own.

Study 2 specifically investigated this apparent absence of a unique rhyme effect. Results show that the rhymed proverb variants used in Study 1 differ in semantic fit between the rhyming words and the rest of the proverb. Only sentences with low, but not those with high semantic fit between rhyme words and the rest of the proverb increased ambiguity and reduced comprehensibility, suppressing a general effect of rhyme. However, semantic fit of the proverbs was seemingly unrelated to linguistic word features such as word frequency and word co-occurrences, which are word-level indicators of processing difficulty in reading. Altogether, results support the hypothesis that rhyme and meter need also be considered as cognitive handicaps during reading.

The influence of motivational music on risk-behavior and ball-throwing performance

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We tested the hypotheses that listening to motivational music improves performing a simple ball-throwing task and evokes higher risk-taking behavior. To this end, we conducted a between-groups experiment (N=150) testing the effectiveness of both an experimenter playlist and participant-selected playlist compared to a no-music control condition. All participants performed a ball throwing task consisting of two parts: First, participants were throwing the ball from fixed distances into a funnel basket. Here performance was measured. In the second part participants chose distances by themselves, which allowed assessing risk-taking behavior. The results indicate that music increased risk-taking but did not improve ball-throwing performance. This effect was more pronounced in male participants and among those who listened to their own playlists. Furthermore, self-selected music enhanced state self-esteem in participants who were performing better but not in those who were performing badly. Our findings contribute to the notion that music listening may serve as a resource for self-enhancement and highlight that music can influence decision-making processes and behavior.

Talk Session: Perceptual decision-making

Time: Monday, 27/Mar/2017: 3:00pm - 4:20pm · *Location:* HS 405
Session Chair(s): Sebastian Bitzer

The Internal Reference Model accounts for Stimulus Order Effects in Discrimination Performance across a Range of Modalities and Stimulus Attributes

Ruben Ellinghaus, Karin M. Bausenhart, Rolf Ulrich

Tübingen, Germany

Discriminating environmental stimuli is crucial to human perceptual performance. In order to investigate the mechanisms underlying this ability, researchers have tried to understand the processes involved in comparing and discriminating two stimuli, for example, when a person indicates the brighter of two successively presented light patches. Most theories of stimulus discrimination proposed in the literature are based on Thurstone's original difference model, according to which a person's decision in such a scenario is the result of a comparison between the internal representations of the two stimuli. However, these models fail to account for the observation that discrimination performance is usually better when a constant standard stimulus precedes rather than follows a variable comparison stimulus; a result often obtained in duration discrimination experiments. This so-called Type-B order effect can be explained by the Internal Reference Model, which assumes that participants compare the second stimulus against a dynamically updated internal standard which is constructed from current and previous instances of the first stimulus presented in each trial. We will present a study which demonstrates that the Type-B order effect is not restricted to the domain of duration perception but rather a general phenomenon which can be observed across a wide range of modalities and stimulus attributes. Our findings are consistent with the idea that the construction of an internal standard is a ubiquitous component of the human ability to compare and discriminate among stimuli.

How do we know that we get it right? Modelling confidence in masked orientation judgments

Manuel Rausch, Michael Zehetleitner

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How do human observers determine how confident they are about the accuracy of a perceptual decision? According to signal detection theory, the correlation between confidence and discriminability of the stimulus should be positive in correct decisions and negative in incorrect decisions. However, in a backwards-masked orientation discrimination task with varying stimulus-onset asynchrony (SOA), we observed that confidence after incorrect decisions is positively related to the SOA. Model fitting on the joint distributions of confidence and responses revealed that the data pattern in the present task cannot be explained by signal detection theory, post-decisional accumulation models, parallel models, or models where confidence is based on reaction times. The best fits to the data were obtained by a model where confidence criteria were adjusted on a single trial basis based on the SOA. We conclude that observers' confidence judgments are based on sensory evidence as well as a heuristic based on the intensity of the stimulus.

Changes-of-mind in perceptual decision making: Evidence for metacognitive preference reversal from mouse- and eye-tracking

Arkady Zgonnikov[1], Denis O'Hora[1], KongFatt Wong-Lin[2], Petri Piiroinen[1]

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Background

Tracking motor response during decision execution provides rich data on dynamics of decision-making process. In particular, hand trajectories reveal that decision makers occasionally change their mind in the course of a decision. Previous work suggests that changes of mind in perceptual decision-making are a product of post-decision evidence processing (Resulaj et al, 2009). However, there are ongoing debates on whether additional, metacognitive processes are involved in changes of mind (Fleming, 2016).

Methods

In our experiment, four participants (three female, one male, aged 29 to 44) performed computerized perceptual decision-making task. Random dot kinematogram (RDK) of fixed duration (800 ms) was used as a stimulus. During the response, mouse cursor trajectories and eye movements were recorded.

Results

We found that changes of mind occur in fixed-duration version of the RDK task as often as in more conventional response-time version (on average, 3.5 percent of the trials included a change-of-mind). Reaction times in the change-of-mind trials were significantly higher than in the trials without changes of mind, even when controlled for individual differences in reaction times, which challenges the account of changes-of-mind as a product of solely post-decision evidence accumulation. Eye data provide additional evidence for alternative mechanisms of changes-of-mind. In a typical trial, once the decision is initiated, a subject saccades to the chosen option. After a delay, a mouse movement is initiated, following the saccadic eye movement. However, there is no prior indication of change-of-mind onset in gaze dynamics, with eye trajectory reversing at the same time (or later) as mouse trajectory. This again indicates that changes-of-mind might be due to a different mechanism than the initial decision.

Conclusion

Our work presents evidence in favor of the hypothesis that, in addition to post-decision evidence accumulation, metacognitive mechanisms are involved in changes-of-mind.

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Acknowledgements

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Talk Session: Evaluative conditioning

Time: Monday, 27/Mar/2017: 3:00pm - 4:20pm · *Location:* HS 301
Session Chair(s): Olivier Parice Corneille

Socially evaluated face prototypes emerge through associative learning

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University of Pécs, Hungary

Background.

As a result of the generalization processes of the mind, daily experiences with our acquaintances have a major influence on our attitude towards unknown others. People possess expectations about how others with preferred or disliked attributes look like. It has been suggested that this is based on facial prototypes, which are stored in the memory and are updated continuously.

However, it is still debated whether explicit knowledge about the behaviour of others is needed to influence future expectations and face preferences. For this reason, we designed three evaluative conditioning task in which we manipulated the detectability of the unconditioned stimuli.

Methods.

In the first experiment, ten facial photographs were shown to the participants along with negative or positive behavioural descriptions. They were asked to learn the associated information and try to remember the faces. At the end of the task they had to choose from two composite faces the one which they find more likeable. These composites were made of the five individual faces associated with the negative, and the positive behaviors, respectively. In the other two experiments the facial stimuli were preceded by images with different valence values (IAPS pictures), and either for a suprathreshold (200 ms) or a subthreshold (30 ms) duration. The task was the same as in the first experiment.

Results.

The participants preferred the positive composite to the negative one above chance in each experiment.

Conclusions.

The results suggest that the valenced cues (decriptions or pictures) modified the participants expectations about how a trustworthy person should look like. That is, face prototypes were formed based on former experiences. The generalization of former information depended only on its emotional valence, irrespective of its social relevance. This shows that no explicit knowledge is necessary, the formation of facial prototypes happens automatically.

Evaluative judgment in spatial context: How do places derive affective meaning from the surroundings?

Christophe Blaison

Humbolt-Universität zu Berlin, Germany

Why do we favor some places over others? Previous research investigated the intrinsic properties that make places look good or bad. This talk presents the complementary view: Places also derive affective meaning from the surroundings. I will present the results of several series of experiments that show how the evaluation of target locations changes as

a function of its position within the spatial context formed by other locations. Evaluative judgment in spatial context depends on the interplay between (i) the distance between the target and affectively salient locations -- or “hotspots” (e.g., a crime ridden housing block or a nice park), (ii) people´s belief about how far the hotspots influence the surroundings, (iii) the chunk of land people have currently in mind. Interestingly, hotspots have assimilative as well as contrastive effects. For example, a crime ridden housing block taints the proximal surroundings but render areas farther away more attractive than in a control condition without negative hotspot. We will present evidence for the robustness and the generality of this contrast effect in spatial context, and how it is influenced by the size and the intensity of the hotspot. More generally, this research program necessitates the combination of theories of assimilation and contrast stemming from social psychology and psychophysics, which are usually studied separately.

The relevance of contingency awareness in acquiring attitudes

Borys Ruszpel, Anne Gast

University of Cologne, Germany

Background

Evaluative conditioning (EC) as a way of attitudes formation by repeatedly pairing a previously neutral stimulus (CS) with a valent stimulus (US) is a major topic in attitude research. The relevance of memory for EC effects is a subject of intense research because it is relevant for understanding the processes underlying EC and attitude formation. The main question is whether the attitude change can occur without participants’ explicit memory for the co-occurrences between neutral and valent stimuli. The majority of studies show that memory of pairings is a condition for EC effects to occur or leads to stronger effects. In almost all of these studies, however, the used stimuli were visual or auditory. For other modalities there is less evidence for the relation of memory and EC. For the combination of olfactory and gustatory stimuli it has in fact been shown that EC effects occur without knowledge of the co-occurrences (Baeyens et al., 1990; Dickinson & Brown, 2007). To investigate the theoretically important question whether with this modality combination EC effects will occur without memory of pairings, we conducted a conceptual replication of these studies.

In our study, we tested whether visual stimuli (drink labels) and olfactory stimuli (artificial but nature identical food aromas) differ in their susceptibility to an evaluative conditioning procedure (EC) with positive and negative tastes. EC is defined as the change in liking of a stimulus (conditioned stimulus, CS) that is due to the previous pairing with positive or negative stimuli (unconditioned stimuli, US). Further we were interested in whether an aroma-taste EC effect would be less dependent on explicit memory for the stimulus combination than the label-taste EC effect. Third, we were interested in whether the aroma-taste EC effect would be more stable across time than the label-taste EC-effect. These research questions followed on the one hand from the often assumed preparedness of olfactory and gustatory associations and on the other hand from a research question on the relevance of awareness and memory for EC effects. In the typically conducted EC experiment with visual stimuli, EC effects usually strongly depend on awareness and memory.

Method

Participants worked at desks with desktop computers that run the experimental procedure. Also on the desk, we placed the drinks that are part of the relevant stimuli for our experiment, as well as bread sticks and water to neutralize taste between trials. During all phases, participants asked to follow the instructions presented on the computer screen.

The experiment consisted of three main phases:

1. A conditioning phase in which combinations of olfactory (CS1), visual (CS2) and gustatory (US) stimuli were presented

2. An evaluation phase, in which participants rated all olfactory stimuli (CS1) and visual stimuli (CS2).

3. A memory assessment phase, in which participants indicated which stimuli they thought were presented together.

Phase 1: In the first phase of the experiment (conditioning phase), participants were presented with a set of 18 (2+16) plastic cups containing water solutions (drinks). All drinks were presented as 5-ml servings in 30-ml plastic cups on a plastic tray with numbers on it. Sixteen of the solutions contained the CS-US combinations for the conditioning phase. Eight of these 16 drinks contained polysorbate 20 (USnegative) and the remaining eight drinks contained sugar syrup (USpositive). In addition to that, four drinks each contained one of four different aromas. Two of the selected aromas were for one participant always combined with polysorbate 20 (CSnegative) and two of the selected aromas were combined with sugar syrup. These combinations were counterbalanced across participants. Two additional cups were used for practice trials and contained drinks with two otherwise non-used aromas and no taste.

In each conditioning trial, participants were asked to pay close attention to the visual stimuli depicted on the computer screen, smell the content of the cups, and drink the content of the cups. This procedure was exactly paced to ensure attention to visual, olfactory, and gustatory stimuli. Before the start of the conditioning phase, participants were exactly instructed about the course of the task. To further ensure precise following of the procedure, we included two practice trials at the beginning of this phase.

After each trial, the participants were asked to eat a small piece of bread stick, so that their olfactory and gustatory structures would not be overwhelmed and that they would distinctively process all the drinks.

Phase 2: In the second phase of the experiment, participants were asked to evaluate all CS1 (aromas) and CS2 (labels) with rating scales. For rating of the aromas, participants were presented with four cups containing the four aromas and asked to smell on each and indicate its pleasantness one-by-one. For rating of the labels, the four labels were presented on the screen and participants were asked to indicate their pleasantness one-by-one. Aromas and labels were rated in counterbalanced order across participants.

Phase 3: In the third phase of the experiment, memory for the stimulus combinations was tested. For assessing memory for the aroma-taste link, participants were presented with cups with the four aromas one-by-one. During the four trials, participants also had two cups of the two tastes. For each aroma, they were asked to indicate with which taste it was combined. For assessing memory for the label-taste link, participants were presented with the four labels on the screen one by one. During these four trials, participants also had two cups of the two tastes. For each label, participants were asked to indicate with which taste it was combined. Memory for aroma-taste and label-taste combinations were rated in counterbalanced order across participants.

Results

We performed the statistical analysis of the rating data with item-based linear mixed models (multilevel model analysis) implemented in R package lmerTest. The fixed factors of interest in the analysis were: valence (negative and positive), memory of pairings (remembered and not remembered) and type of CS (bottle designs and smells). We also included crossed random effects for subjects and items.

We found an overall EC effect that was not moderated by whether the stimulus was visual or olfactory. For both types of modalities, we found EC effects only for remembered and not for non-remembered pairings.

Conclusions

The fact that EC effects occurred only for remembered pairings for both bottle designs and smells supports the claim that contingency awareness is necessary for EC effects to occur, even for combinations of olfactory and gustatory stimuli previously thought not to depend on memory of pairings.

The Influence of Misinformation Manipulations on Evaluative Conditioning

Taylor Benedict, Anne Gast

University of Cologne, Germany

Evaluative conditioning (EC) is a change in the valence of a conditioned stimulus (CS) due to previous pairings with a positive or negative unconditioned stimulus (US). EC is relevant for understanding the acquisition of implicit and explicit attitudes. It is often assumed that attitude acquisition is based on implicit or unconscious learning. Several studies suggest, however, that EC is mediated by explicit memory. Therefore, EC may be susceptible to the same factors that influence memory, such as misinformation manipulations, which can create false memories. Our preregistered study integrated the misinformation effect into the EC paradigm by falsely suggesting that some of the CSs had been paired with different USs, which had been previously shown. After the conditioning phase, the participants answered detailed questions about the USs while receiving inaccurate suggestions indicating that the CSs had been paired with a different US with the opposite valence. Other pairs were questioned with accurate suggestions, while the remaining pairs (controls) were not questioned at all. We found that this manipulation significantly moderated EC effects. For the pairs that were combined with inaccurate information we found a reverse EC effect, while we found a typical EC effect for both control pairs and pairs combined with accurate information. Manipulation checks showed that the misinformation effect successfully moderated memory for the pairs, as performance was reduced in the misinformation condition. The results support the relevance of explicit memory for EC effects and are therefore also relevant for understanding the processes underlying the acquisition of attitudes.

Symposium: Visuospatial attention and working memory in action planning: Interactions and mechanisms

Time: Monday, 27/Mar/2017: 4:40pm - 6:00pm · *Location:* HS 401
Session Chair(s): Tobias Moehler

Attentional selection determines saccade landing position

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Different studies revealed that visual attention is selectively shifted towards the goal of an impending saccade shortly before the eyes start to move (e.g. Deubel & Schneider, 1996). These results support the premotor theory of attention (Rizzolati et al., 1994) which predicts that visual spatial attention arises from activation within saccade areas and that saccade preparation is sufficient to produce shifts of spatial attention. Recent electrophysiological studies challenged this theory by showing that visual but not motor neurons recorded within saccade centers (FEF, SC) sustained spatial attention (e.g. Gregoriou et al., 2012). These studies demonstrated that attention and saccades, despite being two interdependent processes, can be dissociated at the neuronal level. Can we observe such a dissociation at the behavioral level? Here, we instructed participants to saccade towards one of two potential saccade targets. When the two targets were closely spaced, saccades often land in between. As we measured pre-saccadic attention at several locations including the saccade targets and the location in between, our paradigm allowed us to determine whether saccade preparation produced a shift of spatial attention in all cases. We found a significant attentional benefit at the target location towards which saccades were executed when compared with the non-selected target. Interestingly, this pre-saccadic shift of attention towards the saccade landing position was absent when saccades landed in between the two targets. In this case attention was equally distributed across the two target locations, demonstrating that averaging saccades arise from incomplete attentional selection between two possible saccade paths. Contrary to the premotor theory of attention, we show evidence that preparing a saccade is not always sufficient to produce a shift of spatial attention at the saccade endpoint and that attentional selection determines the saccade landing position.

This research was supported by DFG grants to MS (SZ343/1) and HD (DE336/5-1).

Simultaneous allocation of attention to perceptual and saccade targets in a same-different matching task: Effects on discrimination and saccade performance.

Tobias Moehler, Katja Fiehler

Justus-Liebig-University Giessen, Germany

In the current study we investigated whether visual attention can be simultaneously allocated to spatially distinct perceptual and saccade target locations by examining perceptual and saccade performance. Participants performed a same-different matching or a single discrimination task during the preparation of a saccade. Sequentially presented central arrows cued the perceptual and the saccade target locations which were either at the same (congruent) or at different (incongruent) locations. Probe(s) appeared 0 – 120ms after the saccade target cue. In incongruent trials, probes appeared at spatially dissociated perceptual and saccade target locations. Participants were asked to match the identity of both probes (i.e., same or different). In congruent trials, only one probe appeared at the

cued perceptual target location which coincided with the saccade target location. Participants had to indicate the identity of the probe. The results showed that half of the participants successfully performed the matching task, while the other half performed around chance. The temporal dynamics of perceptual performance in the matching and the discrimination task substantially differed between the high and the low performance group. For saccade performance, we found that latency, accuracy, and precision were deteriorated in the matching compared to the discrimination task, and that saccades curved away from the perceptual non-saccade location. Our findings demonstrate that people can simultaneously attend to multiple locations for perception and action; however, pronounced interindividual differences are present not only in this general ability but also in the temporal dynamics of spatial attentional allocation.

Acknowledgment: German Research Foundation, International Research Training Group, IRTG 1901, ”The Brain in Action’’.

Saccades impose priorities on visual short-term memory independently of memory load

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Humans face a vast amount of visual information in their environment, only a limited share of which can be maintained in visual short-term memory (VSTM). As a result of this bottleneck, the visual system continuously selects from the rich pool of available visual signals. In the absence of informative cues, saccades constitute a powerful selection mechanism for visual memory, prioritizing stimuli in VSTM whose spatial position is congruent with the target of a subsequent saccade (Ohl & Rolfs, in press).

In the present study, we examined whether saccades impose this bias only when items compete for memory resources. In two experiments, we cued observers to generate a saccade 400 ms after the disappearance of a memory array that consisted of a varying number of oriented Gabors and unoriented noise patches. After a delay of 800 ms, observers were asked to report the orientation of the Gabor at a random one of the stimulus locations. Although saccades were uninformative for the memory task, they strongly influenced performance — observers remembered stimuli more often when they had appeared at the saccade target location (congruent trials) than when they had appeared elsewhere (incongruent trials). Critically, saccades imposed these priorities in VSTM independently of memory load, even for set sizes as small as two stimuli. Moreover, saccades deteriorated memory performance in incongruent trials irrespective of the stimulus type (Gabor or noise patch) at the saccade target location.

Together these results imply that saccades constitute a fundamental spatial selection mechanism for visual memory. Representations in memory are attenuated when they do not overlap in space with subsequent saccade targets, irrespective of the number of representations competing for access into VSTM.

Independent selection of eye and hand targets suggests effector-specific attentional mechanisms

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Both eye and hand movements have been shown to bind visual attention to their goal locations during movement preparation. However, it is still a matter of debate whether a unitary attentional system underlies the selection of both eye and hand targets, or whether they are selected by independent systems. To approach this question we investigated the deployment of visual attention in coordinated eye-hand movements. In dual movement tasks we asked participants to reach and look towards two different locations simultaneously cued at fixation, and to discriminate the orientation of briefly presented noise stimuli. Perceptual discrimination performance was taken as a measure of the spatio-temporal attentional distribution during motor goal selection.

Our results show that attention is allocated in parallel towards the future saccade and reach target, increasing both at the eye and the hand goal until movement onset. Importantly, the attentional dynamics did not differ between single (eye or hand) and combined (eye plus hand) movements. Thus, the allocation of attention to one effector's motor goal was not affected by the concurrent preparation of the other effector's movement. Since action selection mechanisms for different effectors did not compete for attentional resources, our findings suggest that targets for eye and hand movements are represented in separate, effector-specific maps of action-relevant locations.

We also tested this conjecture for visuospatial working-memory. While single movement experiments have shown that both saccades and reaches selectively interfere with spatial working-memory, we investigated spatial memory performance in combined eye-hand movements. In line with the assumption of effector-specific systems for the selection of saccade and reach targets, we observed improved spatial memory at both motor goals, independently for eye and hand movements.

Taken together our results suggest that eye and hand targets are selected independently and in parallel.

This work was supported by a DFG grant (GI964/1-1) to HD.

Symposium: Lying and cheating (Part II)

Time: Monday, 27/Mar/2017: 4:40pm - 6:00pm · *Location:* 101
Session Chair(s): Roland Pfister, Anna Foerster

Cheating behavior in deviant youths

Aiste Jusyte[1], Roland Pfister[2], Robert Wirth[2], Michael Schönenberg[3]

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The understanding of social norms constitutes a key component in children and adolescents' socialization. However, this process is disrupted in some individuals, leading to chronic psychopathology marked by repeated acts of rule violations. Despite previous research attempts to understand the etiology of deviant behavior, the cognitive processes occurring at the very instant a rule is violated are barely understood. We present an approach to investigate the cognitive markers underlying individual differences in rule adherence and their association with the development of socially deviant behavior during childhood. This is achieved by comparing the performance of youths with conduct problems to matched controls on two paradigms designed to assess cognitive conflict during rule violations as well as behavioral proneness to disregard rules as a function of

short-term gains. Only a combination of the two paradigms allows for a detailed assessment of cheating behavior from the first-person perspective.

How false alibis change dishonest processing

Anna Foerster, Roland Pfister, Robert Wirth, Oliver Herbort, Wilfried Kunde

University of Würzburg, Germany

At the heart of dishonest responding lies the inhibition of an automatic tendency to respond truthfully. This effortful inhibition of an initially activated response deteriorates performance even for dishonest responding to simple yes/no questions. Providing a false alibi, however, reverses this picture: Responses in correspondence with false alibi actions – that have not actually been performed – are generated spontaneously and efficiently. The current experiments targeted the cognitive basis of this facilitation. Participants secretly performed mock crime actions and learned about other actions that were allegedly performed by most participants. Half of the participants were to pretend that they performed these new actions instead of the ones they actually performed in a subsequent computer-based inquiry. Distractors, i.e., yes and no, appeared alongside each question in the inquiry and were either compatible with the honest or the dishonest yes/no response. Without a false alibi at hand, honest distractors facilitated dishonest responding because they match the initial honest response activation. With a false alibi at hand, by contrast, there was no such facilitation. These findings indicate that explicit false alibis indeed affect automatic retrieval.

How susceptible are reaction time based deception measures to faking attempts?

Kristina Suchotzki, Matthias Gamer

University of Würzburg, Germany

Background: The reaction time based Concealed Information Test (CIT) and the autobiographical Implicit Associations Test (aIAT) have been shown to provide valid means to detect deception and concealed information. In the current two experiments, we tested how vulnerable both methods are to attempts of participants to fake their test outcome. Methods: In both experiments, participants were either assigned to a guilty group (that performed a staged mock crime) or an innocent group (that performed an everyday activity). All participants then took a CIT and an aIAT, with the order being counterbalanced across participants. Half of the participants received instructions on how to influence their response patterns and achieve an innocent test outcome in the CIT, and half of the participants received instructions on how to influence their response patterns and achieve an innocent test outcome in the aIAT. Results: Our first experiment revealed a substantial effect of faking on the CIT effect size. No effect of faking was found for the aIAT. This could be explained by the generally small aIAT effect and the low correct classification rate in our experiment. In the second experiment, we tested whether the use of a response deadline hindered participants to implement faking strategies. Results revealed that the faking effect was indeed eliminated in the CIT, yet was now present in the aIAT. Conclusion: Reasons for the generally smaller effect sizes in the aIAT in our study compared to other aIAT studies will be discussed, as well as an explanation why response deadlines may be more effective in CIT compared to aIAT designs. Finally, consequences for the applied use of reaction time based deception detection methods in general and of the CIT and the aIAT in particular will be presented.

Binding lies: Flexible retrieval of honest and dishonest responses

Roland Pfister[1], Christina U. Pfeuffer[2], Anna Foerster[1], Franziska Przybylski[2], Andrea Kiesel[2]

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Dishonesty can take a toll on the liar's memory, because he or she needs to tell a consistent lies not only in one instance but also across multiple occasions. We tested whether this toll is mitigated by associative learning, i.e., by associations between a question and its corresponding response and by associations between a question and its previous intentional context (honest vs. dishonest responding). Results indicated automatic retrieval of the response to a question if, and only if, the intentional context repeated but not when it switched between a prime and a later probe trial. These findings indicate hierarchical associations between (dis-)honest intentions, questions, and the corresponding responses, which allows for flexible, context-specific retrieval.

Symposium: Cognition and emotion in human-machine-interaction (Part II)

Time: Monday, 27/Mar/2017: 4:40pm - 6:00pm · *Location:* 103
Session Chair(s): Stefan Brandenburg, Anna Katharina Trapp

Temporal changes of users' affect during human-computer interaction

Nils Backhaus, Stefan Brandenburg

Technische Universität Berlin, Germany

Examining the change of user affects over time is an ongoing endeavour in human computer interaction. Few studies examined the development of affects over time. They found that affects can be manipulated towards a more positive or negative direction using a game console or film clips. However, these manipulated effects quickly reverted to a neutral state when the experimental setting changed. The present study avoids this change. Subjects watched either three positive or negative film clips on a tablet PC and later accomplished four tasks on the same device. We assumed that a stable experimental setting helps to maintain the participants' affect. Results showed that we succeeded in manipulating subjects affect. Again, positive and negative affect quickly reverted to neutral when subjects started task accomplishment. The findings suggest that affects prior to the interaction might motivate people to approach technical artefacts. However, they become irrelevant as soon as people start interacting with them. Here, the interaction characteristics determine the users' affects.

Hunting for quick "Likes" - The effects of reach, longevity and quality of social media content on the fulfillment of psychological needs

Ngoc-Huy Truong, Carine Ewert, Matthias Frorath, Rul von Stülpnagel

University of Freiburg, Germany

One major psychological stressor associated with Facebook use appears to be the constant manag-ing of irrelevant or annoying content (Fox & Moreland, 2015). However, it remains unclear which circumstances promote the tendency to make such "low quality" contributions on social media.

We argue that the longevity and reach of shared content influences its quality: Users will try to share more high quality content the longer they believe it is visible to other users and the fewer users they address. Furthermore, we predict that sharing content perceived as high quality results in greater satisfaction of basic psychological needs (namely autonomy, competence, and related-ness) and thus psychological well-being.

In this work in progress study, participants curate articles they selected on the Internet in a web-based application. They are further encouraged to write personal statements for their selection. One group is told that many other curators exist so that their own curated articles could disappear in a mass of other users' articles (low longevity). The other group is told that there are few other curators so their own articles are longer visible (high longevity). Additionally, the number of alleged readers is manipulated (low vs. high). Dependent variables are the effort to share high quality con-tent (measured by search time and length of the selected articles as well as of the personal state-ments) and the fulfillment of basic psychological needs.

The results will reveal insights into how social media designers can promote the sharing of more long- lived, thoughtful content and whether this implementation can help create a more meaning-ful user experience.

A Longitudinal Field Evaluation of an App for Teenagers with Sickle Cell Disease and Thalassemia

Anastasiya Lebedev[1], Michael Minge[1], Stephan Lobitz[2], Kai Sostmann[3], Manfred Thüring[1]

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Sickle cell disease and thalassemia are two rare genetic diseases with severe complications that can be significantly alleviated through therapy compliance and particularly medication adherence. Therapy compliance over years is crucial for benefits to the patients' health and life expectancy. However, it is often observed, that adolescents show a low level of medication adherence. A cur-rent research project at Charité Universitätsmedizin Berlin aims at improving self-management skills and adherence in children and teenagers by developing a smartphone-based application (app). The new app utilizes the behavior change approach by Michie, van Stralen and West (2011), COM-B, that distinguishes between capability, motivation and opportunities as antecedents of be-havior. The objective of the present study is to evaluate the first prototype of the app in a longitu-dinal field study which is conducted over five weeks. Twenty teenagers affected by sickle cell dis-ease aged between 12 and 18 years are randomized to two conditions: One half of the participants receives reminders every other day to use the app. The second half does not receive notifications. Once a week all patients are asked to complete an online survey measuring user experience. In the beginning and at the end of the study, a short usability test is conducted and standardized ques-tionnaires assessing motivation, expectations, and user experience are answered. Frequency and duration of use are collected as objective dependent variables. The data is analyzed to answer the following research questions: (1) Which usability problems emerge over time? (2) Do the patients use the app and its behavior change features more often when they are reminded to use them? (3) How often and how long is the app used in general; are key behavior change features being used? During the presentation results of the study will be presented and discussed.

User Experience in smart kitchen environment

Anne Pagenkopf, Arnd Engeln, Sabine Palm, Katharina Zeiner, Michael Brumester, Jürgen Scheible

Stuttgart Media University, Germany

Since several years, the “User Experience” topic is promoted by industries to be a good way for developing products and being successful on market. It claims to have a more holistic view on product development than usability. User-centered product development has to be extended by new methods in order to achieve a good user experience.

The “Smart Kitchen” project is funded by the German Federal Ministry of Education & Research and our industrial partner E.G.O. GmbH. It aims to enhance the user experience of cooking by examin-ing how digital media can be accessed intuitively using multimodal interaction. We use qualitative and quantitative empirical methods within various steps of the product development. In this itera-tive user-centered development process we ensure design solutions with very good user experi-ence.

In the beginning, we identified user requirements in qualitative research by combining observation and interview methods in private surroundings. Based on these results we extracted “Opportunity Areas”, which point out potentials to enhance the user experience (e.g. user needs that are not or not sufficiently satisfied). In parallel we ran an online survey to detect positive experiences in cur-rent cooking situations. The results were structured into experience categories.

We used these opportunity areas and experience categories in innovation workshops with devel-opers to create ideas for the kitchen of the future. The ideas are currently evaluated by users in qualitative and quantitative studies. By this, we ensure to meet relevant user requirements and to enhance the user experience of the solutions in an early stage of development - long before tech-nical implementation.

The report will describe methods and results of the current evaluation.

Talk Session: Methods: Statistics and data analysis

Time: Monday, 27/Mar/2017: 4:40pm - 6:00pm · *Location:* 105
Session Chair(s): Sebastian Wallot

Publication bias in meta-analysis

Arianne Constance Herrera-Bennett, Moritz Heene

Ludwig-Maximilians-Universitaet Muenchen, Germany

Background: Psychology today is in the midst of a crisis of confidence, causing researchers to question the validity and replicability of published work, and advocate more rigorous methodological standards and approaches. One example is the increasing use of meta-analyses within the social sciences as a tool to aggregate individual studies into a body of findings. Unfortunately, where there conceptually exist strong grounds to posit a more representative effect estimate by synthesizing findings across a set of studies, the reality of the matter is in fact notably skewed: A considerable extent of documented meta-analyses tend to reflect inflated effect sizes (ESs).

Methods: In light of the surprising prevalence of documented meta-analyses advocating biased ESs, the current research seeked to take a closer look at factors that may be playing a role in the emergence of exaggerated ESs. First, it looked at how the use of questionable research practices (QRPs) affect the level of bias observed in meta-analysis, replicating Bakker et al.’s (2012) findings. Second, it assessed the power of the Test for

Excess of Significant Findings (TES, Ioannidis & Trikalinos, 2007) to detect an excess of positive findings within the meta-analysis.

Results: Main results showed significant effects of QRP use as well as small-study bias on the degree of bias produced. Power of the TES test was shown to be primarily high in detecting inflation of genuine non-null effects (i.e., high hit rates), but failed especially in identifying cases of false-positives. These effects were also investigated while varying levels of M (number of studies in the meta-analysis) and MaxStudies (maximum number of small studies run), and across different values of true ES (TrueES).

Conclusion: Results indicate a strong need to improve the degree of precision of summary ESs and better techniques to identify bias in meta-analyses. Limitations as well as recommendations in how to deal with the problem of bias in the published literature are also provided.

Approximate Bayes Factors

Ulf Mertens, Andreas Voss

Heidelberg University, Germany

In experimental psychology, the Bayes factor (BF) has become a popular alternative to classical hypothesis testing. BFs allow for the comparison among hypotheses by taking into account the uncertainty in the parameters of the models. One important advantage of the BF is the ability to express support for both alternative and the null hypothesis. Although BFs are favorable in many ways, they are nonetheless difficult to compute for non-standard tests. Approximate Bayesian Computation (ABC) offers a way to approximate BFs for arbitrarily specified models. Due to this flexibility, ABC is a promising tool for BF computation if the BF cannot be computed using standard software. In the first part, we present simulation results in which we compare the approximated BF with the default BF computed by JASP for a two-sample t-test as well as a simple linear regression. In the second part, we demonstrate the use of our Python module named approxbayes and show how to easily implement a Bayesian version of the Levene-Test.

Multidimensional Recurrence Quantification Analysis (MdRQA) for the analysis of multidimensional time-series and its application to group-level data in joint action

Sebastian Wallot[1], Andreas Roepstorff[2], Dan Mønster[2,3]

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The collection of multivariate time series data has become increasingly part of research protocols in the area of biological/physiological psychology, and social psychology, in particular joint action research. One central question in both domains pertains to the coupling/common dynamics between multiple physiological, behavioral, or cognition-related measures (of multiple agents). However, proper of quantification of group-level dynamics (i.e., with more than two component signals) has been difficult, usually reverting to work around solutions that quantify group-level behavior as some average of individual or dyadic behaviors.

In this presentation, I introduce Multidimensional Recurrence Quantification Analysis (MdRQA) as a tool to analyze multidimensional time series data that allows a more appropriate quantification of group-level dynamics. I will briefly show how MdRQA can be

used to capture the dynamics of high-dimensional signals, and how MdRQA can be used to assess coupling between two or more variables. In particular, I describe and application of the method to joint action, as it provides a coherent analysis framework to systematically investigate dynamics at different group levels – from individual dynamics, to dyadic dynamics, up to global group-level dynamics of arbitrary size. The example data comes from a study on team work, where groups of three participants work together in order to manufacture as many origami boats as possible within 5 minute-sessions, while their skin conductance was being recorded. When comparing individual dynamics of skin conductance versus dyadic dynamics of skin conductance versus group-level dynamics of skin conductance, it turns out that group-level dynamics as quantified by MdRQA show better predictive power of group performance (i.e., number of boats built) compared to individual or dyadic measures.

Mental Chronometry 2.0: A dynamic and probabilistic approach to study perception, cognition, and action on different time-scales

Sven Panis

TU Kaiserslautern, Germany

Background.

A number of methodological and theoretical pitfalls have plagued the RT research field since its conception, when the goal is to study the time-course of a cognitive process.

Methods.

I present the results of two masked priming experiments - designed to study response inhibition - that illustrate why I believe that cognitive (neuro)scientists should switch to the statistical technique for analysing time-to-event data that is standard in many scientific disciplines: event history analysis; also known as survival analysis, hazard analysis, duration analysis, failure-time analysis, and transition analysis. Time-to-event data include saccadic latencies, RT data, perceptual dominance durations, etc. Instead of focusing on the probability density function and the cumulative distribution function, event history analysis focuses on the (conditional probability or) hazard function of instantaneous response occurrence (given no response at earlier time points).

Results.

In particular, I show that differences in mean RT can clearly underestimate the actual duration of the process-of-interest, and that differences in mean accuracy conceal the existence of multiple consecutive cognitive states during a trial.

Conclusion.

Event history analysis is a distributional method that can deal with right-censored observations and time-varying predictors by taking the passage of time explicitly into account, in contrast to many current approaches in RT research (such as comparing mean RT, constructing delta plots and conditional accuracy functions based on estimated quantiles, etc.). In a discrete time event history analysis the passage of time since target onset is divided in a set of contiguous time bins, e.g., each with a width of 40 ms. One can then study how the effect of an experimental manipulation (such as SOA, stimulus duration, prime-target congruency, target-distractor distance, etc.) on the hazard of response occurrence changes across the across-bin/within-trial time-scale (and also across the across-trial/within-block time-scale, and the across-block/within-experiment time-scale).

Symposium: The Remote Associate Task - A paradigm for investigating creative, metacognitive, insightful, and intuitive processing mechanisms (Part II)

Time: Monday, 27/Mar/2017: 4:40pm - 6:00pm · *Location:* HS 304
Session Chair(s): Thea Zander

Examining Insight, Fixation, and Incubation using Remote Associate Test Problems

Jarrod Moss, Edward Cranford

Mississippi State University, United States of America

Problem-solving research with Remote Associates Test (RAT) problems has found that participants can experience an insight or “Aha” upon solution. However, these problems can also lead to other solution experiences, and it is not clear that the phenomenological insight experience always results from the same underlying cognitive processes. There is a growing neuroimaging literature utilizing these types of short insight-like problems to examine the neurocognitive processes underlying insight. However, it is not clear to what degree these types of problems involve similar cognitive processes as more traditional insight problems. For example, restructuring of a representation is a cognitive process that may only sometimes be associated with an “Aha” experience in RAT problems but has been associated with traditional insight problems. In this talk, I will present the results of a functional magnetic resonance imaging (fMRI) study from my lab that investigates whether different patterns of neural activation underlie different kinds of insightful problem-solving experiences. Along with behavioral data on RAT problem solving, these results indicate that similar subjective ratings of insight result from different kinds of cognitive processes. It is therefore important to have additional sources of data beyond subjective ratings to investigate the cognitive processes that contribute to insight problem solving. In addition, this fMRI study also examined the neural correlates of incidentally encountered information during incubation periods that have been found in other studies to lead to enhanced problem solving after resuming work on the problem. These results contribute to the growing neuroimaging literature on insight problem solving, but they also highlight the importance of not averaging over different kinds of cognitive processes that lead to a similar phenomenological experience.

Using Compound Remote Associates to Investigate Metamemory

Monika Undorf[1], Thea Zander[2]

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Metamemory refers to the ability to monitor and control one’s own memory. An ongoing debate concerns whether nonanalytic, experience-based processes (i.e., fluency of processing information at study) affect metamemory judgments over and above analytic, theory-based processes (i.e., deliberate applications of one’s beliefs about memory). The present study used compound remote associates to examine whether the experience-based process of intuition underlies people’s predictions of their future memory performance (judgments of learning; JOLs). We presented participants with groups of three words that were either remote associates of a single solution word (coherent triads) or had no common associate (incoherent triads). Participants made a JOL for each item and took a test of cued recall. They were never informed about semantic coherence or common associates and short presentation times ensured that they could not retrieve the common associate. In all experiments, JOLs and memory performance were higher for

coherent than for incoherent triads. Moreover, coherent triads were processed more fluently (i.e., read more quickly) than incoherent triads. Results revealed that the effect of semantic coherence on JOLs occurred for participants who were aware and unaware of relations between all three triad words, but was more pronounced for aware participants. In sum, the current study demonstrates two things. First, intuition impacts metamemory judgments over and above theory-based processes. Second, compound remote associates are well suited to investigate how experience-based and theory-based processes combine in metamemory.

The hippocampus and the Default Mode Network in the formation and representation of schema-congruent memory traces

Björn Schott[1,2], Jasmin Kizilirmak[3], Alan Richardson-Klavehn[4]

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Insight during problem-solving can improve memory formation, but the underlying neural processes are thus far poorly understood. We present two fMRI studies in which we conceptualized insight as sudden comprehension of a novel relationship between familiar stimuli that fits into existing knowledge and is accompanied by a positive emotional response. We aimed to relate neural correlates of insight to associative novelty, schema congruency, and intrinsic reward, all of which can enhance memory formation. To this end, we utilized an adapted version of the Compound-Remote-Associates Task (CRAT). Each item consists of three clue words and a plausible (insight) or implausible (control) solution word. Solutions were presented after a brief problem-solving attempt to induce either sudden comprehension (insight) or continued incomprehension (control). Insight was associated with increased activation of bilateral hippocampus, medial prefrontal cortex (mPFC), amygdala, and striatum. Neural correlates of successful memory encoding of insight solutions depended on the memory test employed. Reproducing the solution upon second presentation of the triad was predicted by increased activation of the mPFC, whereas subsequent recognition memory for solution words was associated with activations in the striatum and midbrain. Increased hippocampal responses to insight compared to control items suggest a preferential novelty response of the hippocampus to meaningful rather than arbitrary associations. The subsequent memory effect in the mPFC is compatible with recent research on schema-related memory, that is, memory traces that fit into pre-existing knowledge may accelerate or shortcut hippocampal encoding via signals from the mPFC. As the mPFC is also a prominent structure of the Default Mode Network (DMN), we discuss this observation in relation to a recently observed involvement of the precuneus, a posterior DMN structure, in non-semantic schema-dependent encoding.

Symposium: Contextualized decision making: Mediators and moderators (Part II)

Time: Monday, 27/Mar/2017: 4:40pm - 6:00pm · *Location:* 201
Session Chair(s): Arndt Bröder

Learning trajectories of exemplar-based and rule-based judgments

Arndt Bröder[1], Michael Gräf[2]

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Judgments and inferences often rely on probabilistic cues that allow educated guesses about an unknown criterion. At least two cognitive mechanisms have been proposed how people integrate these cues: cue abstraction and exemplar models. The former set of mechanisms specifies sequential processing steps in the form of "strategies" which imply a piecemeal processing of cue-criterion relations. Exemplar models, in contrast, assume a global similarity match of current cue patterns with exemplars stored in memory. Little is known about the time course of learning strategies or exemplar processes across a long phase of repeated judgments with feedback. Using a newly developed measurement model to estimate the relative impact of cue and exemplar processes by means of a mixture parameter, in several experiments, we found a surprising trend from using strategies first to using exemplars later which was much more pronounced in memory-based judgments than in judgments with all information provided on the computer screen.

The role of causal expectations in contingency learning and (biased) choice behavior

Franziska Bott, Hanna Fleig, Thorsten Meiser

University of Mannheim, Germany

Learning contingencies between choice options and outcomes plays a crucial role in successful decision making. Pairwise correlations of choice options and outcomes with a third context variable, however, can influence judgments of contingency between the choice options and outcomes in various ways: they can either benefit (inferring) the contingency as in the case of pseudocontingencies or augmentation, or they can even have the opposite effect of reducing the perceived contingency between options and outcomes in terms of blocking. Besides objective structural properties of a learning sample (e.g., the strength of the contingency between options and contexts), subjective expectations regarding the causal sequence of options, contexts, and outcomes are presumed to moderate whether the pairwise correlations with the contexts have a fostering or competitive effect on the judgments of contingency between the options and outcomes. This moderation was tested in two experiments (N1 = 128, N2 = 127). We manipulated causal expectations regarding two options and two contexts in terms of their causal proximity to two outcomes (gain vs. loss). Moreover, within both experiments it was varied whether the options and contexts were presented as single cues or in compound. Estimates of the options' and contexts' winning probabilities reflected the positive pairwise contingencies of the options and outcomes with the context variable as well as the participants' choice behavior: they preferred the option and the context with a higher winning probability. The results revealed that this preference for the option with the higher winning probability was even more pronounced when the options were causally more proximal to the outcomes than the contexts and when the options and contexts were presented in compound.

Felt jitter – A model for correlation judgments with continuous variables

Florian Kutzner[1], Max Ihmels[2], Klaus Fiedler[3]

[1]Universität Heidelberg, Germany; [2]Universität Tübingen, Germany; [3]Universität Heidelberg, Germany

Many decision makers seek to gauge how strongly variables are related, not last to assess the degree to which potential causes influence desired outcomes. With pairs of dichotomous variables, e.g. expensive or cheap products and high or low satisfaction, these judgments seem to be driven by the proportion of confirming instances (PCI), instances involving high satisfaction with expensive and low satisfaction with cheap products. Yet, many decisions of interest involve continuous variables. Extending the PCI account to continuous variables, we propose a model of distance-based correlation judgments. Higher numerical distances between variable pairs and more variability of those distances, high "jitter", result in lower correlation ratings. This model predicts judgments to increase with a) the statistical correlation between variables, b) the similarity in numerical magnitude of the variables' values and c) with a smaller variance of the variables. Finally, building on evidence that numerical quantities are represented ever closer the larger their numerical value, the model predicts that e) judgments will increase with the variables' numerical magnitude. Three studies in which participants experienced the correlation between the price and quality of wine confirm these predictions.

Symposium: Prospective memory – current trends and theoretical advances (Part II)

Time: Monday, 27/Mar/2017: 4:40pm - 6:00pm · *Location:* 204
Session Chair(s): Marcus Möschl, Philipp Schaper

Time-of-day affects prospective memory differently in younger and older adults

Nicolas Rothen, Beat Meier

University of Bern, Switzerland

The goal of this study was to investigate the impact of circadian arousal on prospective memory performance as a function of age. We tested a younger (18–34 years) and an older group (56–95 years) of participants on- and off-peak with regard to their circadian arousal patterns in a computer-based laboratory experiment. For the prospective memory task, participants had to press a particular key whenever specific target words appeared in an ongoing concreteness-judgment task. The results showed that prospective memory performance was better on- than off-peak in younger but not older participants. Younger participants consistently outperformed older participants in all conditions. We conclude that prospective remembering underlies time-of-day effects which most likely reflect controlled processes.

After-effects of responding to prospective memory targets across the lifespan

Milvia Cottini[1,2], Beat Meier[2]

[1]University of Pavia, Italy; [2]University of Bern, Switzerland

Responding to prospective memory (ProM) targets during an ongoing task (OT) requires switching between the two tasks. Thus, switching can result in an additional slowing of response times to the subsequent OT trials (i.e. after-effect) that is unrelated to the performance slowing typically observed due to monitoring for the ProM targets. Moreover, slowing can also occur when ProM targets appear after the ProM task was deactivated (i.e., an additional after-effect). The purpose of this study was to investigate both types of after-effects as well as monitoring costs across the lifespan. 90 participants of three age groups (7-years-old children, 19- to 26-years-old adults and 65- to 75-years-old adults) performed an event-based ProM task that was divided into 3 blocks: a baseline block (only OT); a ProM block; and a ProM block in which the ProM intention was deactivated. This permitted us to compare OT performance across the three blocks and the three age groups. Moreover, after-effects of responding to ProM targets and after-effects of responding to deactivated ProM targets were examined considering the subsequent OT trials in the two ProM blocks. The results of this study can shed light on the different sources and the extent of the cognitive costs resulting from the presence of a ProM task across the lifespan.

I should have stopped – Investigating the role of response suppression in commission errors

Philipp Schaper, Tobias Grundgeiger

Universität Würzburg, Germany

Prospective memory refers to our memory for future tasks. These tasks have often to be retrieved and executed once a certain cue occurs. But these intentions can also erroneously persist even though they are no longer relevant and may result in commission errors. The dual mechanism account proposed that commission errors occur when the intention is spontaneously retrieved and its execution is not suppressed on time. We investigated whether the suppression of the execution is a prerequisite for commission errors by introducing a response lag condition in which participants had to delay their response to ongoing task trials for one second (Experiment 1) or two seconds (Experiment 2). As a baseline, we added a pause of the same length between ongoing task trials in both experiments. All participants were first instructed about the prospective memory task and were subsequently told that the prospective memory task was cancelled. In a later phase, participants encountered several no longer relevant prospective memory cues. If failed suppression of the intention is a prerequisite for commission errors, we should observe fewer participants committing errors in the response lag condition, because additional time is available to make up one's mind and suppress the execution. Contrary to this prediction, we found significantly larger commission error rates than zero in both response lag and pause conditions in Experiment 1 and 2. In addition, there was no significant difference in commission error rates between the response lag and pause conditions. In Experiment 2, we could also replicate prior findings by showing a significantly higher commission error rate for cancelled intentions compared to finished intentions (the intention has been executed before it was declared finished). These results indicate that failed intention suppression is no prerequisite for the occurrence of commission errors.

Talk Session: Motivational modulation of cognitive control

Time: Monday, 27/Mar/2017: 4:40pm - 6:00pm · *Location:* HS 403
Session Chair(s): Andreas B. Eder, Jessica Sänger

How performance-contingent reward modulates cognitive control: Increased proactive control at the cost of decreased flexibility

Carmen Hefer, Gesine Dreisbach

Universiy of Regensburg, Germany

Growing evidence suggests that performance-contingent reward promotes proactive control in terms of increased context maintenance and cognitive stability. In two Experiments we investigated whether this reward effect comes at the cost of decreased cognitive flexibility. To this end, different versions of the well proven AX-continuous performance task (AX-CPT) were used. In this task, the cue A or B is followed by a probe X or Y resulting in AX, AY, BX, and BY trials. Only on AX trials, participants give a target response, otherwise a non-target response. AX sequences occur with 70%, the others with 10% each. This trial-type frequency makes the context cues highly predictive and, consequently a proactive control strategy in terms of preparing an advance response highly efficient. In Experiment 1, it is shown that the typical reward effect in terms of increased proactive control not only survives the withdrawal of reward but also delays the adaptation to changed task conditions (elimination of the predictive validity of the A-cue) that make the proactive strategy maladaptive. In Experiment 2, it is shown that this reduced flexibility to adapt is also observed in a more demanding modified version of the AX-CPT and is even stronger under conditions of sustained reward. Taken together, results of both Experiments thus speak to the idea that the prospect of reward increases proactive control and thereby cognitive stability. This increased cognitive stability however comes at the cost of decreased flexibility in terms of delayed adaptation to new reward and task conditions.

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Attracted by rewards: Disentangling the motivational influence of rewarding and punishing targets and distractors

Robert Wirth[1], David Dignath[2], Roland Pfister[1], Wilfried Kunde[1], Andreas Eder[1]

[1]Uni Würzburg, Germany; [2]Uni Freiburg, Germany

Traditional research on action control focuses on the outcome of a decision process and neglects the way by which these decisions are put into action. Here, we provide direct evidence for ongoing control of motivational impulses during post-decision action execution. Using a movement task in which gain/loss stimuli either functioned as targets or distractors, we show that different phases of a movement are distinctly shaped by motivational impulses. Response initiation times revealed control costs for loss targets and distractors, and control benefits for gain targets. However, movement trajectories revealed strong attraction towards the gain distractor, in line with a hypothesized pull of approach-related stimuli, while targets and distractors associated with losses had no repulsive avoidance-related effect on movement trajectories. These results show that motivational processing of goal-relevant stimuli influences the way in which goal-directed actions are executed and highlight a prominent role of reward-related distractors in shaping movement execution.

Hunger and reward modulate proactive interference in visual working memory

Thomas Maran[1,2], Pierre Sachse[1], Lucas Haraped[1], Franziska Rieger[1], Marco Furtner[1]

[1]Leopold-Franzens University of Innsbruck, Austria; [2]Alpen-Adria University of Klagenfurt, Austria

Conflict resolution is a key challenge for higher cognition and susceptible to motivation (Botvinick & Braver, 2015). Most research on motivational modulations of cognitive control focused on the effects of monetary reinforcement, but less is known about how more basic drives like hunger modulate cognitive control. The present study aimed to investigate the effects of food deprivation and monetary reward on control over proactive interference, a main source of forgetting in memory. Participants (n=97) were randomly assigned to three conditions and performed a modified recency-probes paradigm with food and non-food stimuli. In all three conditions participants were instructed not to eat for at least ten hours prior to testing. In the control group, participants received a standardized meal one hour before testing (sated group). In the second condition participants were food deprived for ten hours without any prior meal (food deprived group). The third condition received a standardized meal before testing, furthermore they received performance-contingent monetary incentives for correct and fast responses (rewarded group). Results showed, that both, the hungry and the rewarded group showed an accelerated resolution of proactive interference, as compared to the sated group. Moreover, a specific increase in conflict resolution occurred when the conflicting probe depicted food compared to non-food objects. Thus, we conclude that motivation initiates biased competition of active memory representations in favor of prioritized source information at cost of familiar, but irrelevant information. Since food deprivation and monetary reinforcement energizes a similar performance pattern, we suggest a common mechanism underlying motivational enhancements of proactive interference resolution. We discuss arousal-biased competition as one core mechanism, which could account for the incentive effects of hunger and reward gain on conflict resolution.

Is thinking really aversive?

Andreas B. Eder, Thorsten Erle, Franziska Maas, Anand Krishna

University of Würzburg, Germany

Previous research showed that people prefer to administer electric shocks to themselves instead of being left alone with their thoughts. In our research we examined the motivational reasons behind this behavior. Several experiments replicated the result that participants choose to shock themselves during a waiting period (15 minutes). The primary motivation for this behavior was however not hedonic (escape from engaging in one's own thoughts) but curiosity about the effects that possible actions can have on the self in an underarousing environment. The results suggest that people show a motivation to explore regularities in the environment even when they are clearly unpleasant to them.

Talk Session: Methods: New instruments and applications

Time: Monday, 27/Mar/2017: 4:40pm - 6:00pm · *Location:* HS 405
Session Chair(s): Kilian Semmelmann
Session Chair(s):, Felix Henninger

Evaluating the Validity and Reliability of the Wearable EEG-System Muse

Alexandra Hoffmann, Corinna Christmann, Gabriele Bleser, Thomas Lachmann

University of Kaiserslautern, Germany

Wearable EEG systems are small wireless devices which can e.g., be used in a wide range of field studies and brain-computer-interfaces outside the laboratory. They are increasingly used in research because they are easy to transport, can be applied in a broad variety of settings and they are much cheaper than conventional wired EEG systems. However, there is still a lack of knowledge about the validity and reliability of wearable EEG systems. MuseTM, for instance, is a wearable EEG system often used by researchers to measure and classify alpha activity even though there exists no published independent proof of the system's validity and reliability. Therefore, the recent study aimed to test both these criteria for this wearable EEG. A total of 20 participants took part in two recording sessions, with a 30 minutes break between them. The EEG signal was recorded simultaneously by the wearable system and by the Brain Products gel-based Anti-CHamp system. Each session consisted of four conditions in randomized order. Conditions included an eyes open and an eyes closed scenario to induce changes in the relative extent of alpha and beta activity due to the alpha blockage. Moreover, participants performed a breath-counting relaxation exercise aimed at eliciting enhanced alpha activity and a brain storming exercise aimed at eliciting enhanced beta activity. Results will be discussed.

Pupil-based Biofeedback

Jan Ehlers, Anke Huckauf

Ulm University, Germany

Biofeedback frameworks externalize covert physiological responses (e.g. changes in skin conductance or heart-rate variability) and allow voluntary interference by means of simple cognitive techniques. Given that valid and continuous feedback is provided, even autonomic activation indexed by pupil diameter is subject to intentional manipulation (Ehlers et al. 2016). However, several studies (Surwitt et al. 1977; Manuk et al. 1975) question the impact of real-time feedback by reporting no considerable effects compared to a control group. The current study addresses this issue in a pupil-based biofeedback application. We systematically varied the type of feedback (continuous, discrete, absent) in a long-term training study to reveal operating principles that account for the documented differences. Furthermore, we applied feedback mechanisms already during mandatory baseline acquisition to test for visualization-based artifacts that may contaminate autonomic activation during subsequent measuring. Empirical collection is currently in progress. Results may not only deepen our understanding of underlying mechanisms but provide an important contribution to a more efficient treatment in clinical biofeedback applications.

lab.js — Modular Building-Blocks for Browser-Based Experiments

Felix Henninger

University of Koblenz-Landau, Germany

With the growing capabilities of web browsers, an ever-increasing number of researchers rely on browsers to conduct experiments and surveys -- regardless of whether data collection occurs via the internet or within the laboratory. Considerable improvements in tooling notwithstanding, browser-based experiments still lag behind dedicated laboratory-based experimental software with regard to flexibility and ease-of-use. We introduce lab.js, an open source library designed to vastly simplify the realization of and data collection with browser-based experiments. It controls the succession of stimuli and input handling, leaving researchers to supply only the overall structure and content of their studies. Through lab.js, we aim to make browser-based experiments more widely accessible, and to enable researchers with a basic knowledge of HTML and CSS to build browser-based web experiments. We are confident that researchers familiar with web development will be able to realize their studies more quickly and easily using our library; more experienced developers will find it extensible, adaptable, and thereby suitable even for complex experiments that previously could have only been built manually. The library is freely available from https://github.com/felixhenninger/lab.js

Networking in Behavioral Research Experiments: Linking E-Prime and Smartphone

Michael Stumpf, David Dignath, Andrea Kiesel

University of Freiburg, Germany

In behavioral research, the E-Prime suite is frequently used for stimulus presentation and data collection in computerized experiments. It provides a common, standardized, and precise computer research language for psychology (Schneider, Eschman, & Zuccolotto, 2012).

E-Prime-based experiments typically run on dedicated PCs; subjects interact with the system via keyboard, mouse, parallel port or similar hard-wired devices. However, the E-Prime suite is not limited to serial and parallel port devices, but also supports socket devices for networking, which makes it feasible to connect to devices over the internet.

We present a networking setting where an E-Prime program communicates with an app running on an Android smartphone via an ad-hoc wireless network, and we discuss opportunities and limitations of this approach. This setting provides (1) new ways of interaction for E-Prime-based experiments and (2) the combination of features available on today smartphones with E-Primes's capabilities to control experiments. As an example, we sketch the integration and use of a smartphone sensor in a motor-cognitive dual task experiment.

References:

Schneider, W., Eschman, A., & Zuccolotto, A. (2012). E-Prime Reference Guide. Pittsburgh: Psychology Software Tools, Inc.

Talk Session: Evaluative judgements and implicit associations

Time: Monday, 27/Mar/2017: 4:40pm - 6:00pm · *Location:* HS 301
Session Chair(s): Olivier Parice Corneille

Approach-Avoidance training of drinks consumption - testing determinants of the effect

Anand Krishna, Andreas Eder

JMU Würzburg, Germany

Background - Approach-Avoidance Training (AAT) consists of repeated pairing of target stimuli with either approach or avoidance behaviors. Stimuli paired with approach movements should be liked more afterwards, whereas stimuli paired with avoidance movements should be liked less. Method - We investigated the AAT effect using joystick pull/push movements as the behavior and colored sweet lemonades as the stimuli, measuring implicit/explicit attitudes and consumption as dependent variables. Results - After failing to show any AAT effect in study 1 (N = 55), we varied the training procedure to illuminate possible determinants of the effect. In study 2 (N = 36), we replaced the first study's semantic approach/avoidance behavioral framing with a perceptual approach/avoidance consequence (zooming target stimuli towards or away from the participant) and interspersed consumption measures with the AAT to eliminate lack of experience with the stimuli as an influence factor. We still found no AAT effect. In addition, our manipulation check at the end of the experiment showed no effect of the AAT training on joystick responses to the target stimuli. In study 3 (N = 114), we implemented a manipulation check closer to the training and applied sequential Bayesian testing. The manipulation check was successful, but Bayesian analysis showed moderate to strong evidence against an AAT effect on all measures. Finally, in study 4 (N = 96), we varied the order of attitude and consumption measures. Again, no AAT effect was found in any condition. Conclusion - These studies indicate that AAT effects may not be as robust as previously assumed, especially for neutral stimuli.

Red = False and Green = True? Investigating Implicit Color-Validity Associations

Lena Nadarevic, Franziska Lena Metzger

Universität Mannheim, Germany

When grading exams, teachers often mark false answers in red and true answers in green. Based on this observation, we hypothesized that people hold automatic red-false and green-true associations. To test our hypothesis, we assessed implicit color-validity associations with the Implicit Association Test (IAT). In Experiment 1, participants performed three IATs in which they had to categorize true and false statements and – depending on the IAT condition – red and green, green and yellow, or red and yellow objects. The IAT data revealed a clear red-false association (i.e., faster responses when the response categories "red" and "false" shared the same response key than when "red" and "true" shared the same key). In contrast, responses were only faster for the response mapping "green/true" when "red/false" was assigned to the other response key but not when "yellow/false" was assigned to the other key. However, the pattern of results changed when gray instead of yellow was used as a comparison color in Experiment 2.

This time, the IAT data displayed a clear green-true association. In contrast, responses were only faster for the response mapping “red/false” when “green/true” was assigned to the other response key but not when “gray/true” was assigned to the other key. Taken together the findings of Experiments 1 and 2 suggest that implicit color-validity associations are context dependent.

A New Measure of Implicit Beliefs: The Propositional Evaluation Paradigm (PEP)

Florian Müller, Klaus Rothermund

Friedrich-Schiller-Universität Jena, Germany

Identification of propositions as the core of attitudes and beliefs (De Houwer, 2014) has resulted in development of implicit measures targeting personal evaluations of complex sentences (e.g., the IRAP or the RRT). Whereas their utility is uncontested, these paradigms are subject to limitations inherent in their block based design, such as allowing assessment of only a single belief at a time. We introduce the Propositional Evaluation Paradigm (PEP) for assessment of multiple propositional beliefs within a single experimental block. We present data documenting the validity of the PEP and its utility in predicting actual behavioral outcomes over and above conventional self-report. Offering reliability and ease of administration, the PEP expands researchers’ options for an implicit assessment of propositional evaluations.

Are objective value and emotional valence of car brands (mentally) spatially represented?

Seba Kaplan[1], Korbinian Moeller[2], Thomas Bäumer[1]

[1]Hochschule für Technik Stuttgart, Germany; [2]Leibniz-Institut für Wissensmedien, Tübingen, Germany

In homogeneous product categories such as the car industry companies use their brand equity as sales argument. However, psychological brand equity is an (partly) implicit measure as it reflects consumers’ associations with a brand, and thus hard to assess by explicit methods. Building on studies on spatial-numerical associations, this research evaluated whether there may be similar spatial associations of brand equity. If so, this might allow for the development of an implicit measuring method for psychological brand equity.

Accordingly, this research focused on the question whether psychological brand equity is spatially associated. Objective value (price) or emotional valence may serve as indicators. Following results from numerical cognition research a response time (RT) advantage for right hand as compared to left hand responses was expected for high priced/positive connoted car brands.

Participants (n=37) had to indicate whether they estimate a car brand as higher priced/more positive compared to a control brand by pressing corresponding response buttons. Response-to-hand assignment was varied, so that they should press a right lateralized key for higher priced/more valent estimations in one condition and a left-lateralized one in another condition.

Results provided first evidence for a spatial representation of brand equity: responses to higher priced and more negative valent brands were found to be executed faster by the right as compared to the left hand.

Participants systematically associated higher prices and (contrary to expectations) negative valence of car brands with the right side of space. The latter may suggest that more negative brand valence were interpreted as “backmost ranks” – similar to German school grades (higher digits represent more negative grades). Overall, these findings fit nicely with results from numerical cognition research which point to a systematic association of larger numbers and the right side of space.

Symposium: Temporal dynamics of decision processes in mouse movements and eye movements: Applications and methodological challenges (Part I)

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* HS 401
Session Chair(s): Stefan Scherbaum, Pascal J. Kieslich

Assessing cognitive conflict in the public goods game: A mouse-tracking analysis

Pascal J. Kieslich

University of Mannheim, Germany

Current research in psychology and economics debates whether people have a spontaneous tendency to cooperate in social dilemmas. Many studies have investigated this question using response times as a dependent or manipulated variable with mixed results. As response times may reflect influences of different cognitive processes, there is a growing trend to use other process measures for examining this question. One recent study has applied mouse-tracking to dyadic social dilemmas using the curvature of mouse movements as indicator of cognitive conflict during the decision process. The basic idea is that if cooperation is the spontaneous tendency, there should be less conflict (i.e., less curved mouse movements) for cooperation than for defection decisions. The current study extends this method to social dilemmas involving groups of actors. Specifically, a repeated binary public goods game was developed and implemented in an incentivized lab experiment. The analysis of mouse movements revealed that on average more cognitive conflict was associated with not contributing (vs. contributing) to a public good. However, this effect was not found for all individuals as there was considerable interindividual variation. This variation could be explained by individual differences in situational and dispositional cooperativeness, most importantly through the Honesty-Humility factor of the HEXACO personality model. The current contribution highlights the importance of assessing and explaining interindividual differences in cooperation decisions. Besides, it demonstrates the usefulness of mouse-tracking for exploring the dynamics of cooperation and provides a suitable paradigm to implement this in social dilemmas.

Using decision space visualisations to characterise individual decision makers

Arkady Zgonnikov[1], Andrea Aleni[2], Petri Piiroinen[1], Denis O'Hora[1]

[1]National University of Ireland, Galway, Ireland; [2]University of Naples Federico II, Naples, Italy

Background

Computerized paradigms have enabled decision making researchers to gather rich data on human behaviour, including information on motor execution of a decision, e.g. by tracking mouse cursor trajectories. These trajectories can reveal novel information about on-going decision processes (Spivey et al, 2005). As the number and complexity of mouse tracking studies rapidly increase, more sophisticated methodology is needed to analyse the decision trajectories.

Methods

In this talk, I will present a new computational approach to generating decision space visualizations based on mouse-tracking data. Decision space is an ‘energy potential field’ mathematically derived from velocity and acceleration of mouse movement during a

decision. Visualised as a 3d surface, it provides a comprehensive overview of evolution of motor decisions (O'Hora et al, 2013).

Results

Employing the dynamical systems theory framework, I develop new method for generating decision spaces based on arbitrary number of trajectories. This approach not only generates 3d representation of decision spaces, but also effectively describes each mouse trajectory by a number of interpretable parameters. These parameters characterise time evolution of decisions in more details compared to conventional measures, and can be compared across experimental conditions, and even across individuals.

Conclusion

The decision space visualisation approach is a novel tool for analysing mouse trajectories during decision execution, which can provide new insights into individual differences in dynamics of decision making.

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Acknowledgements

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Combining eye and mouse tracking in a delay discounting game

Ulrike Senftleben[1], Sonja Ries[2], Jens Helmert[1], Stefan Scherbaum[1]

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When choosing between immediate and temporally delayed goods, people sometimes decide disadvantageously. Recently, we provided process-level insight into differences between individually determined advantageous and disadvantageous choices by using a delay discounting computer game combined with mouse tracking.

In the work presented here, we combined within this delay discounting game the tracking of mouse and eye movements. This served on the one hand to gain a deeper understanding of the decision process leading to advantageous or disadvantageous choices and on the other hand, to better estimate the concordance of the two process tracing measures.

Our results indicate that mouse and eye tracking are in concordance with respect to the general process of choice, but that the two measures also highlight different aspects of the decision process.

The continuity between choice and preference: Augmenting a drift diffusion analysis of delay discounting with eye-tracking measures

Martin Schoemann, Stefan Scherbaum

Technische Universität Dresden, Germany

In intertemporal decision making, individuals prefer smaller rewards delivered sooner over larger rewards delivered later. In recent literature, it has been argued that two separate

cognitive processes might be involved in choosing between rewards available at different points in time (Rodriguez, Turner, & McClure, 2014). The first is temporal discounting, which transforms given information about size and delay of the prospect reward into subjective values. The second involves a comparison of the available rewards to enable and execute choice on the basis of these subjective values. Diffusion models and other classes of accumulation models can account for the choice process but assume the subjective values from temporal discounting to be given (Krajbich, Armel, & Rangel, 2010; Rodriguez et al., 2014). However, in intertemporal choice the subjective value of each alternative is not given a priori, but can only be calculated when all information of a choice task is available. Hence, if diffusion models indeed merely modeled the choice process, then the calculation of the subjective values (e.g. the generation of preference) should be found within the non-decision time. In our study, we applied a diffusion model on RT data from a classic intertemporal choice paradigm, in which we also collected eye-tracking data. Our results from diffusion modelling replicated recent findings concerning parameter variations between conditions (Rodriguez et al., 2014). The analysis of the gaze behavior however revealed that no significant information are processed during the non-decision time, indicating that diffusion modelling captures both preference and choice. Hence, based on our findings, we argue that there is some continuity between choice and preference, and that it cannot be seen as two distinctive cognitive processes.

Symposium: Evaluative conditioning II: Correlates and consequences of acquired preferences (Part I)

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* 101
Session Chair(s): Tobias Heycke Frederik Aust, Christoph Stahl

On the effect of relational information on explicit and implicit measures of evaluation

Karoline Corinna Bading[1], Klaus Rothermund[2], Christoph Stahl[1]

[1]University of Cologne, Germany; [2]Friedrich Schiller University Jena, Germany

The associative-propositional evaluation (APE) model (Gawronski & Bodenhausen, 2006) postulates that attitudes are acquired through deliberate propositional reasoning as well as automatic formation of evaluative associations, driven by repeated co-occurrence of neutral and valent events in the environment (i.e. evaluative conditioning). Furthermore, it is assumed that indirect measures of evaluation always reflect the valence of these evaluative associations, whereas direct measures of evaluation only do so when they align with other propositions about the given attitude object. Accordingly, Moran & Bar-Anan (2013) could demonstrate that participants preferred alien creatures that co-occurred with, but stopped a horrifying scream over alien creatures that co-occurred with, but stopped a pleasant melody when using a direct measure of evaluation. On the contrary, and in accordance with the notion of evaluative associations based on mere co-occurrence, the participants' preference reversed when being captured by indirect measures of evaluation (IAT, SPF). In two studies we replicated the original results (study 1) but found indirect measures of evaluation to reflect propositional reasoning – instead of mere co-occurrence – when other IAT variants (study 1) as well as an evaluative priming paradigm (study 2) were used. An alternative account, that explains both the original results as well as our own findings, is discussed.

Of two minds or one? A registered replication of Rydell et al. (2006)

Tobias Heycke[1], Sarah Gehrmann[1], Julia Haaf[2], Christoph Stahl[1]

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Evaluative Conditioning (EC) is defined as a change in liking of a target object (conditioned stimulus, CS) that is due to the pairing of the CS with a negative or positive stimulus (unconditioned stimulus, US; De Houwer, 2007). Evaluative conditioning is proposed as a mechanism of automatic preferences acquisition in dual-process theories of attitudes (Gawronski & Bodenhausen, 2006).

Evidence for the automaticity of EC comes from studies showing EC effects for subliminal stimuli. In a study by Rydell, McConnell, Mackie, & Strain (2006), the CS was a picture of a character named Bob, which was preceded by a subliminal prime and followed by explicit, behavioral information about Bob which was opposite to the valence of the prime. The main finding of the study is that explicit attitudes were affected by behavioral information, whereas implicit attitudes reflected the valence of subliminal primes. Rydell et al. (2006) conclude that their participants simultaneously held opposite implicit and explicit attitudes at the same time depending on the two types of information received.

This study is one of the strongest pieces of evidence for dual process theories (Sweldens, Corneille, & Yzerbyt, 2014), and it is therefore crucial to assess its reliability and boundary conditions. In a direct registered replication of the study by Rydell et al. (2006) we replicated a learning effect of supraliminally learned information on explicit ratings. However, we were unable to detect any effect of the subliminally presented primes on implicitly measured associations towards the target character. If anything, the implicitly measured evaluation reflected the supraliminally learned valence.

Rule- and similarity-based generalization of stimulus evaluations acquired through evaluative conditioning

Fabia Högden, Christian Unkelbach, Christoph Stahl

University of Cologne, Germany

Neutral stimuli that appear together with positive or negative stimuli will acquire a positive or negative property, respectively. This effect is referred to as Evaluative Conditioning (EC) and is often recruited as a parsimonious explanation of the formation of attitudes. To account for attitude formation beyond individual stimuli (e.g., towards a social category), however, EC effects should generalize to novel stimuli. The present research addresses whether such generalizations take place in a rule-based or a similarity-based manner in four experiments. Drawing on a paradigm from predictive learning research (Shanks & Darby, 1998), participants learned to categorize geometric shapes into the categories “mammals” vs. “reptiles”. This categorization could be mastered by learning on the basis of individual stimuli (associative) or by rule abstraction. During this categorization task the neutral geometric shapes were shown together with a positive mammal picture or a negative reptile picture, thereby constituting an EC procedure. In a subsequent generalization test, participants (a) categorized novel shapes as mammal or reptile stimuli and (b) evaluated them. With regard to categorization (a), we observed that rule-learners applied the categorization rule to novel stimuli, whereas associative learners categorized novel stimuli based on similarity to stimuli from the learning phase. With regard to the evaluation of novel stimuli (b), however, both rule- and associative learners generalized in a similarity-based manner, i.e. rule knowledge was not used when evaluating the novel stimuli. We discuss implications for theoretical accounts of EC.

Dissociating controllable and uncontrollable effects of unconditioned stimuli on attitudes and consumption

Mandy Hütter[1], Steven Sweldens[2]

[1]Eberhard Karls Universität Tübingen, Germany; [2]Erasmus University Rotterdam, The Netherlands

Can evaluative conditioning have uncontrollable effects on individuals' attitudes and consumption decisions? Answering this question is methodologically challenging, because the presence of an uncontrollable process can be masked by a simultaneously operating controllable process. We argue that existing methods conflate the contribution of both processes and are therefore unable to reliably measure or demonstrate the presence of an uncontrollable process. To solve the conundrum, we implement a multinomial processing tree model. Across five experiments, we demonstrate the fit of the model estimating controllable and uncontrollable processes. We also establish the validity of the parameter estimates. As predicted, we find that the parameter estimate of the controllable process is susceptible to participants' cognitive resources and levels of motivation to exert control. The parameter estimate of the uncontrollable process appears unaffected by these factors, corroborating its interpretation as an uncontrollably operating process. Furthermore, we demonstrate that the estimates of controllable and uncontrollable processes are both predictive of choice and consumption in a study that employed water brand logos as conditioned stimuli and a subsequent water tasting. Our research has important methodological, theoretical, and practical implications.

Symposium: The Beneficial impact of predictability on human performance

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* 103
Session Chair(s): Laura Broeker

Predictability matters when multitasking – the impact of perceptual predictability and implicit learning

Laura Broeker[1], Harald Ewolds[2], Stefan Kuenzell[2], Rita de Oliveira[3], Markus Raab[1,3]

[1]German Sport University Cologne, Germany; [2]University of Augsburg, Germany; [3]London South Bank University, UK

Findings from different areas suggest a beneficial impact of predictability on dual-task cost prevention and reduction, e.g. induced by perceptual predictability (Körding, & Wolpert, 2004) or implicit knowledge (Wulf & Schmidt, 1997). To test this several experiments were conducted examining the effects of a predictable environment in a tracking task. While in the first study perceptual predictability was created by providing visual and auditory information, the second study examined predictability in the light of self-generated implicit knowledge. It was hypothesized that both, perceptual cues as well as implicit learning, positively affect dual-task performance.

Participants performed a manual pursuit tracking task following a red square with a joystick while concurrently responding to high-pitched sounds by pedal press and ignoring low-pitched tones. The tracking path consisted of three segments. In experiments manipulating perceptual predictability, all three segments were randomized throughout all trials trial, in implicit-learning manipulations a constant middle segment was presented. In a first step perceptual predictability was manipulated by displaying the tracking path ahead of the red target, in a second step the tones of the secondary task were presented as a sequence

manipulating auditory predictability. Third when knowledge was manipulated via the constant middle segment of the tracking path; an implicit group was not informed about the repeating segment, while the explicit group was.

As expected both perceptual predictability as well as implicit and explicit knowledge lead to enhanced tracking performance indicating its beneficial effects for dual-task cost prevention and reduction.

Across-task predictability of stimulus and response events preserves implicit sequence learning in dual-task situations

Eva Röttger[1], Hilde Haider[1], Fang Zhao[2], Robert Gaschler[2]

[1]University of Cologne, Germany; [2]FernUniversität in Hagen

One crucial finding is that implicit sequence learning is often reduced in dual-task situations. Schumacher and Schwarb (2009) found no manifestation of it when a serial reaction time task (SRT; Nissen & Bullemer, 1987) had to be performed simultaneously with a (random) two-choice tone-identification task. By contrast, temporal delays and priority differences left implicit sequence learning intact. The authors concluded that parallel response selection / central capacity sharing (see, e.g., Tombu & Jolicoeur, 2003, 2005) disturbs sequence learning while serial response selection (see, e.g., Pashler, 1994) does not. However, they did not specify the exact mechanism.

On the other hand, Schmidtke and Heuer (1997) found that impaired dual-task sequence learning resulted from task integration whenever the secondary task events were random. With perfectly correlated sequences in both tasks, however, integrated learning occurred - that was as good as single-task learning.

Another way to interpret both findings is that the random elements of one task, occurring in close temporal contiguity to the regular elements of the other task, introduced co-occurrences of events that had no predictive value. Thus, they prevented the minimization of the prediction error - that is, they prevented associative learning (see Rah, Reber & Hsiao, 2000; Rescorla & Wagner, 1972).

We conducted several experiments using the design of Schumacher and Schwarb (2009). Crucially, we manipulated the tone-identification task in different ways. For example, responding to only one of the randomly occurring tones left sequence learning intact. Our interpretation of this finding is that in the proportion of trials where only one response was required, the pattern of co-occurrences was less noisy and that, thus, a reduction of the prediction error was possible. Overall, first results support the assumption that increasing the predictability of stimulus and response events within as well as across tasks preserves implicit sequence learning in dual-task situations.

Can a predictable timing sequence help multitasking?

Fang Zhao[1], Robert Gaschler[1], Eva Röttger[2], Hilde Haider[2], Roland Thomaschke[3]

[1]Fernuniversität in Hagen, Germany; [2]Universität zu Köln; [3]Albert-Friedrich Universität in Freiburg

Our SPP Multitasking project sets out to test whether sequence learning can support multitasking by fostering the separation of representations involved in the two tasks. In a dual-task condition, temporal separation (prioritization of one task over the other) may ease the problem of dysfunctional across-task bindings of stimuli and responses (Logan & Gordon, 2001).

When Task 1 and Task 2 overlap, with timing in a sequential order, temporal separation may play out strongly, which might help to increase within-task sequence learning by decreasing across-task binding of stimuli and response events. Two experiments on sequential timing using a dual-task serial reaction time paradigm were conducted. In Experiment 1, participants (N = 28) were firstly explicitly trained to learn a 4-element stimulus sequence and a 4-element timing sequence. Then they were tested in random timing or random stimulus blocks. The results showed that prediction of stimulus sequence can help multitasking. The binding effect seems to exist only in random time condition. When time is predictable, no binding effect exists. In Experiment 2, participants (N = 26) were asked to learn a 8-element stimulus sequence and a 4-element timing sequence. Different from Exp 1, sequence knowledge of timing does NOT help people to keep task representations apart, which may due to the long stimulus sequence length. To sum up, after learning the time sequence, people attempt to temporally separate the two tasks in order to avoid dual-task cost.

What should I expect? How self-generated predictions and cue-induced expectations interact.

Maike Kemper[1], Robert Gaschler[2,1], Torsten Schubert[3,1]

[1]Humboldt-Universität zu Berlin, Germany; [2]Feruniversität Hagen; [3]Martin-Luther-Universität Halle-Wittenberg

Prior studies have documented stronger behavioral and EEG effects of self-generated as compared to cue-induced expectations. However all prior studies have looked at qualitative and quantitative differences between the effects of cues and self-generated expectations by comparing trials that contained only one form of expectation. This study investigates the differences and interactions of cue-induced expectations and self-generated predictions within the same trial in a within-subject design. Participants completed a stimulus response task with different expectation condition blocks. In addition to blocks that only contained cues and blocks in which participants were only asked to verbalize their self-generated prediction, we added blocks where both types of expectations were relevant within the same trials. With this method we could compare the effects of cues and predictions as well as their interaction in trials where they differed. The results suggest that if possibly contradicting expectations exist, they are relied on less than single expectations, even for trials where both expectations coincide. In addition the validity of expectations and the temporal distance of the expectation to the stimulus seem to play a stronger role, if two expectations compete.

Symposium: New insights into the mechanisms underlying automatic imitation

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* 105
Session Chair(s): Oliver Genschow

Motor simulation of multiple agents

Marcel Brass[1], Emiel Cracco[2]

[1]Ghent University; [2]Ghent University

Research on the so called ‘mirror system’ has demonstrated that we simulate observed behaviour in our motor system. Interestingly, almost all research in this domain focuses on dyadic interactions. In our recent research, we investigate motor simulation of multiple

agents. We wanted to know whether observing multiple agents executing the same action leads to stronger motor simulation than observing a single agent. Furthermore, we investigated whether we can simulate two different actions at the same time. Our results provide evidence for motor simulation of multiple agents and hint to a sensorimotor basis of group phenomena.

Psychological distance and imitation

Jochim Hansen[1], Hans Alves[2], Oliver Genschow[3], Yaacov Trope[4]

[1]Universität Salzburg; [2]Universität zu Köln; [3]Universität zu Köln; [4]New York University

The present research tested the effect of psychological distance on imitation. We hypothesized that observers engage in more movement imitation when a model is psychologically near but in more goal imitation when the model is distant from the observer. Findings of Experiments 1-3 showed that temporal and spatial distance reduced imitation of specific movements in a learning task. Experiment 4 demonstrated that psychological distance (compared to proximity) reduced participants' imitation of movements that were unrelated to their own goal, replicating the findings of Experiments 1-3 in a non-learning context. Experiment 5 demonstrated that temporal distance (vs. proximity) increased imitation of a goal relative to imitation of a movement. Experiment 6 measured goal-based imitation independently of movement-based imitation and found that spatial distance (vs. proximity) decreased the rate of goal errors (indicating more goal imitation) compared to movement errors. The findings are discussed in relation to extant theories of imitation.

The modulation of mimicry by ethnic group-membership and emotional expressions

Birgit Rauchbauer

University of Vienna

Mimicry has been ascribed affiliative functions. In three behavioral experiments, we used a newly developed social-affective mimicry task (SAMT) to investigate mimicry´s modulation by emotional facial expressions (happy, angry) and ethnic group-membership (White in-group, Black out-group). Experiment 1 established the main consistent effect across experiments: enhanced mimicry to angry out-group faces compared to angry in-group faces. Experiment 2 demonstrated that these effects were not confounded by general aspects of response conflict. Experiment 2 and pooled analysis of Experiments 1 and 2 also corroborated the finding of enhanced mimicry to angry out-group faces. Experiment 3 further confirmed this hypothesis by showing, that mimicry was selectively enhanced in response to out-group persons framed as physically threatening. Further, across experiments, black persons were implicitly more strongly associated with threat. Enhanced mimicry was consistently related to response facilitation in the execution of congruent movements. This suggests that mimicry acted as a social congruency signal. Our findings suggest that mimicry may serve as an appeasement signal in response to negative affiliative intent. It suggests that mimicry might not only be used to maintain and establish affiliative bonds, but also to ameliorate a negative social situation.

Comparison processes in imitation: Similarity testing facilitates automatic imitation

Oliver Genschow

Universität zu Köln, Germany

As the saying goes “monkey see, monkey do” it is widely agreed that individuals imitate their interaction partners. However, current research shifts away from the picture of the human being that automatically imitates whatever her or she may observe. For example, research has shown that individuals less strongly imitate others when they are faced with out-group members, non-human agents, or when being in a competition mode. Despite evidence of these—and other—inhibitors, past research has not yet offered a comprehensive model that allows integrating them. Here, we suggest that taking into consideration Mussweiler’s (2003) selective accessibility model may allow offering a new perspective on the integration of different moderating variables in automatic imitation. That is, all the inhibitors may elicit a focus on dissimilarities, as compared to similarities, and thus affect automatic imitation. In order to test whether a dissimilarity focus, as compared to a similarity focus, decreases automatic imitation we conducted two studies in which we manipulated participants’ focus. Study 1 finds decreased automatic imitation when individuals focus on dissimilarities between themselves and their interaction partner, as compared to when they focus on similarities. By including a neutral condition in the second study, we replicate this finding. Moreover, further analyses show that a focus on similarities increases and a focus on dissimilarities decreases automatic imitation. In sum, by taking into account comparison processes between interaction partners, the results help understanding why individuals do not always imitate each other, but sometimes inhibit this automatic tendency.

Symposium: Current research in cognitive aging: Mechanisms of decline and spared functioning (Part I)

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* HS 304
Session Chair(s): Beatrice G. Kuhlmann

Speech comprehension at the “cocktail-party”: Behavioral and EEG evidence of changes over the lifespan

Stephan Getzmann, Edmund Wascher

Leibniz Research Centre for Working Environments – IfADo

Impaired speech comprehension in multi-talker environments is a major challenge not only for the elderly. There is increasing evidence that the ability to extract speech information from a mixture of sound decreases even in the middle age. While it is known that these difficulties in speech-in-noise comprehension are associated with declines in both hearing and cognitive abilities, the interaction of age-related changes in sensory hearing and cognitive functions are still poorly understood. Here, the results of an ongoing large-scale study are reported in which speech perception is investigated in participants of a broad age range (20 to 70 years), using a realistic listening scenario in combination with electroencephalography. A stock exchange's trading environment is simulated in which sequences of short words (combinations of company names and values) are simultaneously presented by three speakers at different locations. The participants respond to the value of a target company present in 50% of trials, while ignoring all other companies. Detection of target company and discrimination between critical target values were assessed separately. The results indicate a significant decline in speech perception

performance, starting at the age of about 50 years. This decline occurred independently of an age-related reduction in (pure-tone audiometric) hearing abilities, and was associated with a continuous reduction in N2, N400, and P3b amplitudes. While declines in target detection were associated with decreasing P3b, declines in target discrimination came along with decreasing N400. Thus, age-related changes in working memory and language processing appear to contribute differentially to deficits in simple speech perception and the more demanding comprehension of speech information.

The impact of age on the processing of interruption and distraction in working memory: An ERP study

Kristina Küper, Stefan Arnau, Edmund Wascher, Stephan Getzmann

Leibniz-Institut für Arbeitsforschung an der TU Dortmund, Germany

Older adults are more prone to interference and previous event-related potential (ERP) research has indicated that age-related increases in the susceptibility to different types of interference may be mediated by distinct mechanisms. The present ERP study examined the impact of aging on the processing of two distinct types of interference: distracting irrelevant information and interruption by a secondary task. In a working memory task, older and younger adults had to memorize one of two sequentially presented items and ignore the other. Participants then had to select the memorized item in a probe display. On a third of the trials, this primary task was interrupted by a cued secondary math task which had to be attended before the presentation of the second memory item. Behavioral performance and probe-locked P300 modulations indicated that older but not younger adults were prone to proactive as well as reactive interference from the irrelevant memory item. Age-related performance deficits were exacerbated by trial interruptions which selectively impaired WM retrieval of the pre-interruption item in younger adults but resulted in generalized performance deficits in older adults. Age-differences in N300 modulations elicited by the cue signaling the interruption task indicated that these unspecific age-related performance deficits may have been mediated by impairments in prospective memory cue processing and task preparation.

How verbalizations influence implicit sequence learning and the emergence of explicit knowledge across the life span

Nicola Kristina Ferdinand, Jutta Kray

Saarland University, Germany

The goal of this study was to explore the ability to implicitly and explicitly learn regularities across the lifespan and to examine whether this learning process can be influenced by verbalizing supposedly helpful or hampering information, respectively. To this end, children (8-10 years), younger (19-30 years) and older adults (70-80 years) took part in a sequence learning experiment. Our results show that verbalizing sequence-congruent information during learning is a powerful means to generate explicit knowledge. It is especially helpful for younger adults. In contrast, verbalizations had much less influence on implicit learning, although recent research demonstrates that implicit learning can be modulated by directing participants' attention to relevant aspects of the task. We found that verbalizing during learning slows down responses but does not modulate the amount of implicit learning. This slowing was especially pronounced in older adults who were not able to overcome the cost of the dual-task situation (responding to the sequence learning task and verbalizing) and were slowed down even by the supposedly helpful verbalization.

However, younger adults showed an initial dual-tasking cost which, in the case of a helpful sequence-congruent verbalization, was overcome by practice and turned into a reaction time and learning benefit. However, when the verbalization was omitted this benefit was lost. This implies that better implicit learning is confined to younger adults and to situations in which a helpful sequence-congruent verbalization is continually executed.

The Effect of Task Switching on Age Differences in Event-based Prospective Memory.

Nicola Ballhausen[1], Katharina M. Schnitzspahn[2], Alexandra Hering[1], Matthias Kliegel[1]

[1]University of Geneva, Switzerland; [2]University of Aberdeen, UK

Background: Prospective memory (PM) refers to the memory for future intentions. While observed age differences in that capacity for a long time have been explained by a general decline of control capacities, more recent correlational studies suggest that specific executive processes may differentially account for those age differences. We set out to experimentally test the specific impact of task switching on age differences in PM.

Methods: Healthy younger (n = 45) and older (n = 43) adults were tested using a task switching paradigm with and without an additional PM task instruction. Participants had to work on a letter comparison task and to decide if a) a presented letter either was a vowel or a consonant or b) a small or capital letter. The ongoing task was performed both as pure (only one of the tasks) and as mixed task blocks (switch between the two tasks). For the PM instruction, participants had to respond to two specific pre-defined letters.

Results: Main effects of age and task switching on PM performance were qualified by a significant interaction of the two factors: significant age differences only emerged in the task switching compared to the pure condition.

Conclusion: Task switching and PM seem to share core processing components, and age-related differences in task switching are likely to be a key mechanism for lower PM capacities in older adults.

Talk Session: Ideomotor action, effect anticipation, action planning

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* 201
Session Chair(s): Oliver Herbort

Anticipation of delayed action-effects: Learning when an effect occurs, without knowing what this effect will be

David Dignath[1], Markus Janczyk[2]

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According to the ideomotor principle, behavior is controlled via a retrieval of the sensory consequences that will follow from the respective movement (“action-effects”). These consequences include not only what will happen, but also when something will happen. In fact, recollecting the temporal duration between response and effect takes time and prolongs initiation of the response. We investigated the associative structure of action-effect learning with delayed effects and asked whether participants acquire integrated action-time-effect episodes that comprise a compound of all three elements or whether they acquire separate traces that connect actions to the time until an effect occurs and actions to the effects that follow them. In three experiments, results showed that

participants retrieve temporal intervals that follow from their actions even when the identity of the effect could not be learned. Furthermore, retrieval of temporal intervals in isolation was not inferior to retrieval of temporal intervals that were consistently followed by predictable action-effects. More specifically, when tested under extinction, retrieval of action-time and action-identity associations seem to compete against each other, similar to overshadowing effects reported for stimulus-response conditioning. Together, these results suggest that people anticipate when the consequences of their action will occur, independently from what the consequences will be.

Exploring conceptual generalization of response-effect compatibility with bilingual transfer

Noémi Földes[1], Andrea M. Philipp[1], Arnaud Badets[2], Iring Koch[1]

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The ideomotor principle states that actions are represented by their sensory consequences. This notion can be tested with the response-effect compatibility (REC) paradigm, where participants' responses are followed by an either compatible or incompatible response effects (e.g., an effect on the right side after a right-hand response is considered compatible due to the spatial correspondence, while an effect on the left side after the right-hand response is considered incompatible). Shorter reaction time is observed in the compatible condition compared to the incompatible condition (i.e., REC effect), suggesting that effect anticipation plays a role in action control.

In the present study, we examined a possible conceptual generalization in the REC paradigm, more specifically, participants had to respond by saying a word and the effect was a word presented in the same language or in another one. Additionally, words could be compatible (i.e., they had the same meaning) or incompatible (different meaning). We compared performance of a group with bilingual transfer (response in German, effect in English), and a monolingual group in which response and effect languages were German.

We expected to find a REC effect in both groups, suggesting that response effects are represented conceptually, regardless of the language. However, while an REC effect was found with the monolingual group, no or even a reversed effect was observed for the bilingual transfer group.

To interpret this reversal, we suppose that the anticipation of an effect word might lead to the suppression of the translation-equivalent word in the other language, so that performance in the compatible condition is reduced. This results demonstrate that the conceptual generalization of REC can be further influenced by bilingual language control processes like inhibition.

Anticipatory Action Planning in Preschool Children

Oliver Herbort[1], Juliane Büschelberger[1], Markus Janczyk[2]

[1]Julius-Maximilians-Universität Würzburg, Germany; [2]Eberhard Karls Universität Tübingen

When we grasp objects we usually adjust the grasp to the intended object manipulation (End-state comfort effect). For example, adults consistently grasp a horizontal bar either with an "overhand" or "underhand" grasp, depending on the direction of the upcoming bar rotation. Surprisingly, children younger than 10 years fail to adapt the grasp consistently to the upcoming object manipulation in such tasks. We addressed whether children are unable to plan ahead or whether they cannot implement their plans in the usually employed tasks. Adults and 5-6 year olds performed the bar rotation task and a task which required

the rotation of a circular dial. The children's performance in the bar task was below that of adults. In the dial task, performance of both age groups was equally high. This shows that children are in principle able to plan their grasps with respect to upcoming object manipulations. However, they cannot implement these plans in the commonly used bar task, most likely because it requires overcoming a potent habitual response.

Symposium: Automated driving – a plethora of challenges (Part I)

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* 204
Session Chair(s): Felix Wilhelm Siebert, Alexander Liebing

Automated Driving - Modeling Relevant Aspects of Driver Behavior

Klaus Bengler

TUM, Germany

The technical feasibility to automate driving is increasing. But it is questionable, which role the driver will play in this human-machine system. Automation of mhuman machine systems leeds to out of the loop phenomena and long-term behavioral changes. Still the ability of active drivers to manage traffic conflicts and risky situations is one of the most important factors of road safety. First experiments show that there are automation effects and relevant ergonomic design requirements. Still, by far not all questions are adequately answered. The contribution will show attempts to formulate models for drivers' information processing and decision making in situations of automated driving.

How do drivers experience automated driving behavior of other drivers?

Katharina Preuk

DLR, Germany

Automated systems enable time and energy efficient driving. In the next years, the number of automated vehicles will increase; however, most of the drivers will not possess an automated vehicle. Those drivers may experience automated driving behavior as aversive as it may be difficult to understand and, therefore, to anticipate. However, they may also perceive automated driving behavior of others as useful and adapt their own driving behavior accordingly. In two studies, the effects of a driver with automation on drivers without automation were investigated. In this presentation, the focus is on how automated driving behavior is perceived by drivers without automation which was investigated in a first study. In a follow-up study, it was investigated whether informing drivers without automation about the equipment of drivers with automation affects how they perceive the automated driving behavior. Results for both studies are presented and discussed in terms of traffic safety.

"Driver takeovers at system boundaries of conditionally automated driving as a function of naturalistic non-driving-related tasks - a preliminary study".

Dennis Pascal Befelein

IZVW, Germany

Vehicle automation is one of the most rapidly growing fields within the domain of traffic research and from a technical standpoint, the vision of self-driving cars has become more and more tangible within recent years. Highly automated driving (HAD) is characterized by the automatic exertion of lateral and longitudinal vehicle control without the need for continuous system monitoring by the driver (SAE Level 3). Nevertheless, monitoring by the driver or even take-overs are likely to become necessary at limits of these systems, examples being obstacles on the road, highway departures or system failures. This study investigated driver take-over time and subjective driver ratings in case of a system failure (outfall of lateral and longitudinal guidance before a curve) as a function of four different naturalistic non driving-related tasks: Watching the news on a tablet (Video), a manual search task behind the co-driver's seat (Backseat), playing a video game on a tablet (Tetris), mental arithmetic tasks concerning cruising range (Calculate) and watching the scenery (Baseline). Regarding the time it took drivers to grasp the steering wheel (hands-on time), the tasks Video, Backseat and Tetris required significantly more time in comparison to Baseline. This did not hold true for the Calculate task. In addition, the manually distracting tasks Video, Backseat and Tetris also differed significantly with regard to the time it took drivers to empty their hands (hands-empty time), with Tetris requiring significantly more time than Video and Backseat. Although criticality ratings were generally low, distracted drivers rated take-over situations significantly more critical for all tasks than undistracted drivers, with the Tetris task being rated most critically. Relevant task characteristics such as hand occupancy or degree of task involvement are explored and their influence on take-over times is analyzed.

Collision avoidance in conditional automated driving – Evaluation of three steering wheel behaviors regarding effectiveness of collision avoidance and driver acceptance

Alexandra König[1], Bernhard Schlag[2], Julia Drüke[1]

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In conditional automated driving the automation contributes to perform almost all aspects of the driving task, and helps in safety-critical situations. The driver serves as a fallback with a sufficient time reserve to resume vehicle control. However, the driver`s reaction in a safety-critical situation is still an unknown variable. Interfaces of human-machine interaction (HMI) play an important role while driving automatically as they provide to build up trust by means of transparency and predictability. The steering wheel is one of those interfaces that have a significant impact on driver's reaction in conditional automated driving. As conditional automated driving allows hands-off driving, the driver is no longer in direct contact with the steering wheel. A pretest has shown that drivers prefer a reduction of steering wheel movements while driving automatically because of comfort aspects. The question arises in what way steering wheel movements affect the driver's reaction in safety-critical situations. The aim of the driving simulator study was to investigate the effect of three strategies of steering wheel behavior (full, 50% reduced, and no steering wheel movements) on driver`s reaction and acceptance in an unexpected safety-critical situation that still can be handled by the automation using a swerving maneuver. Driving and

subjective data were analyzed for a total number of 58 drivers (N = 33 female; M = 39.1 years, SD = 11.0 years). In the safety-critical situation 24 drivers (41.4 %) resumed vehicle control. The steering wheel movement had no effect on the frequency and the time to take-over. In this simulator study two subjects showed a collision after the unintended take-over. The maximum steering wheel angle was lower when drivers interfered in the safety-critical situation compared to the automation reference, but was higher when steering back on the lane, implying that the intervention was difficult for the driver to control. Drivers evaluated the 50 % reduced steering wheel movements less disturbing compared to the strategy without steering wheel movement. The results contribute to the research question whether drivers need to be decoupled in safety-critical situations. However, further research in on-road traffic conditions is required to validate the results and to enlighten the role of the steering wheel in automated driving in more detail.

Should my vehicle drive as I do? A methodology to determine drivers‘ preference for automated driving styles.

David Käthner, Stefan Griesche

DLR, Germany

With automated driving being on the cusp of wide spread market introduction (Rivera & van der Meulen, 2014), Human Factors aspect of design and evaluation of the exact behaviour of automated vehicles gains crucial importance. Safety margins determine an envelope of possible trajectories for the automated vehicle, but as of today, the parameterisation of the vehicle’s behaviour within that envelope to create attractive driving styles has has not received wide spread attention yet (Scherer et al., 2015). However, for acceptance of automated driving functions, deemed critical to deliver the promised reduction in accident numbers, it is essential to design automated driving styles that win end users over to activate them on public roads. In two consecutive studies we investigated how to measure preferences for automated driving styles, whether or not drivers prefer being driven similar to their own driving, or if at least default styles can be created that a majority of the users enjoy.

In a first study 43 subjects drove in three scenarios on a two-lane motorway in a motion-based driving simulator. Users were instructed to drive at 120 km/h, forcing them to overtake slower vehicles on the right lane. The scenarios were varied regarding the presence and behaviour of faster cars on the left lane, compelling subjects to decide on timing and execution of overtaking manoeuvres. Based on the data from this study, four prototypical driving styles were extracted, using a multivariate time-series clustering algorithm (Griesche et al., 2014). In a second study, 35 subjects from study 1 rated the attractiveness of the prototypical driving styles gained from that study, in addition to their own style. Using a Best-Worst-Scaling technique, preferences for either one of the prototypical driving styles or their own style could be measured. The results indicate that i) many but not all subjects do like their own styles, but not in every situation, and ii) certain styles exist which are preferred by the great majority of the users.

CONFORM – A visualization tool and method to classify driving styles in context of highly automated driving. In: 30. VDI/VW-Gemeinschaftstagung Fahrerassistenz und Integrierte Sicherheit, 2223, Seiten 101-109. VDI Verlag Gmbh. 30. VDI/VW-Gemeinschaftstagung Fahrerassistenz und Integrierte Sicherheit, 14.-15. Okt. 2014, Wolfsburg. ISBN 978-3-18-092223-2. ISSN 0083-5560

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Talk Session: Cognitive control I: Interference and conflict

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* HS 403
Session Chair(s): Ulrich Ansorge

The process dissociation model of the Stroop task and its word reading parameter

Nadine Schimpf, Kerstin Dittrich, Karl Christoph Klauer

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When performing the classical Stroop task (Stroop, 1935), participants are to name the ink color of a color word. Typically, responses are slower and more erroneous when ink color and word meaning mismatch (incongruent trials, e.g., REDblue) than when they match (congruent trials, e.g., BLUEblue). This performance difference is called the Stroop effect. In congruent trials, both color naming and word reading lead to the same response. However, in incongruent trials word reading leads to different response and Stroop interference occurs. In order to estimate the processes of color naming and word reading, Lindsay and Jacoby (1994) applied the Process Dissociation (PD) model to the Stroop task. They demonstrated a double dissociation of color naming and word reading: The use of two color sets (bright versus dull colors) solely affected the color naming parameter, and the manipulation of proportion congruency influenced the word reading parameter only. However, the mechanisms underlying proportion congruency effects are still highly debated. Therefore, it seems rather circular to assume that a reduced word reading parameter accompanying the proportion congruency effect reflects a reduced influence of word reading: On the one hand, cognitive control is assumed to be the key mechanism of proportion congruency effects, while others argue the effect is due to simple contingency learning. In order to shed further light on this ongoing debate, a series of experiments were conducted to investigate what exactly is measured by word reading parameters of the PD model: Cognitive control, associative learning, or both. Additionally, a more straightforward manipulation of word reading was used to investigate the nature of the word reading parameter by influencing the legibility of the Stroop stimuli with different fonts (well versus poorly readable). Results of these experiments will be presented and discussed.

On the robustness of the Stroop effect: The influence of implementation intentions

Sarah Teige-Mocigemba, Kerstin Dittrich, Karl Christoph Klauer

University of Freiburg, Germany

In the Stroop task, participants are to name the surface color of a word while ignoring its meaning. Typically, participants cannot fully ignore the word meaning resulting in faster reaction times and fewer errors in congruent trials (e.g., the word GREEN printed in green) than in incongruent trials (e.g., the word GREEN printed in blue). The robustness of this finding has led to the assumption that the Stroop effect relies on automatic processes that cannot be influenced intentionally. Recent research, however, suggested that, if not intentionally, the Stroop effect can be reduced unintentionally by competing automatic processes. Based on this work, we tested in a series of three experiments whether implementation intentions (i.e., if-then rules linking a goal-relevant behavior to a specific

situation) as a means to compile automatic processes intentionally are effective in reducing the Stroop effect in a standard Stroop task (Experiment 1) and a semantic Stroop task (Experiments 2 and 3). Stroop tasks comprised so-called critical and non-critical trials, and implementation intentions targeted motor response processes (Experiments 1 and 2) or semantic processes (Experiment 3) in critical trials only. In the standard Stroop task, implementation intentions exerted very specific effects by eliminating Stroop effects in critical trials, while non-critical trials remained unaffected. In the semantic Stroop task, on the other hand, the Stroop effect was only reduced when implementation intentions targeted semantic processes, but not when they targeted response processes. Interestingly, the semantic Stroop effect was influenced on a more general level as evidenced by a reduction of the semantic Stroop effect in both critical and non-critical trials. The present findings suggest, for the first time, a possibility to affect even the allegedly uncontrollable processes underlying the semantic Stroop effect by means of implementation intentions.

Two Independent Frontal Midline Theta Oscillations During Conflict Detection and Adaptation in a Simon-like Manual Reaching Task

Thomas Töllner[1,2], Yijun Wang[3], Scott Makeig[4], Hermann J. Müller[1,5], Tzyy-Ping Jung[4], Klaus Gramann[6]

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One of the most firmly established factors determining the speed of human behavioral responses towards action-critical stimuli is the spatial correspondence between the stimulus and response locations. If both locations match, the time taken for response production is markedly reduced relative to when they mismatch—a phenomenon called Simon effect. While there is a consensus that this stimulus-response (S-R) conflict is associated with brief (4-7 Hz) frontal midline theta (fmθ) complexes generated in medial frontal cortex (MFC), it remains controversial (i) whether there are multiple, simultaneously active theta generator areas in the MFC that commonly give rise to conflict-related fmθ complexes; and if so, (ii) whether they are all related to resolution of conflicting task information. Here we combined mental chronometry with high-density electroencephalographic (EEG) measures during a Simon-like manual reaching task and used independent component analysis (ICA) and time-frequency domain statistics on source level activities to model fmθ sources. During target processing, our results revealed two independent fmθ generators simultaneously active in or near anterior cingulate cortex, only one of them reflecting the correspondence between current and previous S-R locations. However, this fmθ response is not exclusively linked to conflict but as well to other conflict-independent processes associated with response slowing. These results paint a detailed picture regarding the oscillatory correlates of conflict processing in Simon tasks, and challenge the prevalent notion that fmθ complexes induced by conflicting task information represent a unitary phenomenon related to cognitive control, which governs conflict processing across various types of response-override tasks.

Cognitive conflict hurts memory

Michèle Friedli, Beat Meier

Institute of Psychology and Center for Cognition, Learning, and Memory, University of Bern, Switzerland

Research consistently shows that cognitive conflict impairs immediate task performance, but their long-term impact is not clear. The current study was designed to investigate the influence of several types of cognitive conflict on subsequent memory systematically. In a task-switching paradigm participants had to carry out two semantic classification tasks which involved the same set of response keys. In Experiment 1 the stimuli were univalent, in Experiment 2 and 3, the stimuli were bivalent (relevant for both tasks). This allowed us to investigate three conflict types: task switching, stimulus bivalency and response compatibility. After the encoding phase consisting of the task switching paradigm, participants completed a surprise recognition test, either immediately or after a one week interval. The immediate test revealed that subsequent memory was consistently lower for switch compared to repetition stimuli and this effect was enhanced with bivalent stimuli. In the delayed test, the advantage for repetition stimuli disappeared, but a response-compatibility effect emerged: compatible stimuli (stimuli requiring the same response keys for both tasks) were remembered better than incompatible stimuli (stimuli requiring different response keys for each task). Together, the results indicate that cognitive conflict as triggered by task switching, bivalent stimuli, and incompatible stimulus-response mappings can hurt subsequent memory. The specific effects, however, seem to depend on the specific type of conflict and the test delay.

Talk Session: Memory I

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* HS 405
Session Chair(s): Agnes Scholz

Comparing Recognition-Memory Models Under Minimal Assumptions: Ranking Judgments are Consistent with Two-High-Threshold Theory

Simone Malejka, Daniel W. Heck, Edgar Erdfelder

University of Mannheim, Germany

In a recent empirical study, Kellen and Klauer (2014) used a K-alternative ranking task to compare continuous-strength and discrete-state models of recognition memory under minimal assumptions. The conditional probability of old items being assigned Rank 2—given that they were not assigned Rank 1—was higher for strong than for weak old items. This finding was interpreted as being consistent with signal-detection theory while contradicting the two-high-threshold model. According to the latter, failure to assign Rank 1 to an old item can be seen as evidence for entering a state of non-detection. Conditional on non-detection, the two-high-threshold model apparently cannot explain how the strength of old items (weak vs. strong) can affect the ranking judgments. However, this conclusion only holds under the auxiliary assumption that new items are detected as new with a constant probability in the context of weak versus strong old items. When this assumption is dropped, the conditional probability of old items being assigned Rank 2 should increase with the probability of new-item detection. In an empirical study, we show that new items are indeed more easily detected in the presence of a strong as compared to a weak old item—even when the old item was not detected. Hence, Kellen and Klauer's (2014) finding is consistent with the two-high-threshold model as long as different probabilities of new-item detection are taken into account.

A nap, but not rest or interference, consolidates language learning

Stefan Heim[1,2,3], Juliane Klann[2,4], Kerstin Schattka[2], Sonja Bauhoff[2], Gesa Borcherding[2], Nicole Nosbüsch[2], Linda Thomaschik[2], Ferdinand Binkofski[2], Cornelius J. Werner[2]

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Recent evidence suggests that a period of sleep after a motor learning task is a relevant factor for memory consolidation. However, it is yet open whether this also holds true for language-related learning. Therefore, the present study compared the short- and long-term effects of a nap versus an activity task after vocabulary learning on learning outcome. Thirty healthy subjects formed three treatment groups. Each group received a pseudo-word learning task in which pictures of monsters were associated with unique pseudo-word names. At the end of the learning block a first test was administered. Then, one group went for a 90-minute nap, one for a rest period without sleep, and one received another 90-minute session with interfering activity during which a new set of monster names was to be learned. After this block, all groups performed a first re-test of the names that they initially learned. On the morning of the following day, a second re-test was administered to both groups. The nap group showed significant improvement from test to re-test and a stable performance onto the second re-test. In contrast, the rest and the interference groups showed decline in performance from test to re-test, with stable low performance at re-test 2. The 3 (GROUP) x 3 (TIME) ANOVA revealed a significant interaction, indicating that the type of activity (nap/rest/interfering action) after initial learning actually had influence on the memory outcome. These data are being discussed with respect to translation to clinical settings with suggestions for improvement of intervention outcome after speech-language therapy if it is followed by a nap rather than interfering activity.

How is Long-Term Memory for Configurations Built up?

Mirko Thalmann, Alessandra Souza, Klaus Oberauer

University of Zurich, Switzerland

The so-called Hebb Effect shows that repeating the same sequence of items within a stream of randomly constructed sequences of items improves immediate memory for the repeated, but not for the random sequences. It is considered as evidence for the buildup of long-term memory (LTM) that is used in the immediate-memory test. This project aims at explaining why the Hebb Effect is often not found when configurational stimuli as arrays of colored circles are used instead of sequentially-presented stimuli as lists of words. The current experiment tested the hypothesis that people only create a precise representation of an array of stimuli when they are required to actually recall information from the array. Three repeated arrays of colors were shown in 96 mini blocks of four trials together with an array that was randomly constructed in every mini block. In every mini block participants performed a recall test on the first repeated array and a recognition test on the second repeated array. They alternated between recall and recognition on the third repeated array and on the random array.

We modeled the recall data with the mixture model of Bays et al. (2009) in a hierarchical Bayesian framework. Regression analyses on the latent parameters showed better and more precise memory in the repeated recall and repeated alternation conditions compared

to the random filler condition. Unexpectedly, there was only a main effect of repetitions reflecting a general learning effect but no interaction between repetitions and condition. There was no learning in the recognition test at all. The results suggest that the act of recalling is critical for the learning of visual information. The fact that learning in the recall test did not spill over to the recognition test in the repeated alternation condition shows that LTM was only accessed during the recall test. A currently conducted experiment examines the absence of the interaction between condition and repetitions more closely.

Olfactory context dependent memory

Ryan Patrick Hackländer, Christina Bermeitinger

Universität Hildesheim, Germany

When we learn information in the presence of a certain odor, we are better able to retrieve that information when again in the presence of the same odor, as opposed to in the presence of a different odor, or no environmental odor (e.g., Cann & Ross, 1989). This shows that odors can be effective contextual mnemonic cues. Still, it is unknown exactly how an odor is cognitively represented and how it is encoded together with the target information. One theory about odor identification is that it relies on automatic pleasantness ratings (Yeshurun & Sobel, 2010). In the current talk we will discuss experimental investigations concerning the role of odor pleasantness, and its relation to evaluations of target information, in context dependent memory. Surprisingly we found no evidence for a mnemonic benefit for material affectively congruent to the contextual odor. These results will be discussed in relation to their implications for future theorizing about the role of affect in olfactory cognition.

Talk Session: Thinking and reasoning

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* HS 301
Session Chair(s): Andre Aßfalg

Socio-cognitive determinants of conditional reasoning

Bruno Richter, Lupita Estefania Gazzo Castañeda, Markus Knauff

University of Giessen, Germany

Conditional reasoning is an essential paradigm for investigating the mechanisms of human deductive reasoning and rational thinking. A conditional is a proposition put into an if-then-structure. When the if-part is given, the then-part follows logically. However, in recent years research found that these otherwise valid inferences can be withdrawn in light of additional information (e.g., background knowledge). These additional information are called disablers. They prevent the consequence to occur even though the antecedent is given. The study reported here aimed to examine the impact of social interaction anxiety on conditional reasoning within everyday social contexts. Participants were confronted with conditional reasoning problems that included either neutral or social content. After every conditional a disabler was shown that was either relevant or irrelevant to the inference participants should draw. The acceptance ratings of the conclusions were measured and then correlated with the extent of social interaction anxiety which was raised by a questionnaire. Using irrelevant disablers, conclusions were accepted more strongly as opposed to using relevant disablers. Moreover, on average the acceptance ratings of neutral conditionals showed higher scores than the acceptance ratings of social conditionals. The present study provides no evidence for a correlation between social interaction anxiety and the acceptance of social conditionals. Furthermore, response times

for the conclusions were independent of the extent (low vs. high) of a person's social interaction anxiety. In conclusion, the current results are in line with the assumptions of the new paradigm psychology of reasoning and can be discussed in light of possible implications for future research as well as clinical relevance.

Don't ask, don't tell: Participants Neglect Unmentioned Components in Conditional Reasoning Models

Andre Aßfalg, Karl Christoph Klauer

Albert-Ludwigs Universität Freiburg, Germany

One of the central questions in reasoning research is how people assess the validity of logical arguments that include conditionals (if p, then q). For example, in Modus Ponens arguments, participants typically conclude from the conditional (if p, then q) and the affirmation of the antecedent (p), that the consequent (q) must follow. Some authors argue that when the conditional includes causal content, participants' responses rely on a causal model that includes alternative causes for the consequent, the base rate of the antecedent, and additional conditions for the causal link between antecedent and consequent. We tested whether participants' responses conform to this full model or to only those components of the model that were explicitly mentioned in the task. In two experiments, separate groups of participants provided probabilistic judgments for Modus Ponens and Affirmation of the Consequent arguments, as well as estimates of the model parameters. In this scenario, the full model tended to overestimate judgments compared to a model that assumes that participants neglect unmentioned alternative causes. In another experiment, we manipulated the presence of additional conditions and alternative causes. Participants judged whether the presence/absence of the consequent (antecedent) was possible given the presence/absence of the antecedent (consequent). Overall, response patterns matched well with the assumption that participants base their judgments only on explicitly mentioned model components. The causal model further outperformed the predictions of conditional and biconditional interpretations of the task. We conclude that causal models provide accurate predictions of conditional-reasoning judgments if one accounts for the neglect of model components that were not mentioned in the task.

The Conjunction Fallacy – A Polycausal Proposal

Momme von Sydow

LMU München, Germany

The debate on the conjunction fallacy (CF) continues to be vigorous and it remains central for our understanding of probability judgments and of central aspects of language. A conjunction fallacy (CF) is normally taken to refer to a phenomenon that people sometimes judge the probability of a logical conjunction to be higher than the probability of one of its conjuncts. A direct application of the standard axioms of probability (Kolmogorov's axioms) demands that such judgments are fallacious. The main, early psychological account, representativeness heuristics, at least in its traditional form, has justly been criticized as being an underspecified 'one-word' explanation. However, there are more than ten theories of the conjunction fallacy that have received empirical support in recent years. There are even theories which claim to be fully consistent with probability theory (e.g., by applying probability at another level, or considering source reliability). Based on own experiments, research of others, and some examples, it is suggested here that we in any case have to distinguish two main classes of causes of CFs. The first class concerns the relationship between ordinary-language connectives, like "and", and the connectives in the

ideal language of (propositional) logic. The second class concerns the interpretation of the term probability and other process theories explaining CFs. Theories of the CFs often have tacitly assumed that CFs could be explained mono-causally, but I will argued that this is an absurd assumption. Based on theoretical considerations and experimental evidence, it is plausible to belief in a polycausal account of CFs, acting on both levels. This leads us to a brief discussion of explicated applicability creteria as hallmarks of good theories. For instance quantum probability at present does not seem to meet this requirement. Finally, I will sketch, why at least some of these theories may well be fully compatible with each other.

Thinking fast, not thinking slow – a drift diffusion model account of Belief Bias

Anna-Lena Schubert[1], Mário Ferreira[2], André Mata[2], Ben Riemenschneider[1]

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Belief Bias is the tendency to evaluate arguments based on the believability of their conclusions rather than on their logical validity. Dual process theories propose that intuitive reasoners produce a fast, intuitive response, that is overridden by slower, deliberative processing. The drift diffusion model allows a distinction between the efficiency of information accumulation and the time taken for cautious and deliberate processing. We modeled 41 participants' data in a relational reasoning task with the drift diffusion model, and related diffusion model parameters to other process models and thinking styles. Trials with a conflict between the intuitive and the deliberative response differed only in drift rate and not in boundary separation, suggesting that such a conflict affected the signal-to-noise ratio in information accumulation. Moreover, drift rates were positively correlated with the controlled processing parameter and negatively correlated with the heuristic processing parameter of the process dissociation procedure, which suggests that participants had smaller drift rates because they were compelled towards the intuitive response. Taken together, our results provide a new perspective on the notion that successfully overcoming a conflict between the believability and the validity of an argument requires slow, deliberate processing.

Talk session: Language

Time: Tuesday, 28/Mar/2017: 8:40am - 10:00am · *Location:* E03
Session Chair(s): Thomas Jacobsen

A raspberry called blinki and a tank called mokango - Vowel selection in naming depends on the emotional valence and size of the to-be-named objects

Susann Ullrich, Vivian Rauscher, Carolin Schiefler, Ralf Rummer

Universität Erfurt, Germany

A growing number of research in the field of phonological iconicity reveals systematic relationships between attributes of objects and their names – contrary to the widespread linguistic assumption that this relationship be arbitrary. For instance, the vowel /i:/ appears dominantly in names of small or positive objects, whereas /o:/ appears more in names of big or negative objects. Theories referring to the frequency code or articulatory features offer plausible explanations for those phenomena. Particularly robust findings for the vowels /i:/ and /o:/ get further substantiated by the articulatory feedback hypothesis: The

zygomaticus major muscle (ZMM) is involved in smiling as well as the articulation of /i:/. While articulating /o:/ the ZMM is blocked, hence not allowing any positive embodied feedback. We chose an active naming paradigm to exclude that such sound-meaning correspondences in language might just be passive receptive leftovers from the early days of speech evolution before arbitrariness took over. Hence, in an object naming task we combined estimates of size and valence ratings in a 2x3 factorial design. We expected participants to create names containing more /i:/s when referring to positive and small objects, and to produce more /o:/s when naming negative and big objects. Participants were first presented with a brief auditory narration in Swahili, a language with a similar vowel repertoire as in German. Afterwards, their task was to invent pseudo-Swahili names for real object pictures. For /i:/ we find, as expected, main effects for valence and size: names for small positive objects contain most /i:/s, and names for big negative objects contain least /i:/s. For /o:/ we find a main effect for valence with most /o:/s in names for negative objects and least /o:/s in names for positive objects. Interestingly, an interaction effect reveals that this outcome is driven by size, as names for small objects show no difference in their /o:/ content whereas names for big objects show the mentioned increase of /o:/s with negativity. We also analyzed frequencies of occurrence of the vowels /a:/, /e:/, and /u:/ and will discuss those findings based on our presumptions.

Incidental second language grammar learning in simulated dialogues

Annika Christine Brandt, Herbert Schriefers, Kristin Lemhöfer

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One remaining mystery in research on second language acquisition is why even proficient learners who are intensively exposed to the second language (L2) reach a point after which they fail to use this natural L2 input to further improve their language skills.

The current studies aimed at a better understanding of the conditions under which L2 learners benefit from natural corrective L2 input. The target group consisted of German learners of Dutch. These tend to transfer the grammatical gender of their L1 to the L2, leading to persistent errors in the L2 (Lemhöfer, Schriefers, & Hanique, 2010, Acta Psych.).

To test the effect of correct input under rather natural, but experimentally controlled conditions, we created a simulated dialogue-game in which cards had to be described (cf. Branigan, Pickering, & Cleland, 2000, Cognition), i.e. with no explicit focus on learning. Participants were not interacting with a real conversation partner, but listened to recordings of a native speaker. We tested whether initial gender errors would be corrected after hearing the correct utterance from the recording. Results indicate that grammatical gender accuracy improved after receiving only one instance of correct L2 input per noun.

However, the task was easy enough to lead to some participants' suspicion that it was really about the learning of word gender. Therefore, we cannot be sure if learning conditions were incidental or intentional. In order to test this, the data were compared to a more implicit, seemingly L2-unrelated memory task. Again, a learning effect was observed which did not differ in size from the one in the first study.

This research does not only provide new insights into natural L2 acquisition, but also demonstrates the suitability of a new experimental paradigm to study these processes.

Variability of causal role assignments in the physical domain across languages and cultures

Annelie Rothe-Wulf[1], Gregory Kuhnmünch[1], Sieghard Beller[2], Andrea Bender[2]

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Causal cognition in the physical domain has long been regarded as invariable to language or culture. Recent research, however, produced rather mixed results of causal role assignments within and across languages for various physical events, suggesting at least some linguistic and cultural influence. Candidate moderators that are conceivable to account for this variability might be culturally shared concepts, language-specific cues to causality, or the way physical content is construed. In a series of experiments we asked Tongan and German participants to assign causation to one of two entities in various physical events. Generally, cross-cultural similarities emerged when physical forces were explicitly named or linear motion was involved in an event. In addition, we observed culture-specific content effects in both cultural groups and culture-specific sensitivity to linguistic cues across both languages. In this way, the results provide fruitful implications for the debate on the diversity of causal cognition in the physical domain.

Symposium: Temporal dynamics of decision processes in mouse movements and eye movements: Applications and methodological challenges (Part II)

Time: Tuesday, 28/Mar/2017: 10:30am - 12:00pm · *Location:* HS 401
Session Chair(s): Stefan Scherbaum, Pascal J. Kieslich

Dissociating components of cognitive flexibility: Continuous measures, dynamic modeling and clinical assessment

Stefan Scherbaum[1], Tobias Grage[1], Moritz Walser[1], Katrin Hummel[1], Maja Dshemuchadse[2]

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Cognitive flexibility as an executive sub function is often studied as the ability to shift cognitive sets. Here, we propose to further distinguish two components of cognitive flexibility: shifting flexibility - a complete shift between unrelated sets – and spreading flexibility – the breadth of spreading activation between related sets.

To separate these two components, we used a homonym relatedness judgement task which tested shifting flexibility (primed vs. unprimed meaning of the homonym) and spreading flexibility (strongly or weakly related associates). Combining this task with mouse tracking, we found that the two components of cognitive flexibility indeed follow independent time courses, which is in concordance with the predictions of a dynamic neural field based model implementing our original assumptions.

Using this model, we derived parameter-specific predictions related to obsessive-compulsive symptoms (OC)r and expected that OC symptoms are primarily associated with the shifting component's parameter. In a sample of subclinical students, the homonym relatedness judgement task yielded the predicted pattern of impaired shifting flexibility in the high OC group.

We propose that studies about cognitive flexibility in the area of executive functions should take the two independent components into account, especially when studying moderators of cognitive flexibility.

A Neural Process-Tracing Correlate of Stimulus Evaluation and Decision Making

Mary E. Frame, Joseph G. Johnson, Robin D. Thomas

Miami University, United States of America

Background: Contemporary theories of decision making often seek to specify the emotional, motivational, and cognitive processes that underlie observable decision behaviors. This requires us as researchers to pursue more sophisticated means of empirically verifying hypothesized processes. To that end, we present three experiments that used the lateralized readiness potential (LRP) to establish a neurological basis for response competition between decisions involving subjective preferences.

Method: Affectively-valenced pictures and monetary gambles similar to the stimuli used in a mouse tracking study by Koop & Johnson (2013) were used as stimuli in binary decision tasks in Experiment 1 and 2, respectively. Experiment 3 served to reinforce the findings of Experiment 2 using an identical setup but gamble stimuli counterbalanced based on a different risk metric.

Results: The results of Experiment 1 provide evidence that the LRP is capable of measuring preparatory motor activity underlying the dynamic accumulation of subjective preference in the premotor cortex. Neural signatures indicated there was more response competition when participants chose between more similar stimuli (affective valence) as indicated by the neural signatures. When choosing among gambles in Experiments 2 and 3, we again observed increased response competition when participants chose between more similar stimuli (risk).

Conclusion: The overarching goals of this project were (1) to determine if preparatory motor activity through the LRP could be used as a direct measure of response competition in binary preferential choices, and (2) in doing so provide convergent validity for past work which utilized response dynamics to measure underlying cognitive processes in binary decisions. Our results indicate that it is possible to utilize the LRP as a measure of response competition for subjective preference in addition to the more objective categorization task paradigms traditionally used in this domain.

Advanced mouse- and hand-tracking analysis: Detecting and visualizing clusters in movement trajectories

Jonas M. B. Haslbeck[1], Dirk U. Wulff[2,3], Pascal J. Kieslich[4], Felix Henninger[5], Michael Schulte-Mecklenbeck[6]

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Mouse-tracking and hand-tracking studies interpret curved aggregate trajectories as continuous and simultaneous competition between options. The assumptions underlying this interpretation, most importantly whether the aggregate trajectory is a proper representation of trial-level trajectories, remain however inappropriately assessed. In this project, we mainly demonstrate a novel clustering procedure for mouse-trajectories. Via the reanalysis of dozens of published datasets, we show that this tool detects substantial proportions of trajectory types that are inconsistent with the aggregate trajectory and the idea of simultaneous and continuous competitions. These results demand caution for the use of mouse-tracking as an indicator of continuous and simultaneous competition. In addition, we present several tools that help visualize and analyze mouse- and hand-tracking data.

Tracking changes of mind through mouse movements

Bence Palfi[1], Barnabas Szaszi[2], Pascal J. Kieslich[3], Balazs Aczel[2]

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In the current research project, we assess the potential of two analysis techniques that aim to detect how often people change their mind in choice tasks and at what time points these changes of mind occur. Our development aimed to overcome two limitations of existing motion-tracking data analysis methods: (1) the implicit assumption in several methods that only one change of mind (CoM) can occur during the decision-making process; and (2) the lack of information about the time point at which a CoM and the commitment to a choice alternative occurs. As a solution, we propose two approaches and corresponding analysis methods that provide indicators for the number of choice commitments, the direction and the time point of these commitments based on mouse movement data of individual trials. The first method is based on the assumption that a

mouse movement approaching one of the options indicates a commitment towards that option. In other words, this method estimates the number of CoM and choice commitments by exploring how many times a movement reached a pre-specified area in the proximity of a particular choice alternative. The second analysis method assumes that continuous movements towards a choice alternative represent a commitment towards choosing that alternative. Based on this, the complete mouse movement of a trial can be separated into different parts of homogeneous movements towards one of the choice alternatives. A commitment is assumed if the covered distance in an individual part exceeds a pre-specified threshold. Finally, we provide demonstrations of the analysis methods as well as recommendations on when each method can be employed to gain information about decision-making processes.

Symposium: Evaluative conditioning II: Correlates and consequences of acquired preferences (Part II)

Time: Tuesday, 28/Mar/2017: 10:30am - 12:00pm · *Location:* 101
Session Chair(s): Tobias Heycke Frederik Aust, Christoph Stahl

The impact of evaluative conditioning on early sensory processing

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Evaluative conditioning (EC) refers to a change in the valence of a stimulus due to its repeated pairings with an affective stimulus. Several studies demonstrated that this form of learning depends on the availability of attentional resources during conditioning. According to attentional theories of associative learning, successful EC may further be expected to induce changes in the associability of the conditioned stimulus and yield sensory processing advantages, as compared to neutral control stimuli. To test this prediction, in the present study, a standard EC procedure was followed by a test of iconic memory and a test of peripheral stimulus processing ('useful field of view' task). Evaluative ratings yielded significant EC effects. Moreover, shorter decay times of iconic memory and lower detection thresholds in the peripheral processing task were measured for stimuli that were previously paired with positive or negative affective pictures, as compared to control stimuli that were paired with neutral pictures. These results suggest that EC is based on a learning mechanism that leads to changes in the associability of stimuli operating at an early stage of sensory processing.

Inferential influences in (operant) evaluative conditioning

Pieter Van Dessel, Jan De Houwer, Sean Hughes

Ghent University, Belgium

Background: Evaluative conditioning and operant evaluative conditioning can be defined as the changes in the liking of a stimulus that are due to its pairing with a valenced stimulus or with a valenced action. These effects are often considered to be primitive changes in liking that require little or no cognitive effort and thought.

Method: We offer a different perspective and explore whether evaluative conditioning and operant evaluative conditioning might depend on the inferences participants make about the valence of a stimulus as the result of the stimulus-stimulus or stimulus-action pairings. To this end, we tried to prevent or facilitate participants to make inferences about stimulus

valence on the basis of the pairings and examined whether this moderated (operant) evaluative conditioning.

Results: Both evaluative conditioning and operant evaluative conditioning effects were moderated when participants were impeded or encouraged to make inferences about stimulus valence on the basis of the stimulus-stimulus or stimulus-action pairings.

Conclusion: Inferential influences might play an important role in (operant) evaluative conditioning effects.

An Ecological Conceptualization of Contingencies in Evaluative Conditioning: Attitude Acquisition is Sensitive to Contingencies

Max Ihmels, Mandy Hütter

University of Tübingen, Germany

The role of the ecology has received little attention in the domain of attitude acquisition. In the present research, we use an evaluative conditioning (EC) paradigm as an empirical analogue to real-world attitude acquisition and investigate its dependency on the conditioning context. In EC, a conditioned stimulus (CS) is paired with a positive or negative unconditioned stimulus (US) and consequently acquires US valence. We propose an ecological approach to the investigation of the contingency sensitivity of EC. The more a stimulus is predictive of positive (negative) valence, the more positive (negative) should the evaluative shift be. This ecological definition of contingency is dependent on two aspects: The conditional probability of a US being positive given a specific CS occurs and the probability of a US being positive given any other CS occurs. This implies relativity and context sensitivity of EC. That is, for a CS to demonstrate an evaluative shift it needs to be paired with positive USs with a higher probability than other CSs in the environment; otherwise it is not predictive. We manipulate these two aspects in a standard EC paradigm by introducing CSs that are paired with different ratios of positive and negative USs and by manipulating the overall positivity (negativity) of the context. The experiment shows that the ecological contingency predicts EC effects. The more predictive a CS is of positive valence (beyond the valence of the context), the more positive is the evaluative shift. This holds true for objective as well as subjectively perceived contingencies.

When sensitivity to evaluative counterconditioning is associated with socio-political ideologies : Is this due to cognitive style differences ?

Amélie Bret[12], Adrien Mierop[2], Martial Mermillod[1], Olivier Corneille[2]

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Socio-political ideologies predict prejudice against out-group members. Right-Wing Authoritarianism (RWA) is a risk factor for ethnocentrism, nationalism, and prejudice. Although, RWA is associated with extreme attitudes held toward social groups, little empirical evidence exist regarding its link with attitude change - as a result of the exposition of counterattitudinal information. In three studies, we addressed the latter question by submitting participants to an evaluative counter-conditioning procedure. Two families of “Greebles” (neutral fictive characters) were successively paired with positive and negative affective pictures or vice versa. In the first study, we observed that high RWA prevented counter-conditioning. In the second one, we replicated and extended these findings with a larger set of stimuli.In the last study, we established that RWA influence evaluative

counter-conditioning rather than evaluative conditioning itself. In other words, RWA is negatively associated with attitude change although it does not impact attitude acquisition. These findings have implications for both intergroup relations and attitude formation literatures.

Symposium: How task parameters in implicit measures impact evaluative effects: Evidence from different paradigms

Time: Tuesday, 28/Mar/2017: 10:30am - 12:00pm · *Location:* 103
Session Chair(s): Michaela Rohr

Quicker than expected: Evidence for rapid endogenous attentional orienting with emotional facial expressions

Timea Folyi, Michaela Rohr, Dirk Wentura

Saarland University, Germany

Given their biological and social relevance, it is often suggested that emotional facial expressions are processed rapidly and efficiently (e.g. Batty & Taylor, 2003). In the present study, we asked the question whether emotional faces can be easily associated with new task-relevant meaning and utilized fast as symbolic cues in a spatial cueing paradigm.

The endogenous cueing research mainly uses simple symbolic cues that code spatial information based on their perceptual features (e.g. color) or simple semantic meaning (e.g. letters). The rationale for this approach is the fact that endogenous cueing develops slowly as the cue stimulus and the associated spatial meaning need to be interpreted before attention allocation. In order to obtain reliable cueing effects, the target should follow the symbolic cue with at least about 600 ms (stimulus-onset-asynchrony, SOA; recommendation of Chica, Martín-Arévalo, Botta, & Lupiáñez, 2014). However, given their high importance, we expected that emotional faces can be interpreted more quickly, despite their perceptual and semantic complexity. Thereby, we applied the brief SOA of 300 ms, and also a SOA of 600 ms.

In Experiment 1, we used positive (joy) and negative (anger) facial expressions as cues. In three versions of Experiment 2, we presented specific negative emotions: Sadness vs. anger; fear vs. anger; and fear vs. sadness. One could argue that differentiation of specific emotions takes more time than differentiation of valence, however, recent evidence suggests that a differentiation within the negative domain can occur at early stages of information processing (Rohr, Degner, & Wentura, 2012, 2015).

We found significant cueing effects without moderation by SOA in all experiments, indicating that specific emotional expressions can be interpreted fast and orient attention rapidly according to their newly acquired spatial meaning. Our study thus highlights the special status of emotional faces as highly relevant stimuli.

Who'd want summer without sunshine? Associations and evaluative congruence in the valent/neutral categorization task

Benedikt Werner[1], Elisabeth von Ramin[1], Adriaan Spruyt[2], Klaus Rothermund[1]

[1]Friedrich Schiller University Jena, Germany; [2]Ghent University, Belgium

It is commonly agreed upon that response compatibilities play a major role for the emergence of evaluative congruency effects. However, more recent research re-popularized the idea that processes of encoding facilitation might be involved as well,

contingent on the allocation of attention on and thus the processing of valence (feature specific attention allocation; see, e.g., Spruyt, De Houwer, Hermans, & Eelen, 2007). After an exchange of studies arguing for and against the further necessity of prime-target response compatibilities for the observation of evaluative congruency effects (see, e.g., Werner & Rothermund, 2013), the research seemed to support opposing positions, finding contradicting results with very similar procedures (see Spruyt & Tibboel, 2015). One notion that could possibly explain the discrepancy in results is a confounding of evaluative congruency and associative relatedness. In order to examine this idea, we confounded either evaluatively congruent or incongruent prime-target pairs with associative relatedness in a between-subject design. The valent/neutral categorization task was used to ensure the processing of valence information in the absence of response priming effects. A clear effect of associative relatedness was observed while an (overall) effect of evaluative congruency did not emerge. Given that associative relatedness is more likely to occur within evaluatively congruent than incongruent prime-target pairs after random assignment, uncontrolled associative relatedness can potentially feign an effect of mere evaluative congruency. Thus, our results highlight the importance to control for associative relatedness in evaluative priming paradigms.

Are specific emotions automatically differentiated if they are not task-relevant? – Evidence from the leave-one-out paradigm

Michaela Rohr, Dirk Wentura

Saarland University, Germany

Implicit measures focused by and large on the processing of stimulus valence, given the assumption that this dimension can be extracted quickly, unintentionally, effortless, and even non-consciously (i.e., automatically).

Whether or to what degree automatic processing characteristics apply to more specific processing of emotional information was, however, neglected until recently. In some earlier studies, we (Rohr, Degner, & Wentura, 2012, 2014; Rohr & Wentura, 2014) provided evidence that priming effects beyond valence can be observed already under masked presentation conditions, providing evidence for a differentiated automatic extraction of emotional information. However, in all of these studies, the employed specific emotion categories were task-relevant.

With the present research, we aimed at examining whether differentiated processing would also take place under masked presentation conditions, if a specific emotion is not task-relevant. Therefore, we developed the leave-one-out paradigm: In this paradigm, participants are asked to categorize emotional facial expressions from two different negative emotion categories (e.g., anger, sadness). Masked emotional facial expressions are presented as primes. The prime emotions encompass the two task-relevant emotion categories (e.g., anger, sadness), and additionally, a third negative emotion category (e.g., fear), which is never presented as a target. Based on our earlier findings, we hypothesized that specific emotion aspects beyond valence should be assessed, even if not task-relevant. It was, however, unclear, whether the specific emotion category could be extracted.

Results from three studies (fear-out, anger-out, sad-out) suggest that the specific emotion category can be processed, even if not task-relevant. Implications of these results for the processes and mechanisms involved in priming (e.g., attention, response processes) will be discussed.

Intentionally shaped automaticity in facial muscle activations: Evidence from the affective Simon paradigm.

Julia Kozlik[1], Roland Neumann[2]

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A vast amount of research has shown that humans have a natural tendency to react with specific facial muscle contractions to affective states: positive affect triggers contractions of the zygomaticus major muscle whereas negative affect leads to increased activity of the corrugator supercilii. Recently, we have shown that affect-induced facial muscle contractions are modulated by strategic practice. Specifically, natural tendencies to smile while in positive affect and to frown while in negative affect are reversed with practice of affect-incongruent muscle contractions. Based on these findings, we conducted two experiments adopting an affective Simon procedure to test whether the formation of implementation intentions would be sufficient to modulate affect-induced facial muscle contractions. We observed that natural response tendencies are reduced to zero by mere intentions to perform affect-incongruent muscle contractions although these intentions have never been executed. These results indicate that automatic response tendencies are intentionally shapeable.

Symposium: Visual attention and perception in sports

Time: Tuesday, 28/Mar/2017: 10:30am - 12:00pm · *Location:* 105
Session Chair(s): Iris Güldenpenning, Stefanie Hüttermann

The attention window and attentional asymmetries: Is the shape of the attentional spotlight symmetric or not?

Benjamin Noël, Stefanie Hüttermann, Daniel Memmert

German Sport University, Germany

Background: Based on previous research involving the attention window paradigm the attentional focus is considered to have the shape of a symmetric ellipse (comparable to the visual field). However, there are many studies demonstrating the influence of attentional asymmetries in a lot of different tasks and environments in and outside of sports. Additionally, theories that try to explain pseudoneglect (systematic failures in line-bisection performance) often state that the left side of an object or the visual field receives more attention than the right side. This can possibly lead to better identification of stimuli that are presented to the left side of the point of fixation compared to identification of stimuli that are presented on the right side of the center. However, the current form of the attention window paradigm does not allow verifying if the elliptic shape is indeed symmetric and if identification performance differs for each side of the ellipse. That is why we aimed to modify the original version of the paradigm in a way that makes identifying asymmetries possible. Methods: Participants were required to perceive the number of certain stimuli at two different locations correctly. The distance of the stimuli to the fixation cross in the center of the screen differed and participants were only allowed to make use of peripheral vision. Results: In accordance with theories trying to explain the phenomenon of pseudoneglect the analyses of data showed that participants were able to perform better for stimuli that were presented to the left than to the right side of the fixation cross. Conclusion: The results are discussed with regard to research on the attentional window and its consequences for attention-related research in sports and other environments.

Attention in the Eye of the Beholder: Pupil Dilation in Peripheral Vision

Andreas Brocher[1], Raphael Harbecke[2], Tim Graf[1], Stefanie Hüttermann[2], Daniel Memmert[2]

[1]University of Cologne, Germany; [2]German Sport University Cologne, Germany

Previous work has shown that attention decreases with increasing distance to eye fixation. In this paper, we take the first step in developing a paradigm that measures attention in peripheral vision without involvement of a task directly linked to peripheral vision. This would allow us to test peripheral attention in the absence of a person's conscious awareness. We built on the well-established attention-window task (AWT, Hüttermann et al., 2013) in which participants typically evaluate simultaneously two stimuli presented in visual periphery. The AWT lends itself for investigating a participant's maximal attention span. We conducted two eye-tracking experiments investigating whether the AWT can be used to test peripheral attention outside participants' conscious awareness. In each trial of Expt1, objects were presented peripherally for 300ms in one of various distances (12.5°, 20°, 27.5°, 35°, 42.5°) to both sides of fixation. Objects included zero to four triangles and participants indicated the number of triangles. Replicating previous work, participants' performance decreased with increasing distance, $p < .001$. More importantly, participants' pupil size increased with increasing distance, $p < .001$. In Expt2, we excluded the possibility that pupil size in Expt1 increased as a mere function of visual distance. Before each trial, participants were prompted to either indicate whether or not an object appeared in their visual periphery (perception condition) or count triangles within the objects (attention condition). Pupil size increased much more strongly for the attention than the perception condition, and the increase was significantly steeper as a function of center-object distance in the attention than the perception condition, $p = .027$. Taken together, we found that shifting attention to the periphery involves increasing pupil size. These results indicate that peripheral attention can be measured in absence of an explicit task linked to visual periphery.

Can visual illusions improve skill acquisition in sport?

Rouwen Cañal-Bruland[1], Yor van der Meer[2], Jelle Moerman[2]

[1]Friedrich-Schiller-University Jena, Germany; [2]Vrije Universiteit Amsterdam, The Netherlands

Chauvel, Wulf & Maquestiaux (2015) reported that golf putting practice with holes that appear larger than they actually are leads to larger performance improvements than practicing with holes that appear smaller than they actually are. The authors applied the well-known Ebbinghaus illusion to manipulate the perception of the target's size (see also Witt, Linkenauger & Proffitt, 2012). We recently argued that from a motor control and learning perspective, Chauvel et al.'s finding is somewhat surprising (Cañal-Bruland, van der Meer & Moerman, 2016). That is, we reasoned that when performers face a target that appears smaller than it is this should enforce them to be more precise, whereas when performers face an apparently larger target they may allow themselves to be less precise. Similar to Chauvel et al. we invited participants to practice an aiming task (a marble-shooting task) with either a visual illusion that made the target appear larger or a visual illusion that made the target appear smaller. In contrast to the Chauvel et al. study, we applied a pre-post-test design, included a control group training without any illusory effects and increased the amount of practice to 450 trials. Our results did not confirm the outcomes of Chauvel et al. (2015). By contrast, our results showed that the group practicing with apparently smaller target enhanced performance from pre- to posttest, whereas the group practicing with the apparently larger target did not show any improvements. Notably, also the control group improved from pre- to posttest. Given the

conflicting findings and earlier work of our group indicating that in far-aiming tasks visual illusions seem to effectively influence aiming performance (Cañal-Bruland, Voorwald, Wielaard, & van der Kamp, 2013), we feel that more research is needed to examine the impact of visual illusions on aiming tasks to further the empirical debate and our theoretical understanding of the underlying mechanisms mediating such effects.

Control over the processing of the opponent's gaze direction in basketball experts

Matthias Weigelt[1], Iris Güldenpenning[1], Yvonne Steggemann-Weinrich[1], Mustafa Alhaj Ahmad Alaboud[1], Wilfried Kunde[2]

[1]University of Paderborn, Germany; [2]University of Würzburg, Germany

Basketball players' responses to an opposing players' pass direction are typically delayed when the opposing player gazes in another than the pass direction. Here, we studied the role of basketball expertise on this, so called, head-fake effect in three groups of participants (basketball experts, soccer players, and non-athletes). The specific focus was on the dependency of the head-fake effect on previous fake experience as an index of control over the processing of task-irrelevant gaze information. Whereas (overall) the head-fake effect was of similar size in all expertise groups, preceding fake experience removed the head-fake effect in basketball players, but not in non-experts. Accordingly, basketball expertise allows for higher levels of control over the processing of task-irrelevant gaze information.

Symposium: Current research in cognitive aging: Mechanisms of decline and spared functioning (Part II)

Time: Tuesday, 28/Mar/2017: 10:30am - 12:00pm · *Location:* HS 304
Session Chair(s): Beatrice G. Kuhlmann

Aging and Hindsight Bias

Julia Groß, Ute J. Bayen

Heinrich-Heine-Universität Düsseldorf, Germany

Learning about a fact or the outcome of an event makes it difficult to give an accurate account of one's prior prognosis. Specifically, we tend to overestimate what we knew in foresight when asked in hindsight (e.g., Fischhoff, 1975). In a number of published studies, older adults showed stronger hindsight bias (HB) than younger adults (e.g., Bayen et al., 2006; Bernstein et al., 2011; Groß & Bayen, 2015). Age-related difficulties in episodic memory increase the necessity of reconstructive processes; age differences in HB may thus be (partly) caused by age differences in the ability to recall prior judgments. To isolate a possible effect of episodic memory on this age difference, we compared HB in 47 young (age 18 to 35) and 47 older adults (age 60 to 85) in task versions that did vs. did not require episodic recall. In the "memory" version, participants generated and recalled numerical estimates to difficult knowledge questions. For half the items, the correct solution was shown at recall. In the "hypothetical" version, participants generated numerical estimates, too. For half the items, the correct solution was shown during the estimation task. In both tasks, participants were asked to ignore the solution. We used a multinomial processing tree (MPT) model (Erdfelder & Buchner, 1998) to analyze the data from the memory task. The model allowed us to estimate separate probabilities of recollection and reconstruction processes that contribute to HB. We used a simple distance measure to measure HB in

the hypothetical task. As expected, we found age differences in episodic recall in the memory task: Older adults showed a lower probability of recalling their prior estimates. Also as expected, both age groups showed HB on all of the measures. Unexpectedly, however, no age difference in HB emerged; in neither task and in none of the measures. We present a series of follow-up analyses and discuss implications.

The role of encoding for prospective memory development across the lifespan

Alexandra Hering[1], Nele Wild-Wall[2], Michael Falkenstein[3], Patrick D. Gajewski[3], Katharina Zinke[4], Mareike Altgassen[5], Matthias Kliegel[1]

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Background: Prospective memory is the ability to realize delayed intentions. Four phases are identified to successful prospective remembering: intention formation, intention retention, intention retrieval and intention execution. It is well established that prospective memory development follows an inverted U-shape function across the lifespan. However the majority of studies focused thereby on intention retrieval neglecting other phases such as encoding or retaining intentions. Methods: We combined behavioral and electrophysiological measures to investigate the role of memory-related processes for intention encoding in a lifespan sample. The aim was to examine the role intention encoding for prospective memory development. Adolescents, young and old adults worked on a semantic judgment task as ongoing task with an embedded prospective memory task. Participants had to remember to press a specific key when the words appeared in a specific color. We manipulated the number of intentions and the time to encode the intentions. Results: On the behavioral level, young and old adults outperformed adolescents in both tasks, the prospective memory task and the ongoing activity. On the neural level, old adults demonstrated efficient encoding indicated by a large positive frontopolar slow wave (FPSW) while adolescents showed a small FPSW that corresponded to their lower behavioral performance. Furthermore, temporal-parietal slow wave activity was relevant for encoding in adolescents but to a lesser extent in young and old adults. Conclusion: Our findings suggest that efficiency of intention encoding is important for successful prospective memory and plays an essential role in explaining age differences.

I Still Remember Where I Saw This: No Evidence for Faster Source Forgetting in Older Adults

Beatrice G. Kuhlmann

University of Mannheim, Germany

Compared to younger adults, older adults show much greater deficits in memory for the source of information (i.e., where, when, and how something was learned) than in memory for the information itself (i.e., item memory; see Old & Naveh-Benjamin, 2008, for a meta-analysis). However, most of this research used immediate memory tests. Therefore, it is currently unclear whether this age-related source memory deficit also extends to faster source forgetting over delays between study and test. Further, it is unclear whether item and source forgetting rates differ in general. In the present study, 64 younger (18-30 years) and 64 healthy older adults (60-85 years) studied words on the computer screen's top or

bottom (spatial source manipulation). Either immediately or 1 hour after study, participants completed a source-monitoring test requiring recognition of studied words among distractors and screen-position attributions for all words claimed to have been studied. The data were analyzed with a multinomial model (Bayen, Murnane, & Erdfelder, 1996), reparametrized to measure changes in item versus source memory, both corrected for response biases. Despite the older participants' typical immediate deficits in item and source memory, forgetting rates did not differ between age groups. Notably, only item memory significantly declined over the 1-hour delay whereas source memory remained stable. That is, there was no evidence for an age-related deficit in source forgetting; rather, older adults, just like younger adults, were able to perfectly maintain source memory for spatial positions over a 1-hour delay.

Association of Acute Exercise and Fine Motor Learning in Older Adults

Lena Hübner[1], Ben Godde[2], Claudia Voelcker-Rehage[1]

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An acute bout of high intensity physical exercise, as compared to a resting condition, led to enhanced improvement in fine motor performance 24 h after physical exercise in young adults, indicating that acute exercise can boost motor learning [1]. In older adults, cardiovas-cular fitness level is positively associated with fine motor performance [2]. We examined whether an acute bout of moderate intensity exercise affects motor learning in older adults. Thirty older adults (65-74 years of age) were assigned to an experimental group (n = 15, acute exercise: 20 min cycling at 65 % of maximum Watt performance level) or a control group (n = 15, rest: listening to an audio book). Groups were matched with respect to cardiovascular fit-ness level (assessed by use of spiroergometry (VO2-peak) on a bicycle ergometer). Motor learning was assessed with a visuomotor precision grip tracking task. Participants had to track a sine wave pattern with their right dominant hand at baseline (immediately before acute ex-ercise/rest: 8 trials of 15 sec (i.e., 1 block)) and for practice (immediately, 30 min, and 24 h after exercise:/rest: 4 blocks each). Tracking variability was operationalized as the root mean square error (RMSE: at baseline and last practice block). Preliminary analyses revealed that the experimental group performed better 24 h after intervention as compared to the control group, indicating improved motor consolidation processes. These findings are promising, as they indicate potential applications for motor rehabilitation.

[1] Roig et al. (2012). PloS One, 7(9), e44594.

[2] Hübner et al. (under review).

Talk Session: Perception and action

Time: Tuesday, 28/Mar/2017: 10:30am - 12:00pm · *Location:* 201
Session Chair(s): Felix Johannes Goetz, Johannes Schulz

Perception and action in social interactions are based upon the visual but not motor system

Laura Fademrecht, Stephan de la Rosa, Heinrich H. Bülthoff

Max Planck Institute for Biological Cybernetics,Tübingen, Germany

BACKGROUND: It is commonly assumed that action recognition in social interactions is mediated by a single and primarily motor based mechanism. Yet other influential theories assume that vision for perception and vision for action are mediated by different visual

processes (Milner & Goodale, 2008). Does the observation of actions and the interaction with an interaction partner in social interaction rely on the same motor based recognition mechanism? We examined the response properties of action representations in observational and interactive social scenarios. Experiment 1 examined action representations and their sensitivity to influences from the visual and motor system. Experiment 2 examined the influence of visual action representations on action production in social interactions. METHODS: We measured the response properties of neural action recognition processes by means of behavioral adaptation. To probe participants' action discrimination ability, participants discriminated morphed actions. RESULTS: Experiment 1: We found that the repeated viewing (visual action adaptation) and the repeated execution of actions (non-visual motor adaptation) changed participants' perception of ambiguous actions, demonstrating the influence of the motor and visual system on action recognition. Yet when participants were visually and motorically adapted at the same time (akin to simultaneous action observation and action execution in social interactions) only visual action adaptation was able to alter participants perception. Experiment 2: Visual action representations influence action production (by measuring participants' movement trajectories) only when participants execute and observe actions at the same time. CONCLUSION: These results suggest that action and perception in social interaction is mainly driven by the visual system. Moreover, we suggest different action recognition mechanisms for observing an action and interacting with an interaction partner.

Action Goal Changes Induced by Agents and Patients Both Cause the Updating of Event Models

Frank Papenmeier, Anne Mahlke, Annika Boss

University of Tübingen, Germany

Observers represent events, such as everyday actions or actions in a movie, in event models along multiple dimensions such as space, time or goals. Whenever new information along those dimensions is perceived, the event model is updated accordingly. In the present research, we investigated the goal dimension. Goal-directed actions involve both an agent performing the action and a patient receiving the action. Previous research found an agent advantage effect in visual perception and event perception. In two experiments, we investigated whether goal changes caused by an agent cause a stronger updating of event models than goal changes caused by a patient. We recorded short action clips showing goal-directed actions, such as hugging or handing over a book. We manipulated the completeness of the actions: actions were either complete or actions were interrupted midway. Interruptions were caused either by the agent, such as stopping and retracting the action, or by the patient, such as refusing to grab the book that is handed over. We generated still images from the action clips and participants viewed them as a self-controlled slideshow. This allowed us to measure viewing times for each image as dependent variable indicating processing time. As predicted, images depicting the goal change caused an increased viewing time, thus indicating an updating of event models across goal changes. However, the size of the updating effect was comparable for goal changes caused by agents and goal changes caused by patients. We conclude that observers update their event models when changes in goal-directed actions are perceived but that the updating is independent of the source of the goal change.

Autonomy and level of action identification

Anita Körner, Felix Johannes Goetz, Georg Förster

University of Wuerzburg, Germany

Actions can vary in how autonomously they are performed. Typically, people who are considered autonomous in their actions can think of and choose from multiple options. By contrast, people who must consider restrictions are considered less autonomous in their actions. Consequently, the present research defines autonomous actions as actions that one can choose freely and has the means and capacity to perform so that the intended consequences ensue. According to Action Identification Theory (AIT), actions can furthermore be conceptualized at different levels of abstraction (Vallacher & Wegner, 1987): When concrete details of how to perform the action are salient, action identification is low; when an abstract and comprehensive account of the action and its reasons is salient, action identification is high. Taking the autonomy of actions into account, AIT predicts that when multiple options are available (high autonomy), actions are conceptualized at a more abstract level (high action identification). By contrast, restrictions (low autonomy) should lead to a more concrete conceptualization of actions (low action identification). Results of three laboratory experiments and one applied study supported this hypothesis. In all four studies a modified version of the behavioral identification form (BIF) was used to assess the degree of action identification.

Memory task difficulty and modality do not affect sequential motor planning

Christoph Schütz, Thomas Schack

Bielefeld University, Germany

In a sequential reaching task, people persist on their former postures. The size of this hysteresis effect is a proxy for the fraction of motor plan reuse. The cost-optimisation hypothesis predicts that the fraction of motor plan reuse increases if the available cognitive resources are reduced. Motor tasks and verbal/spatial memory tasks share common working memory resources. Results of a previous study suggest that the difficulty of a concurrent verbal memory task affects the fraction of motor plan reuse: In a more difficult task, the fraction of motor plan reuse was lower. This was in contrast to the predictions of the cost optimisation hypothesis. We therefore questioned the previous results and asked whether memory task difficulty affected the fraction of motor plan reuse in the reported manner. To this end, we designed a sequential reaching task. Participants had to open a column of nine drawers with cylindrical knobs in ascending and descending sequences. Hand pro/supination was used as the dependent variable. In a concurrent memory task, participants either had to memorize letters or symbol locations in a 4×4 spatial matrix. In the easy task, a letter/symbol was presented at two of the nine drawers. In the difficult task, a letter/symbol was presented at each drawer. Preliminary results showed a significant effect of 'sequence' in both the verbal, $F(1,22) = 20.567$, $p < .001$, and the spatial task, $F(1,22) = 42.232$, $p < .001$, which implies that a hysteresis effect was present. There was no interaction of 'task difficulty' × 'sequence' in either task, and no interaction of 'task modality' × 'sequence'. The size of the hysteresis effect did not vary as a function of task difficulty and did not differ between the verbal and the spatial memory task. This indicates that, in the current study, motor planning was affected neither by the difficulty nor by the modality (verbal/spatial) of the concurrent memory task.

Symposium: Automated driving – a plethora of challenges (Part II)

Time: Tuesday, 28/Mar/2017: 10:30am - 12:00pm · *Location:* 204
Session Chair(s): Felix Wilhelm Siebert, Alexander Liebing

Cooperation behavior of road users in t-intersections

Jonas Imbsweiler, Barbara Deml, Renáta Palyafári, Fernando Puente León, Fabian Ries

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One of the future challenges for autonomous cars is to cope with human road users within coop-erative traffic scenarios. Thereby, cooperation ranges from common right hand priority situations to more complex situations, in which more than two road users are involved and in which right of way is unclear from a legal point of view. Road users can interact by implicit (e. g. driving behav-ior) or by explicit communication behavior (e. g. gestures, direction indicator).

Against this background six relevant traffic scenarios of t-intersections have been identified within an observational study (Imbsweiler et al., in press). Next, these scenarios were investigated in a quasi-experiment (N = 20) by reproducing them with the help of instructed test drivers at the site of a traffic training center. The experiment was based on a 2x4-design, with scenario as one fac-tor and repeated measurement as the other factor. As dependent variables driving parameters, eye-tracking data as well as subjective survey data were recorded, whereby only the last category shall be presented here. Within the survey, the participants were asked to rate the cooperation-willingness of their cooperation partners and they were told to judge the accident risk of the sce-nario as well as to indicate how sure they have been that they would be given priority.

At t-intersections three positions are possible and for this reasons, these are also differentiated within the analysis, two road users making a left turn and one roads user driving straight on.

For the left turn position a 2x4-ANOVA was calculated and concerning the factor scenario differ-ences were found for the certainty of driving ($F(16, 3) = 16.884$ $p < .000$), but not for the estimat-ed accident risk ($F(16,3) = 1.034$, n.s.).

For the straight on position a 2x2-ANOVA was carried out and differences were found between the behavior patterns for the cooperation-willingness ($F(16, 3)$, 4.842, $p < .05$.) and for the cer-tainty of driving ($F(16,3) = 7.305$, $p < .05$).

The results show that different behavior patterns were perceived differently by road users and autonomous cars should choose the behavior that is perceived more cooperatively.

The gentle automated vehicle. Influence of vehicle speed, daytime and pedestrian's age on the expected moment of car braking as sign of cooperation.

Matthias Beggiato, Claudia Witzlack, Josef Krems

TU Chemnitz, Germany

Besides performing lateral and longitudinal car control, automated vehicles must be able to handle situations with cooperation needs. As part of the DFG SPP 1835 "cooperatively interacting vehicles", the project KIVI at TU Chemnitz focusses on the interaction between automated vehicles and pedestrians in parking scenarios. In this shared-space situation, braking is an important informal vehicle signal of cooperation, indicating the intention to let the pedestrian cross. An experimental study assessed the effects of participant's age,

daytime and approaching vehicle speed on the expected moment of “gentle” car braking initiation. Using a Labview-based simulation environment, pre-recorded real videos of approaching cars from a pedestrian’s view on a parking area were presented to 42 participants. Independent within-subject-variables were daytime (midday/dusk) and approaching vehicle speed ranging from 10 to 40 km/h in 7 steps of 5 km/h (exactly manipulated using the simulation). The between-subjects-factor consisted of two age groups ranging from 20-30 years and 50+ years. Participants completed 42 randomly presented trials by pressing a button at the last moment they would cross. The selected time gap was recorded as dependent variable. Results of the mixed ANOVA showed a main effect of daytime and vehicle speed as well as an interaction between age and vehicle speed. More conservative time gaps were chosen in the dusk condition. In line with previous studies, accepted time gaps decreased with increasing vehicle speed, indicating more risky crossing decisions at higher speed levels. Older participants took more conservative decisions on lower speed levels, however ending up at the same time gaps for higher speeds. Results show that applying one simple time gap for automated cooperative braking does not fit human/pedestrians perception and expectations. A non-linear function including vehicle speed and daylight condition is recommended instead.

Cooperation between drivers: Why do we break?

Tanja Stoll, Lingzi Man, Martin Baumann

Faculty of Engineering, Computer Science and Psychology, Department of Human Factors, Ulm University

In future car-to-car communication and car-to-infrastructure communication will be a central part of automated driving experience. Cooperative interactive driving is seen as promising approach, in which the car interacts cooperatively with the driver and the environment. But before implementing such a cooperative system, it is necessary to first investigate the cooperation between humans in traffic context in order to understand the underlying mechanisms. Otherwise the driver’s acceptance and trust of such cooperative systems can be diminished.

Therefore a comprehension based cooperation model for traffic use is introduced, based on the models of Situation Awareness by Durso, Rawson and Girotto (2007) and Baumann and Krems (2009) and findings from social psychology.

In recent studies the proposed cooperation model was tested experimentally. Concentrating on lane changes on German highways, potential influencing parameters like situations’ criticality based on TTC and distance were manipulated. Additionally, personality traits like aggression and prosocial behaviour were taken into account.

Baumann, M. K., & Krems, J. (2009). A Comprehension Based Cognitive Model of Situation Awareness. In V. Duffy (Ed.), Digital Human Modeling SE - 21 (Vol. 5620, pp. 192–201). Berlin: Springer.

Durso, F. T., Rawson, K. A., & Girotto, S. (2007). Comprehension and situation awareness. Handbook of applied cognition, 2, 163-193.

The potential safety effects of a frontal brake light in light motor vehicles

Tibor Petzoldt[1], Katja Schleinitz[1], Rainer Banse[2]

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Missing or faulty communication between motorised road users and pedestrians is one of the factors that can help explain the still considerable proportion of pedestrian casualties in road traffic. Especially given recent developments in vehicle automation, an answer to the question of how to communicate “vehicle behaviour” and “vehicle intentions” in the absence of any direct interaction between the driver and the outside world is becoming increasingly relevant. A frontal brake light, which is intended to convey to other road users ahead that the vehicle is about to stop might be a very simple approach to support pedestrians in the interaction with (potentially automated) motorised vehicles. In a video based lab experiment, we assessed the effect of a frontal brake light on the identification of vehicle deceleration. The results show that the brake light facilitated the identification of braking considerably. More importantly, however, in a scenario in which a portion of the decelerations was accompanied by the brake light, the observer’s reactions tended to become more conservative for brake activations in which the brake light was absent. This conservative behaviour might be seen as an indicator for a potential safety effect of the frontal brake light.

Talk Session: Cognitive control II: Response inhibition

Time: Tuesday, 28/Mar/2017: 10:30am - 12:00pm · *Location:* HS 403
Session Chair(s): James A Grange

Motor imagery of action inhibition

Martina Rieger, Stephan F. Dahm

UMIT - University for Health Sciences, Medical Informatics and Technology, Austria

In studies on motor imagery participants often execute and imagine a complete unfolding action. However, in real life situations it is sometimes required to inhibit what one is doing. Action inhibition represents an interesting situation for motor imagery: People are asked to mentally inhibit an action that has already been inhibited from execution due to its imagined nature. If predictions of the ongoing state of the motor system occur in real time during motor imagery, action inhibition should be similar in imagination and execution. We used the stop signal task to investigate action inhibition in motor imagery. Participants performed a go task (visual discrimination task) which was occasionally interrupted by a stop signal (a tone, stop task) with a variable delay relative to the go signal. Participants were asked to respond as fast as possible on all trials, but to try to stop the response if the stop signal occurred. The task was performed in three conditions a) execute go and the stop task as usual, b) execute the go task but imagine the stop task (i.e. participants do not actually stop the actions, but imagine to stop while executing), and c) imagine the go task and the stop task (i.e. participants inhibit an action that has already been inhibited from execution). After each stop signal trial participants were asked, whether they were successful in (actually or mentally) inhibiting the action or not. We calculated the inhibition functions of each condition based on the probability of responding at different stop signal delays. Similar inhibition functions were observed in all three conditions, indicating that the action inhibition is similar in imagination and execution. However, parts of the inhibition functions were less steep when inhibition was imagined, indicating that imagined inhibition is less precise then actual inhibition.

This work was financially supported by the Austrian Science Fund (FWF): P24940-B25.

Strategies to stop selectively: A fMRI study

Stephanie Antons, Barbara Drüke, Maren Böcker, Siegfried Gauggel

RWTH Aachen University, Germany

Selective inhibition describes the stopping of an action while other actions are further executed. It can be differentiated between two strategies to stop selectively: (1) stop all then discriminate and (2) first discriminate then stop. The stop all then discriminate strategy leads to a fast stopping of all ongoing actions which is then followed by a re-initiation of the action which should be further executed. The inhibition process of the first discriminate then stop strategy is preceded by a discrimination stage and, therefore, allows the inhibition of one action while the continuing actions are less interfered. It is assumed that this strategy is especially used when information allows to prepare for the possible stopping reaction. Both strategies differ in cortico-subcortical pathways used for their execution which become visible on a behavioral level in inhibition times and interference of the further executed actions. Aim of the present study was to investigate the use of the two strategies in situations requiring the replacement of the stopped action by a new one.

Twenty healthy right handed male participants performed a selective stop-change task with informative and uninformative cues during functional magnetic resonance imaging.

Behavioral results show that the informative cues led to a benefit in both inhibition times and interference of the continued action. The fMRI data revealed that the same cortico-subcortical pathway was used with informative and uninformative cues. Behavioral and neuronal results indicate that participants used the first discriminate then stop strategy for selective inhibition in this stop-change task irrespective of the amount of information. Moreover, the neuronal data show that the benefit in the informed condition was produced by an efficient preparation for the concrete change process. The task complexity and level of information might be possible factors effecting which strategy is used for selective stopping.

Prime competition in fast motor responses: Response activation and inhibition in a sequential-prime paradigm

Maximilian Philipp Wolkersdorfer, Larissa Leist, Thomas Wegner, Stefan Hellrigel, Stefanie Scülfort, Sven Panis, Thomas Schmidt

University of Kaiserslautern, Germany

In response priming experiments, a participant has to respond as quickly and as accurately as possible to a target stimulus preceded by a prime. The prime and the target can either be mapped to the same response (consistent trial) or to different responses (inconsistent trial). Here we investigate the effects of two sequential primes followed by one target in a response priming experiment. Each prime can be consistent (con) or inconsistent (incon) to the target, resulting in four conditions (con-con, con-incon, incon-con, incon-incon). We designed a stimulus layout where any number of primes can be presented in sequence without mutual interference. Further, we employ a series of different stimulus-onset asynchrony (SOA) conditions, where the SOAs between primes 1 and 2 (SOA1) and the SOAs between prime 2 and target (SOA2) are manipulated. In a previous experiment, we found that under certain conditions (SOA1 = SOA2) the second prime deletes effects of the first one, that with increasing SOAs the second priming effect exceeds the first one, and that in the long run the priming effect is dominated by the second prime. In a new set

of experiments, we further vary the SOA conditions to study the effect of response inhibition late in the trial, replicate the past findings, and reanalyze all data by employing discrete-time hazard functions of response occurrence and conditional accuracy functions to explore the respective time-courses of the effects on the basis of individual response-time distributions (Panis & Schmidt, 2016).

The dynamics of response activation and suppression in conflict tasks

Ronald Hübner

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Stimulus features can automatically activate their associated responses. If this activation is incompatible with the current goal, then a response conflict arises that has to be resolved by control processes, such as attentional filtering or activation suppression. Recently, there has been growing interest in the dynamics of these processes and its flexibility. That is: How flexible can the dynamics of control be adapted to the current situation? A prominent method to investigate this issue is to examine delta functions and conditional accuracy functions, which indicate how response conflict varies with response time. It has been shown, for instance, that the delta function increases for the Flanker task, but decreases for the Simon task. This difference has been explained by the idea that irrelevant information precedes relevant information in the Simon task, but not in the Flanker task. Indeed, we report Flanker task experiments, in which irrelevant information was presented before the target. In this case the delta function was also decreasing. Further, we provide evidence that part of this decrease was due to activation suppression. Finally, we show, that the degree of suppression depended not only on the delay between relevant and irrelevant information, but also on stimulus features. If the features allowed our participants after target onset to quickly recognize that the stimulus was congruent, then response suppression was low, compared to stimuli for which this differentiation was not possible. These results not only demonstrate that response suppression can generally be adapted to global control demands, but also that adjustments can occur on-the-fly for the processing of the present stimulus depending on its features.

Talk Session: Memory II

Time: Tuesday, 28/Mar/2017: 10:30am - 12:00pm · *Location:* HS 405
Session Chair(s): Tobias Tempel

Oculomotor movements do not provide benefits over covert shifts of attention when retrieving verbal information from memory

Agnes Scholz[1], Anja Klichowicz[2], Josef Krems[2]

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Background:

When trying to remember information that was presented auditorily, people look at spatial locations that have been associated with visual stimuli during encoding of this information, even when the visual stimuli are no longer present. It has been shown that such eye movements to "nothing" can influence the retrieval performance for verbal information. However, the mechanism underlying this functional relationship is unclear. For visuospatial memory retrieval, it has been shown that overt eye movements do not provide benefits over covert shifts of attention.

Method:

In order to test if this holds true for verbal memory retrieval, we asked participants to remember verbal information that has been associated with a spatial location during an encoding phase. Additionally, during the retrieval phase, all participants solved an unrelated visual tracking task that either appeared in an associated spatial location or in any incongruent spatial location. Half the participants were instructed to look at the tracking task, half shifted their attention covertly (while keeping the eyes fixed).

Results:

Retrieval performance was facilitated both when participants looked at and when attention was covertly shifted towards the associated spatial location in comparison to being distracted from the associated spatial location.

Conclusion:

Covert shifts of attention seem to be sufficient to cause differences in retrieval performance. The results provide insights into the relation between visuospatial attention, eye movements and verbal memory retrieval.

Indirect memory tests as a means to distinguish between availability and accessibility in motor memory

Tobias Tempel, Christian Frings

University of Trier, Germany

Memory retieval shapes memory. Typically, it benefits retrieved information but it can also impair associated information that was not retrieved. We investigated such retrieval effects in motor memory. Participants initially learned several simple motor sequences, each consisting of the subsequent movement of fingers of one hand to be executed by sequentially pressing assigned response keys on a standard keyboard. The motor sequences were learned as responses to simultaneously presented number stimuli. In a second phase, numbers were provided as cues for retrieving the corresponding motor sequences. We compared effects of this retrieval phase on the performance in a subsequent test phase that either again provided numbers as cues or involved an indirect format. The indirect memory test did not ask participants to recall items nor did it provide any retrieval cues. However, it required the execution of the same motor programs as before when executing the to be learned items but in a response to a novel task. In this task, participants placed their fingers on letter keys and had to enter a sequence consisting of these letters that was displayed on the screen. Thus, the task overlapped with the previously learned sequences only with regard to the involved motor programs. We found a beneficial effect of retrieval regarding previously retrieved motor sequences only to occur in a subsequent direct memory test but not in the indirect test whereas a detrimental effect of selective retrieval regarding previously non-retrieved motor sequences did occur in the indirect test. These findings might suggest that memory retrieval enhanced accessibility of retrieved information but retrieval-induced forgetting resulted from impaired availability.

Text-picture integration during learning reduces working memory load as revealed by EEG frequency band power

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According to multimedia research text-picture combinations can be beneficial for learning because verbal and pictorial information contents are integrated. The integration process is hypothesized to take place in working memory (WM), yet to date no study directly examined WM load during learning of text-picture combinations. Therefore, in the current study we analyzed the WM load during learning of text-picture combinations that differed in the matching between the verbal and the pictorial information and hence in the possibility for integration. In the match condition the verbal and the pictorial information was identical, whereas in the partial-match condition the verbal and the pictorial information was complementary. Yet, in both conditions, integration was possible, whereas in the mismatch condition, the verbal and the pictorial information being dissimilar, integration was not possible. The integration process per se might temporarily increase WM load. After the integration took place, we expected WM load to be lower in the two matching conditions as compared to the mismatch condition. As measures of WM load we analyzed the EEG theta and upper alpha frequency band power using different stimulus-locked as well as fixation-related time-windows. As expected, we observed increased WM load for the mismatch as compared to the two matching conditions, indicated by globally increased frontal EEG theta power and decreased parietal upper alpha power in a retention-related time-window. Furthermore, the upper alpha power indicated increased WM load in the partial-match condition during early viewing times. This might reflect the timing of the integration processes. In sum, the outcomes underline the potentials of neurophysiological measures and the combination of eye-tracking and EEG in multimedia research for understanding integration processes.

This research was funded by the Leibniz ScienceCampus Tübingen "Informational Environments".

Introducing a new visual sensory memory task for the assessment of pattern separation

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In assessments of memory, pattern separation is defined as the ability to distinguish between “repeats” (old stimuli) and “lures” (new stimuli that are similar to old stimuli). The degree of similarity between repeats and lures cannot be controlled for. In the Mnemonic Similarity Task from Stark et al. (2007, 2015), pictures of various objects have been classified post hoc for their respective similarity.

We wanted to design a test where any degree of similarity can be adjusted on a continuous scale. Our choice fell on pink noise stimuli which not only are perfectly fitted to the 1/f-characteristics of our visual system but at the same time should provide the possibility to adjust similarities independently of cultural background.

We tested 37 students of medicine and psychology with pink noise stimuli. Participants executed six identical blocks. Each block started with an encoding phase of the same four repeats, followed by a test comprising twelve stimuli: these four repeats, four lures, and four foils (new stimuli, different in each block). The four lures showed a varying degree of

similarity; they resulted from mixing 20%, 40%, 60%, or 80% of one of the repeats with 80%, 60%, 40%, or 20% of a confound (new stimuli, different in each block). Participants had to indicate whether the stimulus was old, similar, or new.

Participants showed good recognition performance, p("old"|repeat) – p("old"|foil) = 0.67, and moderate pattern separation performance, p("similar"|lure) – p("similar"|foil) = 0.43. On an individual level, recognition performance and pattern separation performance were slightly negatively correlated ($r = -0.3$, $p < 0.035$ one-sided).

These results demonstrate that a memory test based on purely sensory visual stimuli is feasible. Based on model assumptions as well as on the negative correlation between recognition and pattern separation we suggest a slightly different measure of old/new discrimination that does not correlate with pattern separation.

Talk Session: Judgment and problem-solving

Time: Tuesday, 28/Mar/2017: 10:30am - 12:00pm · *Location:* HS 301
Session Chair(s): Christine Blech

How do individual and collaborative spatial problem solving differ? The case of environmental search

Franziska Keilmann[1], Stephan de la Rosa[1], Ulrike Cress[2], Tobias Meilinger[1]

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Collaborative spatial problem solving is an important yet not thoroughly examined task. We report first results regarding the performance differences between individual and collaborative spatial problem solving on the example of searching a large scale space. Participants navigated through a virtual city environment seeing only the environment part visible from their current location from a bird's eye view map perspective. They used a joystick for movement and saw their visible section displayed on an individual monitor. In case of collaborative search their partner was displayed only when located within the area of visibility. Participants searched randomly generated non-grid, street networks of different complexity as implemented by the number of intersections. They searched the same environments once alone and once together with a partner with the order of testing balanced between participants. Participants' task was to search the entire area as quickly as possible just as firefighters searching a burning building for victims. At each intersection and in the middle of each street leg an invisible target location was placed and participants heard a sound when visiting them for the first time. We recorded missed target locations, overall trajectory length and search time per person until self-indicating whole coverage. Our results show a general increase in missed locations, trajectory length, and search time with the complexity of the environment. These increases differed due to individual and collaborative search. For complex, but not for simple environments individual participants navigated shorter distances, finished earlier, but also missed more target locations than when searching the same environments in collaboration. These results indicate that in complex environments collaborative search is less error prone than individual search, but takes longer. Such initial findings will constrain future theorizing about collaborative spatial problem solving.

Solving and creating APM-like matrices: Think-aloud data of cognitive processes

Saskia Jaarsveld, Thomas Lachmann

University of Kaiserslautern, Germany

We present a process-model showing differences and similarities between thinking processes of a solving and a creating task. Participants (N=20) verbalized their thoughts solving Advanced Progressive Matrices (APM) -like matrices and creating an APM-like matrix in the Creative Reasoning Task (CRT). Verbalizations were encoded according synthetic protocols defined for both tasks containing hypothesized verbalizations of transitions between operations. Operations were kept as much as possible identical for both tasks. Results a) the synthetic protocol was confirmed because all verbalizations could be encoded b) observed transitions confirmed the hypothesized differences between both tasks; transitions in solving showed a linear pattern, those in creating a spiral pattern. Concluding, expectations of the process-model were confirmed by the observed differences and similarities of cognitive operations in both tasks.

Simple interventions can increase the diagnostic performance of young physicians

Juliane Eva Kämmer[1], Stefan K Schauber[2], Stefanie C. Hautz[3], Fabian Stroben[4], Wolf E. Hautz[3]

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Every year, around 250,000 people in the U.S. alone die from preventable medical errors, which include a large proportion of diagnostic errors. Despite its crucial importance, research on effective strategies to decrease diagnostic errors is still limited. Here, we investigate the potential of two simple interventions aimed at increasing the diagnostic performance of medical students in an emergency room setting: (1) providing “early support” in the form of a list of 20 potential diagnoses for a given chief complaint (dyspnea) and (2) prompting medical students to create their own list of potential diagnoses to consider after having formed a first impression of a patient. We compare the information search behavior, time to diagnose and diagnostic performance of participants in these two experimental conditions with a baseline condition, namely one without any intervention. In the computer experiment, participants (n = 75) faced 6 simulated patients arriving at the emergency room with dyspnea. Cases progressed from an initial video presentation of a patient through a phase of diagnostic tests to the decision on a diagnosis. Type, amount and order of diagnostic tests were chosen by participants and resulted in the presentation of real clinical data (e.g., X-ray or lung sounds), which had to be interpreted. We find, in accordance with previous research, that providing early support increases diagnostic performance in most cases. We also find that prompting physicians to create their own early support can have beneficial effects. Both interventions have no large effects on information search behavior and time to diagnose. We discuss under which conditions these two simple interventions lead to beneficial effects and how they can be incorporated into medical education and clinical practice in order to improve patient safety.

Poster session: Action effects

Time: Tuesday, 28/Mar/2017: 2:00pm - 3:00pm

T-1. Do we see it or not? Sensory attenuation for learned action effects in the visual domain.

Katharina A. Schwarz, Michel Kluge, Lisa Weller, Roland Pfister, Wilfried Kunde

University of Würzburg, Germany

It is a crucial capability to distinguish between the sensory consequences of one's own actions and stimulation that has been caused by other people or events. One of the mechanisms possibly mediating and facilitating this distinction is sensory attenuation: Consequences of one's own actions are perceived as attenuated compared to stimuli that were not caused (and thus not predicted) by the observer.

Sensory attenuation has been discussed as one of the basic principles of perception, and indeed, convincing evidence for sensory attenuation has been found for learned action effects in the auditory and the tactile domain. However, in the visual domain, evidence for sensory attenuation in response to learned action effects remains scarce and ambiguous.

In this study, we aimed to test for sensory attenuation effects in response to learned action effects in the visual domain. To this end, we first attempted to replicate an influential study on this question with mixed results. To account for a few methodological shortcomings of this experiment, we then targeted the same question with improved methodology, informed by recent theoretical assumptions concerning a possible difference between stimulus detection versus stimulus identification. With these experiments, we hope to provide clarity on the principles of sensory attenuation in visual perception to illuminate a so far slightly opaque pattern of findings.

T-2. Non-action-effect binding: A critical re-assessment

Lisa Weller, Roland Pfister, Wilfried Kunde

Universität Würzburg, Germany

Deciding not to act in a given situation can lead to distinct subsequent effects and recent studies report evidence that much like actions and their effects, non-actions – voluntary omissions of actions – can become bound to the non-actions effects. We provide a critical re-assessment of non-action-effect: In an acquisition phase, participants learned to associate actions and non-actions with specific effects. In a subsequent test phase, participants were allowed to choose an action or non-action freely in response to the former effects. Binding should lead to more effect-consistent choices than predicted by chance. Previous studies did not control for participant's deliberate use of strategies that might affect the hypothesized consistency bias and also did not address potential artifacts that might be introduced by overall preferences for either acting or non-acting. We show that these confounds have a strong impact in common experimental designs and introduce ways to mitigate their effects. This improved assessment still corroborated evidence of binding between non-actions and their effects.

T-3. Intentional binding of two effects

Miriam Ruess[1], Roland Thomaschke[1], Carola Haering[2], Dorit Wenke[3], Andrea Kiesel[1]

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When an action produces an effect, the action is perceived later in time compared to an action without following effect. Likewise, the effect is perceived earlier in time compared to a stimulus without preceding action. Despite a substantial number of studies on this phenomenon - referred to as intentional binding effect (IB) - the underlying mechanisms are still not fully understood. Typically, IB is investigated in settings, where the action produces just one single effect, whereas, in everyday action contexts our actions rather cause sequences of effects before leading to the desired outcome. Therefore, we accessed IB of two consecutive effects and manipulated whether participants believed that they have caused only the first, or both effects. We observed IB for the first tone, while time judgments for the second tone were only marginally biased, irrespective of whether participants believed to having caused it or not. This pattern was observed for second tones that were temporally predictable (Experiment 1) or not (Experiment 2 and Experiment 3). In a fourth Experiment shorter effect delays were applied, because the delay of the effect has been shown to impact strongly on IB magnitude. Accordingly, the second tone yielded stronger IB when it was less delayed. These results suggest that events occurring later in an unfolding action effect sequence might be bound less to actions than effects following actions directly. This, however, seems rather to be caused by the longer delay of a later occurring effect, instead of the fact, that it is the second of two effects.

T-4. Different decision strategies in ideomotor free-choice tasks

Diana Vogel[1], Stefan Scherbaum[1], Markus Janczyk[2]

[1]Department of Psychology, Technische Universität Dresden, Germany; [2]Department of Psychology, Eberhard Karls Universität Tübingen, Germany

How do we choose the appropriate action to reach a specific goal? According to ideomotor theory, actions are represented by their subsequent effects. This is often tested in free-choice experiments in which participants learn the connection between an action, e.g. a keypress, and an effect, e.g. a tone, and then have to freely choose between actions while the effect is presented. To better understand participants' behaviour in such tasks, we combined an ideomotor experiment with mouse tracking. We identified two distinct groups following different decision strategies: The first group usually made the decision already at the beginning of the trial, irrespective of the yet to be presented stimulus, while the second group decided within the trial, being affected by the presented stimulus more often. This suggests that people use different approaches in free-choice tasks which results in heterogeneous choice patterns and response times. Such differences should be considered in the interpretation of results from free-choice experiments.

Poster session: Judgment and decision-making

Time: Tuesday, 28/Mar/2017: 2:00pm - 3:00pm

T-5. Discounting Inventory: New Instrument to Measure the Discounting Rate

Marta Malesza

University of Warsaw, Poland

A behavioral definition of impulsivity–the term discounting process–refers to a decrease in the subjective value of an outcome as a specific environmental factor on which a reward or a loss is devalued increases. The aim of this research project was to develop a Discounting Inventory that would allow the measurement of individual differences in the delay, probabilistic, effort, and social discounting rates. The construction of a universal inventory supports the hypothesis that the discounting rate can be regarded as an individual personality trait. Over 400 items covering four types of discounting were generated. Next, a thorough psychometric study and factor analysis of data obtained from a group of over 3000 subjects allowed us to distinguish four traits. Confirmatory Factor Analysis was used to confirm the factor structure of the data from the Exploratory Factor Analysis, and these analyses indicated that the proposed four-factor structure had the best fit to the data. Through several iterations of retaining and deleting items on the basis of their component loadings, item intercorrelations, and contribution to coefficient alphas, the total number of items was reduced to 48. The final 48-item version of the inventory has satisfactory psychometric characteristics, including Cronbach's alpha and test–retest stability. In addition, significant correlations were observed between the Discounting Inventory and traditional discounting measure, suggesting that the Discounting Inventory measures a construct similar to the behavioral discounting process. Moreover, steep discounting is associated with a number of behavioral problems such as addiction, gambling, and impulsiveness that occur as a component of other units of psychopathology. The Discounting Inventory could be an additional measure for diagnosis and monitoring the progress of therapy.

T-6. Gender as a cue in decision making?

Julia Valerie Englert[1,2], Tillmann Nett[1], Nadine Nett[1], Andreas Glöckner[1], Robert Gaschler[1]

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Statistics about gender differences in the workforce show great disparities between genders. For example, while about half the doctorates in the US are now awarded to women, still only 21% of full professors are female (Shen, 2013). Although this difference may partially be due to differences in lifestyle choices (e.g. Ceci & William, 2011), other studies indicate a direct bias against women in science when such factors can be ruled out (e.g. Moss-Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012). Previous studies indicate that even processing of objective cues can be influenced by a gender bias (Dorrough, Glöckner, Betsch, & Wille, submitted). For instance, Dorrough et al. (submitted) presented participants with a matrix in which experts (cues) could recommend one of two products from the same category which was stereotypically associated with a gender (e.g. hand creme, soccer balls). The experts were identified by male or female names. Their gender could either match the gender associated with the product category or not. The results showed that cues are weighted differently in the case of a match or mismatch. These differences can be formally modeled by introducing additional amplification or

attenuation of the presented validities (T. Nett, N. Nett, Dorrough, & Glöckner 2016). In the present experiment the cues were gender neutral (i.e., the gender of the experts was not revealed), yet the options were female vs. male candidates for a job associated with a gender category (e.g. computer scientist or elementary school teacher). Using statistical modeling, we identified the validity of these cues on an individual basis and checked whether gender effects influenced the processing of validities. This was not the case. We did not find evidence of gender being used as a cue in our set-up.

T-7. Why do we like something? Investigating the influence of arousal and valence on aesthetic judgment using evaluative conditioning

Bettina Rolke, Hein Elisabeth, Hütter Mandy

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Models of aesthetic experience (e.g., Redies, 2015) assume that the aesthetic judgment of visual stimuli is fundamentally influenced by emotions linked to perceptual and cognitive processing of these stimuli. Accordingly, positive or negative feelings, as well as different levels of arousal that are associated with the processing of neutral stimuli should influence their aesthetic judgement. We tested this prediction using an evaluative conditioning procedure. We paired images of neutral chairs with pictures of the International Affective Picture System (IAPS). The IAPS pictures varied in valence (positive/negative) and arousal (high arousal/low arousal). In the conditioning phase, a single chair picture was simultaneously presented with an IAPS picture and participants were instructed to look at the pictures and memorize them. Subsequently, the chairs were judged concerning their aesthetic impression. To check for the effectiveness of evaluative conditioning, the chairs were additionally rated as to their valence and arousal. The results showed that chairs presented together with positive pictures were judged to be more positive and more arousing than the other chairs, thus demonstrating the successful conditioning of positive valence. In contrast to valence, the arousal value of IAPS pictures affected neither arousal nor valence ratings of chairs and thus arousal can be considered to have been ineffective in this study. Most importantly, positively conditioned chairs were judged to be more aesthetic than other chairs. Taken together, in showing that conditioned positivity contributes to the aesthetic impression, the results support the model assumption that the emotional state during processing of visual stimuli influences aesthetic judgement.

T-8. Dopaminergic effects on delay discounting and loss aversion

Johannes Petzold[1], Annika Kienast[1,2], Nils B. Kroemer[1], Ying Lee[1], Shakoor Pooseh[1], Dirk Woitalla[3], Thomas Goschke[1], Michael N. Smolka[1]

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Background: Dopamine (DA) is thought to play a key role in impulsive behaviour and value-based decision making (VBDM). However, previous studies show heterogeneous effects of dopaminergic interventions on impulsive choice.

Methods: To systematize the role of DA on impulsive choice, we first conducted a meta-analysis assessing how dopaminergic interventions affect delay discounting (DD) and loss aversion (LA). Second, following a randomized double-blind crossover design, we studied DD and LA in 80 healthy adults at baseline, after administering placebo, and after administering the DA precursor L-DOPA.

Results: Our meta-analysis suggests that there is no effect of elevated dopaminergic neurotransmission on DD and LA. In line with our meta-analysis, we found no main effect of L-DOPA on DD and LA in our study. Interestingly however, participants who thought

they had taken L-DOPA discounted delayed rewards more strongly regardless of the drug condition ($t = 2.107$, $p = .036$). Furthermore, multilevel analysis showed that belief in having taken L-DOPA led to an increase in the response time variability (RTV) in DD ($Z = 2.890$, $p = .004$), which is in contrast to the effect of L-DOPA that reduced RTV ($Z = -6.232$, $p < .001$).

Conclusion: The heterogeneous effects of previous studies may be due to the variety of dopaminergic drugs, tasks, and sample sizes. However, our results suggest that individuals may alter their behaviour if they think that they have received the drug. This is reverberated in literature on placebo effects and implicates that accounting for differences in expected drug effects might help to clarify how DA influences VBDM. The reduced RTV in DD due to L-DOPA is in line with findings suggesting that DA optimizes the synaptic signal-to-noise ratio in the cortex. The fact that we could not detect reduced RTV in LA may indicate that the deliberation process for temporal and risky decision making is differentially modulated by DA.

T-9. Two heads are better than one - Joint decision-making improves delay discounting

Diana Schwenke[1], Maja Dshemuchadse[2], Cordula Vesper[3], Martin Georg Bleichner[4], Stefan Scherbaum[1]

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When choosing between delayed gains, e.g. spending money for short-term enjoyment or saving for long-term investment, people tend to devaluate delayed gains, a phenomenon referred to as delay discounting. Despite the fact that in real life such choices often depend on the joint agreement of multiple people, the question of how two people jointly evaluate delay discounting situations has not been addressed empirically.

In this research, we investigated whether delay discounting benefits from dyadic decision-making and identified which mechanism caused the expected dyadic improvement. To assess these questions, we developed a novel task in which participants executed a sequence of choices between a sooner but smaller and a later but larger delivered reward in an individual and in a dyadic decision-making condition. Participants executed their choices only by navigating a cursor via joystick movement into an option associated target box. In the individual condition, participants navigated their cursor directly to the target box; while in the dyadic condition, in contrast, both participants had to negotiate their individual preferences by coordinating their movements nonverbally. By tracking cursor movements at any time of the decision-making process, we were able to distinguish the individual decision in the individual condition, the initial individual pre-decision within the dyadic condition and the final dyadic consent.

Pairwise comparison of these levels demonstrated a lower frequency of sooner but smaller choices and a higher quality of decisions for the final dyadic decision compared to the individual decision and the pre-decision. We identified dyadic interchange rather than social facilitation as a mechanism to improve group related delay discounting decisions and conclude that dyadic discounting clearly benefits from social collaboration.

Founding: Volkswagen Foundation

T-10. Model-based prediction of information search times in multi-attribute decisions

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The newly proposed parallel constraint satisfaction model for decision-making and search (PCS-DM+S, Jekel, Glöckner, & Bröder, under review) is an extension of the former PCS-DM and allows for the prediction of information search processes in multi-attribute decisions. Like its predecessor, it assumes an automatic, iterative spread of activation through a network representing the decision situation. During the iterative process information is re-interpreted in such a way that the evidence clearly favors one option over the other. When all information is integrated into a coherent representation of the decision situation, the more attractive option is chosen. Information search in this model depends on the joined influence of cue validities and the automatically formed preference for one option. It therefore predicts that people tend to search for information on the more attractive option. This prediction has received some empirical support. The new PCS model also predicts information search times via its model iterations, a dependent variable that has to date not been investigated in the Judgment and Decision Making literature. In order to test this unique prediction, data from three experiments in Jekel et al. (under review) were reanalyzed with regard to information search times to test the hypothesis that the number of model iterations correlates with information search times. In all data sets, support for this hypothesis was found. The ability to predict a new dependent variable increases the scope of the model and therefore puts it at a theoretical advantage compared to other currently existing decision-making models (Glöckner & Betsch, 2011).

T-11. Delay discounting and smoking cessation – Be consistent when you quit!

Charlotte M. Grosskopf, Nils B. Kroemer, Franziska Boehme, Shakoor Pooseh, Michael N. Smolka

TU Dresden, Germany

Introduction: Numerous cross-sectional studies indicate that smokers discount delayed rewards more steeply than non-smokers or ex-smokers. Lower discounting in ex-smokers compared to smokers might be due to changes induced by continuous abstinence from nicotine or higher abstinence rates in smokers with less discounting, but appropriate longitudinal studies are lacking. Critically, successful quitting is not only associated with future-directed decisions, but with consistently holding to one's future goals. We assessed if temporal discounting and choice consistency in treatment-seeking smokers a) is lower compared to non-smokers, b) increases after smoking cessation, and c) predicts time to relapse, using behavioral modeling and neural correlates of decision-making.

Methods: Groups of 44 dependent smokers and 59 controls were recruited for two assessments. Smokers performed an intertemporal choice task during fMRI before and 2-5 weeks after successfully quitting. We captured temporal discounting using a hyperbolic discounting model and consistency was evaluated by Bayesian trial-by-trial analysis.

Results: First, our sample of treatment-seeking smokers did not show steeper discounting than non-smokers or occasional smokers. Second, k did not predict relapse and was not affected by smoking cessation. Nevertheless, smokers who relapsed within 30 days showed a reduced consistency of choices during the task. Consistency predicted relapse together with the FTND. All groups showed similar tracking of subjective value in the "valuation network".

Conclusion: In treatment-seeking smokers, temporal discounting is not higher than in controls. However, relapsing smokers are characterized by reduced consistency in intertemporal choices. Thus, being consistent in one's decisions about future versus immediate rewards might be an important prerequisite in remaining abstinent after an aided quit attempt.

T-12. Across-trial parameter variabilities better explain easy than hard perceptual decisions – revealed by an extended Bayesian model

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Perceptual decision making can be described as a process accumulating evidence to a bound which has been formalized within drift-diffusion models. In discrete time, equivalent random walks have recently been described in the form of a Bayesian model of perceptual decision making (Bitzer et al., 2014). In contrast to drift-diffusion models, this Bayesian model directly links information in the stimulus to the decision process. The originally proposed Bayesian model, however, did not incorporate common extensions of the basic drift-diffusion model which allow the drift-diffusion model to account for response time differences between error and correct responses. Here, we suggest equivalent extensions of the Bayesian model, especially, the inclusion of across-trial variability of a bias and a noise level parameter. We derive parameter distributions for the Bayesian model and show that they lead to predictions that are qualitatively equivalent to those made by the drift-diffusion model with the corresponding extensions. Further, we demonstrate the use of the extended Bayesian model for the analysis of response time data. Specifically, we re-analyze a data set for which we have previously shown that the original Bayesian model describes responses better than a drift-diffusion equivalent model, when the Bayesian model uses the spatiotemporal details of the stimuli to predict responses (Park et al., 2016). Our results replicate this finding with the extended Bayesian model. Additionally, we observe some evidence that the original Bayesian model explains responses to hard decisions better than the extended Bayesian model while the reverse is true for easy decisions. This result is remarkable, because it is based on only 200 responses per participant which is thought to be an insufficient number for identifying variability parameters in drift-diffusion models.

T-13. Experience-based risk communication

Felix G. Rebitschek

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Learning from experience is known to lead to different decisions involving risks than learning from descriptions. For instance, experience-based learning procedures were shown to reduce risk-averse investment decisions. Description-experience gaps, yet, are not due to sampling shortcomings or systematic estimation errors. Indeed, well-calibrated probability estimates reflect the impressive nature of the human mind when encoding events' frequencies. This recommends exemplar-based learning procedures with full feedback from cognitive research for using them as a tool of applied risk communication. The conditions according to which self-paced sampling leads to more accurate risk perception in a lay audience than studying standard risk descriptions with icon arrays were explored. To exclude contingent sampling effects, 180 participants were presented with abstract and realistic scenarios. Three, five, or seven types of binary outcomes were presented in a description condition, an experience condition, a mixed condition, and an open-exploration condition. Both risk estimates and comparative judgments did not

indicate that one format outperforms the others consistently. However, for a limited number of outcomes experience-based risk communication can be considered as an alternative to icon arrays. Future research should pursue examining how this translates into better decision-making, as other research shows that observing patient instances improves Bayesian reasoning on a disease's presence given test results compared to a standard problem description.

T-14. Gender differences in the development of temporal discounting and their impact on adolescent low-risk substance use

Juliane H. Fröhner, Shakoor Pooseh, Michael N. Smolka

Technische Universität Dresden, Dresden, Germany

Background: Adolescence as a critical period in human development is characterized by impulsive behavior and decisions, which is thought to be a result of the proceeding brain maturation. Therefore the typical adolescent behavior is associated with a vulnerability to subsequent substance abuse or dependence. As part of the longitudinal project "The adolescent brain"* and in cooperation with the IMAGEN-project adolescents completed an intertemporal choice task (ITECH). ITECH is an adaptive task to examine the intertemporal decision making. Subjects have to choose between an immediate amount and a delayed amount of money.

Methods: The longitudinal analysis included 126 subjects who did the ITECH task at ages 14, 16, and 18. This study aimed to test whether this longitudinal data reflects the well-known cross-sectional finding that adolescents discount more steeply than adults. Furthermore we wanted to examine whether the discounting rate could predict substance use and vice versa. Note that compared to the German population this sample drinks less risky and smokes less frequently. Due to known gender differences in substance use, we included gender as covariate.

Results: In contrast to the cross-sectional findings we could not find a significant change of discounting rate over time ($F = .480$, $p = .608$). Nevertheless the interaction of time and gender indicated that female subjects were discounting less when getting older whereas male participants showed stable discounting ($F = 3.251$, $p = .043$). A cross-lagged panel design including all subjects could not show any predictive relationship between discounting rate and substance use. Surprisingly, women's discounting rate in the ages of 14 and 16 was negatively associated with the amount of alcohol drunk per week in the age of 18 ($R(14\text{-}18) = -.255$, $p = .017$, $R(16\text{-}18) = -.453$, $p = .030$).

Conclusion: Concluding there are gender differences in the underlying mechanisms which link temporal discounting with substance use in these low-risk users. The negative association of discounting and drinking might indicate that women's drinking is less impulsive and more driven by other motives. Further research should investigate these drinking motives and whether these gender differences can be replicated.

* funded by the German Federal Ministry of Education and Research

Poster session: Language II

Time: Tuesday, 28/Mar/2017: 2:00pm - 3:00pm

T-15. Syntax by the age of 3 and 6 years

Kodjo Vissiennon, Angela D. Friederici, Jens Brauer, Chiao-Yi Wu

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The organization of the language network undergoes continuous changes during development as children learn to understand sentences. To date very few studies investigated the functional interplay of language related brain regions in young children. Our study was set up to explore these functional connections in the language network at two specific stages in language development (use of word order cues and use of case marking cues). One group of 3-year-old (3yo, N=21), one group of 6-year-old (6yo, N=29) as well as an adult control group (N=21) underwent a passive listening paradigm in which we presented German transitive sentences which varied word order. Additionally comprehension was assessed via an offline picture matching task to select those children who were capable processing subject-initial sentences above chance level accuracy to ensure that we were tapping real comprehension. Both age groups showed a main effect of word order (object-initial > subject-initial sentences) in the left posterior superior temporal gyrus (pSTG). However, we provided evidence that behavioral interaction of word order and age (which was driven by a small age effect in the subject-initial but not in the object-initial condition) was reflected in the functional connectivity (FC) pattern of each group. We observed the age differences in the FC between left pSTG and the left inferior frontal gyrus (IFG) where 6yo showed stronger FC between the left pSTG and Brodmann area (BA) 44 of the left IFG compared to the 3yo group in the subject-initial but not the object-initial condition.

Our study demonstrates that while task-related activation was comparable, the small behavioral differences between age groups were reflected in the underlying functional organization revealing the ongoing development of the neural language network.

T-16. Grammatical-gender effects in Hebrew noun production: Evidence from picture-word interference

Antje Lorenz[1], Pienie Zwitserlood[2], Michal Biran[3]

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Background- Gender-congruency effects, that is faster naming of object pictures with gender-congruent than -incongruent distractor nouns, are reported for Germanic languages when participants produce gender-marked utterances, such as determiner-noun phrases. Hebrew codes for masculine and feminine gender. While most feminine nouns in Hebrew carry one of three typical gender suffixes as part of their word pattern, masculine nouns are not gender-marked. In noun-adjective phrases, the adjective is gender-inflected accordingly (e.g., MITAfem YERUKAfem [bed green], KADURmasc YAROKmasc [ball green]). The aim of our study was to examine the effects of overt gender marking in speech production, by comparing gender-congruency effects with gender-marked feminine and -unmarked masculine target nouns in Hebrew. Methods- The materials included target pictures in two matched subsets, 18 with feminine and 18 with masculine names. All targets were inanimate nouns. Feminine targets had typical suffixes: /a/, /et/, /it/, and masculine nouns had no gender suffix. Target pictures were presented for naming, accompanied by written distractor nouns that were either gender-congruent or

gender-incongruent to the target name, but semantically and phonologically unrelated. The targets were also used as distractors. The same target pictures were used in two tasks: bare-noun naming (grey pictures) and noun-adjective naming (coloured pictures). Results- No main effect of gender-congruency was obtained, but a significant gender by relatedness interaction. Post-hoc analyzes indicated significant gender-congruency effects for feminine targets but no effects for masculine targets. Furthermore, response format (bare noun / noun phrase) did not interact with relatedness and/or gender. Conclusion- Gender-congruency effects in Hebrew are restricted to targets with overt gender marking. The data are discussed in the framework of current accounts about access to grammatical gender in speech production.

T-17. Dynamic formation of syntactic predictions based on speaker identity

Leon Kroczek, Thomas C. Gunter

Max Planck Institute for Human Cognitive and Brain Sciences, Germany

Predictions allow for an efficient processing in communicative situations. In order to be efficient, predictions need to be adapted to characteristics of the environment. In a communicative situation, speaker-specific language use might shape a listener's predictions about upcoming language stimuli. In the present experiment we asked whether listeners use speaker characteristics to generate predictions about syntactic structure and how these predictions might change over time.

Twenty participants were presented with sentences which were spoken by two different speakers. Sentences had either a Subject-Object-Verb (SOV) structure or an Object-Subject-Verb (OSV) structure. Crucially, the two speakers differed with regards to the frequency by which they produced a particular syntactic structure. One of the speakers had a high probability to produce a SOV structure and a low probability to produce an OSV structure, and vice versa for the other speaker. Additionally, speakers produced sentences which were ambiguous towards their syntactic structure. For the ambiguous sentences, participants had to identify the subject or the object of the sentence. This allowed us to infer participants' predictions regarding the syntactic sentence structure. Furthermore, in order to assess the significance of speaker-specific predictions, participants were invited to a follow-up study eight months after the initial exposure to the speakers.

The data show that participants started with a strong bias towards the SOV structure, which is the canonical sentence structure in German. With increasing exposure to the speakers, however, participants developed predictions regarding the particular syntactic structure based on speaker identity. These predictions were still coupled to the speakers eight months after the initial exposure. This demonstrates that listeners are sensitive to speaker-specific syntactic preferences and use this information to generate predictions.

T-18. Discourses can help in repairing semantic and world-knowledge violations

Anne Vogt, Carolin Dudschig, Eduard Berndt, Barbara Kaup

University of Tübingen, Germany

Recently, there have been several attempts to investigate the role of linguistic and nonlinguistic knowledge during sentence comprehension mainly using time sensitive methods (e.g., electrophysiological markers) to explore potential differences in processing different types of knowledge. We investigated how linguistic and nonlinguistic violations can be repaired given an appropriate context story which was designed to facilitate the

integration of semantically violated sentences as well as world knowledge violated sentences. Our results showed highest acceptability ratings for correct sentences and world-knowledge violated sentences. However, in comparison to the same set of critical sentences in non-facilitating contexts, even semantically violated sentences were rendered more acceptable given an appropriate context. Interestingly, semantically violated sentences building on animacy-constraints seem to be easier to fix than other types of semantic violations. We conclude that differences in reparability between certain violation types may be a useful way for further investigating the role of linguistic and non-linguistic knowledge during language processing.

T-19. Semantic violations in sentences and scenes: shared neural mechanisms identified with generalization across time MVPA

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Semantic processing is reflected in a negative going EEG deflection peaking around 400ms. This N400 component, originally described for processing of semantically incongruous words in sentences, is also observed in the processing of semantics in visual (scene) perception. Here, we investigate whether or not these two N400 components reflect a shared neural substrate for domain-general semantic processing. We use multivariate decoding of EEG activity (multivariate pattern analysis/MVPA; N=37) to identify neural patterns that distinguish between the processing of semantically congruous vs. incongruous scenes. Then, using generalization across time MVPA (King & Dehaene, 2014) we generalize these patterns to a standard sentence processing experiment, which contains semantically congruous vs. incongruous sentences. We replicate the N400 effect in both experiments. Within the scene experiment, we identify neural patterns that differentiate between the processing of semantically congruent vs. incongruous scenes (using a ridge classifier, $p<0.05$, FDR). When generalizing the trained classifier to the sentence experiment, we observe cross-experiment generalization not only in the N400 time window, but also in a later time window ($p<0.05$, FDR). This indicates that the two N400 effects reflect semantic processing within each modality. Furthermore, the scene-to-sentence generalization results suggest a partially shared neural substrate across domains, particularly in the late N400 time window, possibly overlapping with a late positivity.

T-20. Complex combinatorial linguistic abilities that are NOT affected by aging

Kim Behrent[1,2], Nora Bittner[2,3], Christiane Jockwitz[1,2], Svenja Caspers[2,3], Katrin Amunts[2,3], Stefan Heim[1,2], Yosef Grodzinsky[2,4]

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As we age, many cognitive capacities diminish – we become slower and make more errors. Yet, is this change evinced across the board? In particular, do all rule systems governing our behavior degrade in a similar manner? We investigated this question in a study of a highly specific rule-based combinatorial ability: to integrate logical operators such as negation into linguistic representations. We tested 135 healthy participants of various ages on a sentence-verification task, in which a sentence about proportion (e.g.,

Mehr als die Hälfte der Kreise sind blau), taken out of a theory-determined set, preceded a proportion-depicting image with varying numbers of blue and yellow circles. Sentences had two factors: Polarity (mehr/weniger), and Negation (+/- nicht), resulting in 4 conditions: (Nicht) Mehr/Weniger als die Hälfte der Kreise sind blau. Multiple token sentences and images per type produced a total of 140 trials. Previous results showed that each factor affects performance. We investigated (i) whether the effects are additive; (ii) whether performance is affected by aging. Other cognitive tests were also conducted. The main test, part of an imaging experiment of the FZ-Jülich "1000BRAINS" study, was conducted in the MRI scanner. BOLD-signal, Error Rate (ER) and Reaction Time (RT) were measured. We report RT and ER results, for which main effects of both Polarity and Negation, as well as a Polarity X Negation interaction, were observed, indicating lack of additivity. Next, we looked for age effects, splitting our sample by the median (65 y). For RTs, a main effect of age but no interaction was found. Surprisingly, there was no age effect on ER. By contrast, there were age effects on other language-related tests (verbal fluency and Boston Naming Test) even after correcting for gender, education and processing speed. In our presentation, we will discuss the implications these findings may have to the Modularity Hypothesis and to our view of aging.

T-21. Does personality influence the integration of speaker characteristics?

Franziska Rück, Lisa Landenberger, Franziska Vennewald, Irmgard de la Vega, Barbara Kaup

Eberhard Karls Universität Tübingen, Germany

There is evidence that the mapping between speaker characteristics and the content of a sentence influences sentence processing: In previous studies based on the work by van Berkum, van den Brink, Tesink, and Hagoort (2008), we found an incongruency effect between sentence and a speaker's sex or age – e.g., a man saying he bought a dress or a child demanding a cigarette to calm down – on reading times in phrasal self-paced reading experiments, where speaker characteristics were visually salient through an adjacent picture (Rück, de la Vega, Leuthold & Kaup, 2016). However, violations in the categories of sex and age do not constitute impossible events. Under certain circumstances, men might buy dresses, and there are examples of children who smoke. Further, there is evidence that only subjects with high empathizing skills show reactions to such violations (van den Brink et al., 2012). In the present study, we were especially interested if besides low empathy (Samson & Huber, 2010), also the tolerance for ambiguity in role stereotypes and openness for new experiences (Reis, 1997) diminish the effect of incongruency. Linear Mixed Effect Models with random effects for subject and item and the fixed effect "congruency" were performed. For the phrases with an incongruency effect, we included fixed effects for personality traits. People who were more open or less empathic tended to show a larger effect of incongruency. Although just showing as a statistical trend, it is interesting that the effect of empathy runs in the opposite direction of the findings of van den Brink et al. (2012). The effect of openness is contrary to our hypothesis as well. An explanation might be that people who are more open are more accessible for the content and therefore show a stronger incongruency effect, even if they might not consider these violations strange. These findings point towards inter-individual differences in language processing, which have to be assessed in further studies.

Poster session: Motor control, movement, action

Time: Tuesday, 28/Mar/2017: 2:00pm - 3:00pm

T-22. "I See What You Did There": Kinematic Analysis of Rule- vs Plan-based Grasping

Jean Patrick Philippe Scheib[1], Sarah Stoll[1], Jennifer Randerath[1,2]

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Functionally equivalent grasping can be elicited via different cognitive routes. The rule/plan motor cognition (RPMC) paradigm utilizes plan- or rule-based action-selection, using a combination of essentially interchangeable visual stimuli. If-then rules in the form of Implementation Intentions (Gollwitzer, 1999) were used in the rule task to induce either pronated or suppinated hand postures in pre-handle-rotation grasping. These led to biomechanically comfortable post-handle-rotation hand postures. In the plan task participants were instructed to grasp the handle in a way that would lead to a biomechanically comfortable post-handle-rotation end-state (Rosenbaum et al., 1990). Previous studies using the RPMC paradigm (Randerath et al., 2013; 2015) have shown a robust advantage of rule-based over plan-based grasping in terms of reaction times. Though both modes of movement planning produce visually highly similar motor-outputs, we put the degree of apparent similarity to the test using high resolution motion tracking technology. The present work presents preliminary findings from our lab combining reaction and movement time measures with kinematic grasp analysis.

T-23. Response priming with motion primes and the potential role of vestibular counter regulation for negative compatibility effects

Christina Bermeitinger

University of Hildesheim, Germany

Moving or changing things are especially salient indicators that something important is happening or has been happened. Moving stimuli are able to rapidly attract attention, to guide attention, and to influence our actions. In a series of experiments, we could show that participants respond faster on the direction of static arrow targets if they are preceded by rows of dots moving in the same direction (i.e., positive compatibility effect, PCE). However, this holds true only for a short time window up to 200 ms stimulus onset asynchrony (SOA). From 250 ms SOA on, the pattern turns into negative compatibility effects (NCE) with faster reactions on targets pointing opposite to the primes' motion direction. This negative effect can be explained in part by common theories on NCEs with static primes (e.g., self inhibition, evaluation window account). However, due to the close connection of motion processing and the vestibular system, possibly the vestibular system contributes to the negative effect, for example by a counter regulation similar to that present in vection illusions. If the vestibular system indeed plays a role for the NCE, the negative effect should be reduced or even not occur if the vestibular system is disturbed. Instead, the positive effect should not be influenced by vestibular control which needs some time to act. In a first experiment, we thus used galvanic vestibular stimulation to disturb the vestibular system. We found evidence for our expectations: The PCE with a short SOA (147 ms) was independent of the stimulation. For a longer SOA (360 ms), we found only an NCE with left-cathodal/right-anodal stimulation (i.e., no disturbing effects on the vestibular system in right handers). With left-anodal/right-cathodal stimulation (i.e., disturbing effects on the vestibular system in right handers), we found no NCE. The results

can be interpreted as first evidence that the PCE with motion primes occurs feed-forward due to fast perceptual, motor and/or attentional processes and that the NCE with motion primes is influenced by vestibular control.

T-24. To move or not to move: switching between motor imagery and motor execution

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Motor imagery designates a dynamic mental state during which movements are mentally simulated without actual execution. Motor imagery requires the inhibition of the actual movement. We investigated which mechanisms contribute to motor inhibition. Two groups of participants imagined and executed (randomly) hand movements from two start buttons to two target buttons. During imagination one group indicated the start and the end of the movement by releasing and pressing the right or left start button (hand group). The other group indicated the start and the end of the movement by releasing and pressing a right or left foot button while imagining to release the start button and to press it again at the end of the movement (foot group). Trial sequences differed depending on current action mode (trial N: imagination, execution), previous action mode (trial N-1: imagination, execution), hand (same, different) and target (same, different). Results showed that movement durations were longer in the foot group than the hand group, but the data patterns were similar in the two groups. The previous action mode affected reaction times and movement times differently in imagination and execution trials indicating that motor imagery is not just a weaker form of execution consisting of subthreshold motor activation. Evidence for global inhibition (switch benefits in execution[E]-imagination[I] sequences compared to I-I sequences), effector specific inhibition (hand repetition costs after an imagination trial) and target inhibition (association of a target location with a code indicating that no movement should take place in imagination, indicated by target repetition benefits in I-I sequences) was obtained. In sum, motor imagery is not just a weaker form of execution. Different inhibitory mechanisms, i.e. target inhibition, global inhibition and effector specific inhibition work jointly during motor imagery.

T-25. Anticipated partner reactions do not affect grasp initiation in joint object manipulation

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In line with ideomotor theory, it can be easier to initiate actions when anticipating that they will be imitated. However, this social action-effect compatibility effect is not always found, and the goal of the present study was to learn about its boundary conditions. Subjects and an experimenter performed a joint object manipulation task on a multitouch tabletop.

In each trial, the subject grasped a star-shaped virtual cookie with either a force or precision grip. In different blocks, the experimenter responded by either grasping the cookie with the same (compatible), opposite (incompatible) or a randomly chosen (unpredictable) grip. In three experiments, the naturalistic character of the task was decreased step by step. Experiment 1 was closely matched to a joint baking scenario. Subjects had to grasp a cookie and move it into one of two bowls containing different icings, each requiring a different grip. Subsequently, the partner grasped the cookie with either grip and moved it to a board. In Experiment 2, the basic procedure stayed the same but the scenario was reduced in terms of elements contained, action complexity, and

movement parameters. In Experiment 3, all elements except the cookie were removed, and all that subjects had to do was grasp the cookie, which was immediately followed by the partner performing a grasp. Thus, a highly controlled setting was established, which was about as minimalistic as typical action-effect compatibility experiments.

Still, none of the experiments revealed any influences of partner reaction compatibility. These results question the role of anticipated partner reactions in action planning. It is proposed that when the focus is on a salient task goal or object instead of on producing a movement, the partner's specific way of performing movements is of minor importance, at least when being inconsequential for one's own movements.

T-26. Motor expertise and performance in test of spatial abilities: A meta-analysis

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The question whether spatial skills can be influenced by motor processes or physical activity has received much attention lately as the embodied cognition approach has become dominant in cognitive psychology. From this perspective, many researchers have compared the spatial performance of "motor experts" with that of non-experts. Motor experts are typically represented by athletes or members of occupations in which a clear representation of sensori-motor processes is required. Considering the view that performance in most spatial tasks is facilitated by embodied cognition, the expectation is that the former group should outperform the latter group. This fledgling research area has generally shown support for this view but these findings have not been considered as a whole to determine whether this work represents a promising research questions. Accordingly, the present meta-analysis quantified the magnitude of differences between experts and non-experts in the motor domain on spatial performance and examined variables that might moderate them. The analysis used a set of 46 effect sizes from healthy males and females drawn from 27 samples ranging in publication year from 1971 to 2014. Multilevel meta-analysis was used to account for non-independent effect sizes. Results showed a significant advantage for experts compared to non-experts (mean d = 0.58, 95% CI = 0.33 to 0.83). Stimulus type was the only significant moderator, mostly accounted for by differences among stimuli used in mental rotation. Specifically, 3D blocks (mean d = 0.74, 95% CI = 0.28 to 1.19) produced the largest effects, whereas 2D stimuli produced the smallest effects (mean d = 0.05, 95% CI = -0.02 to 0.122). Human bodies or body parts produced medium magnitude effects (mean d = 0.43, 95% CI = 0.15 to 0.71), whereas other tasks (mostly composed of paper folding and disembedding tasks) also produced somewhat large effects (mean d = 0.63, 95% CI = 0.42 to 0.84). The present results therefore indicate a clear advantage for motor expertise in spatial performance, stimulus type modulates the magnitude of the effects. Implications of the findings for models of embodied cognition and the role of motor learning in spatial abilities are discussed.

T-27. A cognitive-coordinative training improves mental rotation performance in primary school-aged children

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Background

In primary school age varying education situations and requests are of central importance. Several different cognitive abilities play a part in contributing to find suitable solutions and

to react more flexible to changing conditions. In the case of spatial abilities mental rotation and sporting activity share at least particularly the same neural processes. Generally active sporting people seem to have better mental rotation skills. Furthermore, athletes, which have to connect visuospatial and kinesthetic processes during their sporting activity show better mental rotation performance than athletes with mainly cardiovascular sport disciplines. A motor training for enhancing mental rotation ability should therefore basically comprise challenges for the kinaesthetic and proprioceptive system like this is the rule for complex coordinative tasks. Therefore the aim of this study is to investigate the influence of a combined cognitive and motor training on mental rotation performance.

Methods

A pre-test, post-test, comparison group design was followed. 46 primary school children took part either in a special coordinative challenging Life-Kinetik-program or in regular physical education class twice a week for five weeks and solved a mental rotation test before and after the program. A 2 (group) * 2 (time of testing) analysis of variance was conducted with the dependent variable MRT.

Results

The results showed first a significant main effect for mental rotation performance and second a significant interaction between the factors `time` and `group`, in this sense that the “Life-Kinetik”-group showed a larger increase in mental rotation ability.

Conclusion

The substantial difference of a high-leveled combined cognitive and coordinative training compared to regular physical activity leads already after five weeks to a significant increase of mental rotation performance in primary school children. The connection between the results of this study and the general educational performance of children at school is not to be discounted. Since spatial abilities often are a key qualification for mathematical capability, a positive influence of an increased training of coordinative skills combined with cognitive challenging tasks on the learning access in special subjects could be expected.

T-28. Searching for Event-File borders – Separate responses can be bound to each other

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A single encounter of a response and a stimulus results in short lived binding between the stimulus and the response (i.e., in an event file, see Hommel, Müsseler, Aschersleben, & Prinz, 2001). Repetition of any part of the episode can then retrieve the entire event file including the response and leading to increased performance if the response has to be repeated but to response impairment if a different response is required. The large majority of past studies regarding effects of event file integration and retrieval has focused on bindings between responses and stimulus features, finding response retrieval due to feature repetition. The present study investigates whether similar integration and retrieval is also possible between two individual responses. In a prime-probe design, requiring two separately planned responses (R1 and R2) to each prime and each probe display, repetition/change of R1 and R2 between prime and probe were orthogonally varied. In two experiments (n = 25 and n = 30), the results indicated retrieval of R2 due to the repetition of R1. This is first evidence for an integration of two separately planned responses in the same event file. Implications for the structure of event files and more generally the integration of action plans, as well as implications for a possible role of binding effects in sequence learning are discussed.

T-29. Der Simon-Effekt in Ganzkörperbewegungen am Beispiel des Handball-Torwurfs

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In vielen Situationen sind schnelle und richtige Reaktionen von besonderer Bedeutung, z.B. in sportlichen Situationen wie Torwürfen im Handball. In diesem Projekt wurde untersucht, inwieweit grundsätzliche Handlungskontrollprinzipien (wie z.B. räumliche Stimulus-Reaktionskompatibilität; Simon-Effekt), wie sie typischerweise mittels simpler Reaktionen (z.B. Knopfdruck) untersucht wurden, auf ökologisch valide Situationen generalisiert werden können. Dazu führten 19 Versuchspersonen (Novizen; 24,6 J.; 12 weibl.) eine Simonaufgabe durch wobei sie als (vorgestellter) Handball-Torwart auf einen Torwurf eines Angreifers mit einer Ganzkörper-Abwehrbewegung reagieren mussten während ihre Körperbewegung erfasst wurde (Kinematik & Dynamik); auch simple Reaktionen (per Knopfdruck) wurden in einem weiteren Block erfasst. Vorläufige Analysen zeigen einen Simon-Effekt sowohl für simple ($t18=9,0$; $p<.0001$) als auch für komplexe Reaktionen (Taste für Abwehrziel; $t18=4,7$; $p<.001$). Ein Simon-Effekt bereits während der Bewegung konnte in Bewegungsbeginn ($t18=2,74$;$p<.05$) und -amplitude ($t18=2,97$;$p<.01$) nachgewiesen werden, d.h. in kinematischen und in dynamischen Parametern. Der Simon-Effekt lässt sich in verschiedenen, aber nicht allen Parametern von (Ganzkörper-)Bewegungen nachweisen. Diese Daten legen nahe, dass sich das untersuchte Handlungskontrollprinzip auf ökologisch valide Situationen verallgemeinern lässt. Dies eröffnet neue Forschungsmöglichkeiten durch kontinuierliche Verhaltensmessung, d.h. nicht aufsummierter Parameter wie Reaktionszeiten.

T-30. Learning to grasp illusions through error correction

Karl Kunibert Kopiske[1], Evan Cesanek[2], Carlo Campagnoli[2], Fulvio Domini[1,2]

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There is a long-standing debate about whether pictorial illusions affect grasping. More recently, it has been proposed that there might be illusion effects on grasping that decrease over repeated trials. If we consider a pictorial size illusion as simply a perturbation of visually perceived size, such behaviour would be consistent with an effect of sensorimotor learning. However, some studies have reported a very constant illusion effect over the course of an experiment. We conducted an experiment using the Müller-Lyer illusion in which N=40 participants targets embedded in incremental and decremental Müller-Lyer illusion displays in (1) the same block in pseudo-randomized order, and (2) separate blocks of only one type of illusion each. We observed a decrease of the illusion effect over trials, as well as different rates for single-illusion blocks and intermixed blocks. An error-correction model of sensorimotor adaptation was applied to see if differences in the rate of adaptation could be explained as interference between learning of two opposite perturbations. We found evidence of interference, as well as other markers of error correction, suggesting that adaptation through error correction may explain not just dynamic illusion effects in grasping, but also differences between previous results.

T-31. Grasping Movement (Re-)planning Interferes with Working Memory during the Maintenance Process: An ERP Study

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Bielefeld University

The present study focuses on the neurophysiological interactions of cognition, specifically working memory, and grasping movements. In particular, we investigated neuro-cognitive costs of implementing a new grasp plan for separate working memory (WM) domains (verbal, visuospatial) and processes (encoding, maintenance, retrieval). In a dual-task paradigm, 35 participants concurrently performed a WM task and grasp-to-place task (grasp a sphere and place it onto either the left or right motor target according to an arrow cue). For 30% of trials, grasping movement had to be re-planned online. This study employed a 2 (WM Task: Verbal vs. visuospatial) x 2 (Grasp Planning: Prepared vs. re-planned) within subject design. Event-related potentials (ERPs) were analyzed separately for encoding, maintenance, retrieval processes. Behavioral analyses showed that the memory performance decreased for both WM tasks when grasp re-planning was required. That is, grasp re-planning interferes with WM in domain-general pattern. ERP analyses showed for maintenance process that prepared trials elicited larger negative slow waves compared to re-planned trials regardless of WM task. That is, maintenance-related ERPs of verbal and visuospatial tasks were equally affected. There was no effect for encoding and retrieval processes. Therefore, ERP findings support the domain-general re-planning interference with WM. More importantly, for the first time, ERP findings show the process-specific (maintenance) re-planning interference at the neurophysiological level. The present study provides a better understanding of neuro-cognitive mechanisms of manual action flexibility, particularly focusing on ERPs during overt movement execution.

T-32. Functional connectivity during target preparation and target processing in action video game players and non-action video game players

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Top-down attentional control has been identified as one underlying mechanism supporting improved performance after action video game play. The underpinnings of these effects appear to be linked to a reduction in the fronto-parietal network activity during task preparation with a subsequent rebound in the neural activity of this network during target processing (Föcker et al., in preparation). Here we ask, how functional brain connectivity is shaped during task preparation and target processing in 16 action video game players (AVGPs) and 16 non-action video game players (NAVGPs). Therefore, we analyzed brain regions that become differentially coupled during task preparation and target processing in AVGPs versus NAVGPs. AVGPs revealed enhanced connectivity during target processing, showing enhanced functional coupling between the cingulate and seed regions such as left MFG and right FEF. Additionally, AVGPs showed enhanced cross-hemispheric connectivity of the fronto-parietal control network during target processing. By contrast, NAVGPs revealed increased connectivity during task preparation, especially between the seed regions in the fronto-parietal network and sensory or motor areas such as the cerebellum, the putamen, or the visual cortex. These results indicate profound neural plastic changes within the fronto-parietal attentional network in AVGPs known to benefit from heightened attentional control.

T-33. Is the space-time congruency effect associated with response hand or response side?

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Conceptual Metaphor Theory claims that abstract concepts like time are represented in the mind in terms of more concrete concepts like space. Accordingly, time is thought to be represented in form of a mental timeline running from past on the left side to future on the right side. Evidence for this notion comes from response time studies which document a space-time congruency effect (STCE), i.e. faster responses on the left side to past-related stimuli and on the right side to future-related stimuli compared to the reverse stimulus-response mapping. However, from the current body of research, it is unclear whether this STCE is due to an association of time and response side or time and response hand. Several studies employing a crossed-hands setting, where the left hand is placed on the right side and the right hand is placed on the left side, report clear evidence for an association of time with response side. A recent study also reports results that hint towards the existence of an additional association of time and response hand. The present experiment assesses more directly whether such an additional association exists. To this end, an experiment was designed in which only the assumed response hand association could cause a STCE and the effect of response side was eliminated. Specifically, two response keys were placed centrally in front of the participant on the sagittal axis. Consequently, there was no left or right key but only a key that was a little bit closer to the participant than the other. One key was pressed with the left hand and the other key was pressed with the right hand (the key –hand mapping was counterbalanced across participants). Although the influence of response side was eliminated in this design, a STCE was observed that supports the view that an additional association of time and response hand exists. An alternative explanation for the present results on basis of an association of time with sagittal space is discussed.

Poster session: Multitasking

Time: Tuesday, 28/Mar/2017: 2:00pm - 3:00pm

T-34. The role of interhemispheric cooperation in the modulation of spatial attention during multitasking

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A large body of past research found that attention influences the availability of sensory information to conscious perception. It was also shown that this is biased toward the right hemispace, specifically under high cognitive load; which was mainly achieved using, for instance, multitasking. Hence, this bias is ideally present in a basic attentional task using a divided visual field paradigm when a second task is added. However, the high perceptual load can eliminate distractor processing, and thus, lead to a worse performance on the original task, that might mask the rightward bias.

Therefore, we used a multitasking divided field paradigm tapping into verbal and non-verbal processing to examine this shift of attention towards the right hemispace under low and high multimodal load during spatial monitoring in healthy participants. In the single task, respondents had to indicate the position of briefly presented, lateralized targets while

ignoring the verbal (words) and non-verbal (non-words) stimuli presented in the middle of the screen. We, then, achieved high cognitive load by instructing the participants to perform a 1-back task on the verbal/non-verbal stimuli. The response hand was counterbalanced; thus, we calculate interhemispheric cooperation as well to assess whether higher load would mask or facilitate the attentional bias toward the right hemispace.

Our results suggest that load manipulation affects the temporal aspects of basic visuospatial processing, moreover, the stimuli used to achieve higher load involving different (verbal, non-verbal) brain areas also have a crucial role in altering the rightward bias.

T-35. Where Is the Bottleneck in Human Multitasking? – Evidence from Neuroimaging Meta-Analyses

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For decades, many dual-tasking and task-switching studies have demonstrated limitations of the human cognitive system in performing two tasks at once or in close succession. Whether there is a common neural basis of this multitasking limitation ("bottleneck") still is, however, an open question. We therefore conducted 2 Activation Likelihood Estimation meta-analyses of fMRI studies on dual-tasking and task-switching, and then tested for commonalities and differences in the brain networks associated with either paradigm. In total, we included 26 experiments on dual-tasking and 60 experiments on task-switching. We found a common core network related to multitasking comprising bilateral intraparietal sulcus (IPS), left dorsal premotor cortex, and right anterior insula. Meta-analytic contrasts revealed 8 fronto-parietal clusters more consistently activated in dual-tasking and, conversely, 4 clusters (left inferior frontal junction, posterior IPS, and precuneus as well as frontomedial cortex) more consistently activated in task-switching. Our 2 meta-analyses revealed similar fronto-parieto-insular networks linked to dual-tasking and task-switching, but both multitasking paradigms conjointly converged only on 4 regions. Drawing on previous research, this suggests that shifting attention and motor intentions as well as effort regulation for implementing the correct task rules may form the common thread throughout both multitasking domains. Apart from these commonalities, however, our data imply substantial processing differences between both multitasking paradigms. We conclude that dual-tasking and task-switching probably share a non-passive functional “bottleneck” (i.e., additional processing demands related to managing multiple task sets and solving between-task crosstalk) but also involve several distinct subprocesses that may create paradigm-specific bottlenecks of their own.

T-36. Hemispheric specialization in semantic categorization tested by a divided visual field paradigm in single-, and dual-task conditions

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Background

A right visual hemifield(RVF) advantage in semantic information processing (i.e. left hemispheric specialization) has already been observed in previous studies. We tested whether the same effect is found when dual-task performance is required.

Methods

We designed a semantic categorization task combined with a divided visual field paradigm in two task conditions: single-task and dual-task conditions. In the single-task condition, participants (N = 16) were presented visually with words in two types of semantic category: living and non-living objects. They performed the task under monocular viewing condition and were asked to make a semantic categorization in each trial. In the dual-task condition, simultaneously with the semantic categorization of the visual stimuli, participants were asked to memorize auditory information (words). We predicted to find that participants (N = 16) categorize semantic information more easily when sematic stimuli are projected to RVF. Second, considering the higher cognitive load under the dual-task condition, we assumed a higher advantage of RVF presentation in the dual-task condition than in the single-task condition. Third, we investigated the pattern of change in participants' performance as a function of time spent with the task (i.e. Time-on-Task effect).

Results and conclusion

The results revealed more accurate and faster performance in RVF but showed no difference between the single-, and dual-task conditions. In addition, RVF advantage seems to be compromised as a function of Time-on-Task.

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T-37. Multitasking supported by different forms of sequence representations

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While many laboratory studies on multitasking use random stimulus sequences, many multitasking situations in everyday life contain sequences within the tasks (e.g., shifting gears and talking). Here we ask to what extent different forms of sequence knowledge can support multitasking. Past research has demonstrated that humans can acquire two forms of representations of serial order in implicit sequence learning: Chaining sequence knowledge (associations between elements: C comes after B) and ordinal position knowledge (associations between element and list position: C is the third element). We assume that chaining sequence knowledge can support multitasking by separating the representations of two tasks as the elements belonging to one task are associated to one-another (C and B are associated to one another and to the letter-task). In order to test to what extent the two forms of sequence knowledge support multitasking, it is necessary to train participants with only one or only the other form of sequence knowledge. In a first step we present an experiment (N=36) demonstrating that participants can acquire either form of sequence knowledge in isolation in a multitasking situation. Participants typed letter triplets. In chaining training, participants typed sub-units of a fixed sequence (starting points randomly drawn). In ordinal position training, we used two letter lists and chose which of the two first elements is presented before which of the two second elements and followed by which of the two third elements. With either form of sequence training, performance increased despite a secondary (reaction-to-tone) task and decreased at transfer to a random sequence. Performance gradients within triplets showed specific signatures of either kind of sequence knowledge. In a second experiment we test how either form of sequence knowledge reduces the costs of multitasking (compared to single task performance and random sequences).

T-38. Zur Wirkung von Stress auf Doppelaufgaben

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Die Bearbeitung von Doppelaufgaben (DA) erzeugt in der Regel Kosten (Zeit, Fehler) für eine oder sogar für beide Aufgaben. Wird ein zu ignorierender Stressor präsentiert, sollten weitere Kosten entstehen. Um dies zu untersuchen wurde eine DA gewählt, deren Kosten durch Training minimiert werden können. Israel und Cohen (2011) erreichten diesen Trainingserfolg durch eine Instruktionsvariation – keine der beiden Aufgaben durfte bevorzugt bearbeitet werden – und durch eine SOA = 0. Für die Wahl des Stressors wurde berücksichtigt, dass DA-kosten auch von der S-R-Kompatibilität abhängen (Göthe, Oberauer & Kliegl, 2016).

Ziel war, das Experiment von Israel und Cohen (2011) zur Eliminierung von DA-kosten durch Training zu replizieren (Kontrollgruppe, KG). Des Weiteren sollte in der Experimentalgruppe (EG) geprüft werden, wie ein Stressor (zufällig intermittierendes weißes Rauschen) mit dem Training zur Eliminierung der DA-kosten interagiert.

Wie bei Israel und Cohen (2011) mussten die Vpn das Erkennen der Farbe des Rechtecks (rot oder grün) durch einen Tastendruck (visuell-motorisch) und das Wort (LAMA oder HASE) durch Benennung (sprachlich-phonetisch) indizieren. Da die beiden S-R-Dimensionen und der Stressor wenig miteinander überlappen, sollte das Training auch in der EG erfolgreich sein.

Der Ablauf ist für jede Vpn in den 8 Sitzungen gleich, bis auf den Stressor in der EG. Auf die Übung der einzelnen Aufgaben folgt die Präsentation der Einzelaufgaben „Wort“ oder „Farbe Rechteck“ in randomisierter Abfolge (je Bedingung 20 Trials, insgesamt 80). Danach folgen 40 DA (je Kombination 10 Trials). AV = RT u. Fehler.

Die Ergebnisse von Israel und Cohen (2011) konnten in der KG repliziert werden, in der EG konnte eine sig. Reduktion der Zeitkosten bei der DA festgestellt werden.

Poster session: Social cognition

Time: Tuesday, 28/Mar/2017: 2:00pm - 3:00pm

T-39. Fake it till you become it - The influence of high power posing on self-esteem

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High power poses are open, expansive postures like standing tall with chest out and hands on hips. Research showed that people holding these positions for a short time showed increased subjective feelings of power, more action orientation and riskier behavior. The aim of the present study was to investigate the influence of high power posing on self-esteem. We assume that people instructed to show high power poses will afterwards report higher levels of self-esteem than people in a control group. To evaluate possible effects of power posing we added a self-affirmation group.

A pre-post-intervention control group design was realized. Participants were 120 students who were randomly assigned to the power posing group, the self-affirmation group or the control group. First all participants completed a questionnaire which included the State Self-Esteem Scale (SSES) with the three subscales “Social”, “Appearance” and “Performance”. Then the intervention occurred: two different high power poses in the power posing group, a two-stage attribute self-affirmation intervention in the self-

affirmation group and a control treatment in the control group. Afterwards all participants filled out the self-esteem questionnaires for a second time.

Consistent with our hypotheses, high power posing increased self-esteem significant. Further observations showed that particularly the “Social” component of self-esteem profited by high power posing, while the effect on the “Appearance” facet was weaker and there was no effect on the “Performance” facet. Contrary to our expectations self-affirmation had no effect on self-esteem.

In the power posing literature positive effects of power posing on self-esteem are predicted. To our knowledge the present study is the first experiment which tested and confirmed this self-esteem elevating hypothesis. We will discuss our findings in the framework of the power buffer stress hypothesis, which assumes that having power leads to a reduction in the stress response and raises social self-consciousness. Further, implications of our findings for power posing interventions are provided.

T-40. Moral Foundations: Validation of a Spanish-language questionnaire in Colombia

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In a first study we aimed to adapt the Moral Foundations Questionnaire (MFQ; Graham et al., 2011) to the Colombian context, by means of independent revisions of drafting and construction based on cognitive interviews. We then assessed the psychometric properties of the new scale and its correlations with right-wing authoritarianism (RWA) and social dominance orientation (SDO) in a sample of 350 university students. Results showed that, although the adapted MFQ provides more reliable results than the available Spanish version, additional research is needed addressing the scale's validity in the Colombian context. The correlation pattern of moral foundations with RWA replicated previous findings in other cultures, but this was not the case for correlations with SDO. Further, our analysis showed that the five-factor model assumed in Moral Foundations Theory does not fit our data well, and that an alternative model taking into account variations in item format represents a better fit. In a second study, which is currently being conducted, we are assessing correlations between the MFQ and the acceptance of modern myths about sexual aggression (AMMSA; Gerger, Kley, Bohner, & Siebler, 2007), replicating similar studies already conducted in Germany, Italy, and Spain (Bohner, Megías, Milesi, & Süssenbach, 2016). In these studies, AMMSA and MFQ showed meaningful correlation patterns and jointly predicted judgments of victim blaming and perpetrator guilt in an ambiguous rape scenario.

T-41. Age-Stereotype Reliance in Source Guessing: Implicit or Explicit?

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The present experiment investigated to what extent age-stereotype reliance in source guessing corresponds with explicit and implicit age stereotypes. We assessed explicit age stereotypes in 96 younger adults (17-35 years) with the “German Aging Semantic

Differential" (Gluth, Ebner, & Schmiedek, 2010). Here, old adults were rated more favorably than young adults on adjectives reflecting autonomy (e.g., independent) but less favorably on adjectives reflecting instrumentality (e.g., flexible) and integrity (e.g., happy). In contrast, this multidimensionality of age stereotypes was not evident in an Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998): Across all adjective dimensions, we found an association between old and negative (e.g., dependent, inflexible, unhappy), as evidenced in faster responses to these combinations. In the source-monitoring task, two sources presented an equal number of statements explicitly rated to be typical for a young adult or for an old adult (Kuhlmann, Kornadt, Bayen, Meuser, & Wulff, 2015). At test, one source was described as old (i.e., 70 years), the other as young (i.e., 23 years). Multinomial model-based analyses indicated that when people did not remember who made a statement they guessed the source of typical age. Importantly, the statements reflected both positive and negative behaviors from the three adjective dimensions. This allowed us to specifically test whether participants oriented their guessing toward the normed explicit age typicality of the statements or the implicit association, (i.e., old = negative). Overall, these analyses suggest that source guessing rather follows the explicit norms. For example, for a statement demonstrating positive instrumental behavior that was explicitly normed to be typical for an old person, guessing was also biased towards the old source despite the negative implicit association between old and instrumentality.

T-42. Measuring Belief Bias with Ternary Response Sets

Samuel Winiger, Henrik Singmann

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"Belief bias" refers to the finding that individuals are more likely to accept believable conclusions independent of their actual logical validity. Most theories argue that belief bias reflects differences in the quality of reasoning of believable versus unbelievable arguments (e.g., individuals are more inclined to find a fault in an argument that they disbelieve). Recently, however, Dube, Rotello, and Heit (2010) have proposed that the belief bias is solely an effect of response bias. That is, individuals are more likely to accept believable over unbelievable arguments without differing in the actual reasoning process performed for both types of arguments. Unfortunately, their argument rests on the use of Receiver-Operating-Characteristics (ROC) functions which considerably differs from experimental designs typical for this domain. We investigated belief bias with a design very similar to the usual binary response set (follows vs. does not follow) and simply added a third response (i.e., don't know). This allowed us to test belief bias with a fully identified multinomial processing tree model. Two experiments were conducted online using the complex syllogistic structures from Dube et al. (2010) and Klauer, Musch and Naumer (2000). Our results provided supported for both theoretical positions. There was some evidence that the belief bias affected reasoning processes. In addition, we could also find evidence that belief bias affected response processes.

T-43. Social Facilitation of Speeded Cognition: Effects of Confederate Supervisory Monitoring on Automatic and Controlled Information Processing

Michael B. Steinborn, Lynn Huestegge

University of Würzburg, Germany

We examined the effect of mere presence (of a non-evaluative confederate) on automatic and controlled components of speeded cognitive performance. To this end, individuals

were administered with a chained mental arithmetic task at two levels of processing difficulty (which served as a proxy for automatic and controlled processing), comparably in a standard (alone) and a supervised (social-presence) condition. Notably, the factor social context (standard vs. supervised) was examined both in a within-subject design and a between-subject design. As a result, the factor social presence (standard vs. supervised) considerably improved performance speed, while error rate remained low overall, and this improvement was again more pronounced for high (vs. low) demand. Crucially, the benefit on average performance speed originated from a reduction of performance variability, as evidenced from an analysis of the cumulative distributive function (CDF) of responses. Finally, social context improved psychometric quality of test performance as evidenced from cumulative reliability function analysis. These findings indicate social facilitation (but not inhibition) of speeded cognition since it improved not only automatic but also controlled information processing in mental arithmetic. Further, our results indicate that social presence does not simply boost mental processing speed but rather improves the ability to maintain performance stability. Thus, confederate supervisory monitoring might be considered as to improve volitional persistence control.

T-44. Living is judging. How relevance of evaluation affects evaluative priming effects.

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The current structure of psychological research may enhance the tendency that priming effects are usually not published until the expected effects appear (Renkewitz, Fuchs & Fiedler 2011). At the same time task formulation can strongly affect the pattern of priming effects. Considering this possibility is able to explain certain unexpected results of prior investigations. In a first study we identified two relevant task formulations and their underlying processes. In the (second) main study we systematically induced a relevance for evaluation and a generative mindset in the context of an intertwined priming experiment with 160 participants. The results show that the priming effect gets stronger if subjects processed intertwined tasks inducing a relevance of evaluation.

T-45. US Valence Strength and Counterconditioning in Evaluative Conditioning: Testing the Implicit Misattibution Model

Sarah Kritzler, Jens Förster, Andrea Führer

Ruhr-University Bochum, Germany

Two experiments investigated evaluative conditioning. Based on the implicit misattribution account, we hypothesized that attitude strength influences the conditioning outcome in an Inverted-U-shaped manner and that counterconditioning cannot be effective under these particular circumstances. In two online studies, USs of varying stimulus strengths (slightly, moderately and extremely positive) were paired repeatedly with neutral stimuli. Afterwards, we assessed the valence of these CSs depending on their respective US category. The first experiment involved a sample of music fans and pictures of their favourite bands as extremely positive stimuli whereas the second experiment used moderate to extreme IAPS pictures in a more mixed sample. Although we considered all methodological recommendations for testing the implicit misattribution model neither of the two experiments provided support for evaluative conditioning through implicit misattribution as contingency unaware participants never showed significant conditioning effects. Surprisingly, the slightly positive stimuli were the only category producing marginal

conditioning effects, thus there was no evidence for an inverted U-function due to valence intensity.

T-46. The prototypical Nazi: Prototype preference depends on category valence

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Background

Prototypical exemplars are usually evaluated more favourably than atypical exemplars of a category. The hedonic fluency model postulates that prototypes are processed more fluently which causes a positive affect which is misattributed to the stimulus. From the perspective of attitude learning and attitude structure, prototype preference should not occur when a category has a negative valence.

Methods

In a laboratory study, we examined the effect of category valence on the evaluation of prototypical and atypical exemplars of a category. Using an evaluative conditioning procedure, dot patterns of a certain category were paired with either positive or negative USs. Subsequently, participants rated the attractiveness of unshown prototypes as well as shown and unshown category exemplars.

Results

When exemplars of a category were paired with positive USs the usual prototype preference occurred while this effect disappeared when a category was paired with negative USs. Still, prototypes were processed with higher fluency independent of the category valence.

Conclusion

These results show that prototype preference depends on category valence. They also support theories on the context sensitivity of fluency and emphasize the role of evaluative conditioning in the formation of attitudes towards categories, prototypes and exemplars.

T-47. Are empathic influences on information processing subject to racial bias? An EEG study

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The chronometry of empathic influences on information processing is quite well investigated, indicating such influences from early perceptual to late motor stages. Crucially, empathic responses are known to be weaker for members of the racial outgroup than ingroup. However, the chronometry and the specific nature of the influence of the target's racial background on empathic processing remains unclear. In order to investigate this issue, we recorded the electroencephalogram (EEG) and response force (RF) while white participants (ingroup) were presented pictures of fair and dark skin-coloured hands in painful and neutral situations. They judged these pictures either with regard to their painfulness or skin colour. Event-related brain potentials (ERPs) indicated smaller midline ERP amplitudes in the painful than the neutral condition in an early time interval (90-130 ms) only for fair (ingroup) skin-coloured hands. Somewhat later, the early posterior negativity (EPN) showed smaller amplitudes for painful than neutral pictures, irrespective of skin colour. Both effects were independent of the task, suggesting that the early automatic component of empathic processing is influenced by racial background. By

contrast, the empathic influence on the late categorisation stage, as manifested in the centroparietal P300, was present only in the pain judgment task but for both skin colours. This finding accords with the view that the late empathic response reflects a more controlled stimulus categorization process that is insensitive to racial background. RF and EEG oscillations revealed no difference between the painful and neutral condition, but stronger key presses and larger power changes in the pain judgment than the skin colour judgment task indicate enhanced motor activation if the focus is directed towards the pain dimension. In conclusion, present findings broaden the understanding of the influence of racial background on empathic processing.

T-48. Ingroup versus Outgroup – der Einfluss des Lächelns auf die Personenwahrnehmung

Andrea Führer, Jens Förster, Anna Fernkorn, Lara Kaminsky

Ruhr-University Bochum, Germany

Ziel der vorliegenden Studie war zu untersuchen, inwieweit der Gesichtsausdruck Einfluss auf die Wahrnehmung von Personen verschiedener Ethnizitäten nimmt. 113 deutsche Studentinnen wurden gebeten, Fotos von deutsch-, türkisch- und afrikanisch-aussehenden Frauen und Männern zu beurteilen, die entweder einen neutralen Gesichtsausdruck hatten oder lächelten. Die Einschätzung erfolgte auf den Dimensionen Sympathie, Intelligenz, Attraktivität, Vertrauenswürdigkeit und Aggressivität. Es zeigte sich, dass deutsche Personen relativ zu türkischen und afrikanisch aussehenden Personen auf allen Dimensionen positiver beurteilt wurden. Außerdem wurden lächelnde Personen generell als sympathischer, intelligenter, attraktiver, vertrauenswürdiger und weniger aggressiv eingeschätzt als neutral schauende Personen. Die Ergebnisse zeigen weiterhin einen Interaktionseffekt des Lächelns mit der Dimension Aggressivität. Ein Lächeln hatte für die Beurteilung der Aggressivität afrikanisch und türkisch aussehender Zielpersonen einen größeren Vorteil als für deutsche Zielpersonen. Auf den anderen Dimensionen wurde kein derartiger Interaktionseffekt gefunden. Die Ergebnisse leiten zu dem Schluss, dass – neben der global positiveren affektiven Beurteilung anderer Menschen – ein Lächeln effektiv der Wahrnehmung und Bewertung einer Person als aggressiv entgegenwirken kann, besonders wenn sie Mitglied einer als eher aggressiv stereotypisierten Gruppe ist.

T-49. Does the source memory advantage for cheaters influence our later actions positively?

Meike Kroneisen

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Evolutionary psychologists often claim that memory functions can only be understood through an analysis of the specific selection pressures that have shaped the cognitive system during human evolution. In line with this framework, a number of studies have shown a source memory advantage for faces of cheaters over faces of non-cheaters. This can be beneficial for cooperative individuals because remembering that a face belongs to a cheater can help to avoid being exploited by this person in future encounters. In two studies, we were interested in whether our student participants were able to remember cheating game partners in a later game with old and new opponents. The time between the “learning” phase and the “test” phase was either 30 minutes or 30 seconds. In the 30 minutes condition, no influence of the earlier learning phase could be found. In the 30 seconds condition, participants spend more money in the test phase when their opponent

showed trustworthy behavior in the learning phase than when the game partner showed negative behavior. However, they spent most of their money when their opponent was new and trustworthy looking.

T-50. The Impact of Working Memory Load on Nonfaked and Faked IAT D Measures

Jessica Röhner

Technische Universität Chemnitz, Germany

Working memory (WM) capacity has been shown to be related to some IAT D measures and has also been suggested to be involved in faking processes. However, research has yet to investigate whether working memory load (WML) impacts all D measures in the same way and how WML impacts faked IAT D measures. Thus, the current study investigated the impact of WML on nonfaked and faked IAT D measures by randomly assigning 48 participants to one of two experimental groups. In Session 1, both groups took the IAT under standard instructions (baseline). In Session 2, both groups took the IAT while simultaneously working on the random number generation (RNG) task to stress their WM (baseline under WML). In Session 3, both groups were given faking strategies and were asked to fake either high or low scores on the IAT (faking). In Session 4, both groups were asked to fake again while simultaneously working on the RNG task (faking under WML). The results revealed similar impacts of WML on D measures under nonfaking conditions. Under faking conditions, WML somewhat attenuated the effect of the faking of high scores (i.e., the more difficult faking condition) but did not impact the faking of low scores. Moreover, the results imply that the faking strategies of slowing down versus accelerating are associated with different aspects of WM, which provides more detailed insight into the faking process.

T-51. Risk-taking as a predictor of leadership in a multi-client computer game

Xaver Paul Franiel, Margarete Boos

Georg-August-University Göttingen, Germany

Leader-follower relationships occur in everyday life and whenever humans come together in a group, a leader-follower relationship seems to emerge naturally. Early psychological research concentrated mostly on ascribing personality traits to humans as predictors of leadership, and later switching to leader functions and styles (Bass, 1990; Van Vugt, 2006). To empirically investigate the emergence of leadership on a behavioural level, we use an experimental paradigm, the computer-based HoneyComb multi-client game setting (Boos et al., 2014) where players can move their avatars on a virtual playfield. Communication is restricted only to the movement on the field. In previous studies, we could show that humans form groups spontaneously (Belz et al., 2013), and that an informed minority can lead an uninformed majority to a goal (Boos et al., 2014).

According to Gosling (2001) “personality can be defined as those characteristics of individuals that describe and account for consistent patterns of feeling, thinking, and behaving”. We want to investigate whether individual risk behaviour can predict leadership behaviour in groups. We developed two games: an individual “risk” game where players can earn money under risk: by stepping on unknown reward fields players can increase their payoff while stepping on one of several randomly distributed blanks terminates the game. The higher the number of steps on unknown fields the higher the willingness to take risks. In a group-“alignment” game we measure leadership behaviour. In the group game,

players can achieve a monetary reward depending on the number of players reaching the same goal. The higher the number of players on a goal field the higher the payoff for each player. We predict that players who take the higher risk in the individual game, will emerge as leaders in the group game.

T-52. Psychophysiologische Erfassung von Leugnungsprozessen: Effekte der Stimulussalienz und der Einfluss der Persönlichkeit auf die P3-Amplitude des ereigniskorrelierten Potentials

René Köckritz

Christian-Albrecht-Universität zu Kiel, Germany

In dieser Studie wurden Salienzeffekte sowie der Einfluss interindividueller Unterschiede auf die kognitiven Prozesse des Leugnens in einer EEG-Studie untersucht. Dabei sollten die Befunde von Leue, Lange & Beauducel (2012), die erstmals interindividuelle Unterschiede im Kontext des Leugnens mit Hilfe der P3-Amplitude des ereigniskorrelierten Potentials aufzeigen konnten, in einem forensischen (N = 67) Kontext repliziert werden und erstmals auch in einem sozialen Kontext (N = 68) untersucht werden. In einem dem Concealed Information Test angelehnten Paradigma sollte die Kenntnis zuvor gelernter Gesichter geleugnet werden. Dabei wurde im forensischen Kontext auf das Leugnen der Bekanntheit von Gesichtern fokussiert und im sozialen Kontext auf das Leugnen der suggerierten Nicht-Vertrauenswürdigkeit von Gesichtern. Mit Hilfe von Kovarianzanalysen mit Messwiederholung konnte nur die frühe parietale P3-Amplitude im forensischen Kontext als robuster Parameter der Leugnungsdetektion ausgemacht werden, um zwischen leugnungsrelevanten und wahrheitsbezogenen Stimuli zu differenzieren. Die Persönlichkeitsmerkmale Sensitivität für Ungerechtigkeit aus der Täterperspektive (SI-p) und Sensitivität für Unangenehmes (Trait-BIS) hatten keinen Einfluss auf die P3-Amplituden, weder im forensischen noch im sozialen Kontext. Damit konnte das Paradigma nicht erfolgreich auf den sozialen Bereich übertragen werden. Weiterhin wurden mögliche Ursachen diskutiert und Implikationen für zukünftige Replikationen aufgezeigt.

T-53. The influence of resource growth rate on cooperation in intergenerational dilemmas: A person-situation interaction

Mila A. Rüdiger, Pascal J. Kieslich

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There are many problems of global significance with far reaching implications for future generations, such as the overexploitation of common resources like fishing grounds or timber. As these intergenerational consequences are not covered by standard social dilemmas, a growing body of research addresses them using specifically developed paradigms for intergenerational dilemmas. One important feature of common resources is their growth rate, as some resources grow slower than others and, hence, are particularly vulnerable to overexploitation. An open question is the extent to which people are sensitive to the growth rate in an intergenerational context where the resource development only affects future generations. This was investigated in the current study in which individuals (representing different generations) extracted sequentially from a monetary resource while the resource growth rate across generations was manipulated. It was hypothesized that individuals extract less from a resource with a slower growth rate. Besides, it was expected that individuals vary in their concern for future generations and their sensitivity for the growth rate. We hypothesized that this variation can be explained by the Honesty-Humility (HH) personality factor that measures dispositional cooperativeness. As people high in HH

generally show a greater concern for others than people low in HH, it was expected that people high in HH extract less from the resource – particularly for slow resource growth rates. After preregistering the hypotheses and study design, a large online study was conducted. In line with the hypotheses, people extracted less from the resource the smaller the resource growth rate was. Besides, higher levels of HH were associated with smaller extraction decisions, particularly when resource growth was slow. These results suggest that the interplay of both situational and personality factors determines the extent to which people care for following generations.

T-54. Do arm movements influence generosity? An experimental study.

Juan José Rahona López, Martin Lachmair, Peter Gerjets, Susana Ruiz Fernández

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There are numerous findings in the literature supporting an association between bodily states and cognitive and social processes. It was found, for example, that verbs with a movement component (e.g., give) are faster recognized when participants perform a congruent movement (extending an arm) than an incongruent one (flexing an arm). The present study, aimed to examine whether arm movements commonly associated with give (extend an arm) or take (flex an arm) could have an influence on participants' generosity. Therefore, in the present study participants were required to distribute an amount of coins into two savings boxes presented on a multitouch display. One savings box was assigned to the participant and the other box to an unknown person. The location of the boxes were also varied (i.e. box near participant or far participant). Participants have to distribute the coins by performing a give or a take gesture on the display. Results show that the distribution of the coins and also the distribution speed was affected by the performed gesture and the position of the savings boxes. Surprisingly, results show that participants are more generous performing a take gesture than performing a give gesture. A tentative explanation based on the pain-of-paying-effect will be discussed.

Poster session: Spatial cognition and motion perception

Time: Tuesday, 28/Mar/2017: 2:00pm - 3:00pm

T-55. Where is the Castle? Background knowledge about urban structures influences navigation behavior in unknown environments.

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Humans dispose of background knowledge about the structure of street layouts of cities. Humans may therefore infer where particular buildings and places might typically be located (e.g., an ancient castle, or the main station). Correspondingly, this knowledge may affect actual navigation behavior. In Experiment 1, participants were asked to mark supposed positions of buildings and places (including a castle) on a city map which depicted only the street layout. Results show that participants did not select the target locations for those buildings randomly but agreed on a small number of typical locations. In particular, two target locations were preferred for an "ancient castle" on a map of a virtual city that was utilized in form of a virtual environment (VE) in Experiment 2. In Experiment 2, participants freely navigated the VE to find the castle. During navigation, they used a virtual map that depicted only the street layout. The castle was located either at the most likely location (as found in Experiment 1) or at an alternative location. Even

though the alternative location was closer to the starting point, results revealed longer search times and longer trajectories in this condition. This suggests that participants utilized background knowledge about the cities' structural layout to navigate to the target location.

T-56. Measuring distance perception with perceptual matching, reaching, and 3D-gaze position

Rebekka Susanne Schubert[1], Maarten Jung[1], Boris M. Velichkovsky[1,2]

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As a result of technological progress, the spread of stereoscopic applications is increasing in many fields such as work, health and entertainment. The eyes of the user are presented with two images from slightly different viewpoints, which results in a 3D-impression. Experimental studies show large interindividual differences in the perception of stereoscopic content. However, the subjective spatial perception is difficult to measure. Several approaches like verbal reports, perceptual matching, or visually directed actions have been used. Employing binocular eye-tracking to measure the 3D-gaze position would represent an objective measure of distance perception but has so far been neglected in this field. In our experiment, we presented a virtual cone stereoscopically and measured eye movements with a binocular eye-tracking system. The experiment consisted of two randomized blocks. In one block, participants were instructed to match the distance of a real pole to the distance of the virtual cone assessing relative distance perception. In the other block, the absolute distance perception was measured whereby participants made a reaching movement to the position of the virtual cone with closed eyes and thus without visual feedback. We found that participants, who were able to converge to the correct distance, positioned the real pole quite precisely but reveal large interindividual differences in their reaching estimates. We will discuss possible reasons for these findings.

T-57. Task demands influence audiovisual motion extrapolation in three-dimensional space

Sandra Dittrich[1], Tömme Noesselt[1,2]

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Motion extrapolation is an essential skill for many everyday activities, e. g. road traffic. Previous studies focused predominantly on the visual modality and used divergent tasks and stimulus material. In a series of psychophysical experiments, we systematically tested the factors potentially governing motion extrapolation by varying motion information (visual, audiovisual), task (detection, discrimination, extrapolation) and nature of stimulus material (non-three-dimensional, three-dimensional). In visual conditions a ball followed a diagonal trajectory, temporarily disappeared behind an occluder and reappeared on a consistent or a non-consistent trajectory. In audiovisual conditions a moving white noise (congruent or non-congruent to visual motion direction) was presented as well. Participants performed a simple detection task (report when the ball reappeared, Exp. 1), a discrimination task (decide whether the ball reappeared on a consistent trajectory, Exp. 2), or an extrapolation task (judge when the ball would reach a specified position, Exp. 3). All experiments were conducted both in two-dimensional and three-dimensional space (using stereoscopic screen and polarized glasses). Participants benefited from visually consistent trajectories, especially when spatial aspects were relevant. Auditory information was used in tasks in which temporal motion aspects were critical. However, use of auditory

information differed between tasks and participants: for temporal tasks auditory effects were consistently elevated, in spatial tasks participants' performance differed with respect to the influence of auditory information. Importantly, interactions with three-dimensional stimulation reveal an influence of realistic stimulus material. Together, our results demonstrate a complex interaction of task demands, stimulus modality and ecological validity of stimulus material (non-three- vs. three-dimensional) on motion extrapolation.

T-58. How is crowding affected by defocusing stimuli in depth?

Lisa Valentina Eberhardt, Anke Huckauf

Ulm University, Germany

Crowding refers to the phenomenon of reduced recognition of peripherally presented targets when flanked by similar stimuli. The extent of crowding effects considerably depends on the spatial configuration of stimuli: Increasing stimuli's eccentricity as well as decreasing target-to-flanker spacing results in increased crowding. Moreover, there is an interaction of eccentricity and spacing. Based on these classical findings about the importance of spatial configurations on plane surfaces, we questioned whether also manipulation of stimuli's configuration in the third spatial dimension, depth, affect crowding. We used two screens, observed via a semi-transparent mirror to present stimuli in different depths. One screen displayed the fixation depth at a distance of 190 cm, while the other screen was mounted blockwise either in front of (170 cm) or behind (215 cm) the fixated depth to display defocused depths. Isolated and flanked Landolt rings of 0.6° were presented for 20 ms at an eccentricity of 2° either in the fixated or in defocused depths. Results showed in defocused depths similar crowding effects as in the fixated depth. However, results of reaction times and confusion errors suggest different processing mechanisms in the fixated and in defocused depths. Reactions for flanked stimuli in defocused depths were faster than in the fixated depth. Confusion errors showed a tendency towards more inward confusions in the fixated depth, while in defocused depths there were more outward confusions. Nevertheless, results indicate that flanked stimuli produce crowding to a similar extend when they are presented in the same depth, irrespective of whether this depth is fixated or defocused. Deriving from these results in a follow up experiment we examine the effect of defocusing when only the flanking stimuli are presented in defocus. As can be assumed, the recognition of targets presented in the fixated depth should be less affected by defocused relative to focused flankers.

Poster session: Task switching

Time: Tuesday, 28/Mar/2017: 2:00pm - 3:00pm

T-59. A shift in the balance: The interaction dynamics of meta-control parameters and situational demands in color set shifting

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In goal directed behavior, two opposed constraints have to be satisfied: on the one hand, one has to be able to pursue a goal against obstacles and distractions, thereby avoiding volatility; on the other hand, one has to let loose when alternatives become more attractive or the goal becomes unattainable, thereby avoiding futile perseveration. These opposing constraints have been conceptualized as the control dilemma between the shielding of goals from distraction and the shifting of goals when necessary. It is assumed that the

balance between perseverative and volatile behavior is regulated by meta-control parameters which configure the cognitive system's default mode of processing.

To investigate these meta-control parameters, we shifted this balance by manipulating situational demands (e.g. proportion congruency) within a color-based shifting paradigm.

We examine the temporal dynamics of how congruency effects and shift-costs are affected by situational demands via mouse tracking. Furthermore, we use a dynamic neural field based model in order to identify neural parameters which convey the shift in balance.

This study was funded by the Collaborative Research Centre 940 "Volition and Cognitive Control" (DFG)

T-60. Bilingual implicit modality switching

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Institute of Psychology RWTH Aachen University

The present research project explores potential language-specific influences on the embodied processing of the language. In three experiments, we explored embodied language processing in an implicit modality-switching task using property verifications. In implicit modality switching, participants perform a property verification task, that is they make a judgment about two words, a concept and an attribute, deciding whether the words are typically associate (e.g., Tomato-red) or not (e.g., Apple-Blue). When the word pairs in two successive trials refer to the same perceptual modality (i.e. implicit modality repetition) participants respond faster and make less error as compared to an implicit modality switch in which the modality changes (e.g. from auditory [Blender-Loud] to visual [Apple-Blue]). (e.g., Pecher, Zeelenberg & Barsolou, 2003). In the present study, we were interested in examining the language (in)dependence of embodied language processing. Thus, participants performed the implicit modality-switching task in their native and in a foreign language (German vs. English) in pure blocks in Experiment 1. In further experiments we additionally added mixed blocks including unpredictable (Experiment 2) or predictable (Experiment 3; alternating runs L1, L1, L2, L2, L1…) language switches. The results indicate a numerical tendency for modality switch costs. More importantly, the experiments show overall faster responses in native language trials than in foreign language trials as well as language switch costs. However the experiments suggest a comparable data pattern for implicit modality switching in both languages. This observation would be in line with the assumption of language independence of embodied language processing.

References: Pecher, D., Zeelenberg, R., & Barsalou, L. W. (2003). Verifying different-modality properties for concepts produces switching costs. Psychological Science, 14(2), 119-124.

T-61. Individual preference for serial or parallel processing in task-switching: Multitasking does not necessarily lead to costs

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Understanding benefits and limits of multitasking is of high importance in our complex world. One prominent question concerns the efficiency of different task organization strategies in multitasking, i.e. serial versus parallel processing. In a previous set of two experiments we found evidence for individual differences in the preference for one of these two modes of processing (Reissland & Manzey, 2016). This was based on a new task-switching paradigm with a stimulus preview of the task to be switched to next, and a

concurrent dual-task paradigm with voluntary switching between two concurrent threads of tasks. In both settings, about 30-50% of participants used the preview-option for at least partly parallel processing of the two tasks previous to the actual overt switch. This compensated for a part of the usual switch costs, thereby improving their overall multitasking efficiency. However, the other participants continued working on the tasks in a strict serial order. In a new set of experiments we aimed to replicate this finding based on more complex tasks than the simple classification tasks used before. In the first experiment 16 participants worked on a mental arithmetic and a Sternberg memory-search task according to a task-switching paradigm with preview. The results confirm our earlier finding of a preferred processing mode, though more participants (11 of 16) than in our previous study chose to work strictly serially with these more complex tasks. The second experiment involved 36 participants who worked on the same tasks concurrently with complete freedom of task-organization. Again a large group of participants (27) preferred to organize the tasks in a strictly serial manner by blocking long sequences of performing one task before switching to the other task. However, the other nine participants still chose to switch between the tasks very often, also showing indications of parallel processing. This provides more converging evidence for natural individual preferences for either a serial or parallel mode of task-organization. In addition, four participants practicing parallel processing could realize an overall multitasking benefit of up to 48% compared to their single-task performance. They were obviously able to turn often observed multitasking costs into benefits.

T-62. Stimulus-set bindings contribute to task-switch costs in a novel task-switching/card-sorting paradigm

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Background: Stimulus valence is known as a major determinant of task-switch costs. We analysed switch costs in a novel cued task-switching/card-sorting paradigm, in which we replaced valence manipulations by eligibility manipulations. Methods: Forty participants sorted bivalent targets according to their colour or shape. Crucially, the eligibility of stimulus features was manipulated on a trial-by-trial basis by manipulating response eligibility. As a consequence of this manipulation, competing stimulus-set bindings remained eligible (or not) on current trials. Results and Conclusion: Switch costs were diminished when competing stimulus-set bindings were ineligible compared to when they remained eligible. In line with the literature, our findings suggest that stimulus-set bindings contribute to switch costs. The present study proposes a new paradigm to manipulate the contribution of episodic stimulus-set bindings to switch costs, which has several advantages over the hitherto existing methods.

T-63. Examining the Impact of Shifts of Auditory Selective Attention on Implicit Task-Switches

Julia Christine Seibold, Sophie Nolden, Josefa Oberem, Janina Fels, Iring Koch

RWTH Aachen, Germany

In an auditory attention-shifting paradigm, the impact of implicit task-switches was examined. Via headphones, participants heard two dichotically presented words - one spoken by a woman and one spoken by a man. In one half of the experiment, a visual cue at the beginning of each trial indicated if participants had to attend to the male or to the female voice, while in the other half the cue indicated if participants had to attend to the left or right ear. The stimulus-words were a spoken letter and a digit. When the to-be-

attended stimulus was a letter, participants had to indicate by a left or right key-press if it was a consonant or a vowel, whereas for a digit, participants had to indicate if the digit was odd or even. Thus, the task repeated or switched from letter- to number categorization in subsequent trials, implicitly. The results revealed significant attention-shift costs and costs of implicit task-switches. However, whenever an attention-shift was required, the implicit task-switch costs were strongly reduced. Intentional shifts of auditory selective attention produced context changes that might have abolished task-repetition benefits, due to a disruption of the episodic retrieval path of the task-set.

T-64. Interference of task-specific attentional selection of global and local stimulus features

Aquiles Luna-Rodriguez[1], Mike Wendt[2], Thomas Jacobsen[1]

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Switching between tasks that are associated with different attentional requirements may suffer interference from non-optimal attentional settings, processes of reconfiguration, or both. Consistently, various studies demonstrated a performance cost when the relevant perceptual dimension differed from the preceding trial. This dimension switch cost may depend on stimulus-specific proactive interference, brought about by episodic memory of previous occurrence(s) of the current stimulus in the context of the other task. To investigate switching between tasks associated with different attentional requirements excluding proactive interference, we administered a task switching paradigm that involved task-unique sets of hierarchical (Navon) stimuli and varied, between groups of participants, whether the target stimulus dimension (i.e., global vs. local level) was held constant or varied between the tasks. Mixing dimensions impaired performance, particularly in task switch trials. (Consistent with previous findings, task switch costs were virtually absent when the relevant dimension was held constant.) Moreover, when dimensions were mixed interference of the currently irrelevant attentional set showed larger (within-task) global-local congruency effects. In a second phase of the experimental session, the target level was changed for either one or for both tasks. This change yielded a marked increase in task switch costs and global-local congruency effects when it resulted in mixed dimensions but not when the dimension was constant. These results can be explained by assuming that stimulus-specific proactive interference increases task switch costs, and that this increase can be prevented by constantly ignoring the irrelevant perceptual dimension of the stimuli.

T-65. Integration of Task Effects in a Task Set and the Role of Anticipatory Saccades

Angelika Sommer[1], Christina Pfeuffer[2], Sarah Lukas[1]

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In everyday life we are often confronted with competitive situational affordances. Our environment in which we interact may offer different tasks which are mentally represented in so called task sets which is the mental representation of the relevant external stimuli in order to execute a task. As Lukas et al. (2013) had shown in her study task effects elicited by specific responses may play a crucial role in action planning and action selection. In the present study a task switching paradigm was combined with a spatial response-compatibility paradigm. Additionally eyetracking data were analyzed in order to further investigate the role of task effects in action planning. Pfeuffer et al (2016) found evidence for the monitoring function of eye movements in simple stimulus-response-effect associations It is thus hypothesized that task-effect associations may also play a role in

more complex task environments in the process of task selection, like in a task switching paradigm. Specifcially, the question of whether task effects are anticipated on the task or on the response level will be discussed.

T-66. Modality-compatibility effects in semantic categorizations and the role of learning

Simone Schaeffner, Iring Koch, Andrea M. Philipp

RWTH Aachen University, Germany

Previous research demonstrates that sensory-motor modality compatibility plays an important role during language processing when modalities have to be switched. That is, switching between relatively incompatible sensory-motor modality mappings (i.e., auditory-manual and visual-vocal) leads to higher switch costs compared to switching between compatible mappings (i.e., auditory-vocal and visual-manual). However, it remained unclear whether previously described modality-compatibility effects in language processing were mainly based on learning processes resulting from very small stimulus sets. In the present study, we investigated the role of learning concept-to-category associations (Experiment 1) as well as influences of learning concept-to-modality associations (Experiment 2) when participants perform semantic categorizations and switch between different sensory-motor modality combinations. The results of both experiments revealed effects of modality compatibility in terms of higher modality switch costs for switching between incompatible compared to switching between compatible sensory-motor modality mappings and, furthermore, both experiments revealed learning effects. Interestingly, however, modality-compatibility effects were not influenced by these learning effects - neither by learning of concept-to-category associations nor by learning of concept-to-modality associations. Thus, the present study confirms previous findings about modality-compatibility effects during language processing and, moreover, provides first evidence that these effects cannot be reduced by learning effects alone. Furthermore, the study gives important novel insights into the interplay between modality-specific effects and semantic processing during sensory-motor modality switching.

T-67. “Too much” Cognitive Control? Altered Task- and Response-Set Switching in Weight-Recovered Anorexia Nervosa”

Joseph A. King[1], Franziska M. Korb[1], Franziska Ritschel[1], Richard Vettermann[1], Thomas Goschke[1],Tobias Egner[2], Stefan Ehrlich[1]

[1]TU Dresden, Germany; [2]Duke University, USA

Background:

Patients with Anorexia Nervosa (AN) often engage in ritualized behaviors involving eating and are commonly described as having rigid thinking styles. This cognitive inflexibility may contibute to the perpetuation of symptoms and explain the high resistance to treatment in the disorder. Impaired set-shifting has been suggested as a candidate endophenotype based on performance of neuropsychological measures, but few studies have investigated cognitive flexibility in AN with classic task-switching paradigms.

Methods:

In the current study, 22 female weight-recovered AN patients and 22 age-matched healthy controls (HC) performed a cued task switching experiment.

Results:

The groups differed in their speed/accuracy balance: while reaction times (RTs) were generally faster in the HC group, error rates were generally reduced in the AN group. This is consistent with clinical and empirical observations of elevated perfectionism in AN. Performance costs in both RTs and error rates associated with changing task-sets (task-switch costs) and motor responses (response-switch costs) were strongly interactive in both groups: task-switch costs were increased for response-repetitions, but eliminated for response-switches (2-way interaction; both p's < .001). A trend for a group difference in this interdependence between task-and response-selection was evident in RTs, but only when sequential task-switch costs were taken into consideration (4-way interaction p = .056). In error rates, however, the the 3-way group × task-switch × response-switch interaction was much clearer (p = .007). The precise pattern of this difference indicated that task-switch costs in the AN group did not show the typical benefit (i.e. were not reduced) when a concurrent response-switch was necessary.

Conclusion:

Taken together, these findings underline the notion that AN is characterized by "too much" cognitive control, which may come at the cost of flexible behavioral adaptation when environmental demands change.

T-68. Integration of advance information about a forthcoming task switch

Juliane Scheil, Thomas Kleinsorge

Leibniz Research Centre for Working Environment and Human Factors, Germany

We investigated task switching among four tasks by means of a modified cuing procedure with two types of precues. One type of precue consisted of a standard task cue indicating the next task. In half of the trials, this task cue was preceded by another type of precue that reduced the set of candidate tasks from four to two tasks. In addition, we measured participants' spontaneous eye blink rates (EBRs) at the beginning, in the middle, and at the end of the experiment. Whereas interindividual differences in mean EBR had no pronounced effect on task switching performance, changes in EBRs during the first half of the experiment significantly modulated the interaction of the effects of the two types of precues. We suggest that changes in EBRs in the early phase of the experiment reflect adaptations of dopaminergic projections serving to integrate advance information about a forthcoming task switch.

Poster session: Temporal cognition

Time: Tuesday, 28/Mar/2017: 2:00pm - 3:00pm

T-69. Does time production benefit from counting?

Sven Thönes[1], Heiko Hecht[2]

[1]Leibnizinstitut für Arbeitsforschung, Germany; [2]Johannes Gutenberg-Universität Mainz

Background:

It is common to use counting strategies in order to accurately produce duration. Does counting indeed improve the accuracy of time productions in the range of seconds to minutes? Cognitive models of time perception indicate positive as well as negative effects of counting on duration judgments.

Methods:

In two experiments, we compared chronometric counting to intuitive timing (no counting) and to attentional control (simultaneously performing mental arithmetic). In Experiment 1, subjects had to produce time intervals of 60 s duration in an ecological class-room setting.

Experiment 2 tested the effects of counting on time production of 10, 30, and 60-s intervals in a laboratory setting.

Results:

In Experiment 1, counting did not improve the accuracy of time productions. Surprisingly, subjects were most accurate when producing the 60-s time interval intuitively and overestimated duration when counting or doing mental arithmetic. In Experiment 2, the advantage of intuitive judgment over counting was replicated for 60-s-intervals but disappeared at shorter intervals. Inversely, counting had a positive effect on the precision of time production. Especially at the shortest duration of 10 s, time production was less variable when subjects used a counting strategy. As expected, mental arithmetic significantly impaired accuracy as well as precision and led to overproduction of duration.

Conclusion:

The results are discussed in the context of attentional processes and a potential word-length effect in counting. Counting is no good strategy in order to accurately produce duration.

T-70. Does imagined stimulus size influence duration judgments in the same way as physical stimulus size does?

Teresa Birngruber, Rolf Ulrich

University of Tuebingen, Germany

Previous studies have shown that physical stimulus size influences perceived duration. Larger stimuli tend to be judged as lasting longer than smaller stimuli (e.g., Thomas & Cantor, 1976). Similar effects can be observed when stimuli only appear to be of different size because of a size illusion but are actually of the same physical size (Ono & Kawahara, 2007). If objective stimulus size does not drive the size effect on perceived duration, stimuli which only differ in imagined size might elicit this size effect on perceived duration as well. Classic studies of mental imagery have shown that participants imagine things "true to real size", for example an elephant as being larger than a mouse (Kosslyn, 1975). Accordingly, we wanted to investigate whether the duration of words representing small or large animals would be judged differently. In two experiments, we presented names of small or large animals (matched for number of letters and word frequency) for 700, 1000, or 1300 ms. Participants were asked to imagine the animals in front of a constant background (on a tennis court) and to reproduce the presentation duration by holding down a button for the same duration. In Experiment 1, participants additionally had to judge the animals' size in 10 % of trials; in Experiment 2 they only performed the reproduction task. The durations of words representing large animals were reproduced longer than those words representing small animals, but only if animal size was judged as well (Experiment 1). A third experiment is currently running to test the reliability of the effect observed in Experiment 1. The findings suggest that imagined stimulus size can influence time perception under certain circumstances, namely when size differences are made salient.

T-71. Time perception and temporal ratings as a component of UX

Anna Katharina Trapp, Nils Backhaus

TU Berlin, Germany

User experience (UX) is built upon the user's perceptions during the interaction with a product, system or service. It is often measured with rating scales regarding emotions, perceived instrumental qualities (e.g., usability), perceived non-instrumental qualities (e.g., aesthetics), and consequences (e.g., overall evaluation or intention to use). These measures are based on the CUE model (Thüring & Mahlke, 2007) which claims that consequences and evaluations of the system are based on perception of the different qualities and experiencing emotions. However, Sackett et al. (2010) showed that evaluations can also be affected by time perception, more precisely the feeling of time dragging vs. flying by, which was manipulated in an experimental paradigm. In two studies (N=62 and N=80) we asked how well users can estimate their time on task during a human-computer interaction (strength of under-/overestimation), how their estimates translate into a temporal rating regarding the quickness of time passing by, and how temporal ratings covary with UX ratings (see above). Participants were either confronted with a usable vs. a not-usable website and they were either asked to perform think aloud or not during the interaction, resulting in a 2x2 design. We expected to find effects of usability moderated by emotions, as well as effects of think aloud on time estimates and temporal ratings. Moreover, if temporal ratings were used to generate an overall rating of the interaction, these ratings should covary with UX ratings. Results in both studies showed an effect of think aloud on time estimates, but no effect of usability even though the two usability groups differed in emotions. These results indicate that participants were not aware of the longer interaction when performing think aloud, while they adequately perceived the longer interaction when they were confronted with low usability. This interpretation goes along with the temporal ratings, which were not influenced by think aloud but by usability. Moreover, temporal ratings correlated with the overall evaluation (UX). We conclude that temporal perceptions should be seen as a supplemental component of UX that could be used to design for a better UX.

T-72. Multisensory integration of filled and empty temporal intervals

Karin Maria Bausenhart, Maria Dolores De la Rosa

University of Tübingen, Germany

When participants have to judge the duration of multimodal temporal stimuli (e.g., audiovisually marked intervals), they combine the duration information from the different modalities for their judgments. In this process of multisensory integration, conflicts between the modalities are typically solved largely in favor of the auditory modality. According to different theoretical views, such integration may take place at different stages of processing, as for example, perception (i.e., integration of marker stimuli defining the temporal intervals) or memory (e.g., interference between independent, amodal memory representations of temporal information). We aimed at distinguishing between these two accounts by assessing multisensory integration of audiovisual intervals defined by congruent (i.e., both filled or both empty) or incongruent (e.g., auditory filled and visual empty) marker types. If multisensory integration of duration takes place at a perceptual stage, more similar marker signals should lead to larger integration effects. However, if multisensory integration of duration takes place at a memory stage and is driven by interference between temporal representations of a shared representational format (e.g., accumulated pulses or magnitude-based duration representations), marker similarity should not affect the magnitude of the integration effects. The results of two experiments

show that integration effects were generally stronger for empty auditory than for filled auditory intervals, irrespective of the visual marker type. Most importantly, however, congruent marker pairs produced stronger integration effects than incongruent marker pairs, suggesting that multisensory integration of duration is not based on interference between memory representations of an unspecific amodal format, but rather emerges at an early, perceptual level.

T-73. Eye movements and processing of temporal information in comics

Sven Hohenstein, Jochen Laubrock

University of Potsdam, Germany

Visual narratives like comics or graphic novels are characterized by a combination of visual and textual information, using a sequential order of panels. Reading comics is based on shifts of gaze and attention from one panel to another. Transitions between succeeding panels require more or less “closure", an inferential cognitive process that binds panels together (McCloud, 1993). McCloud postulates that the empty space between panels, the “gutter”, can affect the experienced fictive time in the story. However, empirical support for the role of the gutter itself is missing, and therefore its status is rather unclear. In the present study, we investigate how the gutter affects comics readers’ experience of fictive time.

We asked participants to read complex single comic panels at their own pace. Stimuli were taken from popular comic series. In Experiment 1, we presented the panels in two conditions. In the control condition, large panels were presented in their original configuration. In the second condition, split subpanels were presented sequentially one at a time. At the end of the trial, participants were asked to estimate the duration of the scene depicted in the panel. Although the same panel content was shown in both conditions, we observed reliable differences. Estimated duration in the separated-panels condition was higher than in the control condition. This finding is evidence for the impact of the physical configuration of visual stimuli on the readers’ experienced fictive time.

In Experiment 2, full panels were compared with subpanels created by inserting artificial gutters. Thus subpanels were presented simultaneously on a single screen, rendering a visual appearance more similar to actual comic books. Additionally, eye movements were recorded. Again, estimated scene duration was higher when panels were separated. Analysis of eye movements revealed differences between conditions with respect to the distribution of attention. Specifically, each subpanel acted as its own frame of reference, creating its own center bias. As a result, the total number of fixations and the total fixation duration increased in the subpanel condition. Thus, estimated fictional time has a behavioral correlate in total fixation duration.

Symposium: Inhibition as a cognitive construct: helpful and valid? (Part I)

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* HS 401
Session Chair(s): Alodie Rey-Mermet
Session Chair(s):, Miriam Gade

The effect of episodic retrieval on inhibition in task switching

Jim Grange

Keele University, United Kingdom

Humans live in an increasingly busy, multi-task environment which often requires frequent switching between different cognitive tasks. Driving, for example, presents us with an incredibly complex environment wherein many sub-tasks—speed monitoring, interpretation of abstract road signs, planning the best route etc.—must be organised and deployed appropriately in order to arrive at our destination safely. The question arises as to how humans are able to organise and control the selection and deployment of on-going cognitive processes. One mechanism thought to aid control during task switching is the inhibition of competing tasks, which serves to reduce interference during task selection. However, inhibition is a controversial concept due to the observation that many empirical "inhibitory" phenomena can be explained with non-inhibitory accounts. The empirical signature of inhibition in task switching (the n–2 repetition cost) is robust against these non-inhibitory accounts. In this talk I will present work from my lab which questions this robustness to non-inhibitory accounts. In particular, I demonstrate that the n–2 repetition cost is contaminated by episodic retrieval effects. When these effects are controlled, the n–2 repetition cost is vastly reduced, suggesting a more reduced role for inhibition in task switching than previously thought.

Analogous selection processes in declarative and procedural working memory: N-2 list-repetition and task-repetition costs

Miriam Gade[1,2], Alessandra Souza[2], Michel D. Druey[2], Klaus Oberauer[2]

[1]Catholic University of Eichstatt-Ingolstadt, Germany; [2]University of Zurich, Switzerland

Working memory (WM) holds and manipulates representations for ongoing cognition. Oberauer (2009) distinguishes between two analogous WM sub-systems: a declarative WM which handles the objects of thought, and a procedural WM which handles the representations of (cognitive) actions. Here, we assessed whether analogous effects are observed when participants switch between memory sets (declarative representations) and when they switch between task sets (procedural representations). One mechanism assumed to facilitate switching in procedural WM is the inhibition of previously used, but currently irrelevant task sets, as indexed by n-2 task-repetition costs (Mayr & Keele, 2000). In this study we tested for an analogous effect in declarative WM. We assessed the evidence for n-2 list-repetition costs across eight experiments in which participants switched between memory lists to perform speeded classifications, mental arithmetic, or a local recognition test. N-2 list-repetition costs were obtained consistently in conditions assumed to increase interference between memory lists, and when lists formed chunks in long-term memory. Further analyses across experiments revealed a substantial contribution of episodic memory to n-2 list-repetition costs, thereby questioning the interpretation of n-2 repetition costs as reflecting inhibition. We reanalyzed the data of eight task-switching experiments, and observed that episodic memory also contributes to n-2 task-repetition costs. Taken together, these results show analogous processing

principles in declarative and procedural WM, and question the relevance of inhibitory processes for efficient switching between mental sets.

Inhibiting a no-longer relevant task: How is this done? Insights from diffusion modeling.

Stefanie Schuch

RWTH Aachen University, Germany

Cognitive inhibition can occur on different levels, e.g., inhibition of irrelevant stimuli or inappropriate responses. Here, I investigate higher-level task-set inhibition, that is, inhibition of a no-longer relevant task that facilitates switching to a new task. Task inhibition can be measured in behavioral paradigms by assessing "N-2 task repetition costs", referring to the performance difference in task sequences of type ABA versus CBA. By applying diffusion modeling to different data sets, I consistently find the task inhibition effect to be reflected in the drift rate parameter. This finding is consistent with the idea that inhibition of a task can be conceptualized as a noisier cognitive representation of this task, rendering it more difficult to select an appropriate response when performing this task. In general, I argue that inhibition is a useful concept in cognitive psychology, and I will conclude with some thoughts on how inhibition can be conceptualized within a diffusion modeling framework.

Talk Session: Language: Speech, semantic, and prosodic processing

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* 101
Session Chair(s): Petra Ludowicy

Electrical brain activity reflecting early speech-nonspeech discrimination and related self-monitoring

Petra Ludowicy, Tina Weis, André Haese, Daniela Czernochowski, Thomas Lachmann

University of Kaiserslautern, Germany

Discriminating speech from nonspeech depends on early auditory analyses of perceptual features and is highly important for communication. The neuronal processes performing these analyses are mostly investigated in oddball paradigms. However, less is known about how we monitor our performance during this process. To investigate this question, we used an auditory speech/nonspeech discrimination paradigm while recording electroencephalography (EEG). As stimuli, we used the German vowels /a/ (75 ms) and /a:/ (145 ms) as speech sounds. To keep physical features of speech and nonspeech stimuli as similar as possible, spectrally rotated versions of these were used as nonspeech sounds. As the corresponding stimuli were blended into each other in 10% steps, the resulting stimulus set shifts continuously from speech to nonspeech. While performing the auditory speech-nonspeech discrimination task, participants indicated via button press whether each stimulus contained either more speech or more nonspeech sound. Afterwards, positive, negative or neutral (randomly distributed in 20% of all trials) feedback was provided visually. Event-related potentials (ERP) were analyzed following auditory stimulus onset and response onset. Differences in stimulus length affect the neuronal response already 200 ms following stimulus onset in terms of mean amplitude differences, but not regarding peak latencies. Closely related to these findings, the amount of speech and nonspeech in the stimuli was also processed already within 200 ms following stimulus

onset and further affected error related negativity (ERN) amplitudes analyzed following response onset, presumably related to the relative uncertainty associated with classifying each stimulus. These results suggest that perceptual features like stimulus length and the amount of speech and nonspeech information in the stimuli effect auditory analyses and related self-monitoring processes.

The posterior semantic asymmetry (PSA): An early lateralized ERP index of semantic activation

Judith Koppehele-Gossel, Robert Schnuerch, Henning Gibbons

University of Bonn, Germany

The left-lateralization of semantic language processing in the human brain is a well-established finding of lesion and neuroimaging studies. Interestingly, there is only little evidence from event-related potentials (ERPs) consistent with the idea that semantic activation originates from Wernicke's area located in the left hemisphere. As a new approach to carve out lateralized language processes with ERPs, we introduce a lateralization index derived from the difference of left-side minus right-side electrocortical activity. To investigate lateralized activity in single-word processing, a within-subject design with three different tasks (passive word viewing, semantic word processing, and silent word naming) was employed. Differences in terms of increased left-lateralized electrocortical activity in temporo-parietal regions during the semantic task compared to the other tasks were expected. Results suggest a left-lateralized negative component over temporo-parietal areas. This component is clearly present for semantically processed words but reduced during the passive viewing and silent naming tasks, and therefore is referred to as posterior semantic asymmetry (PSA). The validity of the PSA in capturing verbal semantic activation is supported by a significant association with verbal intelligence. Furthermore, the PSA is discussed as a left-lateralized ERP index of semantic processing in Wernicke's area, and the concordant results of a recent, extended replication are briefly presented.

"Semantic P600" in second language processing: when syntax conflicts with semantics

Kristin Lemhöfer, Xiaochen Zheng

Radboud University Nijmegen, The Netherlands

In sentence processing, semantic violations (e.g., "The pizza was too hot to *drink*") typically elicit an N400 effect in the EEG, while syntactic violations are associated with a P600. Surprisingly, previous studies have demonstrated that so-called semantic reversal anomalies (e.g., "The fox that shot the hunter...") elicit a P600 effect instead of the expected N400 (e.g., Kolk et al., 2003). This phenomenon is interpreted as a consequence of the mismatch between syntactic parsing and heuristic processing built on semantic word information (Ferreira, 2003). We made use of this effect to investigate the claim that grammatical processing in second language (L2) speakers is fundamentally different from that in native speakers, namely, based more on semantic heuristics (Clahsen & Felser, 2006). If this claim is true, L2 speakers should more often accept reversal anomalies as correct and, possibly, fail to show the P600 effect. We recorded ERPs in 40 German learners of Dutch and a control group of 25 native Dutch speakers while they read and made plausibility judgments on Dutch sentences. These sentences contained reversal anomalies as well as 'standard' semantic violations as a control condition. Additionally,

individual participant characteristics like L2 proficiency and working memory capacity were measured. The results of the plausibility judgments show that L2 learners' behavioral sensitivity to semantic reversal anomalies was reduced relative to native speakers. Accordingly, while the P600 effect on reversal anomalies was replicated for native speakers, it was largely absent for L2 learners, even though this group displayed normal semantic sensitivity (a N400) in the control condition. These results are in line with the claim of a more semantic and less syntax-based way of sentence processing in L2. Results will be further discussed in terms of the development of L2 syntactic processing and the role of individual differences.

Hearing emotions - the processing of prosody without semantics

Thomas Wegner[1], Patricia B. C. Wesseling[1], Vered Shakuf[2], Boaz Ben-David[2], Shanley Allen[1], Thomas Lachmann[1]

[1]University of Kaiserslautern, Germany; [2]IDC, Israel

Previous auditory Stroop-like studies with spoken emotions have shown that native speakers of Hebrew are unable to completely ignore one of the speech dimensions, either prosody or semantics, when processing their native language, and that prosody has a greater impact than semantics. We investigated how participants process prosody without having access to semantic information. Hebrew sentences, spoken either with an angry, fearful, sad, happy or neutral prosody (factor Spoken Prosody) were presented to 39 native speakers of German (18 female, M = 24) who do not speak Hebrew. Participants were asked to rate these sentences based on these four emotions (i.e. excluding neutral; factor Rated Prosody). Half of the participants were not informed about the language while the other half were told that the sentences were in Hebrew (factor Informed). Additionally, each participant completed a questionnaire evaluating their attitudes towards the German and Hebrew language, and regarding German and Israeli society and culture. An ANOVA revealed main effects for the factors Informed, Spoken Prosody and Rated Prosody. Several 2- and 3-way interactions were found as well. An interaction between Spoken and Rated Prosody (congruency effect: if spoken and rated prosody are the same, ratings were higher) suggests universality of prosodic cues (at least for Hebrew – German). Attitudes towards Israel seem not to influence the ratings of the informed participants, but attitudes towards the Hebrew language seem to have an effect. Further results are discussed.

Talk Session: Consumer decision-making

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* 103
Session Chair(s): Mandy Nuszbaum

Consumer decisions under high information load: Characteristics related to decision quality

Claudia Vogrincic-Haselbacher[1], Isabelle Dinslaken[1], Ursula Athenstaedt[1], Brigitta Lurger[2], Florian Caks[2], Arndt Florack[3], Joachim Krueger[4]

[1]University of Graz, Department of Psychology, Austria; [2]University of Graz, Institute of Civil Law, Foreign and Private International Law, Austria; [3]University of Vienna, Department of Applied Psychology, Austria; [4]Brown University, Department of Cognitive, Linguistic and Psychological Science, RI, USA

When making purchase decisions, consumers often face a plethora of information. Particularly, the sustained growth of e-commerce paved the way to produce, retrieve and distribute information increasingly easier, faster, and cheaper. However, there is growing

evidence that too much information or choice alternatives can impair decision quality. Thus, individuals need to find ways to deal with the information overload and adapt to the structure of the environment, by, for instance, ignoring some of the available information or becoming highly selective. So far, research concerning the complex interplay of information processing behavior, psychological variables, and choice quality is still lacking. Across two studies we aimed to investigate how information processing strategies in concert with several individual and situational characteristics relate to decision quality in the context of a simulated, yet naturalistic, online contract conclusion scenario. The present research moved beyond extant research by assessing information processing behavior with a palette of measures, including different behavioral time- and frequency parameters obtained from a tracking software as well as self-report measures, and examined how these measures were related to the final tariff choice. We found that individuals facing a complex decision, characterized by high information and choice load, were most successful by applying information processing strategies that involved the focused selection and processing of a medium amount of information (study 1). Existing decision aids designed to assist individuals in effortful information processing were only partly able to reduce information load and, finally, promote decision quality (study 2). In line with the assumption of ecological rationality, successful individuals reduced information complexity by switching to a simpler decision making strategy.

The Effects of Conscious and Non-Conscious Exposure to Advertising Spots

Robert Schorn[1], Stefan Pletzer[2]

[1]University for Health Sciences, Medical Informatics and Technology (UMIT), Austria; [2]University of Innsbruck, Department of Strategic Management, Marketing and Tourism

In a world flooded by huge outdoor video screens, public television screens, and pop-up windows on websites showing promotional films, people are more and more exposed to advertising spots, paying more or less attention to them. An experiment was conducted to assess whether consciously watching an advertising spot (coffee versus sports) versus being distracted from watching the spot consciously by paying attention to another task (playing a computer game, not noticing that an advertising spot was running in another window) can influence people's decisions in favor of the advertised brand. The results show that both, watching an advertising spot consciously as well as being distracted from watching the spot consciously affected participants' choice (n = 158) in favor of the advertised brand. It did not make a difference whether participants watched the spot consciously versus non-consciously by being distracted. (Exposed to the sports spot, 70% chose the sports brand in the conscious condition and 69.2% in the non-conscious condition. Exposed to the coffee spot, 37.5% chose the sports brand in the conscious condition and 43.6% in the non-conscious condition.) Theoretical, practical, and ethical implications are discussed.

Online shopping and sustainability: Valuing sustainability-related attributes in an online-shopping decision-making scenario is related to openness and conscientiousness

Gerrit Stöckigt[1], Matthias Brand[1,2]

[1]University of Duisburg-Essen, Germany; [2]Erwin L. Hahn Institute for Magnetic Resonance Imaging, Essen, Germany

The increasing concern about climate change that has become visible in the recent UN Climate Change Conferences leads governments and media to talk about sustainability. Thus sustainability is becoming more salient in people's everyday activities that are related to environmental harm like driving or having products delivered by a delivery van. Especially online shopping is an interesting field in which both social aspects of sustainability (i.e. working conditions) and ecological ones (i.e. environmental impact) are questionable. In order to help improve sustainability in this field it is essential to understand decision making in the online shopping context. For this we have conducted an experimental study with 149 participants and investigated what individual characteristics drive sustainably conscious decisions. For this we employed questionnaires and a choice-based conjoint task in which participants are confronted with varying hypothetical online shopping scenarios including attributes like shipping costs or environmental impact. Analyses reveal that decisions are made primarily on the basis of information on shipping costs, working conditions, and environmental impact, while information on the speed and time of delivery were less important in the decision making situation. Further analyses focus on the relations between the importance of sustainability-related attributes and personality traits as well as socio-demographic variables. Results suggest that conscientiousness and openness are positively related to those attributes and suggest that age plays a role. While the discussion addresses the question why typical relations with agreeableness have not been found, the results of the current study show that experimental approaches using implicit measures may help to better understand what kind of individual factors are relevant for making sustainable online shopping decisions. This is a first step towards understanding an important decision making situation.

How does ignoring auditory information affect consumer preferences? Implications for radio advertising

Raoul Bell, Jan Philipp Röer, Dunja Storch, Ulrike Körner, Axel Buchner

Heinrich Heine Universität Düsseldorf, Germany

Radio advertising is often perceived as distracting. From a psychological perspective, it is unclear whether disruptive advertising should result in increased or decreased consumer preferences. Research on the mere exposure effect suggests that the mere processing of information leads to increased liking. In contrast, research on distractor devaluation suggests that the act of ignoring can lead to negative evaluations of previously ignored information. In the present study, we tested these conflicting predictions by presenting brand names as auditory distractors in the irrelevant-sound paradigm. Participants were required to immediately recall short lists of target items. During target presentation, brand names were presented either as changing-state distractors or deviant distractors. The presentation of these distractors significantly disrupted short-term memory relative to a steady-state control condition. In a preference test, participants saw names of previously ignored brands and new brands, and were required to select the brands they preferred. The preference for the previously ignored brands over new brands increased with distractor repetition, suggesting that ignoring auditory information leads to increased

consumer preferences. Distracting advertising may be undesirable from a consumer perspective, but it may still be effective.

Symposium: Neurocognitive correlates of cognitive control

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* 105
Session Chair(s): Lorenza Colzato

Influences of tyrosine administration on working memory updating in aging: a randomized-controlled trial

Lorenza Colzato, Laura Steenbergen, Roberta Sellaro

Leiden University, Cognitive Psychology Unit & Leiden Institute for Brain and Cognition, Leiden, The Netherlands

In Europe the proportion of people aged 65 years and older is expected to rise from 15% in 2009 to 26% in 2039. Normal aging is accompanied by large decrements in cognitive control, the psychological/neural function that orchestrates goal-directed thought and action. This may be because cognitive control is modulated by dopamine (DA), which strongly declines in normal aging. In light of this decrease, it is interesting to note in healthy young adults the administration of the amino acid tyrosine (TYR), acting to increase DA, has been found to enhance working memory updating, a key cognitive control function. Once the optimal DA level is reached, TYR is no longer converted into DA because tyrosine hydroxylase, the enzyme responsible for the conversion, is inhibited. Here, in an elderly sample, we investigated, in a double-blind, randomized, placebo-controlled design, the effect of TYR on working memory updating in a N-back task. Compared to placebo, our results showed TYR decreased performance. We hypothesize this is because in aging there is a high incidence and prevalence of seropositivity of Toxoplasma gondii (up to 77%), which may impair the function of tyrosine hydroxylase, leading to abnormal conversion rates of TYR. Our findings suggest that TYR administration can be detrimental for performance when the DA system is impaired, such as in aging where tyrosine hydroxylase seems to be affected.

On the specificity of alcohol-induced effects: implications for research and therapy

Ann-Kathrin Stock

TU Dresden, Germany

Background. Risky and potentially harmful alcohol consumption habits are very frequent among youths and adults in Western cultures. However, only little is known about the neurocognitive effects of alcohol consumption that does not (yet) meet the criteria of substance abuse.

Methods. This talk reviews findings of a series of several related experiments investigating this matter by analyzing the behavioral and neurophysiologic effects of acute high-dose alcohol intoxication (~1.2 ‰) on action control.

Results. The acute effects of high-dose alcohol consumption seem to be quite specific: While executive functioning is heavily impaired, both sensory stimulus processing and automatic behaviors seem largely unaffected even at high intoxication levels.

Conclusion. The implications of these findings will be discussed in the context of our current knowledge about long-term effects of alcohol abuse. Based thereon, potential new therapy options are debated.

High body mass index is associated with impaired cognitive control

Roberta Sellaro, Lorenza Colzato

Leiden University, Netherlands, The

The prevalence of weight problems is increasing worldwide. There is growing evidence that high body mass index (BMI) is associated with frontal lobe dysfunction and cognitive deficits concerning mental flexibility and inhibitory control efficiency.

The present study aims at replicating and extending these observations. We compared cognitive control performance of normal weight (BMI < 25) and overweight (BMI ≥ 25) university students on a task tapping either inhibitory control (Experiment 1) or interference control (Experiment 2). Experiment 1 replicated previous findings that found less efficient inhibitory control in overweight individuals. Experiment 2 complemented these findings by showing that cognitive control impairments associated with high BMI also extend to the ability to resolve stimulus-induced response conflict and to engage in conflict-driven control adaptation. The present results are consistent with and extend previous literature showing that high BMI in young, otherwise healthy individuals can compromise key cognitive control functions.

The role of norepinephrine and cognitive control

Christian Beste

TU Dresden, Germany

To cope with most everyday tasks, one has to execute several actions, which is sometimes challenging and requires cognitive control. These cognitive control processes relate to the monitoring of conflicts, the selection of goal-directed actions and inhibitory control. A number of neurobiological factors have already been shown to modulate these processes, but the role of the norepinephrine systems has remained somewhat elusive. This is despite it has been suggested that one property of the locus coeruleus-NE function (LC-NE) is to modulate task-related decision or selection processes with phasic LC-NE responses probably facilitating responses to task-relevant processes. The talk will present studies showing that the LC-NE is triggered from time to time in different executive control processes. The talk will present novel methodological approaches making it possible to examine the modulatory effects of the NE system with a temporal resolution in the milliseconds time range. The presented studies will show that the NE system shows specific modulatory effects for different informational contents that are simultaneously processed in the prefrontal cortex.

Symposium: New findings from cognitive training research (Part I)

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* HS 304
Session Chair(s): Tilo Strobach
Session Chair(s):, Julia Karbach

Task switching practice does not alter conflict processing

Mike Wendt[1], Aquiles Luna-Rodriguez[2], Thomas Jacobsen[2]

[1]Medical School Hamburg, Germany; [2]Helmut Schmidt University/University of the Federal Armed Forces Hamburg

The authors investigated the development of (between-task) response conflict effects and of conflict adjustment during the course of task switching practice. To this end, participants were administered the same task switching procedure in four consecutive sessions. In one of the tasks the proportions of congruent and incongruent trials were manipulated, producing congruent/incongruent ratios of 75/25 and 25/75 during different parts of each session. Stimulus-specific practice and response expectation were controlled by confining this manipulation to a subset of the stimuli (i.e., induction stimuli) and assessing conflict adjustment effects in the other subset (i.e., test stimuli). Although overall reaction times for both tasks decreased to an apparently asymptotic level in the last two sessions, response conflict effects remained constant during the entire course of practice. Corroborating previous findings, a Proportion Congruency Effect (PCE) occurred, confined to the task associated with the manipulation of the congruent/incongruent ratio. The task-specific PCE did not change across sessions, suggesting that conflict processing dynamics are widely unaffected by practice.

Dual-memory retrieval parallelism after practice and the influence of strategic, cognitive, and personality factors

Franziska Orscheschek[1], Timothy Rickard[2], Torsten Schubert[3], Tilo Strobach[1]

[1]MSH Medical School Hamburg, Germany; [2]University of California, San Diego; [3]University of Halle-Wittenberg

The study investigated the role of practice-effects and the cognitive architecture of dual-memory retrieval from a single cue. Even though there has been an established body of research concerning practice in choice reaction-time tasks and associated dual-task costs, the knowledge about such effects in long-term memory tasks with dual retrieval has still been limited. To enhance the understanding about these concepts and to aid the development of adjunct cognitive models we tested predictions about the presence of learned parallelism of dual-memory retrieval within the framework of the set-cue bottleneck model. Since there is a further lack of knowledge regarding person-inherent differences with respect to dual memory retrieval, this research also focused on general cognitive as well as personality factors that might influence performance in dual-retrieval situations. The present study realized four experimental laboratory sessions including computerized assessments of dual-memory retrieval performance with a large number of practice trials as well as additional measures of cognitive functioning and personality domains. The results of this study will be discussed with respect to the set-cue bottleneck model as well as in the context of skill acquisition models.

Transfer effects of working memory training: Can we trust the evidence?

Claudia Christina von Bastian

Bournemouth University, United Kingdom

Can cognitive abilities such as reasoning be improved through cognitive training? After more than a decade of working memory training research, this question is still highly controversial, with prior studies providing contradictory findings. More recently, these inconsistencies have begun to emerge not only on the empirical, but also on the meta-analytical level, suggesting that the evidence gathered by the original studies may have been only weak in the first place. In this talk, I will present the findings from a study in which we assessed the trustworthiness of previous training studies by quantifying their evidential strength using Bayes factors. Based on these findings, I will discuss several factors that are likely to contribute to the current state of evidence, and will stress the need of more solidly designed studies based on theory-driven models of transfer that are tested in larger samples and compared to active controls.

Symposium: Recent advances in TVA-based visual attention research (Part I)

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* 201
Session Chair(s): Kathrin Finke
Session Chair(s): Jan Tünnermann
Session Chair(s): Ingrid Scharlau

Assessments of hemifield processing speed differences in TOJs with TVA

Jan Tünnermann, Ingrid Scharlau

Paderborn University, Germany

There is some controversy whether the superior performance sometimes observed in the left visual field (LVF) in temporal-order judgments originates from enhanced attention in the LVF. Alternatively, a decision-stage difference rather than one in attention-modulated processing speed could be at the core of such performance differences. Here, we point the lens of TVA at potential LVF advantages in order to resolve which discrete components of attentional processing are involved. Intriguingly, a processing speed advantage may depend on whether or not participants prepare eye movements, even when they cannot execute them during the stimulus presentation. The reduction of the effect when the preparation of eye movements is suppressed hints at the attentional nature of LVF benefits in temporal-order judgments.

The time course of salience and its contribution to attention

Alexander Krüger, Jan Tünnermann, Ingrid Scharlau

Paderborn University, Faculty for Arts and Humanities

A vast amount of evidence suggests that salient visual contrasts attract attention. Recently, some studies investigated the time course of these effects and reported an increase of the effect up to approximately 150 ms presentation duration and a later decay. There are several time-dependent influences on attention. To make different effects distinguishable, a quantitative perspective on the mechanisms involved in visual attention

is needed. This is provided by the theory of visual attention (TVA). Its mathematical description of attention includes a parameter dedicated to the effects of salience and provides many psychologically meaningful parameters, for example, the processing speed of the visual system. Using this model, we provide a new perspective on the time course of salience that reveals a change in processing speed as well as TVA's salience parameter. We show that overall processing speed is low before 150 ms. Only afterward, the usual speed of the system is reached. According to TVA, both influences in interaction cause the observable behaviour. Hence, if a salient stimulus is presented for a short duration, its low processing advantage is partly due to the fact that the processing capacity of the visual system is low at that point in time.

Response mapping modulates visual perceptual threshold: a TVA account for motor-perception interaction

Nir Shalev, Humphreys Glyn, Demeyere Nele

University of Oxford, United Kingdom

Contemporary cognitive theories often propose a close link between response selection and perception. However, the exact nature of any action-perception interaction remains unclear. In contrast to a traditional view based on general capacity limitations, shared coding theory postulates a single common system for coding perceptual and action-related information. In the current study, we attempted to test the shared-coding hypothesis by trying to enhance perception when manipulating response mapping. To this end, we created a novel paradigm based on the Spatial-Stroop effect combined with a Stimulus-Response Compatibility, where participants are requested to judge the direction of an arrow, while ignoring its location, using a spatially compatible set of responses. In a series of studies, we manipulated the involvement of response compatibility while maintaining the conflict at the stimulus level. Presentation durations were carefully manipulated in accordance with the Theory of Visual Attention (TVA) framework in order to learn at which aspects of visual processing the motor compatibility may influence performance. We demonstrate how manipulating the response mapping affects the visual perceptual threshold as defined within the TVA. The results provide further support for the shared-coding account of action and perception, as well as introducing a novel approach for implementing different levels of congruency effects within the TVA framework.

Processing speed in the resting brain

Adriana Lucía Ruiz Rizzo[1,2], Hermann J. Müller[1,2], Christian Sorg[2,3], Kathrin Finke[1,2,4]

[1]Ludwig-Maximilians-Universität München, Germany; [2]Graduate School of Systemic Neurosciences, Munich, Germany; [3]Department of Neuroradiology, Klinikum rechts der Isar, Technische Universität München, Munich, Germany; [4]Department of Neurology, Jena University Hospital, Germany

The intrinsic functional connectivity (iFC) of ongoing blood-oxygenation-level-dependent (BOLD) activity in diverse attention-related brain networks is assumed to have functional relevance for individual attention functions. We tested whether the individual variability in basic attention functions is reflected in the individual variability of iFC of ongoing BOLD activity in different brain networks assumed to be relevant for visual attention functions. The theory of visual attention (TVA) was used to quantify visual processing speed, visual short-term memory capacity, top-down control, and spatial lateralization based on performance in whole- and partial-report tasks, in 31 healthy young participants. From resting-state functional magnetic resonance imaging data, we analyzed the iFC of relevant

brain networks. Median-split analyses were run separately for each visual attention function, and iFC of high and low performers was compared. We found that (a) the iFC of a fronto-insular-opercular network differed in the right middle frontal gyrus between participants with high and low processing speed, and (b) the iFC of a frontal eye field-posterior parietal cortex network differed in the right precuneus, and the iFC of an occipital network differed in the right calcarine sulcus between participants with efficient and inefficient top-down control. Our results show that individual differences in visual attention functions are reflected in the iFC of different intrinsic brain networks. They thus suggest that individual iFC patterns in attention-relevant networks bear functional relevance for basic visual attention functions.

Symposium: Traffic psychology: Driver's state

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* 204
Session Chair(s): Anja Katharina Huemer

Fuzzy Pattern Classification for the Online Detection of Driver Lane Change Intention

Franziska Bocklisch, Steffen F. Bocklisch, Matthias Beggiato, Josef F. Krems

Technische Universität Chemnitz, Germany

We introduce a new fuzzy system using adaptive fuzzy pattern classification (AFPC) for data-based online evolvement. The fuzzy pattern concept represents an efficient tool for handling uncertainty in multi-dimensional data streams and combines powerful performance, flexibility and meaningful interpretability within one consistent framework. We outline AFPC for non-linear, multi-dimensional transition processes, namely, for the identification of lane change intention in car driving. While lane changes are rare, they are highly safety-relevant transition processes, showing high fuzziness and large individual and inter-individual variations (e.g., in lane change duration). The method employs a combined knowledge- and data-based approach, and the underlying fuzzy potential membership function concept models expert knowledge, closely mirroring human cognition. The design of AFPC comprises (1) an initial training phase (off-line and supervised), which generates a meaningful start-classifier, (2) an online application phase, and finally (3) an evolvement phase (online and unsupervised). Here we consider parametric and structural adaptations and discuss prospects and future challenges. Furthermore, we present specific modelling results for such online data from a real driving study. Next-generation advanced driver assistance systems, as well as autonomously driven vehicles need to evolve, in terms of parameters and structure, based on online real-time data. AFPC presents an efficient tool for application in this area and others (e.g., medicine).

Using GOMS and the Thinking Aloud Technique to infer driver states

David Käthner[1], Julia Bühring[2], Klas Arne Ihme[1]

[1]DLR, Germany; [2]OVGU Magdeburg

Modelling human drivers as discrete states is a frequently used approach to understand and analyse driver behaviour, but a great challenge lies in linking empirical data with proposed states (Toledo, 2003). We propose a modelling approach based on a fine granular analysis of the driving task, using the established GOMS methodology (e.g. John & Kieras, 1996). At its core, GOMS assumes goals whose fulfilment is the end point of any human action. GOMS employs the concept of operators to determine these goals, and

transfer current states into goal states. Nonetheless, goals of drivers while operating their vehicle in highly complex environments cannot be measured directly, but must be modelled. One possibility is to use task models with hierarchical abstractions of the driving task (Walker, Stanton & Salmon, 2015). However, unlike tasks in highly controlled environments, driving seems to be comprised of a multitude of parallel goals, with drivers enjoying a high degree of freedom in setting these goals in specific situations.

In a simulator experiment with 22 subjects, we therefore explored a second possibility: To ask drivers what their concrete goals were, employing the Thinking Aloud Technique (e.g. Nielsen, Clemmensen & Yssing, 2002). Driving in either a highly controlled traffic scenario or in highly complex traffic situation on a two lane highway, subjects were instructed to report their current goals, current and planned actions, as well as general thoughts throughout the drive. Both video and audio from these trials were recorded, and played back to the drivers after each drive, allowing to ask the subjects further specific questions about their goals and actions in specific situations. Categorising the goals from the recorded audio and video data then allowed us to use them to construct task models based on the DriveGOMS-methodology (Käthner, Andrée, Drewitz & Ihme, 2016).

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Can we get used to self-driving cars? The effect of autonomous driving on passengers' psychophysiological reactions

Katarzyna Patro, Christoph Strauch, Klaus Dietmayer, Anke Huckauf

Ulm University, Germany

Automated vehicles promise drivers to relax during driving, making it less prone to disturbances. However, people are still concerned about using automatic cars. This might be due to few experiences with such vehicles. Hence, we developed an experimental design to investigate whether and how fast people habituate to the autonomous driving mode in the real traffic situation, when they are passengers of automated vehicles. We measured psychophysiological reactions (eye movement, skin conductance, heart rate) of subjects sitting in the back of a car, which drove through the city either automatically or controlled by a human driver. The results will help us to characterize the process of psychophysiological adaptation to the autonomous driving mode, which will be crucial for deciding about subjective comfort of passengers in such vehicles.

Attention! Blue Light – How does sleepiness change over time depending on the number of operations emergency medical drivers have to deal with?

Maria J. Prohn, Britta Herbig

Ludwig-Maximilians-Universität München, Germany

Background: The risk for an accident during blue light driving compared to normal driving is significantly higher (8 times for seriously injured, 4 times for fatal accidents). Compared to normal driving emergency medical drivers (EMD) have to deal with multiple demands and stressors. Every 19 seconds to 3 minutes they have to handle a critical driving situation. However, the effects of different stressors on strain during emergency rescue shifts and their influence ability by a simulator based driver training still remain unclear. The 'Attention! Blue Light' project uses the four-level evaluation model by Kirkpatrick to analyze these questions.

Methods: We use a multi method, reduced Solomon Design to test training effects in a population of EMD. On the evaluation level of outcomes, on which we focus in the presentation, sleepiness during shifts is measured with the Karolinska Sleepiness Scale. Regressions and analyses of variance are used for data analyses.

Results: Data collection in the project is ongoing (up to now 130 EMD have been measured during up to 16 shifts in two German regions). Included in the analyses were all participants from the two study groups with pre tests who completed all measures (57 emergency rescue employees, mean age: 31.7 years [20; 65]; 78.9% male). Shift length was between 6 and 13 hours (mean: 9.3 hours). The number of operations ranged from 0 to 9 (mean. 4.4) during the shifts. Stepwise regressions showed significant effects of time of shift beginning on change of sleepiness over shifts (B t1=0.48; B t2=0.51; p=.00). No effect of shift length (B t1=-0.01; p=.95; B t2=-0.01, p=.96) and number of operations (B t1=0.17, p=.18; B t2=0.10, p=.39) was found. Analyses of variance with repeated measures showed no significant main effects or interactions. However, age as covariate had a small positive effect on the change of sleepiness (F=2.54, p=.12).

Conclusion: Strain of EMD in form of sleepiness changes over shifts depends mostly on the time of day the shifts occur. Surprisingly the length of shift had no effect on sleepiness change at all and number of operations had almost no effect as well. Moreover, a direct impact of the training could not be found. It is discussed if factors like immediate reactions to and learning effects of the training as proposed by Kirkpatrick or other potential stressors like the severity of operations might be more important.

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Talk Session: Multitasking I

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* HS 403
Session Chair(s): Dietrich Manzey

Identifying the locus of compatibility-based backward crosstalk: Evidence from an extended PRP paradigm

Moritz Durst, Sandra Renas, Markus Janczyk

University of Tübingen, Germany

In the psychological refractory period (PRP) paradigm, two tasks have to be processed in short temporal succession. One typical finding in this paradigm is the backward crosstalk effect (BCE), which means that characteristics of Task 2 of both subsequently performed

tasks influence Task 1 performance. This observation indicates that certain features of the second response are activated to some degree before the first response is completed. Therefore, the BCE challenges bottleneck models which assume that Task 2 response selection does not begin until Task 1 response selection is finished. Instead, an extended model with a capacity-unlimited response activation stage prior to the bottleneck as the locus of the BCE was suggested by several authors. To determine the exact locus of the BCE within the stages of the bottleneck model, five experiments were carried out. Experiments 1-4 were PRP-like experiments, which applied three subsequent tasks and used the locus of slack and the effect propagation logic. A pre-bottleneck locus of the BCE was ruled out in Experiment 1-3, as the BCE was not absorbed into the cognitive slack. Additionally, a post-bottleneck locus of the BCE was ruled out in Experiment 4, as indicated by a full propagation of the BCE from Task 1 to Tasks 2 and 3. To further support this latter conclusion, Experiment 5 applied a go-signal manipulation. Taken together the results of all five experiments strongly suggest that the BCE has its source in the capacity-limited stage, which contradicts the widely accepted notion that a capacity-unlimited stage of response activation preceding response selection proper is the locus of the BCE.

Hierarchical task organization in dual tasks

Patricia Hirsch, Sophie Nolden, Andrea M. Philipp, Iring Koch

RWTH Aachen University, Germany

In the present study, we investigated whether Task 1 (T1) and Task 2 (T2) in dual-task situations are represented as a single hierarchical higher-level task, comprising the task sets of T1 and T2. In Experiment 1, we combined the psychological refractory period (PRP) paradigm with the task-pair switching logic (Hirsch, Nolden, & Koch, in press) that requires subjects to switch between task-pairs including a varying T1 and a constant T2. We found worse performance with short stimulus onset asynchrony (SOA) than with long SOA (i.e., PRP effect) and task-pair switch costs, indicating impaired performance in task-pair switches compared to task-pair repetitions. In Experiment 2, we employed a modified task-pair switching logic with a constant T1 and a varying T2. In addition to a PRP effect, we replicated task-pair switch costs under conditions that not only exclude repetition-priming effects of T1 across task-pairs as the source of task-pair switch costs but also disentangle the effects of switching task-pairs from those of switching T1. Taken together, the findings of the present study provide clear evidence that hierarchical higher-level task representations are activated during dual-task processing.

Neural Evidence for Serial Preparation of Subtasks in Dual-Tasking

Robert Steinhauser, Marco Steinhauser

Catholic University of Eichstätt-Ingolstadt, Germany

The Psychological Refractory Period (PRP) paradigm has been utilized for a long time as a means to investigate cognitive processes involved in multitasking. Limitations to processing several tasks at the same time are commonly ascribed to the task execution phase, e.g., due to structural bottlenecks. Less attention has been paid to processes that precede the onset of the tasks, although dual-tasking costs can be explained through strategic scheduling of the subtasks at least partly. Using performance errors as markers of unsuccessful preparation, we investigated neural correlates of task preparation in a cued PRP paradigm. Our results show on the neural level that indeed both subtasks are actively prepared in advance and that the sequential position of the subtasks within the PRP trial is considered during the preparation stage. This provides support for the idea of

strategic advance planning of the task order. In addition, we found neural evidence for the account that the dual-task trial as a whole is represented as a distinct entity, different from the individual subtasks.

Action effect features, but not anatomical features, determine the Backward Crosstalk Effect: Evidence from crossed-hands experiments.

Sandra Renas, Moritz Durst, Markus Janczyk

Eberhard Karls University of Tübingen, Germany

The Backward Crosstalk Effect (BCE) indicates that features of Task 2 in a dual-task paradigm influence even Task 1 performance. However, it can be assumed that responses are represented with multiple features in the cognitive system. In this regard, Ideomotor Theory suggests action effects as one central response feature in human action control. An earlier study by Janczyk, Pfister, Hommel, and Kunde (2014, Cognition) already demonstrated that action effects are one crucial determinant of the BCE. The present study aimed at further investigating which aspect of a response is critical for the BCE. Therefore a crossed-hand manipulation was implemented in two experiments (n = 24) to examine if the BCE is based on the spatial position of the actual response and thus its action effect or on its anatomical connection to the body. Analyses revealed that even when participants press a left response key with the right hand and vice versa, the usual BCE occurs. These results indicate that the BCE depends on spatial features of the action effect rather than on anatomical features and therefore give additional support to the assumption that action effects have an important influence on the BCE and on action control in general.

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Talk Session: Memory III

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* HS 405
Session Chair(s): Artem Belopolsky

Remembering the Unrememberable – the Existence of Detailed Long-Term Memory Representations for Shortly Presented, Unattended, and Incidentally Encoded Visual Objects

Christof Kuhbandner[1], Elizabeth Alejandra Rosas[2], Philipp Spachtholz[1]

[1]University of Regensburg, Germany; [2]University of Munich, Germany

Recent research has shown that humans are able to successfully remember details about thousands of visual objects after only a single viewing (Brady, Konkle, Alvarez, & Oliva, 2008). The aim of the present study was to probe the limits of this ability. Participants were shown a rapid stream of overlapping object pictures and words, and they were instructed to attend to the words and ignore the pictures, and to press a button every time a word was repeated. After stimulus presentation, a surprise memory test for the object pictures followed where one previously seen object and one new foil object were shown (two-alternative-forced-choice task). Half of the objects were tested immediately after

presentation, the other half 24 hours later. The results revealed that participants' object memory performance was substantially above chance, even when the objects in the two-alternative-forced-choice task differed only in subtle visual details, even when tested 24 hours later, and even although participants reported that they do not have any object memories. These findings suggest that we store much more about events as previously believed.

Revisiting the Selective Rehearsal Account of Intentional Forgetting using Pupillometry

Sebastian Scholz, Stephan Dutke

Westfälische-Wilhelms Universität Münster, Germany

In order to use our memory system as beneficial as possible we need to be able to remember important information better than unimportant information and to intentionally forget the latter. Our ability to intentionally forget presented information is explained mainly by two theoretical accounts: Selective rehearsal and inhibitory control. They differ in the regard of how active the process of forgetting is. Inhibitory control accounts state that forgetting is an active process requiring presented information to be inhibited. In contrast, selective rehearsal accounts emphasize working memory processes that act on the to-be-remembered items to aid later retrieval. To-be-forgotten items can simply be dropped from working memory and are no longer processed. Thus, selective rehearsal should require less cognitive load than active suppression as postulated by inhibitory control accounts. Since pupil size is a reliable measure of cognitive load, the present study investigated whether pupil size is able to differentiate intentional encoding and forgetting. Participants performed an item-method directed forgetting paradigm with the three conditions remember, forget, and no instruction while pupil sizes were measured. The classical directed forgetting effect was replicated and the results indicate that pupils dilated most following the instruction to encode a previously seen stimulus, intermediately in the no instruction condition and least in the intentional forgetting condition. This is best explained by the allocation of a different amounts of cognitive resources invoked by the different instructions. By that, the present results are in line with the selective rehearsal account of intentional forgetting but relations to other theories will be discussed. Additional data (e.g., verbal and signal detection indicators) will be reported. Summarized, the (to our knowledge) first attempt to to employ pupillometry to explore intentional forgetting was promising.

Hierarchical Multinomial Modeling of Item-Method Directed Forgetting and Working Memory Capacity

Ivan Marevic[1], Jan Rummel[1], Nina R. Arnold[2]

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Intentional forgetting of information that has recently been encoded is regarded an active and adaptive process and is widely studied using the item-method or the list-method directed forgetting (DF) paradigm. In the present research, we tested whether inter-individual differences in working-memory capacity (WMC), that have been identified as a relevant predictor of DF within the list-method, are also related to stronger DF effects within the item-method. Furthermore, we investigated relationships between WMC and item-method DF at different processing stages by applying the multinomial storage–retrieval model (Riefer & Rouder, 1992) hierarchically to our data. Results showed that individuals

with high WMC are better able to store to-be-remembered information than individuals with low WMC; whereas WMC was not related to retrieval of to-be-remembered information or to either storage or retrieval of to-be-forgotten information. Potential implications for theoretical accounts of item-method DF and hierarchical multinomial modeling approaches are discussed.

Talk Session: Judgment and decision-making: Emotional and motivational modulations

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* HS 301
Session Chair(s): Yury Shevchenko

The Influence of Reward Magnitude on Categorization Decisions

René Schlegelmilch, Bettina von Helversen

University of Zürich, Switzerland

The anticipation of reward is one of the strongest factors influencing processing of information during decision making. In this vein, past research has shown that stimuli associated with large rewards draw more attention and are better remembered than stimuli associated with low rewards. However, it seems unclear how such differences might affect processes during multi-attribute categorization decisions. In the current work we investigate the influence of reward magnitude on the processing of specific items (high rewarding vs. low rewarding training stimuli) during a categorization training phase. Specifically, we examine whether differences in the processing of these training items systematically influence the categorization decisions of novel items in a following transfer phase, which might be driven by changes in the allocation of attention or memory retrieval. We discuss our results in the light of rule-based and similarity-based theories of decision making.

The effect of mood on strategy usage in open and closed Mouselab paradigms

Yury Shevchenko, Arndt Bröder

University of Mannheim, Germany

How does a positive or a negative mood influence the application of compensatory or non-compensatory strategies in a multi-attribute decision task? Previous research found that the influence of mood on the decision-making process can be summarized in mechanisms of attention and motivation (Scheibehenne, & von Helversen, 2015). While the attention theory states that a negative mood leads to the focusing of attention and application of non-compensatory strategies, the motivation theory makes the opposite prediction that a negative mood implies more careful information processing and application of compensatory strategies. We examined those predictions in open and closed Mouselab paradigms (Payne, Bettman, & Johnson, 1993), which allowed to investigate information search as a potential mediator. In the open Mouselab, participants see all available cues at once, which promotes quick and simultaneous integration of information without deliberative calculation of weighted sums. The closed Mouselab, on the contrary, allows only one piece of information be inspected at a time, which induces a serial mode of information search. In web-based Experiment 1 (N=369), we did not find any differences between positive and negative mood in the usage of decision-making strategies; $F(2, 363) = 0.21$, $p = 0.81$. However, in the open Mouselab group (N = 178), the level of negative

emotions at the end of the task was positively correlated with the number of compensatory choices; $r = 0.21$, $p < 0.01$. The correlation found in Experiment 1 was later supported by the findings of Experiment 2 (N=92), which was conducted in the laboratory. In the open Mouselab group (N = 46), participants in the negative mood made more compensatory choices (M = 15.97) than participants in the positive mood (M = 11.30); $t(43.98) = 2.06$, $p < 0.05$. We conclude that the strategy usage in different moods might be mediated by information search.

Value-based Attentional Capture Impairs Trinary Choice

Mikhail Sergeevic Spektor, Sebastian Gluth, Jörg Rieskamp

University of Basel, Switzerland

Normative decision theory typically assumes that the choice proportion of two options is independent of a third option. Recently, two separate studies (Louie et al., 2013, PNAS; Chau et al., 2014, Nat Neurosci) challenged this claim with contradictory results: While Louie and colleagues reported that higher-valued third options impaired choice accuracy, Chau and his colleagues found the opposite effect.

In an attempt to resolve the conflict, we conducted two behavioral and one eye-tracking experiment with a total of 104 participants using Chau and colleagues' paradigm. However, we failed to replicate the choice-improving effect reported in the original study. Instead, better third options reduced decision accuracy in all experiments. At first sight it seems to corroborate Louie and colleagues' account, but this explanation is also incompatible with systematic patterns found in the behavioral and eye-movement data.

In particular, we find that 1) better third options are chosen more often (even if declared as non-available), but the choice ratio between the other options is unaffected, 2) when people are given sufficient time to make their choices, the decision accuracy is unaffected by the third option, and 3) people look more often at better third options, and the more they do so the more their decisions are impaired by these options.

In summary, our results are best explained by a value-based attentional capture account (cf. Anderson et al., 2011, PNAS): Options with higher values receive more attention, thereby “stealing” the time needed to attend to the other options and choose accurately. In order to model the complex interplay of attention and value in trinary choice, we develop a dynamic sequential sampling decision-making model that takes the value-based modulation of attention into account.

Erschöpft, aber gut gelaunt: Das Zusammenspiel zwischen kognitiver Kontrolle und Stimmung bei der Nutzung heuristischer Urteilsstrategien.

Tanja Cremer, Ekkehard Stephan

FOM Hochschule für Oekonomie & Management, Köln, Germany; Der Einfluss von Stimmungen auf die soziale Informationsverarbeitung ist gut dokumentiert (zusammenfassend Bless & Igou, 2006), insbesondere die erhöhte Nutzung heuristischer Urteilsstrategien in guter Stimmung und eine eher aufwändige, analytische Informationsverarbeitung bei schlechter oder neutraler Stimmung. Ebenfalls gut belegt ist der Einfluss der kognitiven Kontrolle auf die Informationsverarbeitung. Die Forschung zu den sog. Zwei-Prozess-Modellen zeigt, dass unter eingeschränkter kognitiver Kontrolle die analytisch-reflektive Verarbeitung zurückgeht und heuristisch-intuitive Urteile zunehmen (Kahneman & Frederick, 2002; Krieglmeyer, Stork & Strack, 2006).

Weniger bekannt ist über die Auswirkungen des Zusammenspiels beider Effekte. Wir untersuchen die gemeinsamen Einflüsse von kognitiver Kontrolle (hoch vs. niedrig; induziert über eine Ego Depletion-Aufgabe) und Stimmung (positiv vs. negativ; induziert über eine Facial Feedback-Prozedur) auf die Nutzung heuristischer und analytischer Strategien bei der Bearbeitung diverser Wissens- und Problemlöse-Aufgaben (u. a. Items des Cognitive Reflection Tests von Frederick, 2005). Die Ergebnisse unterstützen die bisherigen Modellvorstellungen nur teilweise. Zwar fällt der Haupteffekt "Stimmung" signifikant aus und weist in die erwartete Richtung (geringere Nutzung heuristischer Urteilsstrategien bei negativer Stimmungsinduktion), der Haupteffekt "kognitive Kontrolle" ist jedoch nicht signifikant. Stattdessen zeigt sich ein signifikanter Interaktionseffekt zwischen Stimmung und Ego Depletion: Verminderte kognitive Kontrolle führt nur bei positiver, aber nicht bei negativer Stimmungsinduktion zu einem deutlichen Anstieg heuristisch-intuitiver Urteile.

Ergänzend zu den beiden situationalen Faktoren "kognitive Kontrolle" und "Stimmung" werden Richtung und Stärke von dispositionalen Einflüssen auf die Urteilsprozesse untersucht. Von besonderem Interesse sind hier die Persönlichkeitsdimensionen des Big Five-Modells sowie das Merkmal "dispositionale Selbstkontrolle" (Tangney, Baumeister & Boone, 2004). Insgesamt erweist sich der Einfluss der dispositionalen Faktoren auf die Nutzung der untersuchten Urteilsstrategien als deutlich schwächer als der Einfluss der situationalen Faktoren.

Abschließend werden die Implikationen dieser Befunde für Management-, Konsumenten- und Anlageentscheidungen diskutiert.

Talk Session: Cognitive development

Time: Tuesday, 28/Mar/2017: 3:00pm - 4:20pm · *Location:* E03
Session Chair(s): Sebastian Paul Suggate

Reward your number sense! How incentive motivation improves the approximate number system during development

Annika Christine Dix, Shu-Chen Li

TU Dresden, Germany

Factors that affect a person’s mathematic abilities are of great interest in modern technology-driven lives. It has been shown that the precision of the approximate number system (ANS) is predictive for children’s later math achievements. The ANS encompasses processes for perceiving, approximating, representing and distinguishing magnitudes. Its precision differs between individuals and is subject to developmental changes. Moreover, training that improves processes of the ANS has been shown to also improve other mathematic abilities. In the present study, we aimed at (1) enhancing the precision of the ANS using incentive motivation, (2) determining the elementary processes underlying the effects of motivation and (3) identifying developmental differences in such modulations. Participants from different age groups (children, adolescents, and young adults) performed a dot comparison task and a non-symbolic addition task. In both tasks, participants were presented with two clouds of dots differing in numerosity. They had either to decide which numerosity was larger or approximate the sum of both numerosities. Performance on the tasks served as indicator of ANS precision and the ability to operate on numbers, respectively. The opportunity to collect points in some trials to win vouchers at the end of the experiment served as the manipulation of incentive motivation. First results indicate that the precision of the ANS was predictive of non-symbolic arithmetic ability in all age groups; this is in line with Francis Galton’s (1883) sensory discrimination hypothesis of

intelligence. Further, parameters of an EZ-diffusion model characterizing the decision process in the dot comparison task suggests that raising incentive motivation increases the precision of the ANS except for children; thus, incentive motivation seems to be a mechanism for modulating the discriminative precision of the number sense. Applicabilities of incentive schemes for education will also be discussed.

Decline and stability in oculomotor control across the adult lifespan

Jutta Billino

Justus-Liebig-Universität Gießen, Germany

Current theories of age-related functional changes assume a general reduction in processing resources and global decline across lifespan. However, in particular recent studies on ageing of visual perception have highlighted that a detailed differentiation between general decline and specific vulnerabilities is indicated. Healthy ageing in the absence of pathological processes might be characterized by individual resources, compensation, and neuroplasticity rather than by a common ageing factor. Eye movements provide the opportunity to study closely interwoven perceptual, motor, and cognitive processes. Thus, we suggest that they allow unique insights into decline and stability of specific processes across lifespan. We studied a battery of different eye movement tasks in a well-described, healthy sample of 61 subjects ranging in age from 21 to 75 years. The battery included saccade as well as smooth pursuit paradigms which involved varying sensorimotor and cognitive demands, e.g. inhibition, attention, learning, memory, anticipation. We analyzed age-related changes in established standard parameters of the different tasks. Our results corroborate an overall deterioration of processing speed with age, but at the same time reveal surprisingly preserved capacities to integrate bottom-up and top-down processes for efficient oculomotor control. Indeed, the majority of eye movement parameters show stability across the adult life span. These robust resources point out the often ignored complexity of age-related functional changes and emphasize that compensational mechanisms during healthy ageing might have been underestimated so far.

Delineating stress-related disparities in neuroendocrine and neurocognitive child development

Laurel Amber Raffington[1,2], Attila Keresztes[1], Julia Binder[1], Christine Heim[3,4], Yee Lee Shing[1,5]

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Throughout development, children experience varying levels of stress in their family, in school, and from life events. Under conditions of chronic stress, sustained increases in glucocorticoid secretion, most prominently cortisol, can exert damaging effects on the hippocampus and prefrontal cortex (PFC), regions that are important for learning, memory, and executive functions. In the Jacobs study, we aim to elucidate the mechanisms that translate stress-related effects into deficits in cognitive development of children. Data was collected from 142 healthy six-to-seven-year-old children (46% female) from socio-demographically diverse backgrounds. In three sessions, children participated in a

cognitive battery, structural and functional neuroimaging, as well as salivary and hair cortisol sampling. The Trier Social Stress Test for Children (TSST-C) was administered to a subsample of 102 children. The parents completed stress-related questionnaires about themselves and family environment and participated in a videotaped parent-child interaction task. In this talk, we will provide an overview of the Jacobs study and highlight first cross-sectional results, with a focus on the effects of both acute and chronic stress on different memory processes. Preliminary analyses suggest that:

(i) acute stress (induced by TSST-C) increased children's autonomic nervous system activity as indexed by heart rate variability. Furthermore, acute stress enhances memory for emotional content and reduces memory for neutral content;

(ii) parents' perceived stress enhanced reward anticipation-related memory benefit in their children;

(iii) In a probabilistic learning task, children showed enhanced episodic memory for objects paired with delayed feedback compared to immediate feedback, supporting the notion that there is a shift from habitual striatal to declarative hippocampal learning when feedback is delayed.

Further analyses will explore mediating effects of glucocorticoids (stress reactivity and diurnal salivary cortisol and hair cortisol) and brain (hippocampus and PFC volumetric measures) on associations of acute and chronic stress with memory processes.

Symposium: Inhibition as a cognitive construct: helpful and valid? (Part II)

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* HS 401
Session Chair(s): Alodie Rey-Mermet, Miriam Gade

Modeling costs and benefits of negative affect

Ion Juvina, Othalia Larue

Wright State University, United States of America

Affect and emotion influence memory in several ways. In particular, negative valence seems to produce both decreases (i.e., costs) and increases (i.e., benefits) in memory performance in different conditions. We propose a novel approach to modeling the costs and benefits of negative affect in a cognitive architecture. The costs are modeled as learned tendency to avoid negative feelings. Encoding and retrieving negative memories produce changes in core affect that are experienced as negative feelings acting as reward signals feeding into a reinforcement learning process that updates sub-symbolic affective values (i.e., valuations) for memories. In turn, negative valuations cause costs in retrieval performance. The benefits of negative affect are modeled as selective post-processing of arousing memories that may occur during dreaming or mind wandering episodes. Since negative memories tend to be more arousing, they will tend to be post-processed more frequently than positive memories, which leads to higher activation and thus better retrieval performance for negative memories. We will argue that computational cognitive modeling can be a valuable tool for interpreting behavioral and neuroimaging data and thus understanding the multiple facets of the cognitive inhibition construct.

Behavioral components of impulsivity

Christoph Stahl

University of Cologne, Germany

Acting in accord with long-term goals requires control of interfering impulses, the success of which depends on several different processes. Using a structural-equation modeling approach, we investigated five behavioral components of impulsivity: the control of stimulus interference, proactive interference, and response interference, as well as decisional and motivational impulsivity. Results support the existence of correlated but separable components of impulsive behavior. The present study demonstrates the separability of stimulus and response interference. It also supports the notion that control of response-related interference is not a unitary construct: Response-selection demands were separable from those of withholding or stopping. Relations between behavioral impulsivity components and self-report measures of impulsivity were largely absent. We conclude that as the construct of impulsivity has been extended to describe an increasingly diverse set of phenomena and processes, it has become too broad to be helpful in guiding future research.

Inhibition, working memory capacity and fluid intelligence: Investigating the Bermuda Triangle

Alodie Rey-Mermet[1,2], Miriam Gade[1,2], Alessandra Souza[1], Claudia von Bastian[1,3], Klaus Oberauer[1]

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In the last two decades, research on individual differences put forward three cognitive psychometric constructs: inhibition (i.e., the ability to ignore and suppress irrelevant ongoing thoughts and actions), working memory capacity (WMC, i.e., the ability to retain access to a limited amount of information in the service of complex tasks) and fluid intelligence (gF, i.e., the ability to reason with novel information). These constructs have been said to be closely related. However, previous studies have found it difficult to substantiate a strong correlation between inhibition and the other two constructs. This might arise from differences in measurement: Inhibition is typically measured through reaction times, whereas WMC and gF are measured through accuracy. The present study investigates the relationships between the three constructs when inhibition is also measured on the accuracy scale. The results showed good reliability estimates for the measures of all three constructs. Yet, whereas WMC and gF correlated strongly with each other, they correlated only weakly with the inhibition measures. Structural equation modeling identified no model including an inhibition factor. The data could be accommodated by a model with WMC and gF factors, but these latent constructs were not related to the individual measures of inhibition. Measuring inhibition through accuracy does not overcome the difficulties with establishing an inhibition construct as a latent variable. These findings call into question the assumption that WMC and gF are closely related to an ability to inhibit irrelevant thoughts and actions.

Beyond Freud: Dropping the overhead of the inhibition concept

Bernhard Hommel

Leiden University, Netherlands

To stimulate a plenary discussion of the inhibition concept, I will challenge the available theories of cognitive inhibition. These theories converge on the assumption that rational behavior requires the inhibition of automatic, irrational tendencies, which renders them Freudian in nature. I will argue that Freudian figures of thoughts generate unnecessary theoretical overhead that can and should be dropped. As I explain, inhibition is a trivial side-effect of biological information processing that needs no further explanation and no particular instances that perform the inhibition.

Talk Session: Language: Embodiment and grounding

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* 101
Session Chair(s): Anna Katharina Kuhlen

Grounding cognition without direct experience: Do words inherit sensorimotor activation from linguistic input?

Fritz Günther, Carolin Dudschig, Barbara Kaup

University of Tübingen, Germany

The question of how concepts are represented in the human mind still gives room to much debate. Proponents of Embodied Cognition argue that concepts are represented in a modal way, very similar to perception and action. In a series of experiments, Lachmair et al. (2011) showed that participants perform faster upwards movements when presented with words whose referents are typically located in an upper vertical position as compared to downwards movements, and vice versa for words whose referents are located in a lower vertical position. Recently, Öttl et al. (2016) demonstrated that this effect could also be found with novel words, if participants made the direct experience that these words' referents were located in their upper or lower visual field. This shows that direct experience is sufficient to produce such an effect, but not that it is actually necessary. In fact, even in the original item material by Lachmair et al. (2011), one finds many items most participants probably do not have direct experience with, such as submarine or UFO. This leads us to the hypothesis that it might be possible for novel words to inherit location-response congruency effects from the linguistic context in which they are presented, since this is the major source of information about word meanings other than direct perceptual experience. We set up a series of experiments that included various linguistic word learning paradigms for novel words, in which words were either paired with real words referring to objects typically located in the upper or lower vertical space, or replaced them in natural text. We find a dissociation between explicit judgements and behavioural effects: While participants explicitly judge the novel words as referring to entities located in the upper vs. lower space, we do not find location-response congruency effects. This raises the question of how these vertical locations are being represented.

How body orientation affects the retrieval of words related to space, time and valence

Martin Lachmair[1], Susana Ruiz Fernández[1], Peter Gerjets[1], Nils-Alexander Bury[3], Martin H. Fischer[2], Otmar L. Bock[3]

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Background: The aim of the present study was to test the functional relevance of the spatial concepts UP or DOWN for words that use these concepts either literally (space) or metaphorically (time, valence). A functional relevance would imply a symmetrical relationship between the spatial concepts and words related to these concepts, showing that processing words activate the related spatial concepts on one hand, but also that an activation of the concepts will ease the retrieval of a related word on the other.

Methods: The authors manipulated the rotation angle of participant’s body position within a gym-wheel either to an upright or a head-down tilted body position to activate the related spatial concept UP or DOWN, respectively. Afterwards participants produced in a within-subject design previously memorized words of the concepts space, time and valence

according to the pace of a metronome (0.25 Hz). All words were related either to the spatial concept UP or DOWN.

Results: The results including Bayesian analyses show (1) a significant interaction between body position and words using the concepts UP and DOWN literally, (2) a marginal significant interaction between body position and temporal words and (3) no effect between body position and valence words. However, post-hoc analyses suggest no difference between experiments.

Conclusion: The authors concluded that integrating sensorimotor experiences is indeed of functional relevance for all three concepts of space, time and valence. However, the strength of this functional relevance depends on how close words are linked to mental concepts representing vertical space.

Anagram Solving Tasks as a Measure of Concept Activation in Different Linguistic and Non-linguistic Contexts

Eduard Berndt, Carolin Dudschig, Barbara Kaup

Universität Tübingen, Germany

According to the experiential-simulations view of cognition, words automatically activate experiential traces that stem from the reader's interactions with their referents. In our studies, we focused on the corresponding influence in the opposite direction. By means of an anagram-solving task, we investigated whether activating spatial experiential traces would activate corresponding concepts, which in turn would facilitate access to words associated with them. In a set of studies participants solved anagrams of nouns associated with the ocean or the sky (e.g. dolphin = "dplhion" or cloud = "cdulo", respectively). In addition to the anagrams, participants were provided with further non-linguistic cues, such as positional information (presenting the anagram at the top or at the bottom of the screen), and/or pictorial information (presenting a background picture that did or did not match the ocean/sky theme). Anagrams were solved significantly faster when the position of the anagram was congruent with the typical location of the noun's referent in the real world (e.g., "dplhion" on the bottom of the screen; "cdulo" on the top of the screen), but only when presented on the background of an ocean-sky picture. Thus, activating experiential traces indeed seems to activate related concepts, but positional information alone is not enough to find facilitation in an anagram solving task. Rather what is needed is a whole set of traces that sufficiently narrow down the number of related concepts. In additional studies with anagram-solving tasks, preliminary data suggests that linguistic contexts can also function as additional cues. More specifically, linguistic contexts (e.g., adjectives or whole sentences) together with positional information lead to similar congruency effects as the background pictures in the earlier experiments. Implications for the experiential-simulations view of language processing will be discussed.

Understanding the link between motor and vocabulary development: Body-Object-Interaction or Body-Part-Association?

Rebecca Elena Zack, Sebastian Suggate, Heidrun Stöger

Universität Regensburg, Germany

Recent studies have found links between fine motor skills (FMS) and cognitive development, such as general school readiness, attention, mathematical skills, reading performance, early reading development and phonological awareness. When examining the link between FMS and vocabulary development, however, results are mixed but point

toward a role for the body in lexical processing. The current study examines two explanations for links between FMS and vocabulary, revolving around the Body-Object-Interaction (BOI) effect (Siakaluk et al., 2008) and the Body-Part-Association (BPA) effect (Maouene et al., 2008). Previous research has found that participants show a processing advantage when reacting to high-BOI words, an advantage that is also predicted by children's FMS (Suggate & Stoeger, 2014, 2016). A further mechanism, however, is encapsulated by the BPA effect, whereby bodily experiences related to specific body parts (e.g., hand, mouth) are linked to lexical items and can even activate areas in the brain involved in moving this body-part. Accordingly FMS and processing for BOI and BPA words should relate.

The following study attempts to tease apart the link between FMS and vocabulary in terms of the BOI and BPA effects. Accordingly, measures of FMS, gross-motor skills, and vocabulary in 50 preschoolers, 50 primary school children and 50 students were conducted. Participants were administered the Movement ABC, a receptive vocabulary test, measure of intelligence, and a lexical-recognition task, assessing response latencies for high vs. low BOI nouns, as a function of body-part association. Preliminary results show a robust BOI-effect in the student population. Additional analyses will examine the role of motor skill and lexical processing in relation to the BOI and BPA effect.

Talk Session: Human performance, human factors, cognitive ergonomics

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* 103
Session Chair(s): Christine Sutter

Spatial Compatibility and the Processing of Multiple Scientific Graphs

Eva Katharina Riechelmann, Lynn Huestegge

Universität Würzburg, Germany

Multiple panels refer to the combined presentation of several graphs, forming a textual unit. They depict (closely) related, yet different sets of data. We analyzed compatibility effects in graph comprehension, thereby investigating two competing multi-panel design principles by manipulating the spatial compatibility between the data and the legend regions. These two multi-panel compatibility manipulations aimed at either global (legend-legend) compatibility between the graphs (i.e., between-graph compatibility), or local (legend-data) compatibility within the graphs (i.e., within-graph compatibility). Additionally, a baseline condition (no compatibility) was included. In Experiment 1 and 2, participants had to choose one of several graphs from a multiple panel as an answer to a data-related question. Compatibility type and the number of graphs forming a multiple panel were varied in both experiments. Experiment 1 and 2 only differed in the number of legend entries of each graph. We recorded reaction times and error rates as performance measures. The results indicated that compatibility generally facilitates graph comprehension in terms of faster reaction times, at least when a certain threshold of visual complexity is exceeded. More in-depth, initial compatibility effect analyses revealed an advantage of local over global data-legend compatibility. Taken together, the results clearly suggest that compatibility principles should be considered in multiple panel design.

Support for visual search on touch displays by colour coding of semantic categories

Charlotte Spang[1], Anna Katharina Trapp[1], Carolin Wienrich[2]

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In the present study we aim to further understand how users search for apps on mobile touch devices to improve design strategies of mobile touch interfaces. Trapp and Wienrich (in prep) showed that classical results from basic research on visual search can be applied to app icons regarding effects of set size, target presence and stimulus similarity. Moreover, Wienrich, von Kalckreuth and Trapp (in prep) showed that semantic categorisation of app icons represented by colour lead to a decrease in reaction time, but only if participants used the categorization consciously. However, contrary to app icons in real-life, all the studies above changed the spatial arrangement of the icons from trial to trial to avoid spatial learning. The aim of the present study was to find out if semantic categorisation of target icons represented by colour still decreases reaction time in visual search when spacious arrangement of targets and distractors are fixed. In addition, we wanted to investigate how reaction time is influenced by target icons' frequency. Participants (N=24) were divided into two groups (colour-semantic vs. semantic category) and searched app icons on four joint screens containing 15 icons each. Each of the 8 blocks consisting of 24 trials contained 12 frequent and 12 non-frequent targets. Frequent targets were the same in every block. After each block participants were asked about their search strategy. Thus, the experimental factors were the categorisation groups (2 levels), the frequency of the target (2 levels) and the block (1 to 8) while the dependent variable was reaction time. Data was analysed using a linear mixed model. A significant effect of target frequency was found, but there was no effect of categorisation. The missing main effect of categorisation can be explained by interpreting the participants' answers about their search strategy. The colour-semantic participants only used the colour-categorisation in the early blocks. In later blocks participants had learned the positions of the icons and used the same search strategy as the control group, looking for the positions. We conclude that colour based semantic categorisation does not support the visual search task if spatial learning takes place.

Effects of pixel density and display luminance contrast on reading performance

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Display technology has enormously improved in recent years. For example, modern displays feature high degrees of luminance, luminance contrast, and pixel density. The presented experiments tested whether these increases in display quality lead to an improved reading experience.

In two experiments – in a reading comprehension task (Experiment 1) and in a proofreading task (Experiment 2) – reading from a high pixel density display (264 ppi) was compared with reading from a moderate pixel density display (132 ppi). While reading performance was not affected by pixel density, reading from a 264 ppi screen was rated to cause less physical strain than reading from the 132 ppi screen.

Experiment 3 and 4 tested whether increases in text-background luminance contrast lead to improvements in reading performance while the overall luminance level was kept constant. The experiments consistently showed that increases beyond the contrast ratio

of 1:3 do not lead to increases in reading performance. However, the subjective ratings of visual quality increased with increases up to a contrast ratio of 1:32.

In sum, the experiments suggest that (large) performance improvements cannot be expected for displays with high pixel densities or high text-background luminance contrasts. However, displays with state-of-the-art luminance contrasts and pixel densities are rated as being of increased quality, and reading from these displays seems to be experienced as subjectively less exhausting than reading from standard displays.

The effects of virtual reality avatar embodiment on real life walking speed: The temporal stability of the Proteus Effect

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If the users of immersive virtual reality (IVR) applications employ a digital self-representation, i.e., an avatar, they may be subject to the Proteus Effect (Yee, & Bailenson, 2007). This effect describes changes in IVR user's attitudes and behaviors in accordance with identity cues derived from the employed avatar's appearance. The effect may persist for a short time period after the user leaves IVR, through the effect's temporal stability post embodiment has not yet been definitely established (Yee, Bailenson & Ducheneaut, 2009).

The present study tested the temporal stability of a Proteus effect of avatar age on post embodiment walking speed within a short time after leaving IVR. A total of 67 young adults performed tasks either while they were (1) embodying a young avatar, (2) embodying an older avatar or (3) outside of IVR (control group). Both before and after these tasks the participants walked along a set length of corridor, where, unbeknownst to them, the time they needed to traverse this set distance was measured.

During the first half of the post embodiment walking phase, participants who had previously embodied an older avatar took significantly longer to walk the same distance than either the young avatar or control groups, whereas the young avatar and control groups did not differ significantly in their walking times. In the second half of the walking phase, none of the groups differed in their walking times.

The results of this study indicate that the behavioral changes stemming from embodying an avatar in IVR may be subject to fast decay rates, thus limiting the direct impact of the choice of IVR avatar on user behavior to the first minutes after embodiment.

Mind your step: The effects of phone use on visual attention while walking the stairs

Flora Ioannidou, Frouke Hermens, Timothy Hodgson

University of Lincoln, United Kingdom

Walking up and down stairs is a complicated task and a major cause of falls. With the introduction of smart phones, there has been a clear and visible increase in people interacting with their phone while walking. Here, we examine the influence such phone use has during stair navigation by tracking people's eye movements while they walked up three sets of stairs in university campus buildings. Analysis of the eye movements showed a dramatic effect of phone use, but no influence of the layout of the stairs. While using the phone, participants spent around 80% of the time looking at their phone, strongly reducing the time spent looking at the stairs and walls and other people that they may collide with.

These results suggest the need for raising public awareness of the risks of phone use while walking.

Talk Session: Emotion and cognition

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* 105
Session Chair(s): Thorsten Michael Erle

Affect from mere perception

Thorsten Michael Erle[1], Rolf Reber[2], Sascha Topolinski[3]

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Classically, psychological theorizing has assumed that basic perceptual processes have no intrinsic affective signature. Our recent research, however, has qualified this notion by showing that enabling compared to obstructing early perceptual processes during the perception of affectively neutral stimuli elicits positive affect. In three series of experiments participants briefly (< 500 ms; followed by a post-mask) viewed stimuli that either allowed for the operation of an early perceptual process or perceptually matched control stimuli that did not allow for such a process to happen. In this setup, Gestalt-containing dot patterns were preferred over Gestalt-lacking dot patterns, Necker cubes that allow for visual disambiguation were preferred over Freemish crates that partially prevent this process, and Kanizsa stimuli were preferred over control shapes that prohibit the perception of an illusory contour. These preferences were demonstrated using self-reports as well as electrophysiological assessments (fEMG), thus rendering demand characteristics of the stimuli or response biases of the participants unlikely as an explanation. In further experiments, we additionally ruled out metacognitive signals that possess affective connotations of their own, such as perceptual fluency due to familiarity and complexity, as alternative explanations of the observed preferences. We even demonstrate that perceptually exactly identical stimuli are evaluated differently when they are framed as either allowing or preventing the occurrence of an early perceptual process prior to stimulus presentation. These findings inform theorizing in perception about affective properties of early perceptual processes that are independent from perceptual fluency and research on affect about the importance of basic perception as a source of affectivity.

Multi-touch interactions influence the valence evaluation of emotional pictures

Sergio Cervera Torres, Susana Ruiz Fernández, Martin Lachmair, Peter Gerjets

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Background: Could body interactions performed in digital environments influence user's emotional experiences? Evidence based on theories of embodied cognition supports that emotion is closely connected to physical experiences in the surrounding space. Interestingly, multi-touch environments involve hand interactions and related arm movements, which according to these connections may potentially influence user's emotional experiences.

Methods: Based on this assumption, two different studies investigated how touching and subsequently moving forty IAPS emotional pictures on a large-scaled multi-touch monitor (MTM) influenced their perceived valence. Participants performed either lateral (i.e., right-left; Study 1) or a sagittal (i.e., forward-backward; Study 2) arm movements.

Results: The findings revealed that: (1) positive pictures moved from right to left with the dominant right hand, yielded more positive evaluations ($p < .05$) whereas negative pictures moved from the left to right with the non-dominant left hand, yielded more negative evaluations ($p < .05$). These results are in line with the body-specificity hypothesis (BSH), which propose that right-handers associate positive valence with the space surrounding the dominant right hand due to more fluent interactions, whereas negative valence is associated with the space surrounding the non-dominant left hand due to less fluent interactions; and (2) negative pictures yielded milder evaluations after forward (as avoidance movements) compared to backward (as approach movements) ($p < .05$); positive pictures, on the contrary, did not yield significant differences. These results were partially congruent with previous findings of an association between approach-avoidance arm movements in the sagittal axis and emotional valence.

Conclusion: These findings suggest that multi-touch interactions at horizontal and sagittal axes have different consequences on the perceived valence of emotional pictures.

Influence of emotional and mental load on electrodermal activity

Elena Wolf, Barbara Deml

Karlsruhe Institute of Technology, Germany

Bio-physiological signals, like electrodermal activity (EDA), gained a wide interest during the past decades in the context of automatic recognition of human psychological states. However, literature indicates that EDA is used as an indicator for different psychological concepts, such as emotion, stress or mental load. On this account, our aim was to analyze the relationship between various EDA-parameters and the reported experience of mental and emotional load, as well as to distinguish the effects of both, mental and emotional stressors, on different EDA-parameters. For this purpose, 50 subjects participated in an experimental study in the computer lab. Emotional and mental stressors were varied systematically, resulting in a repeated measure design with three different experimental conditions. In the emotion condition picture sets from the International Affective Picture System (IAPS) were presented with systematic variation on the dimensions arousal and valence. In the mental load condition different degrees of difficulty were realized within a ball-tracking task, which had to be performed simultaneously with a secondary task (mental arithmetic task). Within the mental-emotional condition the aforementioned ball-tracking task and the secondary task were combined with a bogus performance feedback in order to operationalize a combination of mental load and the emotional dimensions valence and arousal. Physiological data and subjective data, assessed by NASA-Task-Load-Index and Self-Assessment-Manikin, were measured throughout the experiment for every experimental trial within the three conditions. For data analysis, a multi-level analysis was performed which indicated different effects of mental and emotional load on the EDA-parameters in the three experimental conditions. Implications for the use of EDA-parameters in emotion or mental load recognition systems will be discussed.

If I have to give a talk, then...: Defeasible reasoning and test anxiety

Lupita Estefania Gazzo Castañeda , Katharina Kestel, Markus Knauff

University of Giessen, Germany

In defeasible reasoning previously drawn conclusions can be withdrawn in light of new evidence. For instance, if one is given the conditional “If Jack goes to bed late, then he is tired the next day” with the fact that Jack did go to bed late, one should conclude logically

that he will be tired the next day. However, in light of defeaters, such as Jack drinking lots of coffee in the morning, people often withdraw previously valid conclusions and would in our example conclude that Jack will not be tired. In our study we investigated whether emotions can affect people's consideration of defeaters. To achieve this, we created conditionals related either to test anxiety (e.g., "If I have to write an exam, then I think that I will fail") or to neutral situations ("If a vase falls from the table, then it breaks"). These conditionals were presented with relevant ("I studied a lot for this exam") or irrelevant defeaters ("I have fun when cleaning up my flat"). Participants then had to decide on a 6-point Likert-Scale how highly they accepted the conclusion drawn from the conditional. In addition to their responses to the inference task, we also measured the participants' test anxiety via a questionnaire. When we presented relevant defeaters, all participants gave low acceptance ratings to all kinds of conditionals. However, when presented with irrelevant defeaters, participants with test anxiety gave higher acceptance ratings to the test anxiety conditionals than participants with less anxiety. Thus, they held on to the anxiety related conditional rule more tightly than less anxious people. The results highlight the importance of emotions and personal relevance to reasoning.

When admired others are (no) good: Attachment and the functions of admiration

Ines Schindler[1], Fabian Löwenbrück[2]

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Admiration functions to bind individuals to values, irrespective of their potential to move closer to these. In doing so, admiration can have positive effects as evident in associated feelings of inspiration and gratitude and the action tendency to emulate admired others. However, admiration also can have a "dark side", as it is related to longing, envy, and negative self-related feelings. In two studies, we investigated whether attachment anxiety and avoidance explain who benefits from admiration. Findings of a longitudinal questionnaire study (N=314, 63% women, 18-73 years) showed that avoidance was negatively related to admiration, while anxiety was linked to greater admiration. Nevertheless, the positive association between anxiety and admiration was mediated by longing and envy rather than inspiration and gratitude. Across six months, higher admiration was predictive of greater anxiety while higher anxiety predicted lesser admiration. Admiration thus is an unstable emotion in anxiously attached individuals that is easily experienced but gets down-regulated across time as it functions to further increase anxiety. In an experimental online study (N=249, 76% women, 18-63 years), admiration was induced through one of three video clips. We again found avoidance to predict less admiration in response to the videos. People higher on anxiety were more responsive to an admirable person depicted in the video, as indicated by greater admiration and more emulative tendencies. At the same time, anxiety was linked to more longing, envy, and more negative self-related feelings. These negative reactions outweighed the positive effects of the presented video. Together, the two studies showed that admiration's potential to spur personal growth is limited in insecurely attached individuals and, thus, admiration should not be regarded as an emotion that is always beneficial for everyone.

Symposium: New findings from cognitive training research (Part II)

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* HS 304
Session Chair(s): Tilo Strobach, Julia Karbach

On the compliance with cognitive training in young and older adults

Tiina Salminen, Rojahn Ahmadi

NeuroNation, Synaptikon GmbH, Germany

Self-efficacy, as described in the social cognitive theory, refers to “the belief in one's capabilities to organize and execute the courses of action required to manage prospective situations” (Bandura, 1995). Measurements of self-efficacy predict the way how goals, tasks, and challenges are approached. Self-efficacy has an influence on behavior in diverse health related situations, such as weight loss and quitting smoking (Shin et al., 2011; Gwaltney et al., 2009). Furthermore, studies have shown that self-efficacy mediates the relationship between self-regulatory processes and adherence to physical exercise programs (e.g., McAuley et al., 2011). A persisting issue in cognitive training interventions concerns the issue of adherence and compliance to training. In the present study we approached this question by investigating the role of self-efficacy and self-regulation processes to training adherence and performance in a commercially available cognitive training program. In our study design with three groups, one group had a free choice of training frequency that the participants did not have to define in advance, another group was appointed a training schedule by the training program, and a third group was asked to define their training schedule before beginning the training program. In all groups we assessed self-efficacy with questionnaires and self-regulatory processes with executive function tasks. As age-related decline in executive functions has an effect of self-regulatory processes, we compared the results of older adults to the results of young adults. The findings are discussed together with implications for the design of cognitive training interventions.

Evaluating the effectiveness of a controlled-randomized training of commercial brain games

Tilo Strobach[1], Lynn Huestegge[2]

[1]Medical School Hamburg, Germany; [2]University of Würzburg

Commercial brain games are home-based cognitive trainings that are industrially offered and aim to enhance cognitive functioning. While compelling evidence of brain games’ effectiveness on people’s minds has been challenged, there are only very few attempts to systematically evaluate this effectiveness under ecologically valid conditions. Therefore, we applied commercially available working memory updating and capacity tasks during 20 training sessions. The effectiveness of this training was measured by utilizing pre- and post-assessments in (1) trained working-memory tasks (criterion tests), (2) untrained transfer tasks from the trained updating and capacity domains (near-transfer tests), as well as (3) the non-trained domains (far-transfer tests). Training as well as pre-post-assessments were completely realized home-based. In contrast to an active control group, a training group improved in the criterion tests, showed near-transfer effects in updating and capacity tasks as well as evidence for far-transfer effects (i.e., in the domains processing speed, shifting, and reported cognitive failures). Thus, this study provides one of the first systematic, still yet ecologically valid evaluations of commercial brain games and their effectiveness.

Game-based executive control training for children: Validation of new online training tasks

Verena Johann, Julia Karbach

Goethe University, Germany

Recent studies showed that cognitive training can improve cognitive abilities, such as executive functions (working memory, inhibition, flexibility), in children. However, most of these studies focused on the efficacy of working memory training, whereas evidence for inhibition or cognitive flexibility training is rare. Furthermore, most previous studies did not consider motivational factors and used either psychometric working memory training tasks or partially game-based working memory training batteries. Therefore, the aim of our study was to develop and validate new tasks for a game-based executive control training. We designed three tasks for each dimension of executive control (working memory, inhibition, flexibility) and implemented them in a game-based training program and a psychometric training program. The design of the game-based version was based on the motivational framework proposed by Deci and Ryan, including elements of competence (appealing and rewarding feedback), autonomy (choosing how and where the protagonist proceeds), and relatedness (a child-friendly cover story with a young protagonist). To validate these new tasks for children we systematically compared their performance on the game-based tasks to performance on the psychometric tasks. We tested 60 children (third and fourth grade) in two sessions. The children were randomly assigned to one of three conditions, each one including training tasks from two out of three training domains (e.g., working memory and inhibition). They performed the game-based version and the psychometric version in two sessions (counterbalanced across subjects) with an interval of one week between sessions. The design allowed investigating the convergent and divergent validity of the new training tasks, i.e. testing for correlations between the game-based version and the psychometric version as well as correlations between training tasks and between training domains.

Symposium: Recent advances in TVA-based visual attention research (Part II)

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* 201
Session Chair(s): Kathrin Finke, Jan Tünnermann, Ingrid Scharlau

Visual attention and neurocognitive plasticity

Kathrin Finke[1,2]

[1]Jena University Hospital, Germany; [2]Ludwig Maximilians Universität München

Cognitive enhancement in both healthy and clinical populations by way of diverse treatment approaches has become an increasingly important issue in recent years. For example, by exploiting neuroplasticity, it is assumed to increase cognitive reserve. This way, it might lend resilience against cognitive decline in aging and against the cognitive consequences of brain injury and disorder. In my talk, I propose that the efficiency of visual information uptake may represent a reliable indicator for effective enhancement procedures. To assess such efficiency, the parameter reflecting visual processing speed, as derived from the mathematically formalized ‘theory of visual attention’ (TVA), appears as particularly promising. TVA-based processing speed estimation has special sensitivity

to brain dysfunctions and can document even subtle changes. Moreover, its relationship to alertness suggests an important role for cognitive reserve. Increased alertness may improve a wide range of higher level cognitive functions by enhancing their effectiveness. Therefore, fronto-parietal attention networks regulating the activation level within cerebral information processing systems could represent one component of neural plasticity and compensation underlying cognitive reserve. The functionality of these networks is accessible on the behavioural level by TVA-based assessment.

Sleep disturbance and the risk for cognitive decline: TVA-based assessment of visual processing capacity in patients with insomnia

Peter Bublak, Sven Rupprecht, Kathrin Finke

Universitätsklinikum Jena, Germany, Klinik für Neurologie

Background: Chronic primary insomnia (CPI) is a highly prevalent sleep disorder in subjects >50 years of age and related to psychological distress. As both sleep deprivation and increased stress susceptibility have been shown to represent risk factors for neurodegeneration, CPI patients may be subject to a higher probability for developing progressive cognitive impairment. In fact, in patients with CPI, lower sleep quality has been found to be associated with hippocampal atrophy and cognitive decline. Similar brain and cognitive changes prevail in patients with mild cognitive impairment (MCI), who bear an increased risk for developing dementia. Our own previous work in MCI patients, applying the conceptual framework of the 'theory of visual attention' (TVA), has identified an elevated perceptual threshold in comparison to age-matched healthy participants in a whole report task.

Methods: In the present study we assessed a sample of 16 CPI patients with TVA-based whole report to test the hypothesis that CPI patients also show a significant increase of the perceptual threshold.

Results: Compared to a healthy control group, we found no significant differences with respect to TVA-based parameters of processing capacity. However, within the patient group, the perceptual threshold values were significantly related to the subjective evaluation of insomnia severity (ISI questionnaire). Also, higher threshold values in CPI patients were significantly correlated to polysomnography indices, i.e. the sleep efficiency index, and the arousal index.

Conclusions: These data suggest that TVA-based assessment of visual processing capacity may be able to identify CPI patients with an increased risk for cognitive decline and stimulate further investigations.

Modulation of hemifield effects by transcranial direct current stimulation: Parameter-based assessment with the Theory of Visual Attention

Antje Kraft[1,2], Sein Schmidt[1,2], Jovita Brüning[3], Stefanie Kehrer[4], Norbert Kathmann[5], Stephan A. Brandt[1]

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A bilateral field advantage (BFA), that is enhanced visual processing when stimuli are aligned across both visual hemifields, corresponds to a hemispheric resource model of

parallel visual attentional processing, suggesting more attentional resources for bilateral displays. Several studies have shown that the BFA extends beyond early stages of visual attentional processing. Visual-short-term-memory (VSTM) capacity was higher when stimuli are distributed bilaterally rather than unilaterally and repetitive transcranial magnetic stimulation (rTMS) over the right precuneus diminished the BFA (Kraft et al., 2014). Here we tested in fourty healthy subjects whether the BFA can be modulated by bilateral or unilateral transcranial direct current stimulation (tDCS) applied either over the left and right occipital cortex (O1/O2) or over the left and right parietal cortex (P3/P4). tDCS was applied at a current of 1.5 mA for 30 min using a double-blind and sham controlled within subject design. After stimulation subjects were tested using a whole report paradigm based on the Theory of Visual Attention (TVA; Bundesen, 1990, Kraft et al., 2013). For VSTM capacity tDCS over occipital or parietal cortex reduced the BFA while bilateral tDCS had no effect on visual processing speed. It is discussed how this approach can modulate the inter-hemispheric parietal and occipital balance and whether it can be used in therapeutic settings, e.g. in patients with visual deficits or spatial neglect.

Aging and active perception: Modulation of visual processing speed by auditory warning cues

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External warning cues without any spatial or feature-based information lead to short-lived changes in preparatory states defined as phasic alertness. While it was shown that young healthy participants have higher visual information uptake rates under conditions of higher phasic alertness, it is not clear whether this holds also true for aging individuals. In our study, a whole report paradigm based on the Theory of Visual Attention (TVA) with auditory warning cues and a jittered continuous SOA spectrum was applied to compare alerting effects on visual attentional capacity parameters in younger and older participants. In line with previous studies using visual alerting cues, we found an overall increase of visual processing speed in cued compared to uncued trials. The cue-induced processing speed enhancement was equally pronounced in younger and older participants, indicating that alertness effects on visual processing are preserved in healthy aging.

Visual processing capacity in multiple sclerosis: new implications for clinical assessment

Steffen Kluckow

Hans-Berger Department of Neurology, University Hospital, Jena, Germany

Multiple Sclerosis (MS) is a progressive, demyelinating autoimmune disease characterized by various cognitive impairments and fatigue (“abnormal sense of tiredness or lack of energy”). Due to their preterm manifestation and significant impact on quality of life, a high relevance belongs to early and valid assessment of these deficits. The present study assessed visual processing capacity based on a ‘theory of visual attention’ (TVA, Bundesen 1990, 2005) as a potential method for quantifying cognitive impairment in MS. 75 consecutive patients with relapsing-remitting MS were tested in a whole report task and

compared to 75 healthy control subjects matched for gender, age and education. Additionally, two frequently used short screening instruments for MS-related cognitive deficits, PASAT-3 and MoCA, were also applied. The results show decreased visual processing capacity in MS patients compared to healthy control subjects as well as cognitive impairment according to MoCA and PASAT-3 performance. Furthermore, the TVA-based method detected deficits in visual processing capacity even in MS patients that were unimpaired in terms of MoCA and PASAT-3 scores. These findings indicate that the TVA-based method represents a relevant clinical test instrument, in particular, for revealing cognitive impairment in early MS patients. Our current research aims at linking TVA-based parameters to markers of MS-related neuropathology (e.g. imaging data, inflammatory cytokines).

Symposium: Traffic psychology: Vulnerable road users

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* 204
Session Chair(s): Anja Katharina Huemer

Cyclists gaze behavior within different urban environments

Klaus Reinprecht, Oliver Ondrejka, Meike Sorg

Inspectio Forschungsinstitut, Germany

Cycling is becoming an increasingly growing trend in the urban environment. However, cyclists´ traffic behavior has just recently gained some interest of the academic field and little is known about the gaze behavior of cyclists. The current study investigated cyclists´ gaze behavior within different urban environments.

Therefore, 28 participants (8 female) with a mean age of 29.1 (SD = 7.0) drove an equipped bicycle with the Dikablis Eye Tracker 2.5. Participants were instructed to follow a predefined route in the city of Munich. The route consisted of different road types (e.g. urban road, cycle path, shared-use path) with an approx. length of 3.8 km. On average, the participant needed about 15 minutes to complete the track. Of special interest was whether cyclists´ gaze behavior differed depending on the road settings. Thus, to investigate this the gaze behavior into different areas of interest was analyzed. First results of the study are presented in the talk with special emphasis on performing gaze behavior studies on cyclists.

Do information and a special appearance of e-bikes influence car drivers' time to arrival estimates?

Katja Schleinitz, Tibor Petzoldt

TU Chemnitz, Germany

E-bikes, which have the potential to reach higher speed levels than conventional bicycles, but look basically the same, are suspected to be at a higher crash risk than such conventional bicycles. Other road users might misjudge the time remaining before the approaching bicycle arrives (time to arrival, TTA) as a result of this combination of higher speed and well-known looks. Researchers have therefore suggested to make drivers aware of the higher speed of e-bikes, and give e-bikes a distinct appearance. Goal of this experiment was to investigate the effects of such a unique appearance, coupled with clear instructions about the capabilities of e-bikes, on TTA estimates. Forty participants took part in this experiment. They were presented with video sequences of an approaching cyclist, who wore either a retroreflective vest to indicate he would be riding an e-bike, or

did not wear this vest to indicate that he approached on a conventional bicycle. Their task was to estimate the TTA. The results showed only a minor difference in TTA estimates between the two appearances of the cyclist. Overall, the results imply that simply informing other road users about e-bikes (in conjunction with a re-design that gives them a unique appearance), might not be sufficient to elicit a more conservative behavior.

Cyclists' Anger Experience in Road Traffic: From Anger Provoking Incidents to Developing a Cycling Anger Experience Measure

Anja Katharina Huemer[1], Michael Oehl[2], Stefan Brandenburg[3]

[1]Technische Universität Braunschweig, Germany; [2]Leuphana Universität Lüneburg, Germany; [3]Technische Universität Berlin, Germany

Cycling anger defined as the propensity of cyclists to become angry in traffic is a concept so far neglected in research. Research on emotions in traffic has been focusing rather only on car drivers. However, as the popularity and use of bicycles is growing, cyclists are increasingly involved in accidents. At the same time the number of reports of driving anger among cyclists are increasing, e.g., in bigger German cities. Traffic research shows that especially anger and aggression among road users lead to maladjusted driving and thereby to a higher accident risk. Therefore, our contribution focuses on cyclists' traffic related anger. To ensure a huge range of anger provoking incidents we conducted two studies. Firstly, cyclists discussed anger provoking events they have experienced in daily traffic in focus groups. Secondly, we asked participants to keep a bicycle riding diary registering all anger provoking events they had experienced during one week. Results of both studies showed that most anger provoking incidents that occurred are conflicts between car drivers and cyclists. Conflicts with car drivers caused more anger than conflicts with other cyclists or pedestrians. On the basis of these qualitative studies a questionnaire was developed as a measure assessing cyclists' anger experience in interaction with their cycling environment. Factor analyses proposed four subscales, i.e., police interaction, car interaction, cyclist interaction, and pedestrian interaction. Confirmatory cross-validations with different samples of cyclists supported these results. Alpha reliabilities were acceptable to good. Significant correlations with the Driving Anger Scale for car drivers and with the general State-Trait Anger Expression Inventory suggested convergent validity and providing a complementary instrument for measuring cycling anger in traffic. Furthermore, significant correlations between cycling anger and self-reported risky cycling behaviours were observed.

Fußgängerquerungsverhalten – Gibt es einen Unterschied im Sicherungs- und Querungsverhalten bei Tag und Dunkelheit?

Katharina Rehberg[1], Lars Rößger[2], Jens Schade[1], Magnus Hirschfeld[1], Pascal Friebel[1]

[1]Technische Universität Dresden, Germany; [2]TÜV | DEKRA arge tp 21

Im Jahr 2015 verunglückten in Deutschland 31610 Fußgänger (FG) im Straßenverkehr; 537 FG verloren dabei ihr Leben. Etwa die Hälfte verunglückte dabei bei Dunkelheit und bei etwa einem Drittel ist der Unfall auf Fehlverhaltensweisen des FG (z.B. das plötzliche Betreten der Fahrbahn, das Hervortreten hinter Sichthindernissen und das Queren abseits von gesicherten Querungsstellen) zurückzuführen. Diese Fehlverhaltensweisen sowie Unfallcharakteristika legen Probleme in der Wahrnehmung und Bewertung des motorisierten Verkehrs nahe, die maßgeblich zur Unfallentstehung beitragen. Einerseits spielt dabei der visuelle Kanal als dominante Informationsquelle eine zentrale Rolle. Andererseits zeigen Studien, dass auch akustische Informationen, die insbesondere in

Situationen der eingeschränkten visuellen Wahrnehmung (z.B. Dunkelheit) an Bedeutung gewinnen, einen wesentlichen Beitrag leisten.

Im Rahmen einer Felduntersuchung wurde an acht Standorten auf freier Strecke bei Tag und vier dieser Standorte bei Dunkelheit eine Tablet-gestützte Beobachtung zu querenden FG durchgeführt. Hierbei wurden neben Personendaten das Sicherungs- und Querungsverhalten pro Querungsabschnitt/Fahrbahn (z.B. rechts-links-Schauen, Querungsweg, Querungszeit, visuelle u./o. akustische Nebentätigkeit z.Z. der Querung und Querung als Gruppe) erfasst. Darüber hinaus wurde die beobachtete Querungsstelle (ca. 30m Streckenabschnitt) mittels Videokameras aufgezeichnet, um FG-FZ-Beziehungen (z.B. TTC) und Bedingungen im Straßenverkehr (z.B. Verkehrsstärken) ermitteln zu können. Im Anschluss der Querung wurde eine Teilstichprobe zu ihrem Sicherungs- und Querungsverhalten, Informationsquellen (akustisch, visuell), wahrgenommen Sicherheit der Querung, Motivation und Wegezweck befragt. Die erhobenen Daten sollen einen Beitrag zur Beantwortung folgender Fragestellung leisten: Wie unterscheidet sich das Sicherungs- und Querungsverhalten von FG bei Tag und bei Dunkelheit.

Cycling through intersections: Situational factors influencing safety

Mandy Dotzauer, Kay Gimm, Sascha Knake-Langhorst

DLR e.V., Germany

Within the past years, a shift in mode of transport has been observed. The popularity of cycling has significantly increased and will increase even more in the time to come. On the downside, cycling is also associated with severe injuries or even fatalities, especially when involved in a crash with a motorized vehicle. In urban areas, one of the most risky situations is crossing an intersection while a motorized vehicle turns right. In an effort to increase road traffic safety of cyclists in intersections, within the framework of EU-funded project XCYCLE, an infrastructural supported cooperative advanced driver assistance system (C-ADAS) will be built in order to increase the safety of cyclists. The objective is to develop an online risk assessment in order to predict critical encounters between motorized vehicles and cyclists online. Therefore, in addition to analyzing objective data, such as trajectories, while approaching the intersection, critical encounters need to be analyzed and described as well as situational factors contributing to the critical situation need to be identified. At the AIM Research Intersection in Braunschweig, trajectory and video data has been collected since fall 2016 and will continue to be collected. Conflicts between motorists and cyclists will be extracted and factors (e.g. weather, daytime, traffic light status, riding in a group or alone) will be identified contributing to safety critical situations. These factors will be incorporated in order to accomplish a sensitive online risk assessment.

Talk Session: Multitasking II

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* HS 403
Session Chair(s): Robert Langner

Embodied Cognition in Multitasking: Reduced Between-Task Interference when Stimuli are Presented Near the Hands

Rico Fischer[1], Clara Schweinitz[2], Roman Liepelt[2]

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The proximity of hand position alters the processing of visual stimuli. Stimuli presented close (proximal) to hands receive an enhanced allocation of visual attention compared to stimuli presented far (distal) from hands. In the present dual-task study we tested the consequences of this preferential processing when response hands were located proximal versus distal to the lateralized presentation of S1 and S2 on the screen. In the proximal condition, response hands were located on the left and right side of the monitor. In the distal condition, they were placed onto the left and right side of the lap. If hand proximity results in a generally increased attentional processing of stimuli within the common hand space, enhanced levels of between-task interference should be expected. If hand proximity, however, results in an increased hand-specific attentional processing for each hand, between-task interference should be reduced. Participants performed two number categorization tasks in close temporal succession. While hand proximity did not affect overall performance in Task 1 and Task 2, between-task interference was significantly reduced in the proximal compared to the distal stimulus-hand condition in both tasks. Findings suggest a facilitated processing of stimuli presented close to an individual response hand but are inconsistent with the assumption of a generally increased attentional processing benefit for multiple stimuli within hand space.

Decision making, executive functions, and impulsivity in media multitaskers

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In many studies, persons who reported to frequently use different media simultaneously displayed reduced performances in cognitive tests, for example in tests of executive functioning (Jeong & Hwang, 2016; Ophir, Nass, & Wagner, 2009; van der Schuur, Baumgartner, Sumter, & Valkenburg, 2015). Executive functioning was found to be related to decision-making performance under objective risk, that is when risks and chances of the decisions' alternatives are explicit or calculable. At least after several learning trials, executive functions seem to be also related to decision making under ambiguous risk, that is when risks and chances have to be learned from feedback (Brand, Recknor, Grabenhorst, & Bechara, 2007). Thus, compared to low media multitaskers (LMMs), high media multitaskers (HMMs) may perform worse in both types of decision situations. We compared 22 HMMs with 14 LMMs (chosen from an online survey) regarding decision making in the Game of Dice Task (objective risk) and the Iowa Gambling Task (ambiguous risk). Additionally, tests of executive functions and several questionnaires were administered. HMMs showed poorer decision-making performance on the Iowa Gambling Task than LMMs. HMMs and LMMs did not significantly differ on the Game of Dice Task and most of the executive functioning tests. HMMs had higher scores on impulsivity

questionnaires. Also, they indicated a stronger belief that media multitasking can help to experience positive feelings and to reduce boredom. In sum, the results suggest that frequent media multitasking may be related to disadvantageous decisions in situations that require learning from feedback. When combining this with the findings on higher impulsivity and the expectancy to experience positive feelings, consuming media simultaneously may be discussed as a consequence of impulses towards short-term pleasure.

Effector system prioritization in dual tasks and the role of stimulus-response modality mapping

Mareike Amelie Hoffmann, Aleks Pieczykolan, Lynn Huestegge

Julius-Maximilians-Universität Würzburg, Germany

Performing two responses at once (vs. one response in isolation) usually leads to performance costs. Typically, such dual-response costs are distributed asymmetrically across responses whenever different effector systems are involved. Previous studies showed that under suitable conditions this asymmetry can be interpreted as a marker for effector system prioritization, that is, the effector associated with relatively smaller dual-response costs is prioritized over the other. However, previous studies were limited in that they involved only a small set of (three) effector systems, never focused on typical dual-task situations (but on cross-modal response compounds triggered by single stimuli instead), and never considered the role of stimulus-response modality mapping. In the present study, we investigated dual-task cost asymmetries in pairwise combinations of saccadic, manual, vocal, and pedal responses that were triggered by two distinct (visual and auditory) stimuli. Overall, the pattern of dual-task cost asymmetries suggested a robust ordinal prioritization pattern among effector systems. Stimulus-response modality mappings affected some of the dual-task cost asymmetry patterns, but without substantially changing the overall prioritization scheme. Implications for flexible resource scheduling models of dual-task control are discussed.

Visual attention demands modulate the interplay of response selection and visual attention

Christina B. Reimer, Torsten Schubert

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Visual attention and response selection are limited in capacity. In conjunction search, visual attention is required to select items and to bind item features (e.g. color, form), which results in a serial search process. Accordingly, searching the target takes longer as distractors are added to the search display (i.e., set size effect). Concerning response selection, the central bottleneck model proposes that the response selection processes of two tasks in a dual-task situation are performed sequentially when both tasks are presented at high temporal overlap. In the present study, we shed light on the open question whether response selection and visual attention (i.e., feature binding) rely on the same or on distinct capacity limitations. If response selection and visual attention (i.e., feature binding) rely on the same capacity limitation, they would be processed sequentially. However, if response selection and visual attention (i.e., feature binding) rely on distinct capacity limitations, they would be processed concurrently.

In both dual-task experiments of the present study, participants completed two tasks presented with an experimentally modulated temporal interval between them (Stimulus Onset Asynchrony, SOA). Task 1 was an auditory two-choice discrimination task and Task

2 a conjunction search task in which the target had to be detected among variable numbers of distractors (i.e., set size). In Experiment 1, each item in the conjunction search Task 2 consisted of two features. Accordingly, the visual attention demands were low. In Experiment 2, the visual attention demands were high, as each item in the conjunction search Task 2 consisted of four features.

In both experiments, we analyzed conjunction search time according to the locus-of-slack method. In Experiment 1, the underadditive interaction of set size and SOA revealed that the visual attention processes in Task 2 operated concurrently to the response selection processes in the auditory Task 1. The results showed that for low visual attention demands, both processes rely on distinct capacity limitations. Interestingly, in Experiment 2, we found an additive effect of set size and SOA indicating that response selection and visual attention operated sequentially. The results revealed that for high visual attention demands, both processes rely on the same capacity limitation.

To conclude, whether response selection and visual attention rely on the same or on distinct capacity limitations depends on the visual attention demands that are required to bind item features.

The cost of awareness

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Conscious perception of an event has long been associated with favorable processing of that event. However, recent findings from our lab has shown that conscious perception may also come at a price for subsequent stimulus. Under the exact same stimulus conditions, observers are much poorer in recognizing a target when a cue that precedes it is consciously perceived than when it is not. We suggest that this cost reflects a processing limitation that is unrelated to an attentional bottleneck or a response selection limitation but instead emerges in the aftermath of the conscious perception of an event. We show that when experiencing an event consciously, perceiving a second event is impaired if it follows the first event by less than half a second or so – even if this event occurs at an unattended location, We compare this effect to the attentional blink, and suggest that attentional blink findings may be accounted for (at least in part) as an “awareness cost” rather than as an attentional limitation. Lastly, we will show that the cost of awareness occurs even when conscious perception is not explicitly reported. Taken together, our data demonstrates a pervasive perceptual limitation that is directly associated with conscious perception.

Talk Session: Tactile and haptic perception

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* HS 405
Session Chair(s): Anna Metzger

Tactile localization is modulated by implied motion

Simon Merz[1], Hauke S. Meyerhoff[2], Charles Spence[3], Christian Frings[1]

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In the visual and auditory modality, the remembered location of a stimulus is influenced by the implied motion of that stimulus. Here, we used a tactile variant of a spatial localization

task (N = 30). Six vibrotactile tactors (diameter: 3 cm) were attached to the participants forearm. After presenting three consecutive vibrations (duration: 250; ISI between vibrations: 250 ms), participants discriminated between probe vibrations that appeared at the same/different location as the third of the consecutive vibrations. The location of the probe vibration was either identical to the last vibration of the three consecutive vibrations or adjacent to the location of the last vibration. Importantly, if the three vibrations implied a continuous direction of motion, probing the vibration ahead of this motion path elicited more accurate probe discrimination performance than probes that appeared at the preceding location. The results are discussed as a tactile variant of visual/ auditory representational momentum phenomena.

Serial integration of information in haptic softness perception

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University of Giessen, Germany

When people can simultaneously derive multiple redundant estimates about an environmental property, e.g. from different senses or cues, typically the single estimates are “optimally” integrated into a percept: That is, single estimates are weighted according to the estimates’ reliabilities which maximizes the percept’s reliability (Maximum Likelihood Estimation). How serially sampled information from one sense is integrated is less clear. In haptic perception information is usually gathered by sequential and highly stereotypic movements (e.g. indentations of the object with a finger to perceive its softness). Here we study how this sequentially derived redundant information is integrated in haptic perception of softness. For that purpose we developed a method to change haptically perceived softness of silicone rubber stimuli while participants were touching the stimuli with bare fingers. We used this method in order to manipulate softness estimates derived from a single movement segment (indentation) in a multi-segmented exploration. This enabled us to assess how softness estimates derived from each indentation contribute to the overall percept. Our participants explored two stimuli in sequence, with a fixed number of indentations (two, three, four and five) and reported which of the two stimuli felt softer. The contributions of the different estimates associated with the indentations of the first stimulus were similar (as expected for optimal integration), but for the second stimulus an estimate’s contribution was lower when it was associated with a later as compared to an earlier indentation. Consistently, the reliability of the percept given different numbers of estimates was always lower than the reliability given optimal integration of the same number of estimates. This pattern of results is consistent with the assumption that the decrease in weights over time was caused by the fading of the representation of the first stimulus.

This work was supported by the Deutsche Forschungsgemeinschaft SFB TRR 135, A05.

Perception of tactile signals during reaching

Dimitris Voudouris, Katja Fiehler

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Tactile signals on a moving limb are likely to be suppressed during movement planning and execution. Here we examined whether task-relevant tactile signals may also be enhanced in a reaching task. Participants reached to a visual (LED) or a somatosensory target (thumb or index finger of the unseen static hand) and discriminated 2 simultaneously presented tactile stimuli: a reference stimulus on the little finger of their static hand and a comparison stimulus on the index finger of their moving hand. We found that the stimulus on the moving hand was suppressed during movement, compared to when no movement

was performed (baseline). This suppression effect was stronger during somatosensory than visual reaching. When the reference stimulus was presented on a task-irrelevant location (sternum) no differences were found in the strength of tactile suppression between somatosensory and visual reaching. These results suggest that tactile signals can be suppressed at the moving limb and in parallel enhanced at the target hand. We further support our results in a detection task in which reaching led to higher detection thresholds (tactile suppression) on the moving hand independently of the target modality. In contrast, we observed lower thresholds (tactile enhancement) on the static hand during somatosensory but not during visual reaching.

Finally, we examined the spatial specificity of tactile enhancement. Participants reached to their left static thumb or little finger and discriminated a stimulus on one of these digits from another stimulus on their sternum. Tactile stimuli were in general enhanced at the target hand, but we did not find stronger enhancement at target compared to non-target digits. This suggests that tactile enhancement spreads across the whole hand.

Together, our findings show that tactile perception can be modulated during movement depending on the relevancy of the somatosensory information. However, this modulation seems to be rather location unspecific.

Target-dependent modulation of tactile suppression

Hanna Gertz, Dimitris Voudouris, Katja Fiehler

Experimental Psychology, Justus-Liebig-University Giessen, Germany

Tactile stimuli on the moving limb are typically attenuated during reach planning and execution. Tactile suppression may occur due to a match between the actual and the predicted sensory consequences of one's own movements that are generated by an efference copy of the motor command. Suppressing predicted sensory signals might free capacities to process other movement-relevant incoming signals. Here we tested this assumption and examined whether tactile suppression is stronger when additional sensory signals are available that can facilitate successful movement performance.

Subjects reached with their left or right index finger to the unseen index finger of the other hand (body target) or to an unseen pad on a screen (non-body target). In the body target condition, additional somatosensory signals from the static hand were available for localizing the target. Tactile stimuli were presented on one of the index fingers, before or during movement, or in a separate no-movement baseline block. We determined for each subject the detection threshold and the precision of the stimulus' detectability.

Reaching led to a strong suppression of tactile stimuli, as reflected by higher detection thresholds and lower precision of detectability compared to baseline. Tactile suppression was more pronounced when reaching to the body than the non-body target. Moreover, detection thresholds were higher when reaching with the non-dominant left than with the dominant right hand.

Our results suggest that tactile suppression at the moving limb is stronger when additional movement-relevant somatosensory signals are available, possibly to free capacities for processing these signals. Moreover, signals from the non-dominant hand were more suppressed which might point to differences in the sensory predictability between the two hands. To conclude, we show that the presence of movement-relevant sensory information can modulate the perception of tactile stimuli before and during reaching movements.

Tactile stimulation disambiguates the perception of visual motion paths

Hauke S. Meyerhoff[1], Simon Merz, Christian Frings[2]

[1]Leibniz-Institut für Wissensmedien, Tübingen, Germany; [2]Department of Psychology, University of Trier, Germany

The visual system continuously resolves ambiguity within the retinal information with respect to the shape as well as relative size and speed of objects by applying heuristics such as the Gestalt principles. With more than one object moving in a dynamic scene, the correspondence between object locations over time also needs to be disambiguated. Here, we study this phenomenon using displays in which two discs move toward each other, superimpose in the center of the screen, and then moved apart. This display is perceptually ambiguous because it is consistent with the interpretation of two disc streaming past each other as well as the interpretation of two discs bouncing off each other. We show that the visual system incorporates coinciding tactile information in order to disambiguate the motion paths of two dynamic objects by measuring explicit impressions (i.e., asking participants whether they perceive streaming or bouncing) as well as implicit perceptual processes (i.e. the perceived overlap between the moving discs). In the first of two experiments, we observed that the dominant interpretation of the motion paths switched from streaming to bouncing when a brief vibrotactile stimulation (applied to the left hand of the participants) coincided with the moment of overlap between the two moving discs. In the second experiment, the participants adjusted the overlap between two additional static discs until it matched with the perceived overlap of the ongoing bouncing/streaming event. The results of this experiment showed that coinciding tactile stimulation also reduced the perceived overlap between the two moving discs thus leaving a larger uncovered illusory crescent. In return, this larger crescent might induce the impression of bouncing rather than streaming. Our results therefore suggest that the tactile information indeed altered the visual percept of the dynamic event rather than the subsequent cognitive interpretation of an otherwise unaffected visual percept.

Talk Session: Judgment and decision-making

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* HS 301

Framing Climate Uncertainty: Frame Choices Reveal and Influence Climate Change Beliefs

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When engaging with the public, climate scientists and policy makers face the considerable challenge of communicating uncertain predictions from climate science. In the academic literature, such predictions are often presented in the form of a mean value and a confidence interval. This format is, however, rarely found in public communication, where the uncertainty inherent in these predictions is rather summarized in simpler but more ambiguous verbal formats. Here, we investigate whether these verbal summaries of confidence intervals in climate predictions are subject to framing effects, and with what consequences. Underlying preferences of communicators have been shown to influence the selection of verbal frames for communicating scientific evidence, which in turn influence listeners' beliefs. The example we studied was about winter precipitation in Greater London, which was predicted to increase due to climate change by an expected

value of 17%, with a confidence interval ranging to an upper bound of 32%. Somebody who is concerned about the consequences of climate change might frame this upper bound by saying that precipitation 'could have increased by as much as 32%', whereas somebody who is not concerned might say that it 'is very unlikely to have increased by more than 32%.' In study 1, speakers systematically framed the upper end of a confidence interval in a more or less concerned way, depending on their subjective perception of the severity of the consequences and their environmental attitudes. Study 2 revealed that more or less concerned frames had a corresponding effect on listeners: When exposed to a more concerned frame of the confidence interval's upper bound, they perceived consequences to be more severe than when exposed to the less concerned frame. In sum, frame choices reveal and influence climate change beliefs, which may impede the neutral communication of science and likely contribute to an increasingly polarized debate around climate change.

The ecological rationality of cue fluency in memory-based decisions

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How do people make decisions if they have to retrieve relevant information from memory? It has been shown that faster retrieved instances bias the decision-making process (Tversky, & Kahneman, 1973). We were interested in the normative question of how well speed of retrieval works for weighting cues and investigated the ecological rationality of putting more weight on cues that are retrieved more rapidly. To answer this question, we incorporated retrieval speed as an ordering principle into lexicographic evidence accumulation strategies. Two experiments were conducted to assess people's cue knowledge concerning real world objects (here: German cities) and how fluently they retrieve the cues. In the first experiment, participants were forced to answer "yes" or "no" when asked if a city has a cue or not (e.g., an airport), in the second experiment, they could also indicate that they "do not know." The results of the experiments revealed that the fluency with which cues about objects are retrieved is indeed informative with regard to predicting the criterion (here: city size). People retrieved positive cue values (indicating the presence of a cue) more quickly for larger cities. By contrast, negative cue values (indicating the absence of a cue) were more quickly available for smaller cities. Furthermore, retrieving incorrect cue values was much slower on average, so that relying on speed of retrieval when considering information may protect decision makers from incorporating incorrect information in their predictions. In a next step, cue fluencies were used to simulate how well strategies that order cues by their fluency would perform in an inference task (comparing city sizes). The results of the simulations showed that a retrieval order based on speed largely benefited the decision strategies. Retrieval-based strategies were more accurate than their counterparts using a random order, and they could also compete with competitor models, such as take-the-best and linear regression. To sum up, putting more weight on information that comes to mind quickly (e.g., by ordering cues by retrieval speed) may not necessarily represent a bias, but could be an ecologically rational strategy for weighting information.

Developing a paradigm to purely measure favorism of preference-consistent information

Inga Marie Bause[1], Irina Rebecca Brich[1], Ann-Katrin Wesslein[2], Friedrich W. Hesse[1]

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The evaluation bias (also “biased assimilation”) has become an umbrella term describing a variety of findings associated with a post-decisional bias in the appraisal of information pieces as a function of their relation to the decision. In our study, we use it to describe the tendency to evaluate information which is consistent with one’s preference more favorably than preference-inconsistent information. The experimental paradigms typically used to measure biased information evaluation mostly induce a preference based on a first, biased set of information. The evaluation bias is then measured as the distorted evaluation of preference-consistent, compared to preference–inconsistent pieces of information from a second set of information. Since the evaluation of new information is influenced by its relation to previous information this measure of the evaluation bias might be confounded through associations between pieces of information from the first and the second set. To purely measure the bias in the evaluation of preference-consistent information, we propose a new experimental paradigm. In this paradigm, a preference towards one of two products is induced based on an arbitrary task (i.e. signal detection task, mental association task), eliciting a preference on a meaningful basis without actually supplying participants with relevant information about the products. Subsequently, participants are presented with similar, parallelized information items for both products and rate them on different dimensions. We expect items belonging to the preferred product to receive better ratings with regard to valence and relevance, reflecting a pure measure of the evaluation bias. The paradigm will be employed to gain a better understanding of the processes underlying the evaluation bias.

A multi-method analysis of the use and effect of war analogies in print media

Christine Flaßbeck, Hannah Eller, Hans-Peter Erb

Helmut Schmidt University Hamburg, Germany

In media, journalists very often make use of historical analogies to describe current political and/or military conflicts as well as to characterize involved actors. We examined the use of historical analogies within articles affiliated to the Crimean crisis between Russia and the Ukraine in 2014. We analyzed more than 500 newspaper articles (Frankfurter Allgemeine Zeitung) in order to determine which concrete historical analogies were used and how the usage varied during eight weeks.

By the content analysis of the newspaper articles we mainly detected analogies referring to war (e.g., War of Georgia 2008), of course. This almost unique usage of war analogies was intense within the first three weeks of reporting, before decreasing rapidly within the following weeks. An exception was the usage of World War II.

We assumed that most people do not really know all the used historical events in media. So, how does any reference affect individuals then?

Therefore, we inserted the most frequently used analogies as targets in a second study (online survey), and asked participants whether they were familiar with a certain historical event or not. Afterwards, they rated the severity of each event, and documented the parallels between each historical event and the target event: the Crimean crisis. The severity ratings depended on individuals’ acquaintance with an event.

We will discuss the results within the framework of analogical reasoning models and decision making, as well as implications for users and recipients of analogies.

Raising Hidden Profile Solution Rate by Supporting Working Memory Processes with Touch Technology

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It is a well-established finding that, for groups and individuals alike, decision-making is impaired when information to-be-considered is distributed as a hidden profile (HP, Stasser & Titus, 1985). This might be attributable to limitations in working memory (WM), which is tasked with storing initial information as well as with integrating and structuring incoming new information properly during a HP task (Mojzisch, Krumm, & Schultze, 2014). Thus, supporting these WM processes by unburdening WM might raise decision quality. To gain insights into the relation of WM and HP performance, we aimed to support the required WM processes by providing adequately designed functionalities on a touch device (a multi touch table, MTT). To this end, a HP personnel selection task was adapted to an individual setting, and was implemented in three conditions (n = 38 each): In the baseline condition, information was displayed on the MTT in a classical HP setup (all information available, no structure, repeated information discernible), thus requiring maximal integration and structure effort in WM. In contrast, participants in the low-support condition received an integrated HP version (all information available, no structure, repeated information integrated), reducing integration effort, and those in the high-support condition were enabled to structure the integrated HP version according to their own criteria, reducing integration and structuring effort in WM. As expected, individuals with support outperformed those in the baseline condition, presumably due to the unburdening of WM (as indicated by observed differences in the decision quality of high- and low-WM participants). That is, the proportion of correct decisions was higher in the support-conditions compared to the baseline condition. To further substantiate the WM-explanation, we focus on the role of WM-load in follow-up experiments. With increasing MTT-support, we expect WM-load to exert less influence on decision quality.

Talk Session: Executive functions

Time: Tuesday, 28/Mar/2017: 4:40pm - 6:20pm · *Location:* E03
Session Chair(s): Laura Steenbergen

The effect of executive functions on metacognitive monitoring: Evidence from an introspective Stroop experiment.

Donna Bryce

University of Tübingen, Germany

While there has long been an assumed relationship between executive functions and metacognition, most previous attempts to investigate this relationship have measured each skill separately and assessed their relatedness statistically. Here, the hypothesis that metacognitive monitoring (also referred to as ‘introspection’ in the field of consciousness research) is specifically limited in situations that make high demands on executive functions was tested. Thus, using an introspective version of a classic executive function task (the color-word Stroop) the accuracy of participants’ metacognitive monitoring regarding their own executive function skills was examined. In this task, executive function demands were manipulated via the proportion of congruent trials, and general task

difficulty was manipulated via font color saturation. Participants provided an estimate of their own reaction time after every trial. It was expected that metacognitive monitoring would be less accurate in conditions that made greater demands on executive functions but unaffected by other increases in task difficulty. Participants were able to report all the observed experimental effects via their reaction time reports. Interestingly, correlational analyses indicated that increasing executive function demands improved, rather than hindered, monitoring accuracy.

High body mass index is associated with impaired reactive task-switching

Laura Steenbergen, Roberta Sellaro, & Lorenza Colzato

Cognitive Psychology Unit, Leiden University and Leiden Institute for Brain and Cognition, The Netherlands

The prevalence of weight problems is increasing worldwide. There is growing evidence that high body mass index (BMI) is associated with frontal lobe dysfunction and cognitive deficits concerning cognitive control. The present study aims at extending these observations to cognitive flexibility, the ability to display efficient task-switching. Normal weight (BMI < 25) and overweight (BMI ≥ 25) university students performed a task-switching paradigm that provides a relatively well-established diagnostic measure of proactive versus reactive control with regard to cognitive flexibility. Compared to normal BMI, high BMI was associated with increased switching costs in the reactive switching condition (i.e. short preparation time), representing reduced cognitive flexibility in the preparatory domain. The present findings are consistent with and extend previous literature showing that high BMI in young, otherwise healthy individuals is associated with less efficient cognitive control functioning.

Narcissistic cognition in anger: relationships between grandiose and vulnerable narcissism, anger, intelligence and executive control

Oliwia Maciantowcz

University of Warsaw, Poland

In reference to the latest research on cognitive regulation of anger and hostility, this paper attempts to demonstrate the specificity of grandiose and vulnerable narcissism in the context of cognitive regulation of aggression exploring relationships between human cognitive resources, emotional state of anger and traits of narcissism.

Two studies among Polish adults were conducted to explore above relationships. First study (N=275) showed that vulnerable narcissism is connected with lower performance in fluid intelligence test (Cattell's test). Further analysis showed that this relation is fully mediated by higher self-reported state of anger. Second study's (N=72) aim was to explore this relation focusing of executive control (antisaccade tasks). Not only individuals higher on vulnerable narcissism were exhibiting greater anger and lower executive control capacity, but level of executive control turned out to moderate anger-vulnerable narcissism relationship. Vulnerable narcissism predicts anger only in individuals with lower and medium executive control resources. High level of executive control inhibits vulnerable narcissism tendency toward anger.

These findings might be crucial for understanding narcissistic aggression and also for differentiation of two types of narcissistic personality in that matter.

Symposium: Current research on metacognition

Time: Wednesday, 29/Mar/2017: 9:20am - 10:50am · *Location:* HS 401
Session Chair(s): Monika Undorf

Extending the font-size effect in metamemory to very small and very large fonts

Malte F. Zimdahl, Monika Undorf

University of Mannheim, Germany

People judge words printed in a larger 48-point font size as more memorable than words printed in a smaller 18-point font size, although font size does not affect memory performance (e.g., Rhodes & Castel, 2008). A recent study (e.g., Mueller, Dunlosky, Tauber, & Rhodes, 2014) showed that this font-size effect is based on metacognitive beliefs (i.e., deliberate applications of the belief that larger words are easier to remember than smaller words) rather than on perceptual fluency (i.e., the ease of perceiving stimuli). The current study investigated whether the same is true when the font-size manipulation has a large effect on perceptual fluency. We assessed judgments of learning (JOLs), recall performance, and lexical decision times for words presented in 48 different font sizes between 6 point and 500 point. Results revealed that JOLs increased linearly with font size. In contrast, lexical decision times followed a U-shaped distribution, indicating low fluency for words presented in extreme font sizes and higher fluency for words presented in intermediate font sizes. Notably, recall performance also increased with font size. These results demonstrate that metacognitive beliefs underlie the font-size effect when font sizes clearly differ in perceptual fluency. Moreover, the results reveal that people's font-size belief was ecologically valid.

Consistency illusion in source monitoring: A-priori beliefs or in-the-moment experience?

Marie Luisa Schaper[1], Beatrice G. Kuhlmann[2], Ute J. Bayen[1]

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People judge their source memory to be better for schema-consistent information (e.g., oven in the kitchen) versus inconsistent information (e.g., toothpaste in the kitchen; Schaper, Kuhlmann, & Bayen, under review). However, several studies found a memory advantage for schema-inconsistent sources (e.g., Küppers & Bayen, 2014). We investigated whether this metacognitive consistency illusion is based on a-priori beliefs (Mueller, Tauber, & Dunlosky, 2013) or in-the-moment experiences (Undorf & Erdfelder, 2015). Prior to the experiment, we assessed participants' beliefs concerning schema-consistent and inconsistent sources. Participants then studied object label items that were presented with scene labels as sources. Items were either presented with their consistent scene or with their inconsistent scene. After each trial, participants were asked to make a Judgment of Source (JOS, i.e., to predict their likelihood of remembering the scene of an object). A-priori beliefs showed that 30% of participants predicted an inconsistency effect on source memory, whereas 53% predicted a consistency effect. Both groups showed a consistency effect on JOSs. However, this effect was more pronounced in those who had initially believed in a consistency effect. Our results suggest that while a-priori beliefs partially influence JOSs, in-the-moment experiences, such as ease of processing (e.g., Undorf & Erdfelder, 2015), also play a crucial role in JOS formation.

Effects of perceptual disfluency on metacomprehension of texts

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One aim of metacomprehension research is to enhance monitoring accuracy, resulting in improved control and comprehension (Dunlosky & Lipko, 2007; Dunlosky et al., 2005). Monitoring can be assessed by judgments that are based on different cues (Koriat, 1997), e.g., fluency. If a text is printed in a disfluent font type learner's judgments should be lower than for a fluent text, overconfidence should be reduced, and judgment accuracy should be enhanced. Furthermore, comprehension of learners whose judgments are more accurate should be improved.

University students (N = 109) learned either with four fluent (Times New Roman) or disfluent (Mistral) texts. The texts were shown for two seconds and Ease of Learning (EOL) judgments were obtained. Then, students read the texts for a first time, made Judgments of Learning (JOLs) immediately after each text, and selected texts for rereading. Afterwards their knowledge was tested with Retrospective Confidence Judgments (RCJ) following each item. Then, students again selected texts for rereading, and afterwards students in both groups reread the texts in a fluent font type. Eye-movements were tracked during reading and rereading. Finally the knowledge test had to be filled in again.

In the first reading phase, students in the fluent group made accurate EOLs, whereas students in the disfluent group were underconfident. Within-person correlations gamma showed that the JOLs significantly predicted termination of study in the rereading phase, but did not affect text selection. In the rereading phase, study times were not different between groups, but students in the disfluent group had longer fixations than students in the fluent group. We found no differences between groups in knowledge gain from the first to the second knowledge test.

Disfluency reduced only the magnitude of EOLs but not of JOLs or RCJs. Thus, disfluency might no longer be a dominant cue when other cues like the content of the texts come into play. Therefore, neither absolute accuracies of JOLs and RCJs differed between the groups nor did the knowledge gain. Anyway, we found that JOLs predicted time of rereading. Moreover, there is evidence for differences in control (i.e. fixation duration) between groups in the rereading phase. Thus we suggest that further research should use more fine-graded measures of control that reading time.

Neuronal correlates on proactive inhibition – metacognitive view

Barbara Drüke, Stephanie Antons, Siegfried Gauggel, Ferdinand Binkofski, Maren Böcker

RWTH Aachen University, Germany

During information processing cues give relevant information which may be helpful or necessary to solve a task and to optimize own actions. The processing of these cues requires some kind of metacognitive knowledge of how someone can deal with the cue and the task, respectively. This knowledge should result in the use of different strategies depending on the cue. Therefore, we aimed to investigate the neuronal correlates of a proactive inhibition task, which highly demands strategic action.

Methods: N=20 male participants performed a proactive StopChange Task in order to investigate preparation processes for different actions. During their performance participants were measured with fMRI (3T). The task consists of Go and Change trials

which were cued with three different types (secure knowledge, no foreknowledge, foreknowledge).

Results: Preliminary results indicate brain activation during preparation phase in similar areas as during action phase, especially if the cue was unspecific (no foreknowledge). We hypothesize that participants use different metacognitive strategies depending on the type of cue.

Symposium: The concept of lying

Time: Wednesday, 29/Mar/2017: 9:20am - 10:50am · *Location:* 101
Session Chair(s): Alex Wiegmann

Bald-faced lies in focus. Comparing recent experimental findings

Jörg Meibauer

Johannes Gutenberg Universität Mainz, Germany

Bald-faced lies seem to be lies that lack a typical property of genuine lies, namely the intent of the speaker to deceive the hearer. For instance when the scared witness in court asserts that he did not see the defendant committing the crime (while in fact he did) for fear of being harmed by the defendant or members of his gang, then he lies but has no intention to deceive the jury (Carson 2010). Quite the contrary, he wants to jury to become aware of his move. Taking such and similar examples as evidence, several scholars propose that the intention to deceive should not be part of a proper definition of lying (Sorensen 2007, Carson 2010). In contrast to this “non-deceptionist” approach, it has been argued by (more traditional) “deceptionists” that bald-faced lies are either no real lies (Meibauer 2014) or that they are connected to an intention to deceive (Lackey 2013). This paper reports a questionnaire study (Meibauer 2016) in which participants were asked whether target utterances in eight cases of putative bald-faced lies were (i) lies, (ii) were deceptive, (iii) and were brazen. Overall, bald-faced lies were considered as lies and as deceptive. Results (i) and (ii) speak against deceptionists and non-deceptionists. With respect to brazenness, participants clearly distinguished between brazen and non-brazen utterances. This shows that the degree of brazenness is an important property of bald-faced lies. By and large, Rutschmann & Wiegmann (to appear) report similar results. In their analysis, all bald-faced lies were rated as lies, and participants ascribed an intention to deceive to these bald-faced liars. However, there was one exception. A special type of bald-faced lie, namely the so-called indifferent lie (as showing up under special circumstances, e.g. games) was not regularly associated with an intention to deceive, i.e., the rules of the games were rated as more important. I will argue that this special type of bald-faced lie should not be taken as decisive evidence against deceptionism. Finally, although the participants judged all bald-faced lies as morally wrong, I will propose that aspects of the motives of bald-faced liars (with respect to their motives, the degree of brazenness, etc.) should have an impact on morality ratings.

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Empirically investigating the concept of lying

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Lying is a moral phenomenon that we encounter almost every day and on several levels. Since lying is such an important moral category, it does not come as a surprise that there has been a lot of empirical research about lies, for example about how to detect lies and the time children start telling lies (Vrij, 2008; Xu, Bao, Fu, Talwar, & Lee, 2010). Given that these areas of research on lying all assume a concept of lying and taking into account that philosophers have argued a lot about the right definition of lying - especially in the sense that it adequately captures people's use of this concept - it is quite surprising that there has been only very little empirical research about the concept of lying (Arico & Fallis, 2013; Carson, 2006; Williams, 2002).

Our aim is to fill this gap by developing an empirically adequate account of people's concept of lying. In this talk we focus on the addressee of a statement and the question whether lying is possible without an intention to deceive.

According to Mahon's (Mahon, 2008) addressee condition, lying requires that a person make an untruthful statement to another person. We want to examine to which kind of addressees you can lie to. It seems clear that you can lie to a "standard" person, but what is about the following addressees? A person who only speaks and understands a foreign language, an insane person, a person with dementia, a person in a coma, a 3-year old, a drunk person, a baby, a dog, a goldfish, an ape, a robot and a computer. What role does it play whether the agent believes that the addressee understands the statement? What about cases in which the agent believes that the addressee is a person who can understand her but when in fact, there is no addressee at all (dreaming, hallucinating, being on drugs, wax figure) or the addressee does not receive the statement (mobile phone connection breaks before the untruthful statement is made, SMS is sent to the wrong addressee or is not received by the addressee)?

The Intention to Deceive the Addressee Condition requires that a person make an untruthful statement to another person with the intention that that other person believes that untruthful statement to be true. Here, we present cases that were considered as lies but in which the intention to deceive was absent and consider cases in which not telling the truth is part of the game (magic shows, science fiction, etc.).

Children's concept of lying

Marina Josephs[1], Alexander Wiegmann[2], Jana Samland[2]

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Consistent with a prominent philosophical definition of lying, recent empirical research with adults has shown that one important component of lying requires that the person makes a statement that she believes to be false (Mahon, 2008; Wiegmann et al., 2016). Thus,

adults mostly ground their judgment on the person's intent and hence her mental states rather than whether the statement was actually false. In the current study, we were interested in the development of such a concept of lying. Do already preschoolers share our adult intuitions? Or does their concept of lying start of to be objective, reality-based and switches to a more subjective one later on? Studies on children's definition of lying are still rare, as most developmental research has mainly focused on the time children become sophisticated liars themselves (e.g., Sodian & Frith, 1992). The one set of studies to date suggest the latter developmental path: children first just compare whether the statement mis-/matches reality and only around the age of 6 to 8 do they start considering the person's perspective (Wimmer et al., 1984, 1985). While these studies offer first important insights, unfortunately they lacked one important condition to really get at the core of the philosophical definition of lying: does a person lie if she had a false belief and thus gives a reality-based statement despite having deceptive intentions? The current study aims at filling this gap. 5- and 8-year-old children are presented with scenarios in which they are asked to evaluate whether agent A lied to agent B. Between conditions we manipulate a) whether agent A said what she believes to be true or false and b) whether agent A had a true or false belief about reality. Additionally, we compare situations where the agent's lying has a bad intention (a boy lying to his sister because he does not want to share his toys) or a good intention (a boy lying to the thief about the location of grandma's jewelry). Data collection is still ongoing.

Lying and illocutionary acts

Neri Marsili, Miklos Kurthy

University of Sheffield, United Kingdom

According to a standard definition, a speaker lies if and only if she asserts what she believes to be false. Formally:

S lies to A about p iff:

1) S asserts p

2) S believes ~p

Let us call (1) the assertion condition and (2) the insincerity condition. According to the assertion condition, only assertions can be lies. However, it seems that some speech acts other than assertions can be lies, when they are insincere. For instance, it seems that (a) can be a lie if the speaker is insincere, whereas (b) can be defective in many ways, but under no circumstances can it be appropriately called a lie.

(a) I promise that I will clean the toilet

(b) I order you to clean the toilet

The problem of which speech acts other than assertions can count as lies is an open research problem that has been almost ignored in the literature. Arguably, all is needed is a revision of the existing definition, rather than an utterly new one. The assertion condition needs to be broadened, to capture the set of illocutionary forces that can qualify as lies. Moreover, since different illocutionary forces express different attitudes (i.e. not only beliefs), the insincerity condition needs to be amended too, to track the different attitudes expressed by different forces.

In this paper, we present a proposal to expand the definition, employing the speech-act theoretic framework developed by Searle (1969) and Searle & Vanderveken (1985). Broadly, the idea is that the performance of a speech act can entail the performance of an assertion, and that a speech act can count as a lie only when such an entailment occurs

(and the speaker lacks the attitude expressed by the speech act). In simple terms, we suggest to revise the definition as follows:

In performing a speech act Σ with content p, S lies to A about p iff:

(1) Σ entails an assertion that p

(2) S lacks the propositional attitude expressed by Σ

We conducted a preliminary study to test some of the predictions of this account against laypeople's intuitions. Unlike the traditional definition, this account shows great promise in making correct predictions concerning ordinary intuitions, e.g. that an insincere utterance of (a) is a lie, while the insincere utterance of (b) is not. The second part of the talk will be devoted to the presentation and the discussion of these results.

Talk Session: Music cognition

Time: Wednesday, 29/Mar/2017: 9:20am - 10:50am · *Location:* 103
Session Chair(s): Christian Kaernbach

The Influence of Tonality and Visual Display on Experts' Processing of Musical Notation

Lucas Lörch

Universität Mannheim, Germany

During the thousands of hours of practice it takes for musicians to reach expert performance, they repeatedly encounter note material that is tonal, as well as displayed according to certain conventions. It is assumed that the process of reading and understanding musical notation is facilitated by those regularities, because they support eye movement planning (Reingold & Sheridan, 2011), the grouping of multiple notes into perceptual units (visual chunking, Bartram, 1978), and the automatic activation of abstract musical information (cognitive chunking, Chase & Simon, 1973b). To assess this assumption, music students performed a silent reading pattern-matching task with sequentially presented melodies, while their eye movement was tracked. The melodies varied on the two factors tonality (tonal vs. atonal) and visual display (regular display vs. irregular display); and differences in the behavioral measures (reaction time, sensitivity, response bias) and the eye tracking measures (number and duration of fixations, number and distance of saccades) between the different types of melodies were analyzed. Tonality and visual display had a significant and strong influence on reaction time and sensitivity. The eye movement was only weakly influenced by the visual display of the notes. Future studies should investigate the crucial aspects of both regularities and the exact conditions of the underlying mechanisms.

Musicians and non-musicians both show a Familiarity Effect for eighth notes in the N1, N2p and P3 component

Linda Becker

Technische Universität Chemnitz, Germany

The Familiarity Effect (FE) describes the phenomenon that it is easier to find an unfamiliar element in familiar elements than vice versa (Frith, 1974). In most cases, the FE was reported for letters, but first attempts were made to show that the FE can also be found for objects (Wolfe, 2001). The aim of the present study was to examine whether the FE can also be found for eighth notes and whether the strength of the FE differs between

musicians (who are highly familiar with notes) and non-musicians (who should be less familiarized with musical stimuli). Furthermore, it was examined at which component of the event-related brain potential the FE occurs.

47 subjects (22.8 ± 4.0 years, 29 musicians, 18 non-musicians) participated. The stimuli consisted of lines with 21 elements that were either eighth notes or vertically mirrored eighth notes. A target element was present in half of the trials and could occur at 0°, ±0.9° or ±1.8°. Reaction times (RTs), sensitivity (d‘) and three ERP components (the N1, N2p, P3) were recorded.

For both groups, strong FEs were found in the behavioral data (d‘ and RT: $p < .001$). No differences in the strength of the FE were found between the musicians and the non-musicians. For both the musicians and the non-musicians, the FE was found for the N1 (at ±1.8° only; $p < .05$, $\eta p2 = .09$), for the N2p ($p < .001$, $\eta p2 = .53$) and for the P3 component ($p < .001$, $\eta p2 = .55$).

It could be shown that the FE can also be found for symbolic stimuli like eighth notes. The missing difference in the strength of the FE between the musicians and the non-musicians was unexpected. It is concluded that both groups were highly (to the same amount) familiarized with eighth notes. For both groups, the FE occurred in the early, middle and late time range of the visual processing and under the same electrodes. Thus, the same processing mechanisms were involved.

Hemispheric differences between left and right supramarginal gyrus for pitch and rhythm memory

Nora K. Schaal[1], Bettina Pollok[2], Michael J. Banissy[3]

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Functional brain imaging studies and non-invasive brain stimulation methods have shown the significance of the left supramarginal gyrus (SMG) for pitch memory. The extent to which this brain region plays a crucial role in memory for other auditory material remains unclear. Here, we sought to investigate the role of the left and right SMG in pitch and rhythm memory in non-musicians. Anodal or sham transcranial direct current stimulation (tDCS) was applied over the left SMG (Experiment 1) and right SMG (Experiment 2) in two different sessions. In each session participants completed a pitch and rhythm recognition memory task immediately after tDCS. A significant facilitation of pitch memory was revealed when anodal stimulation was applied over the left SMG. No significant effects on pitch memory were found for anodal tDCS over the right SMG or sham condition. For rhythm memory the opposite pattern was found; anodal tDCS over the right SMG led to an improvement in performance, but anodal tDCS over the left SMG had no significant effect. These results highlight a different hemispheric involvement of the SMG in auditory memory processing depending on auditory material.

Implicit learning of an artificial harmonic grammar on three different pitch scales: the role of small-integer frequency ratios

Joshua Lorenzen, Christian Kaernbach

Christian-Albrechts-Universität zu Kiel, Germany

Pitch scales provide an organized category system shared by composers and listeners that facilitates the communication of musical structures. The principles that govern sequential structures in music are often referred to as musical grammar which is argued to be learned by mere exposure to “correct” musical sequences. We tried to shed light on potential connections between pitch scales and the perception of musical structures and asked ourselves whether different musical scales offer more or less good prerequisites for learning a (new) grammar. Three different equal temperaments were compared: octave (1: 2) divided by 12 steps (prevailing tuning in today's Western music), tritave (1:3) divided by 13 steps (also known as Bohlen-Pierce scale), and the double octave (4:1) divided by 21 steps. The participants listened over 30 minutes to 20 blocks of 18 different chord sequences in randomized order. These sequences followed a finite-state grammar of moderate complexity. In the test phase, 15 of the trained 18 sequences were randomly presented with 15 new sequences of the same grammar and 15 ungrammatical sequences, and the participants were asked whether the sequences were old / grammatical, new / grammatical or new / ungrammatical. It was found that the grammar could be transferred to new grammatical sequences for all three scale types. The effect was naturally best for today's prevailing tuning, and worst for the Bohlen-Pierce scale. In further experiments it is to be examined whether these differences are actually due to the numerical ratios of the respective scale.

Talk Session: Goals, intentions, and free choice

Time: Wednesday, 29/Mar/2017: 9:20am - 10:50am · *Location:* 105
Session Chair(s): Yacila Isabela Deza Araujo

Working Memory Support Facilitates the Generation of Free Choices

Christoph Naefgen, Markus Janczyk

Tübingen University, Germany

Background: Free choice tasks are tasks in which two or more equally valid response options per stimulus exist. In investigations on the putative difference between voluntary and stimulus-determined actions, free choice tasks are often used in contrast to forced choice tasks, in which only one response option is considered correct. A robust observation is that of longer response times (RTs) in free compared to forced choice tasks. The results of previous experiments from our lab suggest that the RT difference is not due to a difference in processing efficiency but to additional cognitive processes which take an amount of time independent of the stimulus presented.

Methods: The experiments presented here are part of an investigation into the nature of these processes. Specifically, we investigated whether previously given responses influence new responses through working memory load. To this end, participants performed a free choice task, but were in some conditions provided with an external memory about their previous three or seven responses.

Results and conclusion: Results suggest indeed that working memory plays a role in the generation of free choice responses: In conditions without memory support, free choices were generated slower than in both the low and high memory support conditions, between which no difference was observed.

Subjective freedom in decisions follows an outcome model rather than processing conditions of free choice

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While free will is disputed in psychology, philosophy and neuroscience, hardly anybody questions that we have subjective perceptions of freedom or control. However, does subjective freedom accord to objectively-defined process features of free choice, or does it rather follow the less lofty notions of positive outcomes and success?

Several experiments tested this question by manipulating structural parameters of free choice in scenarios and simulated decisions, while measuring the effects on self-report scales referring to the decision and asking about the subjective experience. We will exemplify the methods and consistent results on two experiments in detail. The manipulations of process freedom comprised higher choice complexity; a gradual increase in balance, and thereby conflict, of alternatives in naturalistic choices; positive versus negative outcomes; as well as the experience of success or loss over multiple but factually identical decisions.

The results consistently supported the outcome model. Increased complexity and conflict led to higher uncertainty and lower predictability of choices, but also to less experienced freedom. Experienced freedom was high in simple decisions with a clear dominant alternative and when positive outcomes were experienced or could be confidently expected. Moreover, we found no relation between the subjective freedom and the amount of choice or the responsibility for consequences. These outcome model findings could be validated further via qualitative measures.

We conclude that the experience of freedom is contingent on fluent, confident and successful action, but not on process features of free choice, which often entail effort, difficulty and ambiguity. We will sketch ongoing research on this finding and discuss the implication of a bias in subjective perceptions of freedom in action and decision-making.

Cognitive control across age: Task intentions and their implementation into actions

Edita Poljac[1,2], Rianne Haartsen[2,3], Renske van der Cruijsen[2,4], Andrea Kiesel[1], Ervin Poljac[2]

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Background: Various studies have demonstrated that cognitive control capacities are affected by age. Interestingly, influences of age are not uniform for the different components of cognitive control. The current study was designed to investigate how age modulates cognitive control at two different levels: the level of task intentions and the level of the implementation of intentions into the corresponding actions. In particular, we were interested in specifying how age modulates voluntary task choice (intentions) and task switching abilities (their implementations).

Methods: Seventy-four participants were assigned to one of four age groups (early and late adolescence; early and later adulthood). Participants chose between two simple cognitive tasks at the beginning of each trial before pressing a spacebar to indicate that the task choice was made. Next, a stimulus was presented in one of three adjacent grids, and the participants identified either the location (task 1) or the shape (task 2) of the

stimulus, depending on their task choice for that trial. This voluntary task-switching paradigm allowed us to investigate the intentional component (task choice) separately from its implementation (task execution).

Results: We observed age-related changes for both task choice and task execution. Specifically, although all participants showed a tendency of repeating tasks more often than switching between them, this repetition bias was significantly stronger in early adolescence than in any other age group. Furthermore, participants generally responded slower after task switches than after task repetitions. This switch cost was similar across tasks in the two adolescence groups, but larger for the shape than for the location task in the two adult groups.

Conclusion: Together, our results demonstrate that both task intentions and their implementation into actions change across age in quite specific ways.

Thinking about what is important: Mind-wandering episodes used for maintenance of future task goals

Lena Steindorf, Jan Rummel

Heidelberg University, Germany

Mind-wandering is mostly studied for its negative effects on ongoing cognitive tasks, revealing its intrusive nature concerning current task goals. However, this study focusses on the constructive nature of off-task thoughts which could also be used in a goal-directed manner: Rehearsing a shopping list from time to time might prove helpful later in the store. We asked participants to study twenty grocery-items for a cued-recall test. After cued recall of ten items, participants were either told that they had finished the recall task or that it was interrupted for another task, activating a relevant future task goal in the latter condition. All participants then performed a 2-back task during which thought contents were repeatedly probed. Participants with a future task goal in mind showed both a stronger and a more continuous engagement in goal-related rehearsal thoughts during mind-wandering episodes. Also, cued recall of the remaining ten grocery-items was better for participants with an active future task goal, revealing the success of rehearsal during mind-wandering episodes and the adaptiveness of goal-related off-task thoughts.

Talk Session: Neurobiology of motivation and decision-making

Time: Wednesday, 29/Mar/2017: 9:20am - 10:50am · *Location:* HS 304
Session Chair(s): Anni Richter

The effects of serotonin transporter polymorphism (5-HTTLPR) and acute tryptophan intervention on value based decision making

Philipp T. Neukam[1], Nils B. Kroemer[1], Yacila Isabela Deza Araujo[1], Lydia Hellrung[2], Shakoor Pooseh[1], Marcella Rietschel[3], Stephanie Witt[3], Uwe Schwarzenbolz[1], Thomas Henle[1], Michael N. Smolka[1]

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Background: Serotonin (5-HT) plays an important role in different decision making processes. In a recent computational framework it has been proposed that tonic 5-HT levels (together with DA levels) code the average outcome. Increased 5-HT should

decrease average outcome and thereby decrease opportunity costs of time. Accordingly, we expect that high 5-HT levels decrease temporal discounting, increase discounting rates for gains and losses and increase loss aversion. The goal of the present study was to test those hypotheses and account for possible contributions of the 5-HTTLPR genotype which is a known moderator of 5-HT functioning.

Methods: In baseline session, a total of 611 participants completed a value based decision making (VBDM) battery and gave a blood sample to obtain their 5-HTTLPR genotype. Participants having a genotype with either low or high functional transcriptional efficiency were re-invited to participate in the second part of the study. 160 participants volunteered in the double-blinded, placebo-controlled, cross-over main study and were randomly assigned to acute tryptophan depletion (ATD), loading (ATL) and balance (BAL) conditions. They completed an intertemporal choice (ITeCh) task, a probability discounting task for gains/losses (PDG/PDL) and a mixed gambles (MGA) task.

Results: We found that ATD increased risk aversion in PDG compared to ATL ($F_{1,92} = 5.56$, $p = 0.02$), although this effect does not survive a Bonferroni correction for multiple comparisons across tasks (99% CI [-0.4735 0.0013]). No other significant effects of intervention and/or genotype reached significance.

Conclusions: Our results do not support a strong role for 5-HT in value based decision making which may be related to the tryptophan intervention that is estimated to have a modest effect and interacts with other neurotransmitter systems as well, therefore masking potential effects of 5-HT.

This research was funded by the Deutsche Forschungsgemeinschaft (DFG) grant SFB 940/1.

L-DOPA Reduces Model-Free Control of Behavior by Attenuating the Transfer of Value to Action

Nils B. Kroemer[1], Ying Lee[1], Shakoor Pooseh[1], Ben Eppinger[1,2], Thomas Goschke[1], Michael N. Smolka[1]

[1]Technische Universität Dresden, Germany; [2]Concordia University, Montreal, Canada

Background: Goal-directed actions require considerations along at least two dimensions. First, is it worth the effort needed to obtain the goal (i.e., the allocation of vigor)? Second, within a volatile environment, is it still worthwhile to pursue the same goal after some time (i.e., reinforcement learning)? While there is mounting evidence each supporting the role of dopamine in action control and reinforcement learning, little is known about how these two aspects go hand in hand to support dynamic control of behavior. Here, we tested if increases in dopamine tone by administration of L-DOPA upregulate deliberative “model-based” control of behavior or reflexive “model-free” control as predicted by dual-control reinforcement-learning models. Alternatively, L-DOPA may impair learning as suggested by “value” or “thrift” theories of dopamine.

Methods: We employed a two-stage Markov decision-task in 65 healthy adults, who were sampled to be representative of the general population. We investigated the effect of L-DOPA (randomized cross-over) on behavioral control while brain activation was measured using fMRI.

Results: L-DOPA led to attenuated model-free control of behavior as indicated by the reduced impact of reward on choice and increased stochasticity of model-free choices. Correspondingly, in the brain, L-DOPA decreased the effect of reward while prediction-error signals were unaffected.

Conclusion: Taken together, our results suggest that L-DOPA reduces model-free control of behavior by attenuating the transfer of value to action. Hence, increases in dopamine tone may facilitate energy expenditure and, thereby, allow an individual to “escape” their previous reward history. As a result, individuals may embark on a more effortful exploration of available options in the environment, which makes future decision-making appear as more flexible.

Higher body mass index is associated with lower dopamine tone in the nucleus accumbens

Ying Lee, Nils B. Kroemer, Liane Oehme, Bettina Beuthien-Baumann, Thomas Goschke, Michael N. Smolka

Technische Universität Dresden, Germany

Background: Horstmann and colleagues proposed that striatal tonic DA levels could be lower in mildly obese than in normal weight individuals, thus enabling a heightened phasic response to rewards. This may subserve enhanced cue-triggered pursuit of food rewards i.e. food cue reactivity, which is a key risk factor of overeating and excessive weight gain. Supporting this idea, two 18FMT studies have shown that individuals with higher body mass index (BMI) had lower DA synthesis capacity in the caudate. We extended these findings using a larger, older sample with three measures that reflect tonic DA levels, namely 18F-DOPA influx rate constant (kocc i.e. DA synthesis capacity), 18F-DA washout rate (kloss) and effective distribution volume ratio (EDVR= kocc /kloss).

Methods: Data from 60 healthy participants (age: 34.0 ± 3.56 years, BMI: 25.2 ± 3.33 kg/m2, 49 male, 20 smokers) were analysed. Each participant underwent a pre-screening visit when disinhibited eating was measured with the Three Factor Eating Questionnaire. This was followed by a 18F-DOPA PET visit when BMI was also measured. Individual whole-brain PET parameter estimates (kocc, EDVR and kloss) were derived with a reversible-tracer graphical analysis approach. Correlations between BMI and PET measures within the caudate, putamen and NAcc were then assessed.

Results: We found that higher-BMI individuals had lower EDVR in bilateral NAcc and lower kocc in left NAcc. Intriguingly, disinhibited eating in higher-BMI individuals was not associated with striatal DA tone.

Conclusion: Our findings resonate with recent work that showed higher DA receptor availability (reflecting in part lower tonic DA levels) within the ventral striatum, but not in the caudate of higher-BMI individuals. However, the relationships between higher body weight, overeating and striatal DA tone remain to be resolved. This work was supported by the German Research Foundation (DFG SFB 940/1 2012).

People with higher perceived stress show an increased action bias and enhanced pavlovian control in instrumental learning

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Previous findings show that induced stress modulates the control of instrumental action in a reward context in a manner that favors habitual over goal-directed reactions (Schwabe & Wolf, 2009). As studies by Marc Guitart-Masip et al. (2012) have shown, action and

valence interact in instrumental learning. The aim of the present study therefore was to investigate how perceived stress shapes motivated action/inhibition learning. 18 healthy young subjects were tested using the previously described valenced go/no-go learning paradigm in which participants repeatedly displayed an action bias and specifically learned the reward-associated no-go condition significantly worse than all other conditions. Additionally, all participants completed the Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983). A repeated measures analysis of variance with action (go vs. no-go) and valence (reward vs. punishment) as within-subject factors and perceived stress (low vs. high; median split to form a categorical variable) as between-subject factor was calculated. Compared to participants with lower perceived stress levels, the participants with higher perceived stress had an overall worse learning performance, displayed an enhanced bias towards go-responses and showed an increased coupling of action and valence with worse performance in inhibiting a response in the reward context. These results indicate that perceived stress shifts instrumental learning towards stereotyped behavioral responses. The study expands the findings of Schwabe and Wolf (2009) from induced towards perceived acute stress and from a simple to a complex instrumental learning task, and supports the notion that changes in the control of instrumental action under stress may promote dysfunctional behaviors.

Talk Session: Social cognition I

Time: Wednesday, 29/Mar/2017: 9:20am - 10:50am · *Location:* 201
Session Chair(s): Markus Huff

Cross-cultural differences in interpersonal touch and preference for haptic information

Mandy Nuszbaum

FOM University of Applied Sciences, Germany

Individual differences in interpersonal touch (Need for Interpersonal touch) and preference for haptic information (Need for Touch) are shown within different cultural contexts like Germany, Switzerland or the United States (e.g., Nuszbaum, Voss, Klauer, & Betsch, 2010; Nuszbaum, Voss, & Klauer, 2014; Peck & Childers, 2003; Streicher & Esteves, 2016; Webb & Peck, 2015). However, cultural differences have not been explored yet, but expected due to different cultural values, as defined by Hofstede (2001). Within a quasi-experimental design, we compared Chinese and German native speakers. Whereas China is a collectivistic culture, Germany is an individualistic culture (cf. Hofstede, 2001), which could be also confirmed within the present study. Reflecting their collectivistic culture, Asians are very social oriented, but showed at least touch-interaction compared to other nations (Hall & Knapp, 2013). Therefore, we assumed that Chinese native speakers are lower in the Need for Interpersonal Touch than German native speakers. Results confirmed our hypotheses. In the context of individual preferences for haptic information in decision making e. g., in terms of product choice, previous research showed that individualistic cultures tend to impulsive buying behavior, which is associated with a higher (autotelic) Need for Touch. In contrast, collectivistic cultures discourage impulsive buying behavior and thus are associated with lower (autotelic) Need for Touch. Therefore, Chinese native speakers are assumed to be lower in Need for Touch than German native speakers, which can be confirmed within the present study. Beside Individualism-Collectivism, moderation effects of further Hofstede dimensions like Power-Distance, Uncertainty-Avoidance are explored. Theoretical and managerial implications and future research opportunities are discussed.

Shared sensory experience modulates perspective taking process

Beatrix Lábadi

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Background. Previous studies showed that enfacement illusion as a subjective experience evoked by synchronous interpersonal multisensory stimulation (IMS) elicits changes in the mental representation of self-other boundary. In our studies we demonstrate whether shared sensory experiences between two people could alter the way peripersonal space was represented, and whether this alteration could be influenced the ability to take another person's viewpoint in perspective taking task.

Methods. In this study children (8-9 years old) and adults were involved to measure the shared sensory experience effect in a perspective taking task performance varying first person perspective and third person perspective, and location of the target.

Results. The results show that only the the synchronous interpersonal multisensory stimulation facilitate the perspective taking performance and only in those condition when we used third-person perspective. Similar pattern of findings was found for children and adults. Findings suggest that the multisensory integration of the peripersonal space can be dynamically modulated by the social interactions with partners and contribute to the mechanism of social cognition such as understanding others' actions, and predicted better understanding others' perspective.

Conclusion. The shared multisensory experiences between self and other, even in childhood, can change the perceived similarity of others relative to one's self which resulted a better taking perspectives of others.

It's all in your head: How putative sender identity modulates processing of socio-emotional language feedback

Johanna Kissler, Sebastian Schindler

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Background: A statement's personal significance depends on the communicative context. Across three studies, we investigated how the implied source of evaluative feedback alters cortical processing.

Methods: Brain event-related potentials (ERPs) were recorded as participants read word-streams consisting of positive, negative, and neutral trait adjectives, supposedly representing feedback from another human or generated by a computer. In experiment 1 the computer was portrayed as acting randomly, in experiment 2 it was portrayed as a socially intelligent system and in experiment 3 two human partners, a fellow student or a psychotherapist were said to give feedback. Actually, no interaction partner was present and feedback was always random.

Results: All experiments revealed strong effects of perceived sender and content. In experiment 1, the notion of receiving feedback from a human amplified the P2, the early posterior negativity (EPN) and the Late Positive Potential (LPP). Differences were localized in visual areas, particularly bilateral fusiform gyri. In experiment 2, sender effects were delayed, starting only with the P3. Again, sender effects were localized in the fusiform gyri, but sender identity further modulated superior frontal, anterior temporal, and sensorimotor regions. In experiment 3 the notion of an expert interaction partner accelerated feedback processing, sender effects starting with the N1. Both visual and

social brain activity further increased when participants thought they were interacting with a psychotherapist.

Conclusion: Results specify how the mere notion of different interaction partners alters the processing of identical messages in visual and social brain regions testifying to the importance of social attributions in information processing.

They Saw One Game: Retrospective Judgments, Not Online Processing is Biased by Fandom

Markus Huff[1], Frank Papenmeier[1], Annika Maurer[1], Tino Meitz[2], Bärbel Garsoffky[3], Stephan Schwan[3]

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Attitudes and motivations have been shown to affect the processing of visual input, indicating that observers may see a given situation each literally in a different way. Yet, in real-life, processing information in an unbiased manner is considered to be of high adaptive value. Attitudinal and motivational effects were found for attention, characterization, categorization, and memory. On the other hand, for dynamic real-life events, visual processing has been found to be highly synchronous among viewers. Thus, while in a seminal study fandom as a particularly strong case of attitudes did bias judgments of a sports event, it left the question open whether attitudes do bias prior processing stages. Here, we investigated influences of fandom during the live TV broadcasting of the 2013 UEFA-Champions-League Final regarding attention, event segmentation, immediate and delayed cued recall, as well as affect, memory confidence, and retrospective judgments. Even though we replicated biased retrospective judgments, we found that eye-movements, event segmentation, and cued recall were largely similar across both groups of fans. Our findings demonstrate that, while highly involving sports events are interpreted in a fan dependent way, at initial stages they are processed in an unbiased manner.

Talk Session: Teaching and instruction

Time: Wednesday, 29/Mar/2017: 9:20am - 10:50am · *Location:* 204
Session Chair(s): Maria Wirzberger

The influence of age coherence between pedagogical agents and verbal information on learning and cognitive load

Maik Beege, Sascha Schneider, Steve Nebel, Günter Daniel Rey

Technische Universität Chemnitz, Germany

Pedagogical agents are used more frequently in digital learning environments. On the basis of the computers-as-social-actors paradigm (CASA), learners do not differentiate between the interaction with these characters and any other human social interaction. Therefore, the appearance of pedagogical agents is vulnerable to stereotyping mechanisms such as ageism. In addition, research suggests that the activation of stereotypes depends on the context of accompanied verbal information as well. In this study, participants were randomly assigned to one cell of a 2 (stereotype of the agent: young vs. old) × 2 (stereotypical priming within the text: young vs. old) between-subjects factorial design in order to examine if stereotypes impact learning processes. Besides retention and transfer scores, cognitive load data of learners were collected. Results

revealed that transfer performance is only enhanced when agents and texts together activate either old or young stereotypes, whereas retention performances was not affected by the manipulation. In addition, the manipulation did not result in differences of any cognitive or motivational scores. Results can be explained by the coherence principle which postulates that information of different media should be congruent in order to foster process fluency.

”Natural” Restudy Versus Testing – the Disappearance of the Testing Effect under Ecologically Valid Study Conditions

Kathrin Johanna Emmerdinger, Christof Kuhbandner

Universität Regensburg, Germany

The concept of evidence-based education suggests that educational practice should be based on evidence derived from experimental research. One prominent example of such a strategy is the recommendation, advocated by memory researchers, that the testing of studied contents is a simple and powerful strategy to enhance long-term knowledge. This recommendation is based on experimental studies, demonstrating that testing promotes better long-term retention than restudying (i.e., testing effect). However, a closer look reveals that the observed benefit of testing over restudy may stem from the fact that participants are typically forced to restudy materials in an artificial way that is not found in real-life learning. In order to control for individual differences in strategies applied during restudy, participants are asked to simply reread to-be-learned materials repeatedly. Thus, the question arises whether the testing effect remains robust when compared to a more ecologically valid restudy condition. To examine this question, 240 participants were either asked to restudy previously learned texts by repeatedly rereading the texts (classical restudy condition) or by using their habitual restudy strategies (natural restudy condition), and the effects were compared with a testing condition. A test after one week showed that testing was more effective when compared to the classical restudy condition. However, the testing effect completely disappeared when comparing testing with the natural restudy condition. These results demonstrate that findings from experimental research cannot easily be transferred to real-life educational settings. In experimental settings, it is essential to keep apart causal factors as clearly as possible to maximize internal validity. In doing so, however, artificially separated conditions are created that may inflate the actual importance of effects for real-life settings where optimal performance is characterized by the interplay of causal factors.

Examining the politeness effect in online learning materials for higher mathematics

Maria Mikheeva, Sascha Schneider, Maik Beege, Günter Daniel Rey

Technische Universität Chemnitz, Germany

Higher mathematics is obligatory for university students in MINT-related subjects. However, the content of such courses is a serious barrier for students since included issues are difficult to understand. This leads to prolonged study times and high drop-out rates. Studies have shown that politeness in multimedia instructions can not only enhance learning outcomes but also the motivation to engage in a learning material. This study investigates if politeness can improve the learning performance of students in an online course which lasts 14 weeks. For this, 197 students were randomly assigned to a 2 (politeness in instructions; polite vs. direct) x 2 (politeness in feedback; polite vs. direct)

factorial, between-subjects design. The learning material contained four chapters of higher mathematics, each followed by a learning test. The experiment consisted of exercises with different topics: Taylor's formula, numerical series, differentials, plane curves, integral calculus, and differential calculus. Students were allowed to finish one chapter per month in a pre-defined order. Results show that students with direct instructions scored significantly higher in chapter 4, whereas all other chapters did not reveal significant differences. In addition, experimental groups with a polite feedback spend more time on exercises from the chapters than groups with a direct feedback. A polite feedback also enhanced learning outcomes marginally. Therefore, direct instructions increase the learning results, whereas polite feedback formulations motivate students to exercise more und led to marginally significant higher scores.

How to design effective multimedia learning materials? Effects of an emotional design

Steffi Heidig[1], Julia Müller[2], Helmut M. Niegemann[3], Susanne Narciss[1]

[1]TU Dresden, Germany; [2]University of Erfurt, Germany; [3]Saarland University, Germany

Previous research into multimedia learning has mainly focused on cognitive factors to investigate different instructional conditions and design principles. Emotional factors have so far been widely neglected. However, recent studies showed that the emotional design of multimedia learning material (the usage of warm colors and round face-like shapes) can evoke positive emotions in learners that in turn facilitate the learning process. Following this lead, our study aims to further explore the potential of an emotional design. We seek to differentiate the current findings by systematically deducing emotionally relevant design features using concepts from web design (e.g., visual aesthetics of interfaces), and also taking into account negative emotional states. German college students (N=334) were assigned to one of nine conditions, created by two design factors (classical vs. expressive aesthetics), each with two levels (high vs. low) and a usability factor (high vs. low usability) as well as a control group (no color/gray scale). Unexpectedly, our manipulation failed – despite theoretical deduction of the design features and thorough pre-testing. Subsequent regression analyses revealed that the perceived aesthetics and usability positively affected the emotional states of the learners. Learners' emotional states had a minor impact on learning outcomes but a larger impact on learners' intrinsic motivation, including the motivation to continue working with the material. The results of the study present a differentiated picture of the relationships between design, emotional states and the learning process. They show that we are only beginning to understand the role of an emotional design in multimedia learning and highlight directions for future research.

Talk Session: Task switching I

Time: Wednesday, 29/Mar/2017: 9:20am - 10:50am · *Location:* HS 403
Session Chair(s): Christina Heitmann

Examining interactions between inhibition and task shifting: Results from a Switching task with flanker stimuli

Gidon T. Frischkorn, Anna-Lena Schubert, Dirk Hagemann

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Executive functions are basic processes for various cognitive abilities such as working memory or intelligence. Typically three different executive functions are differentiated,

namely shifting, updating, and inhibition. Although correlational analyses have revealed that these three executive functions are related, the question in how far these executive functions affect each other beyond correlational relations remains largely unresolved.

The present study explored interrelations between the executive functions shifting and inhibition. For this, participants completed a Shifting task with additional flanker stimuli that could be congruent, incongruent or neutral with respect to the target stimulus. This experimental manipulation provides the possibility to assess whether the two executive functions shifting and inhibition are functionally independent or connected to each other. Results showed that flanker stimuli affected both the accuracy and the reaction time of responses to the target stimuli. In detail, incongruent flanker stimuli resulted in lower accuracies and longer reaction times in both trials with and without task shifting.

Although flanker stimuli influenced both accuracy and response times, these effects seemed to be largely independent of task shifting. Thus the two executive functions inhibition and shifting may actually be independent.

"Smart Suppression" as a Solution to the Paradoxical Cost of Multitasking: Meta-Analytic Examination of Rule Suppression Phenomena in Task Switching

Maayan Katzir[1], Bnaya Ori[2], Nachshon Meiran[2]

[1]University of Cologne, Germany; [2]Ben Gurion University, Israel

A challenge in task switching is maintaining readiness to all tasks, creating paradoxical interference from these tasks. "Smart suppression" that targets just the interfering information, provides a partial solution to this paradox. Recently, Meiran, Hsieh, and colleagues (2010, 2011, 2012) found that only the competing task mapping is suppressed, and termed this inhibitory effect 'Competitor Rule Suppression' (CRS). By the same logic, we should expect performance benefit when the competitor task mapping in Trial N–1 remains the competitor task mapping in Trial N. We term this effect 'Competitor Task Mapping Repetition' (CTMR). By re-analyzing 8 studies using Bayesian statistics, we examine whether what is being suppressed when encountering a response conflict (e.g., when having to name the shape of a blue circle) is the entire task mapping (e.g., "IF pink PRESS right, IF blue PRESS left") or an even more specific representation, the currently interfering response rule (e.g., "IF blue PRESS left"). We show that both CRS and CTMR interact with Response (i.e., left or right key), suggesting that the system can recognize the exact source of interference, and inhibit only this source. We thus conclude that the brain uses an even "smarter" suppression than previously thought.

Lemma-based language control in language switching

Andrea M. Philipp[1], Mathieu Declerck[2]

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Switching between languages in language production tasks requires bilingual language control to ensure the production of the correct word in the correct language. This language control is often assumed to change the activation level of languages (i.e., language nodes or language schemas) by activating the relevant language and/or inhibiting the irrelevant language. Yet, next to the language (language node or language schema), bilingual language control is also assumed to affect individual lemmas in order to resolve interference between translation-equivalent lemmas. In the present study, we examined

whether language control occurs between lemmas using a language switching task. Participants practiced either a language or language-specific items prior to a language switching task. The results in the subsequent language switching task showed that language-specific item practice had a larger influence on bilingual language control than practicing only the language. More specifically, practicing language-specific items in the foreign language reversed the switch cost asymmetry as compared to language practice. Typically, the language switch costs (i.e., the performance difference between language switch and language repetition trials) is larger in the more dominant native language than in a foreign language. In the present study, however, the language switch cost was larger in the foreign language than in the native language when language-specific items in the foreign language were practiced beforehand. This data pattern indicates that practicing language-specific items increases the activation level of the corresponding lemmas and, as a consequences, influences bilingual language control. Thus, the current study provides evidence that language control is not restricted to language representations, but could also occur between lemmas.

Differential flexibility in goal pursuit: Better ability to switch goals than means

Christina Heitmann, Roland Deutsch

Julius-Maximilians-Universität Würzburg, Germany

In our everyday life, obstacles regularly force us to either switch our goal or the means with which we have pursued the goal. Previous research has focused on either the ability to switch means or to switch goals but never compared means and goal switching ability. As we expected means and goal switching ability to differ, we developed a new method to orthogonally manipulate whether a means switch or a goal switch is required or not. In Experiment 1, participants collected fruits with the help of tools by using key presses. Means and goal switches were cued. In Experiment 2, the topic and the switch induction was changed to achieve higher ecological validity. Participants visited business customers with the help of means of transport. Instead of cues, obstacles indicated the necessity to switch and participants had to search whether a means or a goal switch is possible. The paradigms of both experiments induced significant RT and error switch costs for means and goals indicating that the switching manipulation worked. In addition, goal switch costs were smaller than means switch costs. We explain the facilitated switching of goals by an enhanced effort investment in goal switches because goals are assumed to be more strongly associated with reward than means. This finding contributes to research on context-sensitive adjustment of cognitive control as well as to research on goal pursuit. Furthermore, the development of paradigms in which two stimulus groups can be orthogonally switched and the possibility to induce switches without cues or predefined task sequences extends methods of task and set switching.

Talk Session: Selective attention I

Time: Wednesday, 29/Mar/2017: 9:20am - 10:50am · *Location:* HS 405
Session Chair(s): C. Nico Boehler

Context modulates feature weighting

Christian Frings, Simon Merz, Frank Mast

Universität Trier, Germany

Controlled behavior often requires selective responding to relevant information while at the same time one has to ignore irrelevant information. In many experimental paradigms participants are instructed which stimulus features define relevant information (i.e. target stimuli) and how they should respond to them – forming some kind of 'task set' or 'target-template' with which to weight the target-features. Here we argue that the (experimental) context additionally incorporates features into the task set that are irrelevant for responding but possibly helpful for separating the target from irrelevant stimuli. Variance of such irrelevant selection features leads to higher feature weights for these features furthering the processing of distractor stimuli that carry these features. We showed such a pattern using a flanker task (N = 30) in which context proportions of selection features modulate the impact of stimulus congruency on response compatibility. On a more abstract level this result points to the adaptivity and flexibility of selection processes.

Selective attention to internal vs. external stimuli

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According to attention-to-memory (AtoM) theory, the deployment of attention to sensory input and to representations in long-term memory is governed by corresponding neurocognitive processes. To examine whether similar attentional processes underlie the dynamic selection of sensory and mnemonic stimuli, we compared behavioral costs and benefits across trials in a visual perception task and a task of long-term memory retrieval. In both tasks, participants had to selectively respond to one stimulus from a predefined set of potentially response-relevant stimuli. From trial to trial, we systematically varied whether the composition of this set was repeated or changed as well as whether the relevant stimulus was repeated or changed. Results of both tasks revealed faster reaction times when the set was repeated and when the stimulus was repeated compared to when it changed. Despite these commonalities that speak for a general correspondence of attentional inter-trial effects during visual perception and long-term memory retrieval, there were also remarkable differences between the different attentional domains. Specifically, when an item presented as target in the current trial had to be ignored in the previous trial, behavioral costs, i.e., increased reaction times, emerged in the visual perception task, but behavioral benefits, i.e., increased accuracy, emerged in a corresponding condition of the long-term memory task. We therefore conclude that different inter-trial priming mechanisms might underlie differences in attention to the external world vs. to internal representations.

Peripheral visual motion does not attenuate the Attentional Blink

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The reduced ability to detect the second of two targets in a Rapid Serial Visual Presentation (RSVP) when it appears within 200 to 500 ms after the first one is known as the attentional blink (AB). This effect, according to some theories, results from an overfocussing of visual attention. In line with that explanation, AB has been found to be attenuated if attention is drawn away from the location of the RSVP via outward-moving dots (Arend et al., 2006). In three experiments we tested whether such irrelevant peripheral visual stimulation would also attenuate the AB with more complex stimuli (e.g., faces, objects), which require increased distributed attentional processing. The results revealed a reliable AB in all conditions, irrespective of target complexity. In order to rule out alternative explanations, we replicated and extended the original experiment. The results again revealed a reliable AB with outward-moving dots under all conditions, thus challenging the original findings. Moreover, in a final experiment, we also tested whether the attenuation can be induced by linking the dots with a separate task on some trials. However, again there was no effect of the moving dots, irrespective of their task relevance. In sum, the results of the present study do not support the explanation that the AB results from an overfocussing of visual attention.

Learning biases selective visual attention

Anna Schubö[1], Hanna Kadel[1], Metin Uengoer[1], Tobias Feldmann-Wüstefeld[1,2]

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To handle the huge amount of incoming information, the visual system has to assign priorities to objects in the visual field. Which object is prioritized depends on bottom-up factors defined by physical stimulus properties, top-down factors such as the observer's current intentions or goals, and a third source of selection bias that can neither be accounted for by stimulus properties nor by intentional selection, that has been labeled "selection history" (Awh, Belopolsky & Theeuwes, 2012) and subsumes a number of different phenomena such as intertrial effects, reward history and learning.

We investigated whether associative learning modulated the deployment of visual attention and combined a categorization learning task with an additional singleton visual search task. Event–related potentials and response times revealed attentional deployment, here we focus on visual search task results. Behavioral results showed that color distractors were more disturbing in visual search when color had been predictive in learning. This amplified distraction was due to differential attention deployment, as indicated by the N2pc. N2pc subcomponents NT and PD showed that when color was predictive in learning, color distractors captured attention before they could be actively suppressed. When shape was predictive, color distractors did not capture attention and could be suppressed earlier in time. These results reveal common underlying mechanisms of associative learning and selective attention, and they also establish learning experience as a third bias in attentional selection apart from bottom-up and top-down control.

Symposium: Action-perception dissociations in normal observers, psychiatric patients and patients with cortical blindness

Time: Wednesday, 29/Mar/2017: 9:20am - 10:50am · *Location:* HS 301
Session Chair(s): Guido Hesselmann, Marcus Rothkirch

Oculomotor responses to eye gaze in patients with autism despite visual unawareness

Apoorva Rajiv Madipakkam[1,2], Marcus Rothkirch[1], Isabel Dziobek[3], Philipp Sterzer[1]

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Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by deficits in the area of social interaction and reflexive orienting to eye gaze cues that is primarily manifested as an avoidance of eye contact. The mechanism underlying eye gaze avoidance in autism however, remains unknown. In other words, the avoidance of eye contact could either be an unconscious and automatic reaction or the effect of a fast, yet conscious evaluation process. To investigate this, we recorded eye movements in patients with ASD and an age- and gender-matched control group in response to faces with direct or averted gaze that were suppressed from awareness by interocular suppression. Participants' awareness was assessed after every trial using a subjective four-point confidence rating scale and an objective, bias-free, 2-alternative forced choice discrimination task. Despite unawareness of the face stimuli, participants in the control group performed more saccades to the face stimuli with direct gaze indicating an unconscious bias towards direct gaze. In contrast, ASD participants showed the opposite effect, that is, more saccades to the face with averted gaze or an unconscious avoidance of direct gaze. These results indicate group-specific dissociations between participants' action (eye movements) and their perception, suggesting that eye gaze avoidance in ASD is an unconscious and automatic effect.

The functional subdivision of the visual brain: Are there true illusion effects on action? A pre-registered multi-lab study

Volker H. Franz

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Influential neuroscientific theories posit a fundamental difference between visual processing for actions and visual processing for perception; the most prominent being Goodale and Milner's two visual systems hypothesis (TVSH). Important evidence for the TVSH is the famous finding that certain visual illusions (as, for example, the Ebbinghaus/Titchener illusion) deceive perception but not grasping. I will sketch the rationale and results of a large, international, pre-registered study that attempted to solve the 20-year long debate of whether or not this is true (Kopiske, Bruno, Hesse, Schenk, & Franz, 2016, Cortex, 79, 130-152). The study is the by far largest study ever conducted on this topic. We ran the same experiment in parallel in four different labs (total N=144), replicated previous studies, and tested grasping as well as multiple perceptual tasks and control conditions. The design, methods and statistical analyses were pre-registered and reviewed before data collection and not altered thereafter. All data and statistical analyses

are open available. We used classic Fisherian ('frequentist') statistics as well as Bayesian methods (with essentially unequivocal results). Our results clearly suggest that grasping is indeed affected by the Ebbinghaus illusion and that this effect cannot be easily reconciled with the TVSH.

Dorsal stream functions rely on V1-input: Investigating the ability of hemianopic patients to avoid unseen obstacles in reaching

Constanze Hesse[1], Thomas Schenk[2], Jutta Billino[3], Mary J. MacLeod[1], Alasdair Ross[1]

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Previous research found that a patient with cortical blindness (homonymous hemianopia) was able to successfully avoid an obstacle placed in his blind field, despite being consciously unaware of its existence (Striemer, Chapman & Goodale, 2009, PNAS). This observation led to the suggestion that dorsal stream areas, that are assumed to mediate obstacle avoidance behaviour, may obtain their visual input primarily from subcortical pathways. Thus, it was proposed that normal obstacle avoidance behaviour may not require visual input from occipital areas. Here we tried to replicate this finding in a larger population of hemianopic patients (N=6) that suffered from circumscribed lesions to the primary visual pathways, including V1. We found that even though patients successfully avoided obstacles placed in their intact visual field, they were unable to avoid obstacles placed in their blind field. These effects were not dependent on whether one or two obstacles were presented. Overall, our findings indicate that normal obstacle avoidance behaviour in the absence of V1 input is a rare occurrence and that behaviour in complex visuomotor tasks critically depends on input from occipital areas.

Weighing the evidence for a dorsal processing bias under continuous flash suppression

Guido Hesselmann

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Continuous Flash Suppression (CFS) is a relatively new method of interocular suppression. I will suggest that three assumptions underlie its popularity. First, the notion that – compared with binocular rivalry – CFS provides stronger masking as well as more precise and virtually deterministic control over visual awareness. Second, the idea that CFS allows for more complex unconscious processing because long suppression durations give unconscious processes ample time to unfold. Third, the notion that CFS suppresses visual processing in the ventral stream, but leaves dorsal processing intact. While all three assumptions are subject of debate and deserve further scrutiny, I will focus on the last of these. The CFS-specific “dorsal processing bias” has been argued to be in line with core characteristics of the dual-stream hypothesis which proposes a dissociation between dorsally mediated vision-for-action and ventrally mediated vision-for-perception. Here, I will first provide an overview of neuroimaging and behavioral studies that either examined the dorsal processing bias or based their conclusions on it. I will show that both evidence for preserved ventral processing and for a lack of dorsal processing has been reported. Next, I will present new data from a functional magnetic resonance imaging study (Ludwig, Sterzer, Kathmann, & Hesselmann, 2016, Cortex 83, 113-123) suggesting that both the ventral and the dorsal visual stream are linked to visual awareness, but that neural activity in ventral areas more closely reflects graded differences in awareness compared

to dorsal areas. Finally, I will conclude that - given the studies published to date - a dorsal processing bias under CFS cannot be universally assumed, and that further research is needed to reconcile the divergent results.

Poster session: Emotion, stress, arousal, and neuromodulation

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-1. Does valence matter? Influences of positive and negative deviants on neutral standard information in the Emotional Oddball Paradigm

Helge Schlüter, Ryan Patrick Hackländer, Christina Bermeitinger

Universität Hildesheim, Germany

The emotional oddball paradigm (EOP) is a modification of the oddball paradigm which uses emotional content as either standard stimuli, deviant stimuli, or both. The EOP has been frequently applied in combination with free recall tasks. Previous studies using emotional negative deviants intermingled in a sequence of emotionally neutral standards have shown a) a better recall rate for the negative deviants as compared to neutral standards, b) a reduced recall rate for neutral standards which directly preceded the negative deviants (e.g., Knight & Mather, 2009; Strange & Dolan, 2004; Strange, Hurlemann, & Dolan, 2003) and c) retrograde hypermnesic effects on preceding standards when using visual scenes instead of written words (Hurlemann et al., 2005, 2008; Hurlemann, Hawellek, Maier, & Dolan, 2007). These retrograde amnesic/hypermnesic effect are not evoked by emotionally neutral deviants.

In the present study, we used sequences of 18 German words, which included three different deviant types per sequence (positive, negative, and neutral deviants). The remaining words of each sequence comprised emotionally neutral standards which were – in contrast to earlier studies – semantically related. We failed to find the typical oddball effects; there was no reduced recall for the neutral deviants compared to standards. However, enhancement effects were found for neutral standards preceding positive and emotional deviants and for neutral standards following positive deviants. Results are discussed in the light of differential influences of semantic relatedness, arousal, and valence.

W-2. Working-memory load enhances evaluative priming from supraliminal emotional words

Laura-Effi Seib-Pfeifer, Henning Gibbons, Robert Schnuerch

Rheinische Friedrich-Wilhems-Universität Bonn, Germany

Following affective primes, evaluative judgments about neutral targets tend to systematically shift toward the valence of the primes (evaluative priming effect, EPE). Prior research suggests that the EPE increases under suboptimal conditions, that is, when the primes are processed only superficially. This has typically been achieved by presenting the primes extremely briefly or by using masking procedures. However, it has been suggested that not only impoverished presentation, but also divided attention results in reduced depth of processing. Based on this idea, we designed an experimental manipulation to vary the depth of processing of clearly supraliminal primes by means of a concurrent working-memory task during an evaluative-priming procedure. A total of 52 participants evaluated a-priori neutral Korean ideographs that were preceded by positive or negative supraliminal prime adjectives. Crucially, in different parts of the experiment, participants either memorized a sequence of two (low load) or four (high load) numerals before each prime word. On randomly interspersed catch trials, participants were asked

about the numerals after the prime word. Cognitive load was therefore restricted to the epoch of prime processing, rather than spanning the whole prime-target-response episode. By use of a catch-trial procedure, we were able to retain the typical evaluative-priming procedure in the judgment trials, while applying cognitive load specifically to the prime. As predicted, and in line with prior research, we observed a significantly stronger EPE under high than low working-memory load. This suggests that an insufficiently explicit representation of affective input facilitates its influence on subsequent evaluative judgments. This has implications for our understanding of the EPE as well as for our knowledge on how context affects evaluation and attitude formation.

W-3. Alexithymia and automatic processing of emotional stimuli: a systematic review

Thomas Suslow[1], Uta-Susan Donges[1,2]

[1]University of Leipzig, Germany; [2]Martin Gropius Krankenhaus Eberswalde, Germany

Background: Alexithymia is a personality trait characterized by difficulties in recognizing and verbalizing emotions and the utilization of a cognitive style that is oriented toward external events, rather than intrapsychic experiences. Even though emotions are, in general, elicited involuntarily and emerge without conscious effort it is surprising that relatively little attention in etiological considerations concerning alexithymia has been given to deficits in automatic emotion processing. In the present investigation, results from studies using behavioral research methods were systematically reviewed in which automatic processing of external emotional information was investigated as a function of alexithymia in healthy individuals.

Methods: Relevant studies were identified through a literature search of Psycinfo, PubMed, and Web of Science databases from 1990 to 2016.

Results: A total of 12 relevant studies (including overall 1004 participants; 60% women) administering five different types of tasks (affective priming tasks, emotional Stroop tasks, emotional visual remapping of touch, chimeric faces tasks or attentional blink) were identified. In 8 out of 12 studies negative affect was controlled as confounding factor. High alexithymia was found to be related to reduced affective priming owing to angry facial expression. Externally-oriented thinking was correlated with reduced involuntary attention allocation to emotional lexical information and related to stronger interference with the processing of images that immediately followed threat-related facial expressions. Difficulties identifying feelings were found to be coupled with impairments in the spontaneous embodiment of fear.

Conclusion: The available evidence from the reviewed studies points to the importance of considering different components of alexithymia in the investigation of automatic emotion processing. There is more evidence for deficits in the automatic processing of facial emotions (especially threat-related expressions) than for deficits in the automatic processing of lexical emotion stimuli in alexithymia. Taken together, deficits in automatic emotion processing could be factors contributing to alexithymic personality characteristics.

W-4. Affect Determines the Route to Rich Memory Representations: Electrophysiological Evidence

Philipp Spachtholz[1,2], Christof Kuhbandner[1], Reinhard Pekrun[2]

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Recently, we have shown that people trade the richness of object memory representations (i.e., the number of stored features) for memory strength as a function of their affective state. When experiencing positive affect, binding resources were distributed more broadly across features so that resulting memory representations were richer at the cost of decreased storage strength, whereas when experiencing negative affect, binding resources were distributed more narrowly across features so that representations were less rich at the benefit of increased storage strength. However, the mechanisms underlying this differential resource allocation are unknown. In particular, theories of affect and cognition typically assume that affect-induced changes in resource allocation are brought about by the modulation of a common underlying process, such as changing attentional breadth (e.g., Fredrickson, 2001; Gasper & Clore, 2002). However, such an assumption has not been tested yet. To examine this issue, we recorded EEG activity while participants encoded visual objects during positive or negative affect. We found that the richness of resulting memory representations was related to the amplitudes of the event-related C1 and P1 components, indicating that differences in richness depend on the modulation of early visual processing resources. Intriguingly, for negative affect, the richness of representations was exclusively related to the amplitude of the C1, whereas for positive affect it was exclusively related to the amplitude of the subsequent P1 component. This indicates that the influence of affect on the allocation of resources across features occurs earlier for negative than for positive affect. In summary, by changing the allocation of resources across object features, affective states seem to determine how much and how well we will later remember information about objects. In particular, this process seems to be mediated by separable neural mechanisms, suggesting that processing in negative and positive affective states is more profoundly different than commonly assumed.

W-5. Using fMRI Neurofeedback to Alter Amygdala Activity and Emotional Reactivity

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Background: While the amygdala is known to be activated by emotional stimuli especially when contrasted with neutral stimuli, much less is known about how differences in amygdala baseline activity prior to emotional stimuli influence emotional reactivity. We hypothesize that reductions in amygdala baseline activity will reduce attentional capture by emotional stimuli as measured by differences between negative and neutral distractors in reaction times (RTs) and BOLD fMRI signals. To study this on the behavioral and neural level, we used fMRI neurofeedback to induce differences in amygdala baseline activity and an emotional interrupt (EMIT) task with temporal emotional flankers.

Methods: Of 32 healthy subjects that completed three neurofeedback training sessions, 22 (mean age 25 years, 10 female) could be included in this analysis. For neurofeedback training, subjects did not know the target region and were told to find their own strategy to regulate the signal, similar to conventional EEG neurofeedback. The combined neurofeedback regulation – EMIT task was conducted on a different day. Two EMIT task trials were presented during each 30s regulation block. A 2x3 repeated-measures design

was used with 36 negative and 36 neutral pictures displayed during 3x12 regulation blocks ('Up', 'Down', or 'Rest').

Results: After neurofeedback training, subjects were able to regulate their amygdala, meaning the amygdala fMRI signal was higher in the 'Up'-regulation condition than in the 'Down'-regulation condition ($t(21) = 2.018$, $P = 0.029$, 1-tailed). As expected from pilot experiments without regulation, we found a slowing of the RTs by negative distractors as contrasted to neutral distractors in the 'Rest' condition. However, this effect was abolished in the 'Up'- and 'Down'-regulation conditions that showed a reduction in amygdala activity (trend for the main effect of regulation condition with $P = 0.062$). Furthermore, the reduction of the emotional capture effect was correlated with the regulation effect across subjects for both the 'Up' (A) and 'Down' (B) regulation conditions ($P = 0.012$).

Conclusion: Neurofeedback without instructed strategies can be used to manipulate amygdala baseline activity. We found evidence that the attentional capture by emotional stimuli is reduced when the amygdala is down regulated. Optimization of neurofeedback or other regulation techniques to manipulate activity of brain regions is highly desirable to investigate the reactivity of the brain in a variety of conditions. We are currently analyzing an experiment that has employed happy imagery to also achieve up-regulation of the amygdala, which should result in increased emotional reactivity.

This study was supported by the Deutsche Forschungsgemeinschaft (DFG) grant SFB 940/1.

W-6. Positive life events induce forward bodily movements.

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Background: To leave something negative behind, to move on after a negative experience, to look forward to something positive. Language metaphors like these link valence with space or even with movements through space. They also indicate that forward movements are more associated with positive valence, whereas backward movements are commonly associated with negative valence. But do valence loaded stimuli have an influence on motor decision making? According to this metaphor it can be expected that participants would spontaneously move themselves in different directions to represent positive and negative life events.

Methods: In the present study, 71 participants stood in the middle of a square mat, which displayed all directions like a compass rose. They were asked to place 6 previously gathered positive, 6 neutral and 6 negative personalized events of their lives by freely moving to one of 8 possible directions (north, northeast, east, southeast, south, southwest, west, northwest).

Results: As expected, positive life events induced forward movements more often than negative life events did, and negative life events induced backward movements more often than positive ones did.

Conclusion: On behalf of these results, it will be discussed how spatial associations of valence may influence motor decision making according to the experimental setting.

W-7. The influence of positivity on subjective life expectancy

Susana Ruiz Fernández, Lotte Sophia Roessler, Martin Lachmair, Peter Gerjets, Juan José Rahona López

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How long do you think you will live? Subjective life expectancy (SLE) is a construct which has been related to psychological variables, such as optimism, physical variables, like healthy habits, and which has been found to correlate with real life expectancy. Although some authors propose that SLE may be influenced by psychological interventions, no studies have been yet carried out to find out this issue. Based on previous studies which relate positive attitude with longer lifetime, in the present study, we wanted to examine whether an intervention aimed to modify participants' point of view upon their daily life could have an impact on SLE. In the present study, 50 participants were randomly assigned either to a positive attitude group, where they had to choose, once a day for a week, the three more accurate sentences to describe their day, among a set of 22 positive sentences, or to a neutral attitude group, where they had to perform the same task, in this case choosing among 22 neutral sentences. We employed a traditional SLE measure (i.e., self-estimated probability of being 60, 70, 80, or 90 years old) as well as a spatial based measure of expected lifetime (i.e., participants had to situate themselves on a 10 meter long line representing their lifetime). As expected, both measures positively correlated and were also found to positively correlate with participants' optimism, as measured by the Life Orientation Test (LOT). More interestingly, the spatial based SLE measure was found to be sensitive to the intervention. A more positive point of view upon daily life yielded an increase in SLE more than a neutral point of view did.

W-8. Fake feedback on SCR during affective processing modifies autonomic arousal

Jan Ehlers, Veronika Strack, Anke Huckauf

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During biofeedback treatment patients are commonly confronted with individually adjusted fear- or stress-related stimuli. By externalizing the associated physiological responses participants become aware of dysfunctional processing mechanisms and acquire cognitive techniques to compensate pathophysiological reactions. The present study assumes that during affective processing, subjects physiologically adapt to a suggested reaction provided via manipulated skin conductance responses (SCR). We applied a within-subject design with the type of feedback (true vs fake SCR) blocked. 24 Subjects were confronted with neutral and aversive sounds obtained from the IADS (Bradley & Lang, 1999); associated SCR were displayed simultaneously as curves on a screen. A cover story instructed participants to passively observe the depicted dynamics. During manipulated trials real-time feedback was replaced by previously prepared signal characteristics, indicating either strong or weak autonomic reactions to stimulus material. Actual SCR were still recorded as the dependent variable. Results suggest that actual responses to fear-related stimuli are considerably weakened when manipulated feedback suggests absent or only small sympathetic reactions. These findings may provide a valuable contribution to clinical settings by supporting anxiety patients to overcome irrational concerns during the period of desensitization.

W-9. Explicit Regulation of Negative Emotions in Patients with Anorexia Nervosa

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Theoretical models and treatment development efforts have increasingly focused on the role of emotion recognition and regulation difficulties in the etiology and maintenance of anorexia nervosa (AN). However, up to now research has mainly included self-report data to undermine this theory.

The current study aims at testing the ability of AN patients to willingly downregulate negative emotions by means of reappraisal. Such strategies are regarded as adaptive and have been shown to successfully reduce amygdala activity and recruit prefrontal areas associated with cognitive control processes. Emotion regulation ability is investigated via behavioral assessment (arousal ratings) and neural activity (fMRT) by using a standard emotion regulation paradigm comparing simply watching emotional stimuli and regulating them.

Our sample consists of 35 acute AN patients and an pairwise age-matched control group.

Behavioral and imaging analyses suggest a successful reduction of arousal and amygdala activity during the regulation condition for both patients and controls. However, compared with controls, individuals with AN showed relatively increased activation in the amygdala as well as in the bilateral dorsolateral prefrontal cortex during the passive viewing of aversive compared with neutral pictures.

Our data do not support the notion of a general emotion regulation deficit in AN. However, the findings support previous theories of increased emotional reactivity to negative events in AN. Further, we found increased recruitment of brain regions implicated in cognitive control which might indicate some kind of habitual control process in AN. The current results might also suggests that reappraisal could be a successful emotion regulation strategy for individuals with AN.

W-10. Mentale Repräsentationen psychischer Zustände: explizite und implizite Komponenten

Ekaterina Alekseeva

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Psychische Zustände umfassen sowohl emotionale als auch kognitive Zustände (z.B. Erwartungen). Die mentale Repräsentation dieser Zustände und der Zugriff auf diese Repräsentationen sind unterschiedlich ausgeprägt und abhängig von der Art des spezifischen Zustands; zudem bestehen große interindividuelle Unterschiede. Es stellt sich nun die Frage, inwiefern bestimmte Lebenssituationen mit bestimmten psychischen Zuständen assoziiert sind. Hierzu wurden in einer Studie mit russischen Probanden die Zustände Seelenschmerz, Freude, Kummer, Fröhlichkeit, Begeisterung und Niedergeschlagenheit sowie die Lebenssituationen „Streit“ vs. „Unterhaltung mit Freunden“ untersucht. Es kamen sowohl explizite (freier Assoziationstest) als auch

implizite (Impliziter Assoziationstest) Maße zum Einsatz. Die Ergebnisse zeigen, dass psychische Zustände assoziativ fest mit den Lebenssituationen verbunden sind, sowohl explizit, als auch implizit. Es konnten typische, atypische und unbestimmte (noch nicht herausgebildete) assoziative Verbindungen der Lebenssituationen mit psychischen Zuständen sowie Geschlechtsspezifika impliziten Assoziierens psychischer Zustände mit Lebenssituationen festgestellt werden. Den am größten ausgeprägten assoziativen Zusammenhang mit den Situationen haben die psychischen Zustände gezeigt, die einen hohen oder einen niedrigen Grad an psychischer Aktivität aufweisen. Die erzielten Ergebnisse bekräftigen die Theorie, dass mentale Repräsentationen psychischer Zustände nicht nur als Prozess, sondern auch als Ergebnis (Komponenten des Weltbildes einer einzelnen Person) betrachtet werden könnten (Andreeva et al., 1998, Alexeyeva & Chernov, 2015). Damit wird ein Beitrag zur Entwicklung eines Models zu Vorstellungen und Wissen über psychische Zustände, zur Beschreibung ihres Inhaltes und zur Rekonstruktion ihrer Strukturorganisation geleistet.

W-11. Do “cool” or “painful” mean the same to different people? Subgroups holding different conceptions of scales also show different responses under experimental conditions

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BACKGROUND: Scales are the most common method to assess perception. Very often, it is implicitly assumed that (groups of) participants conceive the verbal anchors of scales similarly and that responses assessed across participants are comparable.

Here, we demonstrate that this is not the case for typical scales used in thermal comfort and pain research.

METHODS: We used a free-positioning task in which each participant ad libitum positioned verbal anchors on a horizontal line. We used anchors from thermal comfort (ASHRAE scale) and pain research (McGill Pain Questionnaire). Subsequently, participants underwent experimental conditions in which we assessed responses to room temperatures (20, 25 and 30 C°) and to painful and non-painful thermal stimuli (using a thermode applied to the forearm). We used a latent class regression approach to detect subgroups showing different response patterns in the free-positioning task. We then compared these subgroups regarding their responses to room temperatures and thermal stimuli assessed under the experimental conditions.

RESULTS: In the free-positioning task, we found subgroups showing different distributions of the anchors over the horizontal lines for thermal comfort and pain scales. The distinct subgroups reflected different conceptions concerning the relationships among the verbal anchors. Most importatly, the subgroups also differed in their responses to stimuli under the experimental conditions.

CONCLUSIONS: The subgroups we identified using the free-positioning task did not merely represent different abstract conceptions; instead, they also differed in their responses to experimental stimuli.

The results indicate that it is necessary to carefully test how scales are conceived by different people or groups. Neglecting this variation bears the risk of drawing wrong conclusions. On the other hand, taking this variation into account can improve the prediction of responses.

It needs to be clarified if the response patterns reflect different use of scales or different perceptual phenotypes. Additionally, it should be tested whether different populations (e.g. patients vs. controls) use scales in different ways.

W-12. Serotonergic modulation of large-scale brain networks

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Background: Serotonin (5-HT) is distributed throughout the brain and its implication in mood, decision-making and cognition has been extensively studied. 5-HT is synthesized from tryptophan (TRP) a neutral amino acid acquired through dietary intake. Effects of TRP manipulation on resting state functional connectivity have been already reported, mainly in regions with dense 5-HT innervations (i.e. OFC, cingulate and precuneus). Similar effects were also described after the administration of other serotonin modulators, illustrating the role of functional connectivity in the mediation of emotional and cognitive processes. This study used three TRP interventions aiming to better understand the modulatory role of the 5-HT system and the connectivity mechanisms that might be implicated in affective disorders.

Methods: Resting state fMRI of 79 healthy participants (mean age 32.3 y.o, 36 females) was acquired under TRP depletion “ATD”, balance “BAL” and loading “ATL” in a double blind, placebo-controlled, crossover study. Standard preprocessing was carried out with FSL, and denoising with ICA-AROMA, followed by dual regression using the templates of Smith et al., to obtain individual networks and associated time-courses. Permutation analysis of linear models (PALM) was used to investigate the changes of the 10 large-scale brain networks (fast inference method), corrected across contrasts and modalities. Results were thresholded at pFWE < 0.05, using TFCE.

Results: We found that the connectivity between the DMN and two clusters located in the OFC (pFWE < 0.05; x= 2, y=22, z=-26) and in the occipital pole (pFWE < 0.05; x=-6, y=-90, z=6) was stronger under balance condition when comparing it to loading condition. Increased connectivity in the same conditions was also found in the lateral visual network (pUNC < 0.001). There were no differences in the depletion condition.

Conclusion: We demonstrated that TRP modulates the connectivity of the DMN. Our results are in line with previous studies which found enhanced connectivity in the DMN with lower levels of TRP. These findings point out the effects of TRP loading in attention and executive functions. Although it is still under debate, higher levels of TRP have been related to mild sedative effects that can impair attention and therefore, lead to less connectivity between visual and cognitive control areas. On the other hand, emotion-related networks seem to be unaffected by these interventions. A future analysis will investigate whether this modulation differs between 5-HTTLPR genotype groups due to the postulated „reduced availability“ of 5-HT receptors in the carriers of the short allele.

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W-13. Comparison of subjective and objective sleep quality measures and their relation to attentional network functions

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Background. Attention is a complex process involving multiple components (e.g. alerting and executive components), and the current study was aimed at investigating the sensitivity of different attentional functions to impaired sleep quality and decreased sleep duration. Methods. Sleep duration and quality were assessed by both subjective and objective measurements. For subjective measurements, participants completed the Groningen sleep quality questionnaire and a sleep diary referring to two days prior to the attentional tasks. Additionally, surveys were also used to assess participants' general daytime sleepiness and sleeping habits with a one-week time window. For objective measurements of sleep quality, we applied actigraphy measurements: Participants (N = 55) wore an actiwatch (i.e. an activity monitor) for 48 hours continuously. The activatch recording provided more than 20 variables that might be associated with participants' sleep quality (e.g. sleep onset latency, exposure to light during sleep and awaking time). In order to explore attentional functions, the participants performed the Attentional Network Task (ANT) and a psychomotor vigilance task (PVT). ANT as a combination of a cued reaction time task and a flanker task provides measures for three different components of attention: alerting, orienting and executive control. Six performance measures (e.g. attentional lapses, and mean RT) were calculated based on PVT data. Uni- and multivariate analyses were performed to explore the associations of sleep quality data with attentional network functions. Results and Conclusion. The results generally suggest that lower order attentional functions, as for example the alerting function measured by ANT, are more sensitive to sleep quality deficits than higher order attentional functions. (Support: OTKA K120012)

W-14. Chronic and Acute Stress Effects on Six-to-Seven-Year-Olds' Autonomic Nervous System and Hypothalamic-Pituitary-Adrenal Axis Reactivity

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Children differ in the amount of stress they are exposed to during their development. Individual differences in stress exposure are proposed to lead to differences in stress physiology. However, it is not well understood how children physiologically respond to acute stress and how this reactivity may be influenced by differences in chronic stress. This study investigates to what extent chronic stress modulates the autonomic nervous system (ANS) and hypothalamic-pituitary-adrenal (HPA) axis reactivity and their interaction to an acute social stressor (Trier Social Stress Test for Children, TSST-C). 60 six-to-seven-year-old children (50% female) from socio-demographically diverse backgrounds were tested. Chronic stress was operationalized as a cumulative score ranging from 0-10 including binarized measures of low income, unemployment, low parental education, welfare reliance, and negative life events. To assess ANS activity

during TSST-C and at rest, we extracted heart rate variability (HRV), high frequency (HF), and low frequency/high frequency ratio (LF/HF) from continuous electrocardiogram recordings. HPA axis activity was assessed by cortisol levels extracted from eight pre- and post-TSST-C saliva samples. Preliminary results revealed a significant increase in HRV during TSST-C compared to rest, driven by less power in the HF band and greater sympathovagal modulation (LF/HF ratio). There were no direct effects of chronic stress on ANS activity. Thus, acute-stress effects on children's ANS activity mirrored those of adults by showing an increase in HRV, which was not modulated by chronic stress. As a next step we will analyze cortisol stress reactivity using latent growth structural equation models and explore both direct and interactive effects between ANS and HPA reactivity and chronic stress.

Poster session: Empirical aestethics

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-15. What makes a book popular? Predicting aesthetic success of bestsellers from their style

Sven Form, Christian Kaernbach

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It is known from experimental aesthetics, that there is an inverted-U relationship between the complexity of a stimulus and its aesthetic appreciation in terms of preference or enjoyment. For textual stimuli, this relationship has not been studied to our knowledge. Linguistic complexity is part of the style of a text. In the present study, the popularity and linguistic complexity of English-speaking best-selling books from the last 200 years was investigated following a histriometric approach. Scores for linguistic complexity were taken from a commercial database, which had applied the ATOS reading ease formula(TM) to determine linguistic complexity of books. Popularity was assessed with a composite measure including indicators like the number of sold copies or the length of a lexical entry. Regression analysis showed an inverted-U relationship between complexity and popularity suggesting that there is, in terms of complexity, an optimal style for a book.

W-16. Aesthetics in Everyday Life: An Outdoor Eye Tracking Study in Vienna

Vanessa Mitschke[1,2], Jürgen Goller[2], Helmut Leder[2]

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In a combination of an outdoor and a laboratory study, we tested how people encounter art, such as sculptures, graffiti, or other aesthetic objects in an everyday setting. Twelve participants engaged in a free exploration walk at the Danube Canal in Vienna equipped with a mobile eye tracker. In a follow up laboratory session, the participants freely commented on first person videos from their own walks. After watching the video, participants rated various views from their walk for aesthetic liking and interest. We found that participants spent up to 50% of the overall fixation time exploring aesthetic objects and artworks. Further, aesthetic liking and interest for certain views, positively predicted gaze behavior during the walk. The free exploration task gave the participants the freedom to interact with the environment and yielded valuable results about the modalities of attention deployment in a real setting. Our results also highlight the importance and putative benefits of art displays in everyday life and encourage the use of art, supporting the urban art movement and its stance as a public asset.

Poster session: Gender

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-17. Higher amount of cooperative behavior in lesbian women and gay men as compared to heterosexual women and men

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Studies on cooperation related to sexual orientation are limited to self-report regarding related concepts, e.g. altruistic values and empathy. The current study aimed at investigating whether sexual orientation affects cooperative behavior.

A total of N = 80 individuals (20 lesbians, 20 gay men; Kinsey-Scale: M = 5.9, SD = 0.4); 20 heterosexual women, 20 heterosexual men; Kinsey-Scale: M = 0.0, SD = 0.0) adopted the role of the trustee in an investment game. Fictional co-players, equipped with the same budget as the participants, either invested their entire budget (1.50 Euros, high cooperation) or 0.50 Euros (low cooperation). The money was tripled and added to the participants' budget, who could decide to pocket the money or retransfer any amount within their budget to the co-player. The amount of money retransferred served as indicator of cooperative behavior.

Cooperative behavior was affected by the level of cooperation shown by the co-player, with highly cooperative co-players receiving more money (M = 41.4%, SD = 17.8%) than less cooperative co-players (M = 28.4%, SD = 15.3%; main effect "level of cooperation", $p < .001$). Homosexual participants retransferred more of their budget (M = 38.1%, SD = 15.4%) than heterosexual participants (M = 31.7%, SD = 14.3%, main effect "sexual orientation", $p = .043$). Moreover, lesbians retransferred more of their budget to highly cooperative female (M = 44.2%, SD = 22.3%) compared to male co-players (M = 40.0%, SD = 20.2%; gender x sexual orientation x co-player gender x cooperation level $p = .028$).

The current study shows that homosexuals are more cooperative than heterosexual individuals on a behavioral level, expanding research based on self-reports. These results are in line with theories discussing enhanced cooperation of homosexuals as one of the key adaptive feature underlying the evolutionary stability of homosexuality. The study was supported by a grant of the German Research Foundation (DFG) to KTL and BMP.

W-18. Girls play with dolls, boys play with cars – caused by their prenatal testosterone levels?

Lisa M. Körner, Bettina M. Pause, Martin Heil

Heinrich-Heine-University Düsseldorf, Germany

Sex-typed play behavior in early childhood as assessed with e.g., the Preschool Activities Inventory (PSAI) shows large sex differences as early in ontogeny that one might be tempted to conclude that this sex effect is not exclusively formed by society. Sex hormones and especially testosterone that acts in utero and is supposed to have organizing effects on the brain could be an additional cause for sex differences. One commonly used approach to estimate prenatal testosterone levels is based upon the ratio between the second and forth digit length (2D:4D). 2D:4D is shown to be sexual dimorphic and is already developed prenatally since it is already observed in aborted fetuses suggesting a direct relationship with prenatal sex hormones. While 2D:4D is easy to assess and widely used, its precise relationship to actual testosterone levels in utero is still under debate.

The analysis of amniotic fluid is a different approach to measure prenatal testosterone. We conducted a longitudinal study which started with collecting amniotic fluid samples to measure prenatal testosterone. The 2D:4D of 51 girls and 48 boys was assessed for both hands at four measurement points (T1-T4; age: 5, 9, 20 and 40 month). Additionally, the parents filled in the PSAI at T4. We found large sex differences for play behavior as well as for 2D:4D independent of the measurement point. This early sex difference in 2D:4D further strengthens the likely explanation of hormonal influences in utero. Correlations between PSAI scores and 2D:4D revealed a medium effect for girls, suggesting that more testosterone is associated with a more male typical play behavior confirming previous research. In contrast, there was no relationship between PSAI and 2D:4D in boys. Correlations between PSAI scores and amniotic testosterone levels were non-significant for both sexes. Also, there was no relationship between 2D:4D and amniotic testosterone. The non-significant correlations with amniotic testosterone give indirect hints on different time frames in which testosterone acts on different brain areas and 2D:4D.

W-19. When Women Sexually Harass Men: Different Motives Predict Different Forms of Harassment

Jennifer Seifert, Nathalie Brock, Rukiye Köysürenbars, Gerd Bohner

Universität Bielefeld, Germany

Sexual harassment committed by men is a worldwide phenomenon with high prevalence rates that has been widely studied. However, much less is known about sexual harassment committed by women. With the present study we investigated the question of whether women harass men and whether the same motives may explain such behavior as had been found in men. Specifically, we examined a sexual and a hostile motive in relation to two different forms of sexual harassment: unwanted sexual attention and gender harassment. Participants were female students at the University of Bielefeld (N = 102), who completed questionnaire measures of hostility toward men (HM) and short-term-mating orientation (STMO); they also participated in a computer chat with a seemingly real (but in fact simulated) attractive male target. As part of the chat, they could repeatedly send sexist jokes (representing gender harassment), sexualized personal remarks (representing unwanted sexual attention), or neutral jokes and remarks to the target. Results showed that 83% of the female participants sent at least one sexist joke, and 37% sent at least one sexist remark. Furthermore, higher scores in STMO specifically predicted unwanted sexual attention behavior (= the number of sexualized remarks sent), whereas HM specifically predicted gender harassment (= the number of sexist jokes sent). These findings replicate and extend work by Diehl, Rees, and Bohner (2012, 2016), who had observed similar double dissociations between the two motives and the two forms of sexual harassment in men harassing women. To our knowledge, our study is the first to investigate sexually harassing behavior committed by women against men in a realistic interactive setting. Theoretical and applied implications of our findings will be discussed.

W-20. Gender differences in mental-rotation tests: Do men benefit from cube figures as they are stereotypically masculine?

Vera Ruthsatz, Martina Rahe, Linda Schürmann, Claudia Quaiser-Pohl

University Koblenz-Landau, Germany, Germany

Various studies have demonstrated the gender effect in mental-rotation tests. The largest male advantage in mental-rotation tests has been found with Shepard- and Metzler cube figures. This might be due to the male characteristics of such figures, as they are similar to LEGO® bricks or construction toys, which are more frequently part of boys' and men's

realm of experience. This assumption was already examined and confirmed in a study with 286 fourth-graders (Ruthsatz et al. 2014), in which boys only significantly outperformed girls in tasks with cube figures rotated in-depth, while there was no significant gender effect with female-stereotyped pellet figures.

These results were to be replicated with adult participants in the present study. Therefore, 90 university students solved either a mental-rotation test with cube-figure items (C-MRT) or pellet-figure items (P-MRT) rotated in-depth. Subsequently, all participants completed two questionnaires including a self-evaluation and prevailing gender stereotypes. In line with previous findings, cube figures appeared more male-stereotyped and pellet figures more female-stereotyped. A significant interaction of gender and stimulus material was found. Men significantly outperformed women only in tasks with cube figures.

Overall, results suggest that gender-related attributes influence the gender effect in mental-rotation performance. Men seem to benefit from the shapes of Shepard and Metzler cube figures - an important aspect to be considered regarding for example the use of mental-rotation tasks in psychological assessment.

W-21. Do men and women react in an emotionally different way to war and terrorism in different text styles?

Melanie Pohl

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Overall, women read more than men. They read a greater number of poems, novels and narratives and ascribe a bigger importance for their lives to literature. Additionally, they tend to read in a rather identificatory way and to empathesize more with the respective text in order to manage personal life events. Men, on the other side, prefer temporary historical or political books and are more inclined to informal reading that serves further training (Charlton 2004). In this matter, fictional reading for fun is often connoted as feminine and stands in opposition to the masculine connotation of specific, informative reading.

In the present study, this classification is investigated with the help of informative newspaper texts on the one hand and literary texts on the other hand. As women often state to feel and express generally stronger, positive emotions such as happiness, affection or love and men more often reveal intense disdain, pride, guilt or anger, the expectation was that these emotions could also be found as an effect of the reading of the respective texts. Additionally, it was assumed that these emotional effects could be matched with the masculine versus feminine connoted text styles.

As study material, thematically similar texts with the subject war and terror attacks were used. Subsequently, the 117 test persons answered the “Modifizierte Differentielle Affekt Skala” (modified differential affect scale) in an online survey.

It was found that women showed significantly more interest in stronger emotionalizing newspaper texts and were generally more moved by newspaper articles. Other differences between women and men that could be explained by gender could not be found, although the texts in use differed clearly with regard to the type of emotion that the subjects reported. All in all, the results did not show the expected tendency of men and women towards different text styles that had been assumed on basis of the current state of research. It can be assumed that this circumstance is due to the choice of the topic of each text, as war and terrorism provoque equally strong emotions in both men and women and might therefore have a compensatory impact.

W-22. Are men's and women's self-evaluations of their spatial abilities related to their performance in a mental-rotation test?

Martina Rahe, Vera Ruthsatz, Linda Schürmann, Claudia Quaiser-Pohl

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The study examined the influence of gender-stereotyped stimuli rotated in-depth on adults' mental rotation performance and correlations with participants' self-evaluation of their mental-rotation and spatial orientation performance. We assumed an interaction of gender and stimulus material for mental-rotation performance as previous research found the presentation of stereotyped threads and confidence about typical abilities to affect cognitive performance. 39 women and 51 men (age: M=23.12; SD=2.44) solved either the M-MRT-3D consisting of male-stereotyped objects rotated in-depth or the F-MRT-3D consisting of female-stereotyped objects rotated in-depth and subsequently evaluated their task performance. In addition, we assessed participants' self-evaluation in spatial orientation tasks and their ability to point towards North and in the direction of a well-known landmark. Overall, no gender differences were found for mental-rotation performance, whereas a significant interaction of gender and stimulus material appeared. Interestingly, men were able to evaluate their performance in mental-rotation tests very well, while women's self-evaluation did not correlate with their mental-rotation performance at all. Overall, men rated their ability of mental-rotation and spatial orientation better than women. Significant positive correlations between mental-rotation performance and pointing in the direction of a landmark appeared only for males. Exclusively for females, negative correlations between mental-rotation performance and self-assessed ability and frequency of using maps as well as between pointing towards North and self-evaluation of spatial orientation appeared. It can be assumed that women who perform poorly in mental-rotation tests use maps more often, because they need to, and think they know how to use it well. Males seem to have a better ability to self-evaluate their spatial skills.

W-23. Die psychische Gesundheit von Lesben

Rabea Becker, Frank A. Sattler, Riccarda Nater-Mewes

Philipps-University Marburg, Germany

Hintergrund: Laut dem meta-analystischen Modell von Pascoe & Richman (2009) führt wahrgenommen Diskriminierung zu einem stärkeren Stresserleben und darüber zu einer verschlechterten psychischen Gesundheit. Unklar ist bisher, ob und wie die Ingroup-Identifikation (II), internalisierte Homonegativität (IH) und chronische Diskriminierungserfahrung (DE) den Zusammenhang zwischen wahrgenommener Diskriminierung und einem höheren Stresserleben moderieren. Wir gehen davon aus, dass H1) ein erhöhtes Stresserleben den Effekt von wahrgenommener Diskriminierung auf die psychische Gesundheit mediiert und H2) dass II einen Schutzfaktor und IH sowie DE einen Risikofaktor für Lesben darstellen.

Methode: In einer Online-Studie wurden N = 327 Lesben rekrutiert. Es wurden moderierte Mediationen mit wahrgenommene Diskriminierung als Prädiktor, Stresserleben als Mediator, psychische Gesundheit als Kriterium und II, IH und DE als Moderatoren berechnet.

Ergebnisse: Stresserleben mediierte den Zusammenhang zwischen wahrgenommener Diskriminierung und der psychischen Gesundheit für verschiedene Formen wahrgenommener Diskriminierung. IH stellt bei indirekter Diskriminierung einen Risikofaktor dar, die anderen Moderatoren zeigten keinen signifikanten Effekt.

Diskussion: H1) konnte für fast alle Prädiktoren teilweise bestätigt werden: Stresserleben mediierte teilweise den Zusammenhang zwischen wahrgenommener Diskriminierung und psychischer Gesundheit. H2) wurde nur teilweise bestätigt: Internalisierte Homonegativität verstärkte den Effekt von wahrgenommener Diskriminierung auf das Stresserleben; die II sowie DE zeigten keine Effekte.

Poster session: Implicit learning and sequence learning

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-24. Social Influence on Implicit Motor Learning

Alexander Geiger[1,2], Kai Vogeley[1,2]

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Background:

Interacting with another person can influence the performance of simple motor acts. It remains an open question whether social influences are also relevant for implicit motor tasks, e.g., implicit motor learning. To test this hypothesis, we made use of a serial reaction time (SRT) task that was enriched by social and non-social cues.

Implicit sequence learning occurs when information is acquired from the presentation of a series of stimuli without conscious access either to what was learned or to the mere fact that learning occurred.

Methods:

In our socially enriched modification of the SRT task, participants reacted to the location of a target presented in one out of four possible locations on the screen with a spatially corresponding response key. Unknown to participants, the location at which the target appeared was structured according to a deterministic 12 digit sequence.

Either a social (a cartoon of a human face) or a non-social (random arrangement of the elements of the face cartoon) stimulus was providing cues where the next stimulus would appear 200 msec before the target stimulus occurred. The validity of the given cue was either high (valid in 100% of all trials) or low (valid in 50% of all trials). The systematic variation of cue type (social versus non-social stimuli) and cue validity (High Validity (HV) versus Low Validity (LV)) constituted a two-factorial design.

Results:

Results show that valid cueing decreases reaction times and improves the performance of the task. In the HV, both stimuli led to similar reaction times, whereas in the LV, the social stimulus led to significant faster responses compared to the object stimulus.

For the implicit learning, results show a main effect tendency for cueing validity due to higher sequence specific learning in the HV compared to the LV, irrespectively of the presented stimulus, meaning that the LV disrupted the implicit learning.

Conclusion:

These data suggest i) that valid cueing can improve the performance in SRT tasks and ii) that social influences on implicit motor learning elicit more complex interactions with task performance, possibly due to the interference of motor performance and considerations of “hidden” intentions of the social agent.

W-25. Timing independent spatial motor sequence learning is preserved in left-hemisphere stroke

Eva Niessen[1], Anna Dovern[1], Jana Ant[2], Jochen Saliger[3], Hans Karbe[3], Gereon R. Fink[1,2], Iring Koch[4], Peter H. Weiss[1,2]

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Background:

After stroke, the re-learning of motor sequences is a crucial and necessary ability for patients enabling them to master again the complex movements of everyday life. A recent study showed that patients with left hemisphere (LH) stroke exhibited preserved motor sequence learning (as assessed by the serial reaction time (SRT) task) when the timing of the stimuli was comparable in the learning and retrieval phase. However, when in the retrieval phase the temporal delay between the patient's response and the following stimulus was randomized, patients showed significantly smaller learning scores as compared to healthy controls.

Methods:

The current study investigated whether LH stroke patients were able to learn spatial motor sequences even if no predictable temporal information (adopting random response-stimulus intervals, RSIs) is provided during the learning phase. Twelve right-handed LH stroke patients and 12 right-handed healthy controls performed a SRT task with random RSIs to test the incidental learning of a complex spatial motor sequence.

Results:

Our results indicate that, although the learning condition with random RSIs is more difficult than learning with predictable RSIs , LH stroke patients performed as good as healthy controls regarding general learning and sequence specific learning.

Conclusions:

Our results suggest that LH stroke patients are able to incidentally learn a spatial sequence even when no predictable temporal information is available.

W-26. Action-Effects Enhance Explicit Sequential Learning in an Implicit Learning Situation

Sarah Esser, Hilde Haider

Universität zu Köln, Germany

Different studies have shown that action-effect associations seem to enhance implicit learning of motor sequences (e.g., Ziessler & Nattkemper, 2001). In a recent study (Haider, Eberhardt, Esser, & Rose, 2014), we found first indications that action-effect learning might play a special role in acquiring explicit knowledge within an implicit learning situation. The current study aims at directly manipulating the action-effect contingencies in a Serial Reaction Time Task and examining its impact on explicit sequence knowledge. Therefore we created a situation in which the participants' responses lead to a melodic tone sequence, with the difference that these effect-tones were contingently bound to the sequential key-presses for one group but not for the other group. A third control group received no effect-tones at all. Only the group that experienced contingent effect-tones showed an increase in explicit sequence knowledge. The group that received the exact same tone sequence non-contingently to their responses did not show more explicit sequence knowledge than the control group. The results are discussed in terms of the

multimodal structure of action-effect associations and the ideomotor principle of action control.

W-27. Effect-learning in an implicit learning paradigm

Clarissa Lustig, Hilde Haider

University of Cologne, Germany

In the field of implicit learning, several studies now support the assumption that associations between responses and task irrelevant effects can enhance learning within an implicit learning paradigm (R-E-learning; e.g., Hoffmann, Sebald & Stöcker, 2001). Furthermore, action-effect learning seems to play an important role for the development of explicit knowledge in an implicit learning task (see, e.g., Haider, Eberhardt, Esser & Rose, 2014).

What has been unclear, yet, is why redundant effects enhance learning. R-E learning seems to depend on a contingent (see, e.g., Haider et al., 2014; Hoffmann et al., 2001) and/or a compatible (see, e.g., Stöcker, Sebald & Hoffmann, 2003) relation between responses and effects. Stephan et al. (2015) showed that learning a sequence of effect tones led to a benefit when participants afterwards had to learn a congruent motor sequence. What remains open by this study is whether the auditory sequence of effect tones can be learned in advance without an explicit instruction and whether the profit of hearing the tone sequence in advance requires the establishment of the R-E mapping.

In order to investigate this issue, participants were trained with pure random material while performing a serial reaction time task (SRT; Nissen & Bullemer, 1987). They either heard effect tones presented after each response or did not receive any effect tones. Unbeknownst to the participants the tones followed a regular sequence. After three blocks, all participants were switched to a regular response sequence that also produced the formerly presented tone sequence. Results show that participants in the tone-sequence condition responded faster than participants in the no-tone condition. They also showed higher amounts of knowledge in a generation task. Thus, the findings suggest that participants profit from a tone sequence even when this is not explicitly learned and consistently mapped to the responses.

W-28. The impact of noise and pitch distortions on implicit auditory learning processes

Maria Bader, Erich Schröger, Sabine Grimm

Leipzig University, Germany

In everyday acoustic environments, the physical sound information is often distorted before reaching our ears, for instance by interfering sound sources or by changes in the spatial position of the sound source relative to the listeners' ears. That is, every occurrence of a given sound differs as the mixture of concurrent sounds varies. The aim of the current study was to investigate how implicit auditory pattern learning is affected by different types of distortions, such as a partial substitution of the relevant pattern information by noise or by misleading pitch information.

The stimuli used were melodic patterns consisting of six consecutive 50 ms segments of random pitch. Stimuli were presented in a roving standard paradigm in which a specific pattern was repeated in trains of 1, 2, 3, 6, or 12 stimuli followed by a pattern change. In an absolute repetition condition, patterns were repeated identically. In two distorted repetition conditions, one random segment of each pattern was replaced by white noise or by a new segment of random pitch. We obtained event-related potentials in response

to pattern repetitions and pattern changes, while participants paid attention to the loudness of the stimuli. Participants' performance in a pattern change detection task was measured in additional behavioral blocks.

Pattern changes elicited an MMN after three standard pattern presentations in all conditions. No MMN latency differences, but decreasing amplitudes for the distorted conditions were observed. Behavioral detectability as well as P3a latencies and amplitudes were impaired in the distorted repetition conditions. These effects were strongest for distortions defined by random pitch variations, indicating a different quality inherent to this type of distortion.

In conclusion, the differential impact of noise and random pitch distortions can be explained in analogy to energetic and informational masking processes.

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W-29. State equation description of sensorimotor learning underlying saccadic adaptation

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We assess the ability of a state-equation-based model of sensorimotor learning in describing the dynamics of changes in the metrics of saccadic eye movements undergoing adaptation. We fitted several data sets, collected using two different paradigms of saccadic adaptation—using a second target step of fixed magnitude or varying as a sine function of the trial number, with a basic generative model—a modified delta-rule. In this model, saccades change their metrics based on the integration of recent feedback into the next movement. This acquired state–change is leaky—it slowly loses memory of the ensuing state when the feedback disappears. Solving the state-equation provides theoretical derivations of phenomenological behaviors that the global oculomotor response would exhibit if the underlying sensorimotor learning model were accurate. Those phenomenological functions match descriptions suggested in the motor and saccadic adaptation literature—exponential evolution of the gain discounting a fixed step disturbance and a lagged sinusoidal response in presence of a sinusoidal perturbation. We fitted the same data using those predicted phenomenological descriptions and tested whether the theoretically obtained correspondence among parameters from both descriptions match. Based on those observations we discuss and suggest possible improvements to models of saccadic and motor adaptation. Importantly the approach taken in these analyses avails to generalizations and/or extensions to other domains of learning in psychology.

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W-30. Gaze-Contingent Learning in 6-, 8-, and 10-Month-Old Infants

Jantina Hohmann[1], Thorsten Kolling[1], Max Murakami[2], Jochen Triesch[2], Monika Knopf[1]

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Recent research demonstrated that infants are able to learn gaze-contingencies rather quickly (e.g., Wang et al., 2012). A challenging question is whether infants perceive themselves as agents while learning gaze-contingencies. To shed light on this question, 6-, 8-, and 10-month-olds were either tested in a gaze-contingent (GC) or in a yoked

control (YC) condition. Infants in the GC condition (agents) had the opportunity to learn a contingency between their own gaze behavior on one of two peripherally presented red discs and the appearance of an animal picture in the middle of a screen. Only one of the two discs had the function of triggering an animal picture whereas the other was non-functioning. The visual input of infants in the YC condition (observers) was a playback of what was seen by a baby in the GC condition. Observers' looking behavior did not have any impact on the contents of the display. As dependent variables, we analyzed different gaze patterns from the animal picture to the discs and back to the picture. Our results showed that 8-month-olds tested in the GC condition (agents) acquire a preference for the functioning over non-functioning disc. As expected, this preference was not found for the 8-month-olds in the YC condition (observers). Furthermore, infants in the YC condition showed less interest in both discs than infants in the GC condition showed in the functioning disc. Preliminary data of 6- and 10-month-olds show comparable results. This result pattern demonstrates that the visual input alone is not sufficient to create an interest in the discs but that the experience of a gaze-related consequence is crucial.

Poster session: Instruction-based and reward-based learning and memory

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-31. Neural markers of model-free and model-based learning in uncertain environments

Franz Wurm, Benjamin Ernst, Marco Steinhauser

Catholic University of Eichstätt-Ingolstadt, Germany

In the present study we used event-related potentials to investigate neural markers of model-free and model-based learning in feedback-related brain activity. In contrast to a model-free system, in which actions are automatic and stimulus-driven, a model-based learning system expresses flexible, goal-directed actions by deriving expectations about environmental contingencies from an internal model. We theorized that only this system is able to generate distinct predictions that vary with the uncertainty of the environment. Therefore, low uncertainty, allowing both model-free and model-based learning, should yield clear prediction errors and judgments on future choices regarding subjective expectations on feedback valence. High uncertainty, allowing only model-free learning, should yield contrasting effects. This pattern should be reflected in neural markers of feedback processing, namely the Feedback-related Negativity (FRN) and the P3. Participants had to work through a modified two-stage but one-decision Markov decision paradigm. Each block consisted of two independent sets with uncertain transition contingencies. Contingencies were predictable in one set (75%), but random in the other (50%). There was clear evidence for both model-free and model-based learning in predictable sets but only model-free learning in random sets. Both FRN and P3 amplitudes showed different patterns for predictable and random sets. This suggests that neural markers of feedback processing are specifically modified by our manipulation of transition contingencies, and closely mirrored prediction errors generated by the two learning systems.

W-32. Network dynamics of instructed reversal learning

Holger Mohr, Uta Wolfensteller, Hannes Ruge

TU Dresden, Germany

Humans are able to flexibly and rapidly transform abstract instructions into fluent behavior within few practice trials. During short-term practice of task instructions, initially abstract representations are transformed into more pragmatic, automatized sensory-input to motor-output representations. It has recently been shown that the flexibility of this short-term automatization process is impaired by antecedent practice of diverging instructions. Interestingly, several recent studies demonstrated that cognitive flexibility and learning processes can be characterized by changes in functional connectivity between large-scale brain networks. These previous works motivated us to investigate instructed reversal learning by means of large-scale connectivity analyses of fMRI data.

We used an fMRI sample of N=27 subjects and conducted functional connectivity analyses using the network nodes of the Power atlas. Comparing initial learning (learning blocks with novel stimuli) with reversal learning (blocks with previously used stimuli) revealed that there were small but significant differences in functional connectivity dynamics between and within large-scale brain networks across the two learning types. Importantly, these subtle differences could only be detected by multivariate pattern analysis (MVPA) on the network connections, which resulted in an above-chance classification accuracy of reversal vs. initial learning based on a late-minus-early practice comparison (accuracy = 66.5%, p=0.018, chance level 50%). In contrast, standard univariate comparisons between network connections did not reveal significant differences between the two learning types after correction for multiple comparisons. The connectivity change pattern obtained by MVPA indicated that differences between reversal and initial learning were widespread and encompassed several large-scale brain networks including both low-level sensory networks as well as high-level cognitive networks.

W-33. On the efficiency of instruction-based rule encoding

Hannes Ruge, Tatjana Karcz, Katharina Zwosta, Uta Wolfensteller

Technische Universität Dresden, Germany

Instructions have long been considered a highly efficient route to knowledge acquisition, especially compared to trial-and-error learning. We aimed at substantiating this claim by identifying boundary conditions for such an efficiency gain, including the influence of active learning intention, repeated instructions, and working memory load. Our experimental design allowed us to not only measure how well instructed rules were implemented later on, but also to directly measure prior instruction encoding. This revealed that instruction encoding was boosted by an active learning intention. We identified several other factors affecting learning efficiency – beyond the unsurprising finding that instruction-based learning was, as it must be, faster than trial-and-error learning due to the virtual absence of failed attempts in the initial phase of learning. But even when performance was measured relative to the identical number of preceding correct implementation trials the efficiency gain persisted. This suggests that failed attempts entailed indirect learning processes which negatively impacted learning in subsequent trials. A single instruction trial was sufficient to establish the advantage, but repeated instructions were better. Together, this suggests that instruction-based learning might benefit from less demanding WM operations, which might primarily rest on procedural WM updating and maintenance, whereas trial-and-error learning seemed to rely more heavily on hypothesis testing within declarative WM and suffered from proactive interference due to preceding failed attempts. However, strategic factors and inter-individual differences in WM-span could reduce or

even abolish this disadvantage at least in error rates. This was not true for response time gains suggesting more efficient instruction-based task automatization.

W-34. Acute stress differentially affects the habitualization of approach and avoidance behavior in men and women

Katharina Zwosta, Tatjana Karcz, Moritz Walser, Hannes Ruge, Clemens Kirschbaum, Thomas Goschke, Uta Wolfensteller

Technische Universität Dresden, Germany

Previous studies suggest that acute stress reduces flexible goal-directed action control in favor of habitual action control such that stressed participants show an increased tendency to execute previously rewarded behavior even after the outcome is devalued. On the other hand, there is evidence that acute stress differentially affects learning from reward and punishment. Hence, the present study aimed at investigating the effects of acute stress on the acquisition and habitualization of both rewarded approach behavior as well as punishment avoidance behavior. Of 64 participants, one half underwent the Trier Social Stress Test inducing acute psychosocial stress, while the other half was subjected to a corresponding control procedure. Consecutively, habitual approach and avoidance behavior was established by overtraining participants on responses leading to a monetary reward or avoiding a monetary loss. Finally, after subjects were informed that they could no longer gain or lose money, habit strength was tested by the amount of interference the overtrained response tendencies imposed on goal-directed behavior. While there were no main effects of acute stress on either learning rate or habit strength, we found significant interactions between gender and motivation type. Specifically, stressed men showed faster learning of approach behavior and stronger approach habits than non-stressed men, while stressed women displayed slower learning from reward and stronger avoidance habits compared to non-stressed women. These results suggest that the effects of acute stress on behavioral flexibility differ for approach and avoidance behavior depending on gender.

W-35. The power of instructions: Transfer of learned category-response and/or stimulus response associations is determined by instruction

Cai S. Longman[1], Fraser Milton[1], Andy J. Wills[2], Frederick Verbruggen[1]

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Although instructions often emphasise categories (e.g., odd number → left button, object on road → apply breaks, healthy food → eat), psychologists often interpret learning in terms of stimulus-response (S-R) bindings with little attention being paid to the importance of category-response (C-R) bindings. In a new Rapid Instructed Task Learning paradigm designed to investigate the early stages of instructed category learning and transfer of associations between contexts, participants were required to classify novel dot-patterns according to the instructions presented prior to each block. Each phase consisted of a 'training' block, immediately followed by a 'transfer' block. In some transfer blocks the stimuli, categories and/or responses (or any combination thereof) could be novel or repeated from the preceding training block. Learning was assessed by comparing the difference in performance between the end of training and the start of transfer in each condition. In experiments where the instructions mentioned the relevant C-R bindings (the two category templates were displayed alongside the correct response for each category) the evidence for transfer of learned C-R associations to novel stimuli was strong whereas the evidence for transfer of learned S-R associations to novel classifications was much

weaker. In a final experiment where the instructions mentioned only the relevant S-R bindings (all stimuli were displayed alongside the correct response for each stimulus), evidence for transfer of learned C-R associations to novel stimuli was weaker but evidence for transfer of learned S-R associations across classifications was much stronger. Combined, these findings highlight not only the importance of a much neglected, yet critical, aspect of human cognition (C-R associations), but also the importance of framing instructions in such a way as to encourage learning (and transfer) of the relevant material.

W-36. Feedback-based learning and memory in children: Potential modulation by chronic stress

Julia Claudia Binder[1], Johannes Falck[1], Laura Meine[1], Christine Marcelle Heim[2,3], Yee Lee Shing[1,4]

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The ability to learn from feedback on one's choices is central to adaptive behavior. Recent neuroimaging studies suggest that while the striatum is involved in learning from immediate feedback, there is a shift towards hippocampus-mediated learning when feedback is delayed for a few seconds (Foerde & Shohamy, 2011). Furthermore, episodic memory associated with delayed feedback is enhanced, presumably due to the involvement of the declarative memory system. In the present study, we examined whether the feedback timing-related shift from striatal to hippocampal learning can be observed in children. In addition, we were interested in the role of chronic stress in modulating such a shift. As sustained increases in glucocorticoid secretion have been associated with decreased hippocampal volume, we hypothesized that children exposed to chronic stress should show impaired learning and episodic memory performance especially when these are mediated by the hippocampus (i.e., delayed feedback). Chronic stress was assessed by parental questionnaires on socioeconomic status and perceived stress, as well as by diurnal salivary and hair cortisol measures. 141 children aged six to seven years performed a probabilistic learning task, in which they had to learn preferences of cartoon characters. Following each of their choices, feedback paired with unique, novel objects was provided either immediately or after a delay. In line with previous research, children showed enhanced episodic memory for the objects paired with delayed feedback, supporting the notion that there is a shift from habitual striatal to declarative hippocampal learning when feedback is delayed. Further analyses will investigate to what extent chronic stress and hippocampal volume may modulate the feedback timing-associated memory enhancement effect.

W-37. The effects of chronic stress on reward anticipation-mediated memory enhancement in children

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Anticipation of reward has been shown to enhance incidental encoding of episodic memories. Initial neuroimaging evidence suggests that this effect is partly driven by

modulated interactions between the medial temporal lobe and the dopaminergic midbrain. However, these brain regions and the corresponding memory and reward systems are also shown to be affected by stressful experience. This study investigated stress-related differences in the memory-enhancing effect of reward anticipation in a sample of 81 6- and 7-year-old children. Chronic stress was assessed by using questionnaires on indicators of socioeconomic status (SES) and parent-rated perceived stress as well as child's hair cortisol assays. During functional magnetic resonance imaging (fMRI), in each trial, participants saw a unique picture from one of two object categories (living vs. non-living) followed by a number comparison task. Object category served as a cue for whether a correct response on the number comparison task would or would not be rewarded. Recognition memory for the unique pictures was subsequently tested outside the scanner. In line with previous research, reward anticipation enhanced episodic memory performance. Preliminary results suggest that parents' perceived stress had a modulatory effect on the magnitude of reward-related memory enhancement in children. Further analyses are ongoing to examine the neural correlates of this effect as well as its association with child's hair cortisol.

Poster session: Methods

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-38. VoiceExperiment: An Open-Source R-Package for the Analysis of Spoken Responses

Tillmann Nett, Robert Gaschler

FernUniversität in Hagen, Germany

Responses in psychological experiments are collected in a multitude of ways. While some methods to collect responses allow the data to be analyzed directly, for example when dealing with button presses, this is not the case for all types of responses. Especially spoken responses require specialized software to extract response times and answer categories from the collected data. Current software solutions for analyzing spoken responses, however, is either part of a closed source software (e.g. e-prime) or developed within a larger closed-source software ecosystem (e.g. written in MATLAB, Donkin, Brown, & Heathcote, 2009). Closed source solutions have the problem that the underlying algorithms are not freely available. We present a novel software for the analysis of spoken responses, which is developed within R (R Core Team, 2015), a fully open-source ecosystem for statistical analysis. It can be used to extract voice onset times and answer categories from sound files stored during an experiment (for instance run in Psychopy or Opensesame). The software provides both a reliable analysis of response times as well as categorization of the responses (if the set is <=4) based on a clustering approach of speech features (MFCCS, Mermelstein, 1976). The software was built with both the goal of simplicity as well as high modularity in mind. Therefore, pre-defined analysis methods with sensible default parameters are made available through single commands. For advanced tasks, all parameters can be individually changed and all parts of the analysis can be recombined in a modular fashion. To ensure a high quality of the software, modern development approaches such as Test-Driven Development (Beck, 2003) and agile development (Agile Alliance, 2001) were used. Because of the open-source nature of the software and the open design approach, the software can easily be extended by future developers and researchers to suit new needs.

W-39. Comparability and Stability of Internet-based Response Time Assessment in Domestic and Laboratory Settings

Kornelius Schmidt, Robert Miller, Soeren Enge

Technische Universität Dresden, Germany

Our modern world is difficult to imagine without the internet. However, in the field of reaction time paradigms internet-based data collection is still rarely used in practice. While there are many promising findings regarding the quality of internet-based data collection common reservations hinder a comprehensive establishment.

It was the aim of our study to examine to what extent internet-based reaction time data collected under not standardized environment conditions (i.e., domestic setting) could lead to an undesirable increase of data variability in comparison to data collected under standardized conditions in the lab. We used three reaction time paradigms (i.e., go/nogo task, n-back task, task switch task) programmed and presented by the Millisecond Inquisit software. Participants ran through the paradigms in two conditions, i.e. at home and in our lab.

Our data analysis show that there are no major differences between conditions in data variability. These results apply to all three paradigms.

Hence, our results suggest that the use of internet-based data collection does not substantially contribute to increased variability of reaction time data relative to highly standardized conditions. Further, our results invite to an enhanced use of web based data collection.

W-40. Viability of webcam-based online eye tracking

Kilian Semmelmann, Sarah Weigelt

Ruhr-Universität Bochum, Germany

Online experimentation is emerging in many areas of cognitive psychology as a viable alternative or supplement to classical in-lab experimentation. Studies range from the replication of results (Germine et al., 2012; Crump, McDonnell, & Gureckis, 2013) over technical investigations of timing accuracy (De Leeuw, 2014; Reimers & Stewart, 2015) towards an extensive examination of potential influences of conduction environment (Hilbig, 2015; Semmelmann & Weigelt, 2016). While performance- and reaction-time-based paradigms are covered through these approaches, one instrument of cognitive psychology has not yet been examined for its potential in online research: eye tracking. Next to the typical advantages of online data like lower costs, faster experimental cycle, and better generalization, webcam-based eye tracking would remove the reliance on expensive hardware. Utilizing consumer-grade webcams as scientific instruments allows for massive parallel data recording of different populations independent of time and place.

In this work we used JavaScript-based eye tracking algorithms recently made available by Papoutsaki et al. (2016) together with webcams to investigate the potential of this approach. We compared three in-lab conducted tasks (fixation task, pursuit movement, and free image viewing) with online acquired data to analyze the spatial precision in the first two, and replicability in the second task. We found in-lab acquired data to be accurate to about 170 px (1.15° visual angle), able to record pursuit movements, and replicate the results of Walker-Smith et al. (1977) showing human observers fixate more on the eyes than other key regions (30% vs. 14%). Online conducted data on the other hand was slightly less accurate (210 px) and showed a higher variance, but still did replicate the in-lab results in all tasks. By limiting the web data to a high frames-per-second sample the offset could be reduced. Overall, we found web technology-based eye tracking to be

suitable for all these tasks and are confident that the technique will be improved continuously through further research and algorithms to become a viable instrument in all of cognitive psychology.

Poster session: Moral decisions

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-41. Online processing of moral transgressions and emotional violations: An ERP study

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If we find out that someone has cheated in an exam or is telling a lie, we tend to spontaneously judge such behaviour as bad or immoral. This reflects a key aspect of human moral cognition and it makes sense to assume that such judgments are based on our personal experiences, values, and attitudes. Recently, we showed that when participants read about everyday moral transgressions (e.g. adultery), they appear to implicitly engage in the evaluative (good–bad) categorization of incoming information during online comprehension (Leuthold, Kunkel, Mackenzie, & Filik, 2015), as indicated by a larger event-related brain potential (ERP) positivity to immoral than moral scenarios. However, since in this experiment participants were simply reading for comprehension, rather than making overt judgments about the scenarios, it remains unclear whether such a rapid affective categorisation process contributes to explicit moral decisions as well as to on-line processing in more passive tasks. In two experiments, target sentences containing emotional and moral transgression scenarios were presented using rapid serial visual presentation. In Experiment 1, participants made moral judgements for moral materials (“Is the behaviour morally acceptable?”) and emotional judgments for emotional materials (“Are you touched by the text?”) after the presentation of the final critical word. Affective judgments of emotional scenarios elicited a larger late posterior ERP positivity (LPP) to negative than neutral items after about 200 ms, whereas immoral items elicited a larger late anterior negativity after 500 than moral items. In Experiment 2, participants made emotional judgements to both types of scenario, and a larger LPP was triggered for both types of materials. These results suggest that the evaluative processing of linguistic information is both material- and task-dependent and accords with the view that participants engage in more cognitive processing in active moral judgment tasks.

W-42. Justification of an immoral act: Influence of morality and personal values

Mirko Saunders, Diana Boer

University of Koblenz-Landau, Germany

Most people try to avoid immoral behaviors, but moral dilemma situations sometimes provoke immoral acts. How are these acts justified? Do men and women use similar moral and value based justifications?

This study examined to what extent men’s and women’s moral institutions and personal values influence justifications for immoral behaviors. The Moral Foundation Theory postulates that marital fidelity is a moral aspect of fairness. According to this background, it was assumed that fairness is a significant predictor of moral behavior with regard to a

marital cheating scenario. Various studies showed that men and women differ in some aspects of morality. Therefore, a gender effect was expected with regard to the morality evaluation of the scenario. We conducted a scenario study that assessed (a) value-based behavior justifications and morality evaluations in response to an immoral scenario, (b) personal values via the Portraits Value Questionnaire-Revised, and (c) the moral conceptions via the Moral Foundations Questionnaire. 200 adults participated in this study (53 men and 147 women). The results of the multiple regression analyses revealed that (1) in contrast to the hypothesis fairness was not associated with the justifications for the immoral behavior, (2) behavior justifications that correspond with one's personal values were rated as the most appropriate justification, (3) contrary to our expectations, only small gender differences in the behavior justifications and morality evaluations were found. In summary, cheating is considered as an immoral scenario in general but the moral evaluation seems to be less affected by the moral conceptions than by the individual justifications for the immoral behavior and by personal values.

W-43. Consequentialism and Deontology versus Principles and Reasons

Christina Botros

Leuphana Universität Lüneburg, Germany

In Moral Psychology it is common to distinguish between Consequentialism and Deontology when it comes to moral choices (e.g. Cushman, 2013). However, there is another, more basic distinction between principled and particularistic reasoning and decision-making (cf. e.g. Dancy, 2013). While in the former case, one would decide according to a general rule, in the latter case one would look at the reasons present in the particular situation, see what speaks in favor or disfavor of each option and decide accordingly.

What are the differences between the two distinctions? (i) Both Consequentialism and Deontology are principled theories and (ii) both principled and particularistic decision-making is deliberate, while deontological decision-making is thought of as quick, emotional and intuitive (cf. e.g. Greene et al., 2001; Greene et al., 2008).

To investigate this question further, the principled and the particularistic decision strategy were combined with a trolley dilemma manipulation based on Waldmann and Dieterich's (2007) material. In this trolley experiment the main dependent variable was still the decision of whether to sacrifice the few for the many in both dilemma types, but here, participants were either instructed to decide by principle, by the weighing of reasons or were given no instructions (control). Preliminary results show that while in the agent dilemma type principle-based deciders were more prone to sacrifice the few than both reason-based deciders and controls, reversely in the patient dilemma type reason-based deciders were more prone to sacrifice the few than both principle-based deciders and controls. The fact that controls fell in with reason-based deciders in the consequentialism-inspiring (agent) type dilemmas and with the principle-based deciders in the deontology-inspiring (patient) type dilemmas shows that (1) the process behind the different reactions to dilemma type in trolley cases might be understood as the difference between principled and particularistic decision-making and (2) these two decision strategies can be used in both deontological or consequentialistic situations and in case of mismatching they are stronger than what the situation itself inspires. In fact, it seems that the principled/particularistic distinction is the more important of the two.

W-44. Legal Reasoning: Balancing of Civil Rights

Benjamin William Sklarek, Lupita Estefania Gazzo Castañeda , Markus Knauff

Justus-Liebig-Universität Gießen, Germany

Defeasible reasoning has become a hot topic over the last years, especially, in regard to legal reasoning. Thus, one can state that legal rules are often formulated as non-monotonic conditionals. In particular, exculpatory circumstances assume the role of disabling conditions which might defeat an a priori valid verdict (consequence). However, recent studies have shown that the acceptance of exculpatory circumstances was moderated by the degree of crimes' moral outrage. In this study we want to test another issue of legal reasoning labeled as "balancing of civil rights". This phenomenon occurs when two or more civil rights are in conflict with each other. Testing which civil right will be preferred by people's decision and what affects their decision making we presented participants scenarios of conflicting civil rights varied by their moral outrage. For example, participants were asked to imagine a case that a newspaper X has published private information about a celebrity Z. And therefore Z proceeds against the editor of the newspaper X because Z's right of personality was violated. On the other hand, the editor refers to liberty of the press. Participants were shown conditionals with one civil right as premise and the other conflicting civil right as disabling condition. Afterwards, they should decide to draw the conclusion (choosing the civil right from the premise) or to withdraw the conclusion (choosing the civil right as disabler). First results suggest that civil right balancing might be influenced by the degree of moral outrage, as well. However, one might discuss if the decision making process only depends on the degree of moral outrage or whether there are other factors. Additionally, people might also consider whether the rejected civil right causes short- or long-ranged consequences or whether civil rights are dealing with individual vs. social values.

Poster session: Numerical cognition

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-45. The zero effect: voxel-based lesion symptom mapping of number transcoding errors following stroke

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Zero is known to represent a special case in our numerical system because it is not represented on a semantical level. Former research has shown that this can lead to specific impairments when transcoding numerals from dictation to written digits. Even though, number processing is often considered to be dominated by the left hemisphere of the brain, studies indicated that left as well as right hemispheric stroke patients commit errors when transcoding numerals including zeros. The present study set out to conduct a voxel-based lesion symptom mapping analysis to find out which lesion locations are related to errors in transcoding zeros. For the first time, a large sample of subacute stroke patients (N= 667) was assessed without being preselected based on the location of their lesion, or a specific impairment in transcoding zero. The results show that specific errors in transcoding zeros were common (prevalence = 14.2%) and a VLSM analysis (n= 153) revealed these to be related to lesions in and around the right putamen. In line with former

research, the present study argues that the widespread brain network for number processing also includes subcortical regions, like the putamen with connections to the insular cortex. These play a crucial role in auditory perception as well as attention. If these areas are lesioned, number processing tasks with higher attentional and working memory loads, like transcoding zeros, can be impaired.

W-46. Which decision making style makes training in numeracy more effective?

Stephan Pidner, Bernhard Streicher

UMIT – Private University of Health Sciences, Medical Informatics and Technology, Austria

People differ in the way they make decisions and, as one effect, different decision making styles can influence peoples final decisions and outcomes. One possible differentiation can be drawn between maximizing (i.e., a rational and reasoning based style) and satisficing (i.e., to stop searching and make a decision when a so called acceptability threshold is reached). Regarding numeracy, we assumed that differences in numeracy skills can be explained by differences in decision making styles (here: maximizing vs. satisficing). In an experimental study (N = 173) participants answered a numeracy test for two times (t1 & t2). Between the two measurements the experimental group read some information on statistical concepts relevant to numeracy, while the control group did not receive any information. Finally, decision making style (maximizing vs. satisficing style) was measured using a questionnaire. For numeracy results showed no significant main effects and no significant interaction between condition and time. However, at t2 numeracy significantly correlated with satisficing, in the experimental but not in the control group. No significant correlation was found for t1 or maximizing. These results give some indication that the acquisition of numeracy skills depend on decision making style, namely on satisficing. Implications for learning environments and further research are discussed.

W-47. Stimulating numbers – the ordinal and cardinal value of fingers

Elena Sixtus, Oliver Lindemann, Martin H. Fischer

University of Potsdam, Germany

Finger counting is an essential part of children’s development towards mature number concepts. With a one-to-one correspondence of fingers to numbers in Western counting, fingers have an ordinal value (position within the finger counting sequence) as well as a cardinal value (absolute number of fingers counted). In two experiments, we investigated those two numerical meanings of fingers. Participants were tactually stimulated on their fingertips of one hand at a time. They responded by naming the number of stimulations on one fingertip (2, 3, or 4 stimulations; Experiment 1) or the number of fingers that were stimulated (2, 3, or 4 fingers; Experiment 2). In Experiment 1 responses were given faster and more accurately when the number of stimulations corresponded to the ordinal value of the stimulated finger. In Experiment 2 responses to two and three stimulated fingers were given faster and more accurately when the set of stimulated fingers corresponded to finger counting habits. Overall, the two experiments provide evidence for the notions that 1) fingers hold an ordinal value that arises from individual finger counting habits and 2) those habits also affect the perception of the cardinal value of events.

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W-48. Non-symbolic numerosity processing: Why are visual properties important?

Judit Pekar, Annette Kinder

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In numerical cognition, dot comparison tasks are a common method to investigate non-symbolic numerosity processing. In this paradigm, participants have to decide which one of the two presented images contains more dots. It has been suggested that the Approximate Number System (ANS) is responsible for this process and that it is not influenced by the sensory properties of the stimuli. However, numerosity is inherently confounded with the continuous properties of the dots. For example, a stimulus with a higher number of dots has a larger aggregate surface. Thus, in this case participants could solve the task by focusing on the aggregate surface rather than assessing numerosity. Unfortunately, by controlling one cue, confound of other visual cues with numerosity tends to increase. For example, to keep aggregate surface across stimuli with different numerosities constant, dot size has to be adjusted. To circumwent this problem, researchers have put considerable effort into controlling the visual cues. Yet, these methods do not take into account the possibility that participants rely on more than one visual cue at a time. Gebuis et al. (2012) introduced a new paradigm in which their objective was to actively investigate the role of visual cues in numerosity processing instead of controlling them. They challenged the original view on ANS by reporting that numerosity judgements can, indeed, be influenced by the sensory cues of the stimuli and that participants use single cues as well as combinations of cues, even if these are not correlated with numerosity. In the present study, we aimed to replicate the results from Gebuis et al. (2012) and extended the study with an additional condition. In the experiment, the smallest contour around the dot array (convex hull) and the average diameter of the dots were manipulated so that they could be congruent, incongruent or non-informative for numerosity. This method resulted in eight different stimulus types which were presented to participants in a blocked and in a mixed fashion (replicated and additional task, respectively). In accordance with Gebuis et al. (2012), differences in accuracy rates between congruent and incongruent trials indicate the influence of visual cues on numerosity judgement, moreover we showed accelerated congruency effects in the mixed task. These findings have important implications for the interaction between non-symbolic number and its continuous visual properties. We discuss our results with respect to sensory-integration and inhibition.

W-49. Numbers in Space: How Depth Cues impact Number Perception

Steffen Theobald, Thomas Lachmann

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When thinking about numbers, we usually imagine them written down or projected on a 2D surface, like a price label, calculator output or an excel file. While scenarios like this represent the majority of our interaction with numbers, situations where numbers are presented in a 3D environment are getting more and more common, like presentation of numbers in 3D computer games and VR, or superimposed on the environment by means like google glass. Since it has already been shown that visual size can interact with the perception of number size and that depth perception of distant items is strongly dependent on comparing the size of objects we perceive, we investigated if the combination of depth cues and number size can interact with each other.

In our study we superimposed numbers of a fixed visual size on a varying background. This background was used to provide depth cues so that the visual size of the number

appeared to change while actually staying the same. The depth cues were only presented in the parafoveal visual field while the foveal visual field only contained a white number on grey background to reduce the possibility of grouping and crowding effects. Depending on the task condition participants were asked to answer via button presses whether the stimulus was larger or smaller than 5. The presented background was either task irrelevant or relevant in form of an additional no-go task. Our results suggest that information about visual size does not exclusively interact with number size over actually perceived size, but can also be modulated by magnitude systems used in depth perception.

Poster session: Reasoning

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-50. No Effect of Working Memory Load on Conditional Reasoning

Danielle Pessach, Henrik Singmann

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BACKGROUND: Prominent theories of reasoning assume that reasoning involves usage of working memory resources. Most evidence supporting this assumption, especially in the domain of conditional reasoning, is however correlational. In our study we are investigating the role of working memory experimentally in the context of probabilistic conditional reasoning. Conditional reasoning is concerned with reasoning from if-then statements. For any conditional statement there are four inference forms, two of which are valid and two are invalid according to formal logic. As opposed to a deductive (i.e., following formal logic) reasoning task, in a probabilistic setting participants are not asked whether or not a conclusion is valid, but how likely they think the conclusion is. METHODS: In two online experiments, we manipulated within-subject working-memory load (WML; two conditions: load/no load) and number of counterexamples for causal conditionals (few, many) in a probabilistic conditional reasoning task. In Experiment 1 (n = 92), we used four causal conditionals with few or many counterexamples and asked participants to rate the likelihood of the conclusion for the four inference forms. Experiment 2 (n = 95) replicated the first study with a larger set of 16 conditionals. RESULTS: Results showed expected effects for inference and interaction with counterexamples. However, we did not find any effect of WML. Results for Experiment 2 replicated this pattern. CONCLUSION: At least in a probabilistic setting, working memory seems to play no role in conditional reasoning.

W-51. Luchins reloaded – Think aloud protocols suggest that the set is reloaded into working memory after interruption

Christine Blech[1], Robert Gaschler[1], Merim Bilalić[2]

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The Einstellung (set) effect designates the phenomenon that established routines can prevent problem solvers from finding alternative, more efficient solutions. As the classical Luchins (1942) water jug problem is a short task, contribution of long term vs. working memory to the Einstellung effect are not clear. Recent research (a) demonstrates automatic effects of content represented in the focus of attention in working memory and (b) shows that participants face difficulties directing attention away from elements that belong to the known solution. We therefore ask whether the Einstellung effect could be reduced by enforcing overwriting of working memory – or whether participants would reload the set after the interruption. The experiment (N = 161) combined the water jug

paradigm with think aloud protocols to closely track the content of verbal working memory. Subjects in the (a) Einstellung condition worked on five schema-inducing routine tasks followed by one critical task which did not match the schema. In the (b) interruption condition, arithmetic problems had to be solved between routine and critical trials. Thus representations related to the schema inducing trials were cleared from working memory before turning to the critical trial. The (c) control condition only dealt with the critical trial. While we replicated the classical Einstellung effect with verbal protocol as dependent measure, overwriting working memory had no beneficial effect. Thus, participants seemed to reload the set into working memory with high likelihood when faced with the critical trial.

Poster session: Social cognition: Facebook

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-52. Der Einfluss selbstregulatorischer States und Traits auf den Facebookkonsum: Priming von Materialismus und Sozialen Vergleichen

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Das Soziale Netzwerk Facebook bietet seinen Nutzern ein vielfältiges Spektrum an sozialen Aktivitäten und somit eine gute Möglichkeit, Sozialverhalten im Internet zu erforschen. Studien zeigen vielfältige Zusammenhänge zwischen Facebook und psychischen Einflussvariablen. Die Soziale Online-Selbstregulationstheorie (SOS-T) versucht diese vielfältigen Zusammenhänge darüber zu erklären, dass Menschen versuchen, sich via Facebook zu regulieren. Im Rahmen dieses Posters werden zwei Studien vorgestellt, die das Ziel hatten, einen ersten Schritt hinsichtlich der Validierung der SOS-T zu unternehmen. Hierzu wurde der Einfluss zweier selbstregulatorischer Variablen (Materialismus und Soziale Vergleiche) auf den Facebookkonsum in zwei Experimenten mittels Priming-Paradigmen (N1 = 228; N2 = 239) untersucht. Hierbei wurden jeweils erhöhte materialistische Tendenzen oder eine erhöhte Soziale Vergleichsorientierung geprimt und die jeweils andere Variable als möglicher Moderator mit eingeschlossen. Die Ergebnisse sprechen für einen interdependenten Einfluss der beiden Variablen auf den Facebookkonsum und zeigen, dass sie in ihrer hohen Ausprägung mehr Facebookkonsum begünstigen. Somit unterstützen die Ergebnisse die Idee der SOS-T. Weitere Implikationen werden diskutiert und ein Ausblick für künftige Forschung wird gegeben.

W-53. Implicit associations towards Facebook: an evolutionary approach

Antonio Olivera-La Rosa[1], Javier Villacampa[2], Gordon Ingram[3], Laura Saldarriaga[4]

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In the last two decades, the rise in popularity of Internet and social networking have dramatically changed human social interactions. In such a context, evolutionary psychology seems a very suitable approach to online behavior given its long tradition in topics that are of special relevance in this field, such as mating or social exchange (Piazza & Ingram, 2015). For instance, research on evolutionary psychology supports the existence of sex differences in sexual and empathy-mediated behavior. The objective of

the present study is to test whether such cognitive patterns are also operative at the implicit level of Facebook users. We used the Single-Target Implicit Association Test (ST-IAT; Karpinski & Steinman, 2006) in order to assess sex differences in implicit associations between Facebook and two evolutionary relevant constructs: sexual and prosocial behavior. Additionally, we controlled for the role of participant's relationship status as a potential moderator of Facebook implicit associations. Our analysis revealed that Facebook is more strongly associated with prosocial than with sexual behavior. This effect was not sensitive to sex differences. We found that relationship status did play a role in Facebook implicit associations, by women not committed in a relationship exhibiting stronger implicit associations between Facebook and prosocial than with sexual behavior. Indeed, the present findings constitute a first step in the application of implicit measures to cyberpsychology research, and more data are needed to disambiguate relations between implicit and explicit associations towards Facebook. Further studies with different experimental designs should examine potential moderators of the observed associations, such as sociocultural context or personality traits.

W-54. Milliarden Nutzer, Milliarden soziale Vergleichsmöglichkeiten? – Der Einfluss von Facebook auf die soziale Vergleichsorientierung: Eine Priming-Studie

Lily Blaschke, Phillip Ozimek, Jens Förster

Ruhr-University of Bochum, Germany

Soziale Netzwerke, wie Facebook, haben sich bezüglich ihrer Popularität und Nutzerzahlen in den letzten Dekaden stark vergrößert. Sie bieten vielfältige Möglichkeiten zur sozialen Interaktion und somit ein neues Feld der Sozialforschung. Dabei wurden bislang viele Studien durchgeführt, die bereits einige signifikante Korrelate nachweisen konnten (z.B. zum Selbstwert, Narzissmus, Materialismus oder Sozialen Vergleichen), jedoch keine kausale Schlussfolgerung ermöglichen. Die vorgestellte Studie (N = 79) untersucht erstmals den Einfluss der Beschäftigung mit Facebook auf die soziale Vergleichsorientierung (SVO) unter der Berücksichtigung von grandiosem und vulnerablen Narzissmus als Moderatorvariablen. Mithilfe eines Prozess-Priming-Paradigmas wurden Probanden einer Facebook-Exposition ausgesetzt und so Assoziationen zu Facebook aktiviert. Zusätzlich gab es zwei Kontrollbedingungen mit einer neutralen Internet-Exposition und dem Ausbleiben der Expositionsbedingung. Anschließend wurden grandiose und vulnerable narzisstische Tendenzen erhoben sowie die SVO. Es zeigt sich ein signifikanter Haupteffekt bezüglich des Einflusses der Exposition auf die SVO, insofern als dass Probanden in der Facebookbedingung eine geringere SVO zeigen als in den beiden Kontrollbedingungen. Grandioser und vulnerabler Narzissmus haben keinen signifikanten Einfluss weder auf die SVO noch auf die Interaktion zwischen der Bedingung und der SVO. Die Ergebnisse sprechen dafür, dass die Verwendung von Facebook das Bedürfnis nach sozialen Vergleichen unabhängig von der narzisstischen Ausprägung senken kann. Weitere Ergebnisse und Implikationen werden vorgestellt und diskutiert.

Poster session: Teaching and instruction

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-55. 'Getting Airplanes Off the Ground' versus 'Aerodynamic Laws of Ascension': The Perceived Concreteness of Titles Affects Metacognitive and Motivational Aspects in Learning from Expository Texts

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Technische Universität Dresden, Germany

Background:

Titles, as a common feature of expository texts, aid learners in the cognitive processing of text information by providing structure and context. However, titles are likely to also affect metacognitive and motivational aspects of learning by providing cues for judging whether the following text will be easy or hard to comprehend, and whether it will be interesting or not. The present experiment investigates one relevant feature of titles – their level of perceived concreteness – with respect to metacognitive monitoring, reported study motivation, invested study time, and learning outcomes.

Methods:

Sixty-three students of an American university were exposed to either concrete or abstract titles for three expository texts, and provided prospective metacognitive and motivational judgements about the texts on Likert-type rating scales. The participants then studied the texts, provided a set of retrospective judgments, and completed comprehension tests.

Results:

The results revealed a motivating effect of titles: Learners who were presented with titles which were perceived to be concrete (as opposed to abstract) expected the following texts to be significantly easier to comprehend and more interesting, and reported to be more motivated to study them. However, there were no differences with regard to invested study time or comprehension test performance.

Conclusion:

The results of the experiment indicate that educators are able to increase the motivation to study expository texts by accompanying the texts with titles which learners perceive to be concrete rather than abstract. Whether this increased motivation has the potential to result in increased study time and increased learning outcomes may depend on the level of self-regulation which learners are able to apply to a learning task, and needs to be investigated in another set of experiments that allow for more degrees of freedom.

Funding:

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W-56. Learners-as-Designers – Generating Externalizations in order to Acquire Knowledge about a Subject Matter

Gregor Damnik, Antje Proske, Hermann Körndle, Susanne Narciss

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The instructional approach Learners-as-Designers (LaD, Jonassen & Reeves, 1996) is based on the observation that designers of digital learning media often acquire more knowledge about a subject matter than learners who will use this media. Therefore, encouraging students to produce learning media is seen as a powerful source for

knowledge acquisition. However, empirical studies hardly investigated the gains of LaD on knowledge acquisition in a systematic way. When designing and producing learning material, designers are required to externalize their acquired knowledge. These externalizations may support designers in (a) offloading their working memory, (b) finding gaps in their knowledge, (c) generating new ideas, (d) selecting and organizing information, and (e) relating the new information with prior knowledge (Slof, 2010). The purpose of this study was to test if these externalizations contribute to knowledge acquisition in LaD. Therefore, a LaD group was compared with two other groups: one group was provided with a learning environment which was pre-structured by an expert of the subject matter while the other group read a textbook chapter about this subject matter on computer. 38 students participated in the study. The results revealed no significant differences between the groups with respect to retention tasks. However, the LaD group significantly outperformed the other two groups on transfer and application tasks even though the LaD group did not spend more time for learning.

W-57. „Innovative Methoden für die teilnehmerorientierte Schulungsentwicklung in der beruflichen Weiterbildung“

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Im Projekt „Nutzerzentrierte Dienstleistungsentwicklung“ (Förderung: Land Baden-Württemberg, Bosch Powertools, Volkshochschulverband Baden Württemberg) werden an der Hochschule der Medien in Stuttgart Methoden aus User Experience und Design Thinking bzgl. Ihrer Anwendbarkeit auf die Konzeption und Evaluation von Veranstaltungen der beruflichen Weiterbildung untersucht.

Entsprechend dem nutzerzentrierten Entwicklungsansatz und der Methodik des ethnographischen Interviews wurden im Rahmen der Nutzerforschung aktuelle Schulungsangebote der Kooperationspartner (Bosch Powertools und Volkshochschulverband Baden Württemberg) beobachtet und Teilnehmer im Rahmen qualitativer Interviews hinsichtlich ihres Erlebens in den Schulungen befragt. Des Weiteren wurden Experteninterviews mit Schulungsleitenden sowie Auftraggebern von Schulungen durchgeführt. Aus diesen Erkenntnissen konnten auf Basis der Critical Incident Technique (Flanagan, 1954) Gestaltungsräume definiert werden, an welchen Stellen das Nutzererleben effektiv verbessert werden kann. Daran anschließend wurden im Rahmen eines Ideation Workshops und der Delphi-Methode Konzeptideen für ein teilnehmerorientiertes Gesamtschulungskonzept generiert, welches im Rahmen von Pilotschulungen getestet werden soll. Eine wichtige Aufgabe im Projekt liegt des Weiteren in der systematischen Entwicklung und Umsetzung einer begleitenden Prozess- und Ergebnisevaluation. Um dieser Aufgabe nachzukommen werden die Pilotanwendungen des entwickelten Schulungskonzeptes evaluiert und iterativ überarbeitet.

Ziel des Forschungsprojekts ist zudem ein Benutzerhandbuch mit konkreten Handlungsanleitungen für die Anbieter von Weiterbildungsmaßnahmen. Das Benutzerhandbuch selbst wird ebenfalls nach dem Vorgehen der nutzerzentrierten Produktentwicklung entwickelt – von Beginn an werden Anwender des Benutzerhandbuches (Entwickler von Weiterbildungsangeboten aus den Bereichen öffentliche Weiterbildung, Trainingsinstitution und Industrie) in dessen Entwicklung mit einbezogen.

Erkenntnisse zur User Experience aktueller Schulungsangebote, sowie einzelne Aspekte des Schulungskonzeptes werden in dem Beitrag vorgestellt.

Poster session: Traffic psychology

Time: Wednesday, 29/Mar/2017: 10:50am - 11:50am

W-58. Risk Perception of Angry Young and Old Drivers in a Semi-Automated Driving Task

Till Becker[2,4], Carolin Scheifele[3,4], Michael Oehl[1,4]

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Risky driving behavior is a main contributor to traffic accidents. Previous research has shown that age and anger both influence risky driving behavior. The link between other specific emotions and age influencing risky driving behavior nevertheless remains unclear and has not been measured in a method of limits scenario so far. The direct comparison of different emotional states and age groups was therefore undertaken in this study. Risky driving behavior was measured through an application of the psychophysical method of limits. Time headway, the time necessary to reach the position of a lead vehicle, served as a risky driving parameter. After a relived emotion task (happiness, anger or neutral) younger and older adult participants were required to drive a set of predefined routes in a driving simulator and to judge their feeling of safety in ascending and descending time headway changes. The younger drivers (25 to 39 years of age) chose smaller time headways in the anger condition compared to the neutral condition, whereas the older adult drivers (65 to 77 years of age) chose larger time headways compared to the neutral condition. The happiness condition was not significantly different from the anger and neutral emotion conditions for the two age groups. The results indicate a preference for risky driving behavior of younger drivers under the influence of anger and a preference for risk avoidance of older adult drivers. The influence of age on subjective risk perception therefore needs to be taken into account for designing highly automated driving systems.

W-59. Young drivers and emotions – A driving simulator study

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Novice and young drivers are highly overrepresented in car accidents and fatalities. The main reasons for this issue are their inexperience, skill deficits and adolescent risk taking. Even though graduated licensing programs have been implemented to counteract this overrepresentation, novice and young drivers remain a high-risk group. Previous research suggests that even differences within this special age group of drivers can be found. To shed more light on young drivers' risky driving behavior, we included young vs. very young or novice drivers (between-subjects design) in our current study. Additionally, we integrated different affective states (negative vs. happy vs. neutral; within-subjects design) which have proven to increase risky driving behavior besides age and experience. In three separate sessions for the different affective states 20 young drivers, i.e., 19 to 24 years old drivers with driving experience of more than one year, and 18 novice drivers, i.e., 17 or 18 years old drivers with less than one year of driving experience, drove in a driving simulator on two predefined routes (urban area and motorway). Results indicate that both positive and negative affective states tend to increase risky driving behavior in terms of speed and decrease awareness for speed on motorways. In urban road settings speed was more increased by a negative than a positive affective state. Acceleration was highest in a positive affective state on the urban road contrary to the motorway where the negative affective state was most influential. Additionally, risky driving behavior was measured by running yellow traffic lights. In a negative affective state participants ran significantly more

yellow lights than in other affective states. With regard to group effects (young vs. novice) young drivers showed significantly more risky driving behaviors than novice ones. Implications for further research and application in driving education will be discussed.

W-60. Comprehensibility of verbal and pictorial targets on signposts

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Signposting is a common means of traffic regulation and communication to road users. In order to allow fast traffic flow and prevent sudden manoeuvres, the driver's ability to understand a road sign is important for traffic safety. However, a large body of research shows that – with a mean comprehension value that varies between 50 and 70% - drivers have difficulties in understanding the meaning of traffic signs.

The use of pictorials represents one way of conveying simplified, standardized pieces of information. With the increase in traffic volumes over the last decades, a lot of countries have introduced such symbolic signs to facilitate international travelling where language differences constitute linguistic barriers. Currently, a variety of studies on symbolic warning and mandatory signs, but not for directory signs exists. The present study subsequently deals with the improvement of directory signs in road traffic for national and international drivers regarding comprehensibility, correctness of decisions and reaction times.

The aim of this study is to contribute to existing research on the topic of use of pictorials in road traffic and on traffic safety. A reaction time experiment was developed and carried out with 101 participants aged 18 to 87. 63 of the test persons had acquired German as mother language; for 38 of the participants, German was not the native tongue. Each participant was presented with 32 German directory signs that had specially been developed for the experiment. Participants had to indicate the direction they would use to reach a certain predetermined target location that could either be represented verbally or as a symbol.

Two hypotheses were tested: (1) Pictorials should be detected faster and more accurately than verbal targets. This could not be confirmed; instead, we found the opposite pattern. (2) German native speakers would show faster reaction times and more correct answers for symbolic as well as for verbal targets compared to non-native German speakers; this hypothesis could be confirmed. When the covariates age, sex and driving experience were entered into the MANOVA, the main effect of target type (verbal/pictorial) disappeared, and a large age effect and significant differences between signs were found. We assume that the arrangement and number of the destinations on the signs have a relevant influence. The same holds for the length of the target word.

In summary, the current study can be regarded as an important contribution to the still rare research on signposts. The results show influences of factors like age, driving experience or target type on the perception of signposts and demonstrate the need of further research on the subject.

W-61. The effect of coherence on comprehending traffic situations

Christine Gabriele Schnepf, Martin Baumann

University Ulm, Germany

Comprehension is a complex cognitive process that has substantial implications on our subsequent decisions and actions during driving. Only if drivers comprehend the relevant objects of the current traffic situation they can select appropriate actions. Subsequently comprehension is important for safe driving and the prevention of traffic accidents. What

are the basic components of this comprehension process? How do we generate a coherent mental representation of the current situation? Based on the idea that situation comprehension relies on similar processes as text comprehension (e.g., Durso, Rawson, & Girotto, 2007; Baumann & Krems, 2009) one important characteristic determining the comprehension of situations is the objective coherence of the situation itself defined as the logical interconnection of its elements. This study examines, whether the structure of driving situations in terms of its coherence influences the comprehension of the situation. A laboratory experiment was conducted, where 32 videos of driving scenarios on crossroads were shown to 58 participants. These situations were constructed with or without contradictory situation elements. As test stimulus a picture was shown either identical to the final scene of the video or with a change related to a either relevant or irrelevant situation element. The participants were requested to detect these changes on the picture and to indicate the location of the change. The results of this study show that removed relevant elements were noticed and located more often correctly than irrelevant elements. Furthermore, the explorative question revealed differences between removed static and dynamic elements: Removing a relevant car was recognized faster and better and their position was more often declared correctly, especially when cars were removed within coherent situations. Whereas removed traffic signs were only located better, if they were part of a contradicting traffic sign combination. These findings have significant implications for theories describing the process of situation comprehension.

W-62. Neuronal correlates of error processing following unintentional violation of traffic lights

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While driving a car there are many occasions to commit errors. One of the most critical situations is the violation of a traffic light, as this can have severe consequences. The aim of our study was to investigate whether this kind of error is processed the same way in the brain, as it is known from errors happening in classical experimental paradigms. Two well-known neuronal correlates of error processing found in tasks like the flanker or Go-Nogo task are the error related negativity (ERN), peaking around 50 ms after an erroneous response, and the error positivity (Pe), peaking around 300 - 400 ms post-response. To investigate whether we can observe these neuronal correlates after passing a red traffic light, we designed a driving simulation task in which the participants had to drive on a straight road with constant speed. We instructed the participants to brake as fast as possible when approaching a yellow or red traffic light, which was always placed at a crossing. As the traffic light changed to yellow with varying distance from car to traffic light, it was not always possible for the participants to respond fast enough and stop the car before entering the crossing. To compare these results with the ERN and Pe of a more typical task, the participants also completed a Go-Nogo task with a traffic light as stimulus. In this task, the participants should only react with a key press if the traffic light showed a red light. Our results indicate that there are similarities in error processing between both tasks, as in both cases we could observe a strong negativity with a fronto-central topography following the erroneous responses. In contrast to the negativity in the Go-Nogo task that shows the typical peak of the ERN and is then followed by the Pe, the negativity in the driving simulation task shows a different pattern that we interpret as a consequence of the braking response.

W-63. Effects of announced speed checks on the speed level

Mario Sormes, Heinz Albert Stumpen, Benedikt Schweer, Christine Sutter

German Police University, Germany

The main cause of death in German road traffic is non-adjusted speed and speeding. The subjective probability of discovery, which is decisively influenced by the number of police and municipal speed controls, contributes to the observance of the permissible speed limit. The present study investigates the effect of officially initiated announcements of speed checks on the speed level. Over a period of eight weeks, the speed of around 1.27 million motor vehicles was recorded and analyzed at three different study-related measuring points in a district town in Saxony-Anhalt. The baseline period (three weeks) included officially initiated announcements of no speed checks, and speed measurements at the three measuring points. In the subsequent investigation period (five weeks), speed was measured and speed controls were done either with or without officially initiated announcements. The announcements were published on the homepage of the municipality, via radio, in print media and in social networks. The average speed (Vd), the prevailing speed level, which was observed by 85 % of the detected vehicles (V85), the maximum speed (Vmax), the exceeding of the maximum permissible speed (Vzul) and the exceeding of the permissible maximum speed by more than 20 km/ h and thus the classification as a speeder (Vx + 20km / h) were surveyed. The analysis has shown that vehicle drivers are traveling 5 km/ h slower when speed controls are carried out and are again 2 km/ h slower if these controls were previously announced. This shows that appropriate public relations work can specifically support traffic monitoring and positively influence road safety.

W-64. Effects of auditory and visual distraction on driving performance: A simulator study across three different age groups

Melanie Karthaus, Edmund Wascher, Stephan Getzmann

Leibniz-Institut für Arbeitsforschung an der TU Dortmund (IfADo), Germany

Background: During lifespan, several cognitive functions undergo age-related changes. One prominent cognitive function is the inhibition of irrelevant information, which is known to be impaired with increasing age. Inhibition is a very important function for many everyday tasks. For driving a car safely in dense traffic of inner-city areas, for example, several auditory and visual distractors have to be inhibited. In the present study, we examined effects of different types of distraction on driving performance in young drivers and two older groups of drivers.

Methods: Twelve young (19-25 years), ten young-older (56-65 years), and 12 old-older (70-80 years) participants performed a driving task in a driving simulator. The task consisted of continuously lane-keeping and occasionally braking, whenever the brake lights of a car in front flashed up. In addition to the driving task, the participants either had to ignore or to respond to visual and auditory distracting stimuli that were presented while driving.

Results: First results indicate an effect of age on braking response time, with response times of the two older groups being longer than in the younger group. All groups showed longer response times to brake lights when they had to respond to another (distractor) stimulus at the same time. However, in contrast to the younger group, older participants significantly missed more responses to the brake light when visual, but not auditory, distractors where presented at the same time. This effect was observed irrespective of whether the distractors had to be ignored or required a response.

Conclusion: These results are discussed in the framework of individual distractibility, Wickens' multiple resource theory, and age-related changes in inhibition functions.

W-65. Faster or slower? Influencing drivers' decision-making by framing the gains or losses of route options

Madlen Ringhand, Mareen Bentrup, Mark Vollrath

Technische Universität Braunschweig, Germany

In urban traffic, heavy traffic jams occur if the travel demand exceeds the capacity of the network. Influencing drivers' navigational decisions could contribute to an improvement of traffic flow. To this aim, the valence framing, introduced by Tversky and Kahneman (1991), could be used. According to this effect, losses are more important for decisions than similar gains. Presenting differences between two routes as gain or loss could help to alter decisions accordingly. If a loss framing is applied to route information, this should influence route choice stronger than a gain frame.

In an online experiment, four urban route choice scenarios were presented to the drivers twice. They consisted of a main route with certain waiting time at a red traffic light and an alternative route without traffic lights but with varying travel time. A control group without framing was compared to a gain and a loss frame with regard to travel time or waiting time (overall N = 458). The framing was supported by a corresponding font color.

For data analysis, we measured the decisions in favor of the framed route choice attribute. Focusing on the framing of travel time, results were contrary to the assumption, that loss framed routes are avoided more than gain framed routes are approached. At the same time, the design of travel information with a loss frame on travel time was evaluated worse than in the other groups. The framing of the waiting time at a red traffic light showed no effect at all on route choice.

We consider perceptions biases and selective attention as explanations for the opposing effect of loss framing on travel time. Besides, further research should focus on the design, wording and acceptance of the loss framing, as well as a more realistic experimental set-up. In conclusion, the use of valence framing in route choice is worthy of discussion and more effort should be done to design travel information having a lasting effect on drivers' decision-making.

W-66. Visual Anticipation in Dynamic Driving Scenarios

Kristin Mühl, Martin Baumann

Ulm University, Germany

The representation of a situation especially the anticipation of upcoming events is necessary in traffic to ensure safe driving and the prevention of conflicts and accidents. The underlying cognitive process implies the activation of well-learned expectations about the future development of the situation triggered by visual cues. In addition to that, there is an evidence that also sensory-based processes support short-term predictions. The impact of motion extrapolation on visual anticipation is investigated using the paradigm of representational momentum. It describes the systematic error to overestimate position changes along a trajectory of an occluded object in direction of motion. Considering the observation of rear traffic through the driving mirror, this might have an effect on the anticipation of surrounding traffic, because nearly all gazes focus the road in front of the car and rearward cars are rather occluded.

A series of conducted experiments shows that drivers tend to overestimate position changes along the driven road in direction of motion. The increase of velocity and

landmarks each led to stronger forward displacements. In addition, the effect of cognitive distraction on the size of this displacement is investigated. The extrapolated representation of one's own position and of other moving road users provides converging support for visual anticipation and has an impact on the development of a cognitive representation of a dynamic driving situation.

Talk Session: Binding and event files

Time: Wednesday, 29/Mar/2017: 2:00pm - 3:20pm · *Location:* HS 401
Session Chair(s): Carina Giesen

More than meets the eye: Binding an irrelevant missing feature in an event file

Nadine Nett, Robert Gaschler

FernUniversität Hagen, Germany

The distractor-response binding effect (e.g. Frings, Rothermund, & Wentura, 2007) states that task-irrelevant stimuli or features (distractors) as well as the task-relevant stimuli or features (targets) are bound together with the response to the target in an event file. When the response has to be repeated and the distractor is also repeated, participants respond faster and are more accurately than if only the response has to be repeated. However, when the distractor is repeated but the response has to be changed than the participants are slower and less accurate than if everything is changed. Thus, the retrieval of the stored event file can facilitate or impair the new response. We investigated if not only the identity of a distractor is stored in an event file but also its absence. Participants had to classify if an object presented as a drawing on the screen had a motor or not (target). Additionally, the object could have missing wheels (distractor). The interaction between distractor (repeated vs. changed) and response (repeated vs. changed) was significant error rates, even for trials with missing wheels in the prime. Participants responded more accurately when the wheels from first (prime) to the following display (probe) were missing and they had to give the same response than if the wheels were missing in the prime but present in the probe. Participants were more accurate when they had to change their response from prime to probe and the wheels simultaneously changed from missing to present than if they were both missing in prime and probe. This suggests that a missing feature tag can become part of an event file.

Is less always more? The influence of distractor number on the distractor-response binding effect

Ruth Maria Freitag, Birte Moeller, Christian Frings

University Trier, Germany

If a target stimulus is presented together with a distractor, both stimuli can be encoded together with the response in an event file (see Hommel, 2004). Even the repetition of the distractor can retrieve the encoded response (the distractor-response binding effect). Previous research showed, that the distractor-response binding effect can be influenced by factors like the grouping of distractor and target stimulus (e.g. Frings & Rothermund, 2011), or by attentional processes (Moeller & Frings, 2014). In the present experiment (N = 30), a prime-probe design was chosen to investigate the influence of the number of distractors on the distractor-response binding effect. The results show a stronger distractor-response binding effect in a condition with a high number of distractors in contrast to a low number of distractors. These results are discussed against the background of different theories of distractor processing (inhibition vs. retrieval).

Multi-level response coding in stimulus-response bindings: Irrelevant distractors retrieve both semantic and motor response codes

Carina Giesen, Klaus Rothermund

Friedrich-Schiller-Universität Jena, Germany

Stimulus-response (S-R) episodes are formed whenever a response is executed in close temporal proximity to a stimulus. Subsequent stimulus repetition will retrieve the episode from memory, re-activating the previous response. Whereas many research findings attest to the flexibility of representing stimulus features, only little is known about the way responses are coded within transient S-R episodes, that is, whether the retrieved response is represented in terms of specific motor codes, abstract/semantic codes, or both. To differentiate between these accounts, we employed an approach/avoidance task in which semantic meanings (i.e., moving a word “towards” or “away from” a manikin on screen) and motor codes of responses (i.e., pulling or pushing a joystick) were manipulated orthogonally. Results of two experiments indicated that stimulus repetitions retrieve both, semantic as well as motor code representations, indicating multiple and independent levels of response coding. We conclude that response representation in S-R episodes follows similar binding principles as are known from stimulus integration.

Binding of temporal features: Are binding effects involving stimulus duration due to stimulus-stimulus integration, stimulus-response integration or both?

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The world consists of complex events that are characterized by diverse features. Several lines of evidence suggest that the perceptual and/or action features of events become temporarily connected via episodic bindings. Such integration or binding of features has been demonstrated for a large number of visual features, auditory features and response features. Importantly, events typically also involve temporal features like duration. In a previous study, we demonstrated that stimulus duration is also integrated into event representations. In the present study, we investigated whether these binding effects are due to stimulus-stimulus integration, stimulus-response integration or both. In two experiments, subjects responded to two auditory stimuli per trial. The first response was a prepared key press to the mere presence of a tone that varied randomly in duration and pitch (Experiment 1A and 1B) or in duration and loudness (Experiment 2A and 2B). The second response was a binary choice reaction to one feature of a second tone. In this paradigm, partial repetition costs serve as an indicator for integration effects: slower responses to partial repetitions (one feature changes, the other repeats) than to complete repetitions or complete feature changes. Our experiments revealed that duration is bound to other stimulus features (pitch, loudness), even when duration is task-irrelevant. Moreover, duration is bound to the response when duration is the task-relevant feature. In sum, the results demonstrate that binding effects involving duration are due to stimulus-stimulus integration and, depending on the task-relevance of the stimulus duration, on stimulus-response integration.

Distractor-Response Retrieval Effects are driven by Motor Processes

Tarini Singh, Ruth Maria Freitag, Jan Pablo Burgard, Christian Frings

University of Trier, Germany

Binding theories assume that stimuli and responses are integrated in Event Files or Stimulus-Response Episodes. This integration is not restricted to relevant stimuli. Even irrelevant stimuli – distractors – that co-occur at responding can be integrated. The effect of distractor repetition depends upon whether the response is repeated: repeating the response leads to faster RTs whereas a change results in slower RTs. Retrieval effects are assumed to be the result of automatic processes. However it is not clear whether these processes are at a cognitive or motor level. We used a standard binding paradigm and orthogonally varied response relation and distractor relation. For the analysis we estimated the exponential parameter (τ) and Gaussian components (μ, σ) of the Ex-Gaussian RT distribution. The distractor-based binding effect was evident for the Gaussian component but not for the exponential parameter which is typically discussed as reflecting motor processes.

Talk Session: Social and moral cognition

Time: Wednesday, 29/Mar/2017: 2:00pm - 3:20pm · *Location:* 101
Session Chair(s): Angela Rachael Dorrough

Revealing side effects of quota rules on group cooperation

Angela Rachael Dorrough[1], Monika Leszczynska[2,3], Manuela Barreto[4,5], Andreas Glöckner[1,2]

[1]University of Hagen; [2]Max Planck Institute for Research on Collective Goods; [3]New York University School of Law; [4]University of Exeter; [5]Lisbon University Institute

The quota rule in employment is a legal tool to promote gender equality in professions and positions where women are underrepresented. An accompanying assumption is that gender diversity positively affects one of the aspects of team performance in form of group cooperation. However, it is unclear whether this positive effect can be achieved if diversity increases due to a quota rule. In two fully incentivized experiments involving a real-effort task (N1 = 188 and N2 = 268), we examined the impact of quotas as compared to performance-based promotion on group cooperation. We thereby categorized participants either with regard to gender or to an artificial category that was randomly assigned. Cooperation within groups declined when promotion was based on quota compared to performance-based promotion, irrespective of the categorization criterion. Further analyses revealed that this negative effect of quota rules on cooperation is not driven by procedural fairness perceptions or expectations about performance of the promoted group member. Implications of the results for the implementation of equality and diversity initiatives are discussed.

Effects of facial likability and smiling on cooperation and punishment

Laura Mieth, Raoul Bell, Axel Buchner

Heinrich Heine University, Germany

We tested how appearance-based expectations affect cooperation and punishment. Participants played a prisoner's dilemma game with a costly punishment option. In the first stage of the game, the participants decided whether they wanted to cooperate with their

partners or not. The participants' partners had either a likable or unlikable facial appearance or a smiling or neutral facial expression. In the second stage of the game, the participants decided whether they wanted to invest money to punish their partners by decreasing their payoff. Aggregated over trials, participants spent more money for punishing the defection of likable-looking and smiling partners than for punishing the defection of unlikable-looking and nonsmiling partners. However, this effect was only indirect: Participants were more likely to cooperate with likable-looking and smiling partners, which provided the participants with more opportunities for moralistic punishment. When moralistic punishment was expressed as a conditional probability, likable-looking defectors received as much moralistic punishment as unlikable-looking defectors. Smiling had no effect on the conditional probability of moralistic punishment either, but the punishment of smiling partners was milder than that of nonsmiling partners.

Deontological and utilitarian reasoning in moral dilemmas – a multinomial modelling approach

Max Hennig, Mandy Hütter

Eberhard Karls Universität Tübingen, Germany

Research investigating how people make judgments about moral questions has traditionally focused on deontological and utilitarian reasoning processes. While deontological reasoning is characterized by the adherence to absolute rules regardless of consequences, utilitarian reasoning strives to achieve the greatest good for the greatest number of persons, maintaining that the consequences of a particular action make it morally permissible or inadmissible. These reasoning processes have been primarily investigated using moral dilemmas. However, most of the studies using the dilemma-approach suffer from methodological problems, such as contamination of results by response tendencies or the inability to estimate the strength of deontological and utilitarian inclinations independent from one another. In order to avoid these problems, we conducted two experiments using multinomial processing tree (MPT) modeling, which enabled the estimation of the strength of three cognitive processes independent from one another: utilitarian inclinations, deontological inclinations, and inaction tendencies. In both experiments, we manipulated dilemma framing (action/inaction) and whether utilitarian and deontological reasoning lead to the same or different moral judgments (congruent/incongruent). Additionally, we investigated whether adding incentives to abstain from deontological behavior would decrease the strength of the parameter estimating deontological inclinations (Study 1, n = 96). Similarly, we investigated whether selfish interests that go against utilitarian judgments decrease the parameter estimating utilitarian inclinations (Study 2, n = 96). The MPT model fit the data well and was confirmed in a subsequent integrative analysis. The results also indicate that selfish inclinations can exert an influence on reasoning in moral dilemmas. This result underscores the importance of careful stimulus design in order to eliminate potential sources of measurement error.

Is cleanliness really next to godliness? On the impact of physical cleansing on cognitive availability of religious and moral words

Paweł Łowicki

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Background. Purifying rituals have been an inevitable part of various religious practices for thousands of years. Only recently though the potential impact of physical cleanliness on psychological functioning has been studied. Researchers interested in embodied aspects of human cognition found that cleanliness can in fact promote human's religiosity and morality (Preston & Ritter, 2012; Zhong & Liljenquist, 2006).

Methods. The experimental research conducted among Polish university students (N=40) examined the influence of physical cleansing on cognitive availability of religious and moral words. First, participants were asked to clean their hands with wet hand wipes (experimental group, n=20) or to simply rub their hands in the similar way (control group, n=20). Then, all individuals took part in a simple cognitive task on tablet computer. The task required indicating if the word visible on the tablet was written correctly or not. Three types of words were included: religious (e.g. saint), moral (e.g. punish) and neutral (e.g. picture). Afterwards, participants filled out some questionnaires assessing their personal attitude towards religion.

Results. It was found that there were no significant differences in the reaction time or the number of correct answers between experimental and control condition. However, it was found that within the experimental group the reaction time to all kinds of words was positively correlated with the level of belief in God/Higher Power. Similar connection was not observed for the control group. The study revealed also that individuals identifying themselves with certain religion, regardless of the experimental manipulation, needed more time to react to religious and moral content. These participants made also significantly more mistakes with religious words than participants without any religious affiliation.

Conclusion. The present findings do not support the hypothesis that the act of physical cleansing can have direct impact on one's religiosity or morality. On the contrary, the study shows that it is rather the declared religious affiliation that may influence our cognitive processing of such specific content. With regards to the performed correlation analysis, it seems that the potential relationship of cleanliness and religiosity (if existent at all) may be more subtle than it has been argued so far.

Symposium: Reward in attention and eye movements

Time: Wednesday, 29/Mar/2017: 2:00pm - 3:20pm · *Location:* 103
Session Chair(s): Alexander Christian Schütz, Anna Schubö

Attentional input gating in reward-modulated response inhibition

C. Nico Boehler, Zachary D. Langford, Ruth M. Krebs

Ghent University, Belgium

Background. The ability to delay or rapidly inhibit an already-initiated motor response before execution is a key cognitive-control function. Response inhibition is often triggered by an abrupt environmental change, triggering what is labeled reactive inhibition. Typically, it is believed that reactive inhibition relies on a core "response inhibition network" comprising parts of prefrontal cortex and the basal ganglia, which ultimately suppresses motor output. This network has been suggested to also play a role in proactive inhibition,

which refers to the deliberate slowing of responses when full response cancellation might be required. Despite this convergence on motor-level mechanisms, however, there have been indications that attentional processes also contribute to the behavioral outcome in response inhibition tasks.

Methods. To further explore this possible involvement of attention, we used classic ERPs and novel single-trial-based EEG analyses to systematically investigate the role of attention in response inhibition, both in motivationally neutral task contexts and when a financial reward is posted on successful response inhibition.

Results. We show that attentional processes, which most likely precede activity in the core "response inhibition network", can indeed influence both reactive and proactive inhibition, and that extrinsic motivation can further modulate these processes. The results show that fluctuations in reactive and proactive response inhibition, as well as reward-related modulations of these functions, converge on attentional processes that are dynamically engaged to shape behavior.

Conclusion. Overall, the present results support the notion of a dynamic and context-specific control mechanism that modulates attentional engagement strategically, which likely coexists with additional motor-level inhibitory mechanisms, jointly governing response inhibition behavior.

Effects of reward are caused by the necessity to choose

Christian Wolf, Anna Heuer, Anna Schubö, Alexander Christian Schütz

Philipps-Universität Marburg, Germany

Humans can maximize reward by choosing the option with the largest expected value (reward probability × reward magnitude). Expected value has been shown to be negatively correlated with the latency of saccades to single targets. Here we show that this relationship only holds when responses to single targets are embedded in a context where participants additionally have to choose between different options. Participants were rewarded for saccades to targets appearing either left or right from fixation. In a trial, either one (single-trial) or two targets (choice-trial) were displayed. In choice-trials, participants had to decide for one of the two targets and received the corresponding reward. Within a block, one target always received a high, the other one a low reward. Across blocks, we varied the amount of choice trials within a block (0%, 25% or 75%) and the reward difference between the two targets (low or high difference). In single-trials, the effects of reward on saccade latencies were only present for blocks including choice-trials and increased with the amount of choice-trials within one block. When high and low rewards were inverted in single and choice-trials, latencies in single trials were actually shorter for lower rewarded targets. These results suggest that there is no direct connection between expected value and saccadic preparation. Rather it appears that the necessity to choose between high and low rewards leads to inhibition of the low-reward target and that only this inhibition is causing the reward effects in the latency of sensorimotor decisions such as saccades.

Neural signatures of reward effects mediated by choice

Anna Heuer, Christian Wolf, Alexander C Schütz, Anna Schubö

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Effects of expected value on eye movements seem to be caused by the necessity to choose between targets associated with high and low reward (Wolf, Heuer, Schubö &

Schütz, in preparation). This modulation is likely due to the suppression of the low-reward target in subsequent trials. Here, we employed a similar paradigm but with manual responses and used the EEG to identify corresponding neural signatures of this suppression mechanism. Participants were rewarded for correct keypress responses to either a single target presented to the left or right from fixation (single trials) or to one of two targets presented to the left and right (choice trials). One hemifield was associated with a high, the other with a low reward. Across blocks, the proportion of choice trials was varied (0%, 25% or 75%). Behavioural results replicated the finding that an effect of expected value on reaction times was only observed in blocks including choice trials, increasing with a larger proportion of choice trials. Early sensory and attention-related ERP components mirrored these effects and showed increasing suppression of low-reward targets with increasing proportion of choice trials. These findings show that the influence of the necessity to choose has a profound impact on the effects of reward and is a general mechanism that cannot only be observed for saccadic preparation, but generalizes across effectors.

Processing reward-predicting stimuli outside of the focus of attention

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Recent studies have shown that distractors associated with monetary reward can capture visual attention. It is well established that attentional capture by salient distractors can be controlled by pre-focusing attention on the target location. In a set of studies we investigated whether distractors signaling the availability of monetary reward have the ability to break through the focus of attention. In the beginning of trial participants received a cue indicating the target location with a 100% certainty. At the moment the target was revealed a new color singleton distractor was added to the display with an abrupt onset. The distractor color indicated the reward availability. Experiment 1 showed that when the probability of obtaining reward was high, all salient distractors captured attention. This effect may have been caused by participants suboptimally using the location cue. Experiment 2 confirmed this result by showing that salient distractors did not capture attention in a block in which no reward was expected. In Experiment 3, a distractor that signaled reward was present only on a small proportion of trials. The results showed that infrequent distractors that signaled reward captured attention, whereas the distractors (both frequent and infrequent ones) not associated with reward were ignored. Further experiments investigated whether distractors that signaled reward also influenced the oculomotor selection by examining the rate of microsaccades and saccades. The results suggest that even when attention is directed to a location in space, stimuli associated with reward break through the focus of attention, but equally salient stimuli not associated with reward do not.

Talk Session: Joint action and joint attention

Time: Wednesday, 29/Mar/2017: 2:00pm - 3:20pm · *Location:* 105
Session Chair(s): Roberta Sellaro

Task Sharing Reduces Crossmodal Congruency Effects for Visual and Auditory Stimuli

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Joint action research investigates the perceptual, cognitive, and motor processes that enable individuals to coordinate their actions during collaboration. A central issue for current theoretical accounts of joint action concerns the degree to which collaborating actors take their partner's perceptions and actions into account when planning their own actions. Previous research demonstrated that sharing a task with a partner can reduce crossmodal congruency effects for visuo-tactile stimuli located within an actor's peripersonal space (Heed, Habets, Sebanz, & Knoblich, 2010). This effect can be attributed to a top-down influence on multisensory integration that causes reduced weighting of those stimuli to which the partner responds. We used an elevation judgment task with auditory (pitch) and visual stimuli (spatial position) to investigate whether a similar effect can be found for this modality combination. Participants classified the elevation of target stimuli presented in one sensory modality (auditory or visual) while ignoring simultaneously appearing distractors in the other sensory modality. On each trial, the auditory and visual stimuli were either congruent or incongruent with regard to their elevation (i.e., pitch and spatial position). Participants performed the elevation judgement task alone or alongside a partner (within-subjects manipulation) who responded to those stimuli presented to the "irrelevant" sensory modality. We expect the presence of a person responding to the distractors to decrease the weight placed on these stimuli, resulting in decreased crossmodal interference for incongruent (compared to congruent) pairs of audiovisual stimuli.

About the salience of the Japanese waving cat in the social Simon paradigm

Lydia Puffe, Kerstin Dittrich, Karl Christoph Klauer

Albert-Ludwigs University Freiburg, Germany

One of the most prominent paradigms in the joint action domain is the social Simon task: Each of two participants is encouraged to respond to a non-spatial stimulus feature (e.g., colored circles; different tone pitches) by pressing one of two spatially aligned response keys (e.g., left key). Although the spatial position of the stimulus is task-irrelevant, participants perform faster and more accurate, if the stimulus position matches the spatial response key location (i.e., compatible trial) compared to when both dimensions mismatch (i.e., incompatible trial), known as the so called joint spatial compatibility effect (joint SCE). A shared representation of the co-actors' task or action is held accountable for this finding. However, research by Dolk, Hommel, Prinz, and Liepelt (2013) questions this social interpretation of the effect. It is rather suggested that a sufficiently salient non-social object or event (e.g., a Japanese waving cat) is also appropriate to induce the effect by enhancing the spatial interpretation of the situation. But so far, it is not specified what actually defines an object to be sufficiently salient. For that purpose two studies will be presented, which examine the salience of the Japanese waving cat more carefully, thereby following the experimental setting and procedure described by Dolk et al. (2013). Results demonstrate

that it is not a salient non-social object per se leading to an effect, but rather the interaction of its features with the modality of the Simon task. These results may contribute to define the underlying mechanisms driving a joint SCE more closely and they may help to clarify existing theoretical accounts.

Spatial instructions increase joint spatial compatibility effects

Kerstin Dittrich, Lydia Puffe, Karl Christoph Klauer

Albert-Ludwigs-Universität Freiburg, Germany

In the so-called social Simon task, two participants perform a spatial compatibility task together, each of them responding to only one kind of stimulus (e.g., one participant reacts to red, the other to green stimuli). Participants show joint spatial compatibility effects (SCEs), that is, they respond faster when their go-stimulus appears on their half of the computer screen. Effects are absent when the same go/no-go task is performed without a co-actor. Joint SCEs were originally explained in terms of shared task-representations, but recent research suggests that such effects result from a spatial representation of the situation: Performing a task next to a co-actor induces participants to perceive themselves as the right or left participant operating a right or left response key. While previous research already showed that the spatial alignment of keys and the seating position influences the effect, the present research demonstrates that merely instructing participants to be the right or left participant operating a right or left response key instead of labeling participants and keys with arbitrary numbers substantially increases joint SCEs. Implications for theories of (joint) SCEs and for broader theories of effects of instructions on task performance are discussed.

Turn taking enhances the joint Simon effect for non-human co-actors

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Social interactions with non-biological agents and interactions with technical devices have become increasingly important over the last years. Recent studies investigating the interactions between humans and non-human agents showed rather inconsistent results. While the joint Simon effect (JSE) was found to be absent for non-human co-actors like virtual wooden hands, other studies showed pronounced JSEs when the co-actor was a real event-producing object. An often overlooked difference between these studies is the way these co-actors delivered response events. Studies replacing the co-actor by event-producing objects used a continuous response mode, while in studies using wooden hands, the co-actor always produced action effects in a task-related, turn-taking mode. In a series of four experiments, we systematically tested the effects of the response mode on the size of the JSE. The JSE was larger when the co-actor produced events in a turn-taking response mode than in a continuous response mode. Furthermore, we consistently found reliable JSEs for different kinds of virtual non-human co-actors (including a Japanese waving cat, scrambled patterns, and a wooden hand), and found no difference in the size of the JSE between human and non-human co-actors. We discuss possible mechanisms explaining why a JSE might be present or absent when sharing tasks with virtual non-human co-actors.

Funding: The present research was financially supported by the German Research Foundation Grant DFG LI 2115/1-3 awarded to R. L.

Cumulative semantic interference rises through task partner

Anna Katharina Kuhlen, Rasha Abdel Rahman

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When naming pictures, speakers show increased naming latencies with each additional picture within the same semantic category they name in a sequence of pictures (so-called "cumulative semantic interference"). In this study we show that naming latency not only increases in response to participants' own prior naming of within-category pictures, but also in response to their task partner naming the pictures: In two experiments, naming latencies increased more steeply for those categories in which a partner named half of the category members compared to those categories in which additional members were presented only visually (but named by neither partner nor participant). This effect occurred when participants named pictures co-present with their partner (Experiment 1), and even when participants only believed their partner was naming pictures in another room (Experiment 2). Our results suggest that pictures (presumably) named by the partner elicit in participants lexical processes comparable to naming the picture themselves. This interpretation is consistent with the proposal that participants simulate lexicalization processes of task partners, and speaks for a profound and lasting effect of having a partner on the speech production system.

Talk Session: Addictive behaviors and disorders

Time: Wednesday, 29/Mar/2017: 2:00pm - 3:20pm · *Location:* HS 304
Session Chair(s): Ulrike Lueken

‚Wanting' without 'liking' - A test of Incentive-Sensitization-Theory in the context of smoking addiction using the Wanting-Implicit-Association-Test

Laura Anne Grigutsch, Klaus Rothermund, Nicolas Koranyi

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According to Incentive-Sensitization Theory (IST, Robinson & Berridge, 1993), the development and maintenance of an addiction are attributable to the decoupling of two subconsciously operating psychological processes - 'wanting' (i.e., the attribution of incentive salience) and 'liking' (i.e., the experience of sensory pleasure). Under normal circumstances both processes act in concert in governing motivated behavior. During the development of an addiction, however, the neural system responsible for the attribution of 'wanting' becomes chronically hypersensitized for the drug itself and drug-associated cues, leading to excess 'wanting' for the drug while 'liking' remains stable or decreases.

Due to its great explanatory power, IST is highly relevant not only for addiction research, but psychological science in general. However, while there is a constantly growing body of supportive evidence for IST stemming from animal studies, research on human subjects has so far produced mixed results – presumably owing to a lack of appropriate operationalizations of the concepts in question.

Employing different versions of the Implicit-Association-Test (IAT) - the recently developed Wanting-IAT (Koranyi, Grigutsch, Algermissen & Rothermund, in press) and a standard Liking-IAT – the present study put IST to the test by comparing smokers' and non-smokers' degrees of 'wanting' and 'liking' for smoking-related stimuli. While non-smokers' degrees of 'wanting' and 'liking' for smoking-cues were low but highly correlated, smokers displayed significantly increased 'wanting' for smoking-related stimuli, which was independent of whether or not they had smoked immediately prior to the experimental session and was

unrelated to their respective 'liking' scores. In accordance with predictions from IST, these results provide evidence for a pathological decoupling of 'wanting' and 'liking' in addiction due to chronically heightened 'wanting' for the drug.

The role of Internet-pornography-viewing disorder and Internet literacy on IT-security related behaviors

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Internet applications are mostly used in a functional manner. However, some users suffer from negative consequences due to an excessive use of Internet pornography and are not able to reduce their own behavior despite negative consequences. When being online, these users are confronted with a multiplicity of risky decisions particularly with regard to potential threats resulting from the search of pornographic content, which should gratify one's sexual needs. At the same time Information technology (IT) security becomes more and more a critical aspect for private and work-related Internet use. Furthermore, it was found that an individual's level of Internet literacy (technical, reflective, and self-regulative skills) is related to symptoms of a specific Internet-use disorder. There is a lack of research on how users' Internet-related cognitive characteristics might influence IT-security behavior.

The sample consists of 80 participants. We assessed their capabilities to use the Internet in terms of self-regulation and technical expertise as well as their tendencies towards an Internet-pornography-viewing disorder. Furthermore, participants answered a newly developed questionnaire concerning IT-security related behavioral issues.

A moderated regression analysis showed that a loss of control over one's own Internet-pornography behavior predicts the subjective importance of consequences resulting from an unsafe IT-security-related action. This effect was significantly moderated by the Internet literacy dimensions self-regulation and technical expertise. Overall, the model explained 19,8% and 22,1% of IT-security behavior's variance.

On the basis of these results, it seems important to consider human factors, such as tendencies towards specific Internet-use disorders or users' characteristics, when developing IT-security strategies. It seems particularly essential to address the role of Internet-pornography-viewing disorder in the context of IT-security awareness

Problem gamblers are more risk taking and less sensitive towards changes in probabilities in the gain domain only

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Problem gambling is a serious socio-economic problem with an average prevalence ranging from 0.5 to 7.6% worldwide. Reported consequences include debt overload, social

isolation, and suicide. In this paper, we study risk preferences of problem gamblers including their risk attitudes in the gain and loss domain, their perception of probabilities and their degree of loss aversion. Our findings indicate that problem gamblers are systematically more risk taking and less sensitive towards changes in probabilities in the gain domain only. Neither their risk attitudes in the loss domain nor their degree of loss aversion are significantly different from the controls. Additional evidence for a similar degree of sensitivity towards negative outcomes is gained from skin conductance responses in a threat-of-shock-task. These findings provide an explanation why some individuals persist in gambling activities - despite their severe negative consequences - while the general population does not.

Pavlovian-instrumental transfer in young social-drinking adults

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Background: Pavlovian conditioned stimuli (CS) can exert influence on ongoing instrumental conditioned behavior, called Pavlovian-instrumental transfer (PIT). Although the importance for (conditioned) context stimuli on (instrumental) drug taking is widely acknowledged, only few studies have investigated PIT effects in substance use disorders experimentally. Most of them were rat or human clinical studies, showing the capacity of drug-associated CSs to elicit PIT effects or that substance-dependent participants are more susceptible for them, respectively. We are the first to ask whether being more susceptible for PIT might also be a predisposing vulnerability factor for risky substance (i.e. alcohol) consumption.

Methods: We examined 191 18-year-old adults being neither abstinent from nor dependent on alcohol using a PIT paradigm and acquired information about their drinking behavior with a modified version of the Composite International Diagnostic Interview (CIDI) at the baseline of an ongoing longitudinal study.

Results: Baseline analyses revealed an association between stronger PIT effects and riskier alcohol consumption. This was the case when examining the influence of Pavlovian stimuli directly on the instrumental behavior (i.e. number of button presses) as well as rather indirectly on the accuracy of these instrumental responses (i.e. percentage of correctly classifying stimuli and acting accordingly). Results of associations with drinking trajectories over the following two years will be available and presented at the time of the TeaP.

Conclusion: Our baseline results indicate that individual strength of PIT effects is related to alcohol consumption even in a preclinical sample. Results of the longitudinal analyses will shed light on the role of these learning mechanisms for the individual course of drinking behavior.

Talk Session: Social cognition II: Stereotyping and prejudice

Time: Wednesday, 29/Mar/2017: 2:00pm - 3:20pm · *Location:* 201
Session Chair(s): Veronika Lerche

Weapon Identification Task: Stereotype or Brightness Effect?

Veronika Lerche, Andreas Voss

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The weapon identification task (Payne, 2001) has been frequently employed in the research on stereotypes. One typical finding of studies based on this priming task is that tools (e.g., pliers) are more frequently falsely classified as weapon if the target is preceded by a black compared to a white face. This is explained in terms of associations between blacks and danger. Critically, in the previous studies little to no attention has been paid to the brightness of the employed target stimuli. More specifically, as our analyses revealed, the weapons used were essentially darker than the tools (e.g., r = .69 for the stimulus material of Payne, 2001). Accordingly, the “stereotype” effect might at least partly be driven by differences in brightness between weapons and tools. Thus, we conducted a study based on newly developed target material, including brightness of targets as further independent variable. In addition, we employed smartphones instead of tools to enhance the ecological validity of the task. Our study based on a German sample (N = 45) revealed a clear stereotype effect and no effect of target brightness on the findings.

Industrious East, practical West? Connecting stereotypes among German and Chinese students to their perceptions of native speaking media

Jan-Philipp Stein, Xiaomeng Lu, Peter Ohler

Technische Universität Chemnitz, Germany

It is a well-established finding among psychology scholars that media portrayals exert a strong influence on people's culture-related attitudes. In order to shed new light on this perspective, our study explores stereotypes among German and Chinese students in connection to their perceptions of media tonality. Although the last decades have been marked by cordial Sino-German relations on a political level, research indicates that there are still mutual reservations in both societies. In this regard, the growing number of Chinese exchange students in Germany forms a particularly relevant population, as it exemplifies the collision of stereotypes and reality.

We recruited 44 German (age M = 23.46, SD = 4.16) and 44 Chinese (age M = 25.98, SD = 2.11) students at a German university. Following an implicit-association test (IAT), participants filled in a questionnaire on 40 explicit stereotypes concerning both their own (auto-stereotype) and the other culture (hetero-stereotype). Subsequently, we asked them to assess the tonality of their native country's media coverage of the respective other. A manipulation check ensured that all participants considered media in their native language as important source of information.

For explicit stereotypes, we found several significant differences between the groups' self-concepts and their mutual assessment. The data pattern further indicated stronger conformity among Chinese participants, matching the notion of a collectivistic culture. In both groups, however, the highest explicit stereotypes were not predicted by the perceived tonality of native speaking media.

Focusing on implicit attitudes, we examined strong preferences for the native country in both groups. Conversely, only the German IAT scores were predicted by media perceptions—unlike our initial idea, German students showed a stronger implicit preference for Germany if they perceived China-related media as positive. Possible reasons for our various results are discussed.

Wow, that is one nice Turk! A Strong Pro-Outgroup Bias in the "Who Did What?" paradigm

Manuel Becker[1], Sarah Teige-Mocigemba[1], Jeffrey Sherman[2], Karl Christoph Klauer[1]

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One persistent question in social psychologists' efforts to find ways to reduce prejudice is whether or not the strength of social categorization plays a causal role for the level of prejudice. To better answer this question, we developed an unobtrusive, indirect measurement procedure to simultaneously assess both constructs („Who Did What?" task, a variant of the „Who Said What?" paradigm developed by Taylor et al., 1978). In this task, participants are to remember clearly valenced behaviors that members of two groups have ostensibly shown in the past. We used portraits of young male Germans as ingroup stimuli and of young male Turks as outgroup stimuli in two studies (N=160, each) conducted in Germany. As expected, the measurement procedure was sensitive to a manipulation of social categorization. However, contrary to expectations, participants showed a strong tendency to assign positive behaviors to Turks and negative behaviors to Germans when they did not remember the correct person. This is especially surprising for the second study, as participants were paid for correct answers and the participants' measurement outcome of an Evaluative Priming Task using the same ingroup and outgroup stimuli as the "Who Did What" task revealed no such Pro-Outgroup bias, but prejudice against Turks. In two follow-up experiments (N=80, respectively), we investigate the causal mechanism behind the pro-outgroup bias: Do participants hesitate to assign negative behaviors to the outgroup due to self-presentation concerns? Or is this caused by differential standards or expectations that the two groups are held to (e.g., Biernat & Manis, 1994; Hamilton & Garcia-Marques, 2003)?

The role of conspiracy mentality in shaping the evaluation of sources of historical knowledge

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Conspiracy beliefs have been associated with a range of cognitive biases. Some work has focused on cognitive antecedents demonstrating an association between conspiracy thinking and the use of mental shortcuts like heuristics and biases, whereas other research showed a reduction in analytic thinking. In this research, we added perceived power and authoritativeness as negative cues to the body of literature addressing the role of cognitive biases in conspiracy beliefs. We hypothesized that conspiracy mentality leads to a cognitive bias that evokes distrust against those groups or agents perceived as powerful and vice versa – by using a debated historical account as example. We assume that individuals high in conspiracy mentality follow the a priori assumption that the narrative transmitted by the powerful is necessarily motivated, whereas the powerless source should be perceived as more trustworthy. Across four studies, we tested the idea that conspiracy mentality increases distrust in powerful sources (e.g., members of history

commissions) and trust in powerless sources (e.g., blogging lay historians). Study 1 (N = 273) was conducted to establish that conspiracy mentality is associated with the perception of credibility of amateur and expert historians. Studies 2, 3 and 4 (N = 919) experimentally showed that conspiracy mentality is a central predictor of credibility ratings of sources of historical knowledge and increased trust in lay source – independent of the supported position. Together these findings support the notion that conspiracy beliefs translate into general skepticism towards canonical historiography and a greater openness to lay positions.

Of empty words and populated boxes – Allowing for stereotype-consistent interpretation of utterances reinforces automatic social categorization in the "Who Said What"-Paradigm

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Contextual category salience conveyed through discussion topic increases social categorization in the "Who Said What"-Paradigm (WSW, Klauer et al., 2014). However, we propose that besides content of speech, a structural component may facilitate social categorization, too. We define construal bias as an effect whereby speaker attributes have to be considered to come to an unambiguous interpretation of an ambiguous utterance, leading to diverging stereotype-consistent interpretations depending on speaker category. Imagine a poor or a rich person stating "I buy clothes at the thrift shop" or "I buy bread regularly". While very different inferences can be made on speaker traits and motives based on the first statement (the poor person can't even afford new clothes, the rich one is greedy), the second statement cannot be differentially interpreted that way. We suggest that contextual salience introduced via the statements of the WSW Paradigm enhances categorization not just by activating a related concept (e.g. "wealth"), but also by providing a statement set that is more prone to construal bias.

In three WSW studies, we present cumulative evidence for this: In Study 1 (N=143, Germany), we show an indirect effect of high-vs. low-construal condition through differential category-consistent interpretation of statements on categorization strength along the social class dimension. In Study 2 (N=201, US-mTurk), we show that strength of construal bias and categorization strength are more strongly associated when differential statement interpretation is measured before the WSW recall phase (measure of categorization strength) than afterwards. In Study 3 (N=150, Germany) we test the idea of a direct effect of high- vs. low-construal condition on strength of automatic social categorization.

In summary, we introduce and show first evidence for a new effect that enhances automatic social categorization in social interactions through speech and stereotypic inference.

Talk Session: Traffic psychology

Time: Wednesday, 29/Mar/2017: 2:00pm - 3:20pm · *Location:* 204
Session Chair(s): Kristin Mühl

Assessing Driveability - A First Explorative Approach Focusing on Subjectively Perceived Acceleration Behavior as a Sub-Construct of Driveability in Passenger Cars

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Institute for Automotive Engineering ika / RWTH Aachen University, Germany

In automotive engineering driveability is a prominent term to describe how humans experience driving. However, an extensive literature research revealed the need for a common definition of subjectively perceived driveability. Furthermore, previous attempts to assess the construct merely focus on technical aspects and largely neglect subjective ratings. The present study addresses this situation by decomposing driveability into reasonable sub-constructs and focusing on acceleration behavior, first. Second, a questionnaire to assess subjectively perceived acceleration behavior is constructed based literature research and expert workshops. Subsequently, the resulting questionnaire is applied in two driving scenarios, comparing two different acceleration modes. The subjective ratings are processed by running a discriminant function- and a factor analysis, revealing two factors that distinguish between the two modes. The results are a first approach to assess subjectively perceived acceleration behavior in passenger cars requesting for replication and extension on further sub-constructs of driveability as e.g. transverse acceleration behavior.

What’s driving me? - Personality traits determining trust in highly automated vehicles

Johannes Kraus, Theresa Panzer, Baumann Martin

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Background. In driving assistance, automation has gained importance over the last years and recently the first highly automated cars entered public roads. In order to benefit from highly automated driving to a maximum degree (e.g. road safety and traffic efficiency), drivers should hand over control to automation to a degree reflecting the actual capabilities of the automation. An ideal usage behavior thus is established by a simultaneous reduction of both disuse –using the system not in every applicable situation – and misuse, which is established by using the system in an excessive and thus inappropriate way. This pattern of functional and rational system usage has been associated with the concept of calibrated trust (Lee & See, 2004). While the impact of system design features has been prominently investigated, research on personality factors influencing trust evolution has been scarce in this domain.

Methods. This contribution introduces results of an integrating study on personality dimensions associated with the development of trust in highly automated vehicles. In an online par-adigm, participants answered a battery of short personality questionnaires and were after-wards introduced to an assistance system providing the possibility to drive autonomously on highways. In the course of the study, participants decided about system utilization in a series of traffic situations. Following the interaction with the system, acceptance, feeling of safety and trust towards the system were assessed.

Results. Affinitiy for Technology, Technological Self-Efficacy, Predisposition to Trust in Automated Systems and A Priori Acceptance of Automated Driving showed to be significantly related to the three criterion variables. Additionally, Neuroticism and Self-Esteem showed to be associated with trust.

Conclusion. Findings show that differences in users' personality provide perspectives for designing interaction concepts promoting calibrated trust.

What does car driving, cycling, bicycle pushing or walking to your perception: Do the road users differ in distance estimations?

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Many of the oldest questions in psychology deal with perception - and distance perception has been one of the central mysteries (Proffitt, 2006a).

In the study of Moeller, Zoppke & Frings (2016) five distances (4 m, 8 m, 12 m, 16 m and 20 m) were estimated by pedestrians and drivers before and after driving or walking. In our studies we wanted to replicate the results.

In our first study we took the car drivers and pedestrians and included cyclists.

In a second experiment we concentrated on bike pushers and cyclists before and after bicycle pushing and cycling. In both of our studies we added three more and farer distances (between 30 and 50 m) and changed the indirect into a direct measurement.

Comparable to the findings of Moeller, Zoppke & Frings (2016) we found stronger distance underestimations in a driver condition than in the pedestrian condition. No experiments concerning cyclists or bicycle pushers exist yet. Two theoretical approaches may explain the results. On the one hand, the use of tools like cars and bikes should lead to more similar patterns in distance estimations than walking. On the other hand, the action specific perception concept describes the results better in the sense that pedestrians and cyclists have a more similar or specific perception of actions concerning their physical effort and more similar distance estimation patterns.

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Driving anger of German non-professional and professional car drivers

Stefan Brandenburg[1], Michael Oehl[2]

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Driving anger is related to aggressive driving behaviour and a higher rate of traffic accidents. Numerous studies assessed driving anger in countries all over the world. To date, no study examined Deffenbacher's concept of driving anger in Germany as well as the applicability of his internationally widespread measures for driving anger, i.e., the Driving Anger Scale (DAS; Deffenbacher et al., 1994) and the Driving Anger Expression Inventory (DAX; Deffenbacher et al., 2002). The present work fills this gap. We measured

driving anger experience with the DAS and driving anger expression with the DAX in a sample of N = 1136 non-professional car drivers. In addition, we compared driving anger and anger expression of non-professional drivers to a second sample of N = 138 professional taxi drivers. Confirmatory factor analysis showed that the model fit was better for the sample of non-professional drivers compared to the professional drivers regarding the assessment of driving anger. Model fits for the expression of general anger were acceptable for both groups. Non-professional drivers experienced significantly more driving anger than professional drivers. In contrast, both groups did not differ in terms of anger expression. We conclude that Deffenbacher's concept of driving anger does only apply to non-professional German drivers. Modifications of the measures should be made for professional drivers. They might have adapted their level of driving anger over time. Future studies should focus on an in-depth analysis of driving anger and anger expression for professional drivers.

Talk Session: Task switching II

Time: Wednesday, 29/Mar/2017: 2:00pm - 3:20pm · *Location:* HS 403
Session Chair(s): Martina Rieger

The science of perseveration: Insights from a novel task-switching/card-sorting paradigm

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Background: Excessive perseverative tendencies are pervasivein many areas of psychology. We analysed switch costs in a novel cued task-switching/card-sorting paradigm that facilitates integrating basic and clinical research on perseverative behaviour. We reasoned that interference from previously active task sets may be contingent upon the retrieval of these sets via stimulus processing (stimulus-set binding) or response processing (response-set binding). Methods: We examined the efficacy of these two factors through eligibility manipulations. That is, stimulus/response features that were capable to retrieve task sets from previous trials remained eligible (or not) on current trials. Results and Conclusion: We report two main findings from a large study (N = 95): We found that stimulus-set binding, and of importance response-set binding, both contributed roughly equivalently to switch costs. Evidence for stimulus-set binding was exclusively observed when previously executed responses remained ineligible. Possible interpretations of non-additive switch costs are discussed.

Keep flexible – keep switching! The influence of forced task switching on voluntary task switching

Kerstin Fröber, Gesine Dreisbach

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Goal directed behavior depends on a dynamic balance between cognitive flexibility and stability. Identifying factors that modulate the balance between these control states is therefore of major interest for the understanding of human action control. In two experiments we used a hybrid paradigm combining forced- and free-choice task switching and measured spontaneous voluntary switch rate (VSR) as an indicator of cognitive flexibility. In Experiment 1 participants were free to choose a given task on 75 %, 50 %, or 25 % of all trials. In the remaining forced-choice trials task repetitions and switches were

roughly equally distributed. Results showed that VSR increases with increasing proportion of forced choices. To clarify whether the frequency of forced task switches or the frequency of forced choices drives this effect we conducted Experiment 2. In a fully orthogonal design participants were free to choose a given task on 75 % or 25 % of all trials with a predetermined switch rate in the remaining forced-choice trials of 75 % or 25 %, respectively. Results revealed an interaction of both manipulations: The highest VSR was found for the combination of 75 % forced-choice trials with 75 % forced-choice switch rate, while VSR for 75 % forced-choice trials with 25 % forced-choice switch rate was still higher than VSRs in both conditions with 25 % forced-choice trials. This suggests that a context of frequent forced-choices (even more so in combination with frequent forced task switches) changes global control parameters towards more flexible behavior.

The role of preparation on modality compatibility effect in task switching

Edina Fintor, Denise N. Stephan, Iring Koch

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Two experiments examined the role of preparation on modality compatibility in task switching. The term modality compatibility refers to the similarity between the stimulus modality and the modality of response-related sensory consequences. Previous research showed evidence for modality compatibility benefits in task switching when participants switch either between two modality compatible tasks (auditory-vocal and visual-manual) or between two modality incompatible tasks (auditory-manual and visual-vocal), but it was also found that this modality compatibility benefit was diminished with long response-stimulus interval (RSI). However, there is no study that investigated the different aspects of preparation in modality compatibility effects on task switching. To this end, in Experiment 1, we varied the RSI and compared the RSI effect between a predictable and an unpredictable task sequence group. In Experiment 2, we manipulated the cue-stimulus interval (CSI). In Experiment 1, we found that performance is generally better with a predictable task sequence, but preparation has an impact on mainly task repetitions. However, this repetition benefit did not differ across modality compatibility conditions. In Experiment 2, we found decreased switch costs with long CSI, but the CSI effect did not modulate the modality compatibility effect. Together, the data suggest that modality compatibility is independent of preparation, suggesting different underlying mechanisms (i.e., structural task-set overlap vs. advance activation of response mappings).

Switch Costs and Interference in Auditory Attention to Dichotically Presented Words

Sophie Nolden, Iring Koch

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We investigated involuntary attention capture in auditory attention. In addition, we wanted to find out if mechanisms of involuntary attention capture were related to intentional attention shifting. Participants heard two dichotically presented number words, one spoken by a woman and one spoken by a man. A visual cue that varied randomly from trial to trial indicated which speaker had to be attended. The to-be-attended word was always a number word on which participants had to perform a magnitude judgement. The to-be-ignored word could be congruent, i.e., a number belonging to the same category as the to-be-attended word, or incongruent, i.e., a number word belonging to a different category

than the to-be-attended word, or be neutral, i.e., a spoken letter. The data revealed switch costs in reaction times and errors. In addition, compared to the neutral condition, participants benefitted from congruent distractors whereas incongruent distractors were costly. Congruency effects were independent from switch-costs, indicating that involuntary attention capture is independent from intentionally shifting the attentional focus.

Upside down: hand proximity fosters attentional processing but not cognitive control in a visuospatial task-switching paradigm

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Leibniz-Institut für Wissensmedien, Germany

Previous research revealed enhanced cognitive control for objects near the hands in terms of reduced switch costs in a task-switching paradigm (Weidler & Abrams, 2014). These benefits might be the result of more efficient preparation processes for the upcoming task (reconfiguration view) and/or a better dissolving of interferences from the preceding task (interference view). The current study investigated the influence of hand proximity on these processes to disentangle the underlying mechanism(s) of hand proximity benefits during task switching. A visuospatial task-cuing paradigm was used to manipulate the cue-stimulus interval (CSI, allowing for active preparation) and the response-cue interval (RCI, allowing for passive dissolving of interferences) independently. The CSI and RCI were varied twofold (short: 100 ms, long: 1200 ms) and fully crossed in separate blocks of trials for each hand condition (near vs. far). Participants were cued to judge the height or width of rectangles on a computer screen near and far their hands as fast and accurate as possible. Reduced switch costs (RTs, errors) were expected near the hands and especially for longer CSIs, because enhanced cognitive control might provide more attentional resources only for active processes as the preparation for the upcoming task. Results revealed that participants made fewer errors when they worked on the tasks near their hands, irrespective of switch and repetition trials. However, neither an effect of hand proximity on switch costs in general nor an effect of hand proximity on switch costs for longer CSIs could be found. Although this pattern of results indicates a fostered attentional processing of visuospatial stimuli near the hands it does not speak in favor of a fostered cognitive control near the hands in terms of reduced switch costs. These results are particularly relevant in the context of working, learning and living with handheld devices and multi-touch displays.

Talk Session: Selective attention II

Time: Wednesday, 29/Mar/2017: 2:00pm - 3:20pm · *Location:* HS 405
Session Chair(s): Flora Ioannidou, Heinrich René Liesefeld

Modelling distraction and resistance to distraction in visual search

Heinrich René Liesefeld[1], Hermann J. Müller[2]

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When the searched-for target is much more salient than all distractor objects in a visual scene, attention is rapidly and reliably allocated towards that target. Phenomenologically, the target ‘pops out’ of the display. The situation gets more complicated when target saliency is low or when additional salient singletons are present. Under such conditions, top-down task-goals come into conflict with bottom-up saliency signals and attention is

often misallocated towards distractor objects, against the observer's will. As a complex mixture of multiple top-down and bottom-up influences determines performance in such situations, the resulting RT patterns can be difficult to interpret. Computational models can help disentangle such complex mixtures and, thus, differentiate the contributions of various perceptual and cognitive processes. Additionally, the timing of sub-processes can be reconstructed from estimates of model parameters. The model presented incorporates bottom-up saliency, a stochastic decision rule, and two top-down control mechanisms for explaining reaction-time data from several experimental manipulations. Top-down control is implemented via down-weighting of distractor saliency based on the distractors' features and/or their likely spatial location. This model closely fits empirical data patterns, and the parameter estimates as well as model-based simulations provide novel insights into the dynamics of distraction in visual search.

Enough is enough! How do top-down search strategies influence attentional capture and inhibition in visual search?

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In order to enable an appropriate adaptation to current behavioral goals, cognitive control mechanisms provide the selection of relevant visual information such as the recovery from attentional capture by irrelevant objects. Using the event-related potentials (ERPs) of the EEG, we investigated how attentional capture and inhibitory processes are influenced by top-down visual search strategies. Participants performed a spatial cuing task where an irrelevant color singleton cue that was either contingent (color search) or non-contingent (shape search) on attentional sets was presented prior to a target array. To trigger the adaptation of different search strategies, the target could be either identified by searching for a singleton or a specific feature. Independent of the search mode, spatial cuing effects were most pronounced in the contingent condition. No attentional capture occurred in the non-contingent condition when a specific feature defined the target, thus indicating the adaptation of a feature search mode. ERP findings reflected the pattern of behavioral results: N2pc mirrored attentional capture by the irrelevant cue. Rapid reorienting of the attentional focus was indexed by a subsequent contralateral positivity referred to the color cue (i.e. distractor positivity; Pd). Inhibition of the irrelevant information was reflected by a second contralateral positivity after target presentation, which varied with the amount of attentional capture. In line with the behavioral findings no cue-related attentional orienting was observable for the non-contingent condition when feature search mode was adapted. The interplay between selection and inhibition enabled to flexibly control the allocation of attention during visual search.

A Bayesian model of intertrial effects in visual search

Fredrik Allenmark, Hermann J. Müller, Zhuanghua Shi

Ludwig-Maximilians-Universität München

Much previous work on visual search has found intertrial effects, i.e. participants respond faster when the same target properties are repeated compared to when they change between trials, and in particular when it is the dimension on which the target differs from distractors (e.g. orientation or color) that is repeated or changed. Such intertrial effects could reflect trial-to-trial updating of the subjects' prior beliefs about the upcoming target. We propose a computational model of such updating where the prior probability of the target dimension (or of target presence/absence) is updated according to Bayes' rule, and

determines the starting point of an evidence accumulation process based on the LATER (Linear Approach to Threshold with Ergodic Rate) model. Further, the evidence accumulation rate, as a function of target dimension, is updated after each trial to model shifts of attention. To test this new model, we performed three visual search experiments, in which the target differed from the distractors in terms of either orientation or color, and the task was either to report target presence (Experiments 1 and 3) or to report the target dimensions (Experiment 2). In addition, we varied the ratio of two alternative responses. We replicated the intertrial effects that have been found in previous studies. Furthermore, responses were faster on trials which occurred with higher probability. Our Bayesian updating model predicts both the intertrial effect and the effect of the blockwise probability manipulations in all three experiments. This suggests that intertrial effects are likely a consequence of the (approximately Bayesian) updating of prior probabilities which determine the starting point of an evidence accumulation process on each trial in addition to trial-to-trial changes in evidence accumulation rate caused by shifts of attention.

What happens after the distractor? Investigating fixations N + 1 after saccadic inhibition

Johannes Schulz, Sebastian Pannasch

TU Dresden, Germany

During fixations, eyes remain relatively stable to allow for visual information processing. It is widely assumed that analysis of the foveated region is finished before saccade initiation, i.e., that fixation duration directly reflects information processing time [Just & Carpenter, 1980, Psychol Rev]. Accordingly, the durations of subsequent fixations would be independent of each other. However, some authors report contrary results [e.g., Hooge & Erkelens, 1998, Vision Res], i.e., manipulating a certain fixation effects also subsequent fixations. An example for such a manipulation is the sudden onset of an irrelevant distractor stimulus in the visual field. It leads to fixation prolongation due to reduced saccadic activity after the visual change (i.e., saccadic inhibition). Here we examined possible spillover effects from the distractor fixation (N) on the subsequent fixation (N + 1). We analyzed N + 1 fixations of two distractor experiments. In both, distractors were presented about 116ms after fixation onset until fixation end. In Exp. 1, distractor offset was triggered by detection of the new fixation. That causes a delay of about 33ms within the new fixation until actual offset. In Exp. 2, distractor offset was triggered by detection of a saccade, causing actual offset within the saccade or in the first 15ms of next fixation. Distractor presentation had no effect on N + 1 fixations in both experiments, even though the distractor disappearance itself can cause saccadic inhibition [e.g., Pannasch et al., 2011, Atten Percept Psychophys]. We discuss whether the lack of a distractor effect in N + 1 fixations is due to saccadic suppression or inhibition of return. Regarding the independence of fixations, in Exp. 2 we found smaller durations in fixations N + 1 compared to baseline N (without actual distractor presentation), indicating some fixation interdependence.

Altering Surprise Capture of the eye by manipulating expectation breadth about a singleton color

Daniel Ernst, Gernot Horstmann

Bielefeld University & CITEC, Germany

While much of the literature on involuntary attention has been devoted to the conflict between Saliency Capture and Contingent Capture, an additional variant has been proposed as Surprise Capture. Surprise Capture is thought as the attraction of attention instigated by expectation-discrepant, novel, or surprising stimuli. Recent experiments using eye-tracking have revealed earlier and longer gaze fixations on an unexpected novel singleton color, consistent with Surprise Capture. This was tested on the hand of 32 familiarizing search trials including an irrelevant singleton with a constant color followed by a surprise trial, where the singleton color was changed. Other prior studies could show that the impact of surprising events on task performance varies with the discrepancy between the expected and the actual surprising event. However, the effect of different expectation breadths about specific display elements on gaze behavior has not been investigated. Here, we tested different degrees of singleton color variations during the familiarization trials. We predicted a weakening of the surprise capture effect by stronger variation of the singleton color in the familiarization trials due to broader expectations with respect to the singleton color. Results confirmed this prediction. However, regardless the strength of color variation in familiarization trials, once the singleton with the novel color in the surprise trial has been fixated, it always binds the gaze for a longer duration. This suggests that broader expectations weaken the potential of surprising events to preattentively draw attention while postattentive exploration of novel stimulus features remains high.

Talk Session: Decision-making: Moderating effects of age and intelligence

Time: Wednesday, 29/Mar/2017: 2:00pm - 3:20pm · *Location:* HS 301
Session Chair(s): Ying Lee

Mechanisms of Social Decision-Making in Early Adolescence

Andrea Reiter[1,2], Shu-Chen Li[1,2], Ben Eppinger[1,2,3]

[1]TU Dresden, Germany; [2]Volition and Cognitive Control: Mechanisms, Modulators and Dysfunctions; [3]Concordia University Montreal, Canada

Background

In general, adolescence is characterized by a high degree of physical health. Health dangers mostly emerge by decisions teenagers themselve make: Epidemiological research has found higher rates of unprotected sexual intercourse, risky driving, deliquency and experimenting with drugs in adolescence as compared to any other period in life. Previous research also emphasizes the important impact of social factors, i.e. peers, on these maladaptive behaviors. However, mechanisms which underly the influence of peers on decision-making in adolescents are so far poorly understood.

Methods&Results

Here we use two social decision-making tasks in combination with behavioral computational modeling in adolescents as well as young adults to show 1) that decision-making in social contexts is informed by uncertainty estimates in both adolescents and young adults 2) how social decision-making mechanisms differ as a function of a) our

participants' agegroup b) whether they are interacting with own-age players ("peers") or other-age players 3) how this relates to real-life factors like social network size, substance consumption and real-life risk-taking behaviors.

Conclusions

Social Learning paradigms in combination with compuational modeling of behavior appear as a promising step to finegrain our understanding of the often times postulated "social brain in adolescence" and might prove useful to define risk factors for predicting maladaptive behaviors and psychiatric disease, also later in life.

How Does Aging Impact Decision Making? The Contribution of Cognitive Decline and Strategic Compensation Revealed in a Cognitive Architecture

Hanna Bettine Fechner[1,3], Lael J. Schooler[2,3], Thorsten Pachur[3]

[1]University of Zürich, Switzerland; [2]Syracuse University, NY, United States; [3]Max Planck Institute for Human Development, Germany

Older adults are faced with decline in several cognitive capacities. How does this impact their decision behavior—especially under high cognitive demands imposed by parallel activities? Do older adults' decision processes uniformly decline under higher mental strain, or do older adults compensate for decline by strategically reallocating cognitive resources? Using empirical data and computational modeling, we investigated older and younger adults' execution of two decision strategies in a multi-attribute inference task under varying cognitive demands imposed by a concurrent task. One decision strategy (take-the-best) involves considering attributes in order of their importance until one attribute favors one alternative, while the other strategy (tallying) requires the integration of all attributes favoring each alternative. We found that although older adults executed both strategies quite accurately, they showed decrements compared to younger adults. Moreover, older adults' execution of tallying declined with increasing cognitive demands; interestingly, however, their execution of take-the-best was less impaired under the highest cognitive demands than under milder demands. Simulations with computational models in the ACT-R cognitive architecture showed how decline in specific cognitive resources can contribute to older adults' observed decrements in strategy execution. However, to accommodate older adults' preserved execution accuracy when applying take-the-best under the highest cognitive demands, it was necessary to assume compensatory shifts in resource allocation in the models. Thus, cognitive decline and strategic compensation applied under highest task demands gave complementary accounts for the data patterns of older adults' decision behavior.

David and Goliath in Old Age: Asymmetric Competition in Younger and Older Adults

Sebastian Horn[1], Judith Avrahami[2], Yaakov Kareev[2], Ralph Hertwig[1]

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Game-theoretic analyses suggest that weaker agents can stand a chance of winning occasionally against stronger agents in asymmetric competitions waged over several fields if they follow the normative strategy to give up on some fields and concentrate resources on the remaining ones. But how sensitive are younger and older players to their relative strengths and how does aging affect resource allocation in competitive games? In this project, we investigate how a wealth of experience and crystallized knowledge may

help older adults to wisely and selectively distribute available resources and to what extent fluid and numeric abilities account for age-related differences in economic competition games.

Adaptive decision making and the role of intelligence

Daniel Hausmann, Bettina Stalder

University of Zurich, Switzerland

There are two essential and well accepted facts about decision making under uncertainty: first of all, many people make a decision at a time they have subjectively reached enough certainty, and secondly, people are adaptive decision makers in principle. We examined, how accurate people can adopt from a decision task with a minimalist search order (KETO) towards a modified decisional environment like Take-The-Best (TTB) or a traditional Expert-Setting (ES) with one cue and several potential recommendations, how close people behave according to the hidden normative strategies of these tasks, and how intelligence could moderate both, normative behavior itself and/or the normative switch between two tasks. The desired level of confidence (DLC) of sixty-two participants was first measured with a behavior-based short decision making test online (KETO). The DLC is positively correlated with risk attitude and negatively correlated with risk behavior, showing small effect sizes over all. KETO is an attractive and complex virtual game in the sense of an objective personality test and includes 22 comparable decision making tasks, in which one of four options have to be chosen with the help of zero to maximal five probabilistic cues on an information board (www.keto.dah-media.ch). For every individual, the DLC will be experimentally detected according to a constraining procedure and is calculated ex post on the basis of the complete behavioral pattern of searched information. For the second task (TTB or ES) corresponding levels of confidence were quantified. Furthermore, fluid intelligence was assessed with M-KIT (Modularer Kurzintelligenztest). Results show a main effect of fluid intelligence on the capability to adapt to the normative behavior behind each task (KETO, TTB and ES). So far, whenever our individual demand for certainty affects and often biases information search and decision making behavior, high intelligence is a good warrantor of an optimal strategy use in diverse tasks.

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