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Keynote lectures



Action video games as exemplary learning tools

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From chatting on the internet to playing video games, technology has invaded all aspects of our lives. For better or for worse, it is changing who we are. But can we harness technology to effect changes for the better? In the midst of reported negative effects, recent studies show that this might indeed be the case. In a surprising twist, an often-decried activity such as playing action video games enhances various sensory, attentional and cognitive skills. A training regimen whose benefits are so broad is unprecedented and provides a unique opportunity to identify factors that underlie generalization of learning and principles of brain plasticity. A set of common mechanisms are hypothesized to be at the source of this wide range of skill improvement. In particular, performance improvement following action video game play may be mediated through greater attentional control, better statistic inference in neural networks and in turn an enhanced ability at learning to learn. Practical applications from education to health will be discussed.



Vision as a Sensorimotor System

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Traditionally, research on vision focused on its role in perception and our cognitive life. Except for the study of eye movements, which have typically been regarded as an information-seeking adjunct to visual perception, little attention was paid to the way in which vision is used to control our actions, particularly the movements of our hands and limbs. Yet a complete account of the visual system requires as much attention to the organization of motor output as to the processing of sensory input. Historically, however, a sharp division was drawn between sensory and motor systems in classical psychology and physiology. The chapters in undergraduate textbooks dealing with vision were quite separate from those discussing how the motor system works. Similar divisions existed in scientific societies, journals, and symposia – and sometimes within university departments. It is true that one could find the occasional book that talked about ‘sensorimotor integration’ and the occasional meeting that brought together researchers from both fields but, in general, sensory and motor systems were two solitudes. Instead, the prevalent belief was that the visual machinery of the brain is dedicated to constructing an internal model of the external world, a kind of simulacrum of the real thing that serves as a perceptual foundation for all visually-driven thought and action.

All of that has now changed. Today, researchers are actively investigating the ways in which vision is used to control a broad range of complex goal-directed action – and are exploring the neural substrates of that control. New models of the functional organization of the visual pathways in the primate cerebral cortex have emerged that challenge the older monolithic views of the visual system. In this historical review, I will attempt to trace the lines of research over the last twenty-five years that have provided fundamental insights into the role of vision in the programming and control of action, and have made the study of vision-for-action a vibrant part of the vision research enterprise.



The Human Search Engine

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Humans engage in an endless set of visual search tasks at time scales running from a fraction of a second (Where is the “@” on my keyboard?) to many minutes or more (e.g. foraging for berries in a field.) To accomplish these tasks, humans have a search engine that comes with impressive capabilities and equally impressive limitations. Our civilization has designed a set of socially-important search tasks from airport security to breast cancer screening. We want these difficult tasks done at high-speed with low error rates. Perhaps unsurprisingly, that is not the case; in part because of a mismatch between the tasks and that human search engine. Basic research in visual attention can be informed by these problems and can, in turn, offer suggestions for improvements.

Contributions

Semantic distance effects in language production: Electrophysiological evidence for lexical competition across three paradigms

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Inhibitory semantic context effects in language production have long been assumed to reflect competitive mechanisms during lexical selection, a view that has recently been challenged by alternative accounts localizing such effects at the post-lexical level of the articulatory output buffer. One of the observations that have cast doubt on the existence of lexical competition are faster naming times in the presence of closely related relative to more distant context stimuli. Here we systematically investigated semantic distance across different levels of taxonomic hierarchy (e.g., target: salmon, context: shark (taxonomically close), parrot (taxonomically distant) or chair (unrelated)), using event-related brain potentials (ERPs) to localize the effects at lexical or post-lexical stages. Object pictures were named in the context of close, distant or unrelated stimuli in the cyclic and continuous versions of the blocking paradigm (Exp. 1 and 2) and in the picture-word interference (PWI) paradigm. In all three experiments picture naming was consistently slower in the presence of close relative to distant contexts. Together with the time course of ERP effects that suggests early loci at conceptual / lexical stages these findings support lexical competition accounts of inhibitory context effects.

Interpolated Retrieval Practice Counteracts List-Method Directed Forgetting

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Proactive interference arises when study of a first item list impairs memory for a subsequently studied second item list, compared to when the second item list is studied alone. Previous research indicates that a cue to forget the first list can reduce such proactive interference. In the list-method directed forgetting (LMDF) task, subjects are asked to study two item lists, and between lists are either cued to forget the first list (pretending that it is irrelevant) or to remember the list for an upcoming memory test. Typically, the forget cue impairs recall of list 1 items, thereby reducing proactive interference and thus enhancing recall of list 2 items. Here, we followed other prior work indicating that retrieval practice in comparison to restudy can reduce proactive interference as well, and examined whether retrieval practice after study of list 1 items can affect LMDF. Across two experiments, LMDF was present when list 1 items were restudied after presentation, whereas LMDF was absent if a retrieval cycle was interpolated instead. The results emphasize the critical role of proactive interference for LMDF, and suggest that interpolated retrieval practice can render forget cues ineffective by reducing interference.

What can factor analysis tell us about individual differences in metacontrast masking?

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In metacontrast masking the visibility of a target stimulus is reduced by a subsequent masking stimulus, whose contours fit snugly around the contours of the target. Recently studies showed that participants differ substantially in the masking time course, i.e. target visibility as function of stimulus onset asynchrony (SOA) between target and mask: Whereas one group showed increasing performance with increasing SOA, another group showed decreasing performance with increasing SOA. Here we present a new approach for analyzing individual differences, which avoids clustering of participants into one of several exclusive groups: We assessed individual masking functions in a masked target discrimination task and applied factor-analytical techniques to estimate the number of latent variables sufficient for explaining individual variability and to investigate their relationship to different SOAs. For several data sets the results showed that two factors explain up to 90 % of total variability, one of which reflects typical type-A-masking and one of which reflects typical type-B-masking. Moreover, participants' factor scores relate to different, independently assessed masking conditions. These results support the assumption of two independent, differently weighted processes as basis for individually different masking types. We will discuss advantages and drawbacks of this approach.

Morphological markers of early life testosterone exposure predict psychopathic traits in males

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Psychopathy is a personality disorder characterized by severe affective, interpersonal and behavioural dysfunction sometimes culminating in criminal behaviour. It has been repeatedly suggested that psychopathy is associated with elevated testosterone levels, although empirical evidence supporting this claim is scarce. As psychopathic traits typically manifest early in life, we investigated the idea that exposure to testosterone during important phases of human brain development may be crucial. We correlated facial width-height-ratio (FWHR) and second-to-fourth digit ratio (2D:4D), which are assumed to be morphological markers of adolescent and intrauterine testosterone exposure, respectively, with self-reported psychopathic traits in a sample of male undergraduate students (N=82). We found that psychopathic traits were significantly predicted by FWHR and the interaction term of FWHR × 2D:4D, supporting the hypothesized relationship, albeit in a somewhat complex way.

S-Ketamine Influences Strategic but not Exogenous Inhibition of Return

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We investigated whether s-ketamine differentially affects exogenous and strategic inhibition of return (IOR). Participants had to report the presence of a visual target on the left or on the right. A subliminal or a supraliminal cue appeared more often opposite of the target (75%) than at target position (25%). Previous findings indicated that participants use this cue to anticipate the target because they respond faster when the target is presented at the opposite location but only if cues are supraliminal. This points to a strategic use of the cues for (1) shifting attention to the likely target position on top of (2) inhibition of return (IOR). Here, we tested strategic and automatic IOR effects after s-ketamine and after placebo treatment in a double-blind within-participant design. We found reduced IOR after supraliminal cues for the s-ketamine compared to the placebo treatment in the short interval but similar IOR in the long interval, indicating an early effect on the strategic allocation of attention. No differences between the two treatments were found with subliminal cues, suggesting that s-ketamine does not affect exogenous IOR. The findings point to a more prominent role of s-ketamine in top-down controlled executive functions than in automatic processing.

Decoding Free-Choice Movement Selection during Motor Planning

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The planning and execution of simple grasping movements are known to recruit a distributed fronto-parietal network. Here we used multi-variate pattern analysis (MVPA) of functional resonance imaging (fMRI) data to examine whether it is possible to predict the outcome of a motor decision using brain signals that precede movement onset even when the action performed is not instructed by a cue, but freely selected by the participant. We tested 21 participants in a delayed movement task that required planning and executing non-visually guided reach-to-grasp movements toward a single centrally located object using one of three grip types: precision grip, power grip, or touch. A color cue at the beginning of the trial either indicated to use a specific grip type ('instructed condition'), or to freely choose one among the three ('free-choice condition'). Support-vector-machine (SVM)-based MVPA enabled us to correctly predict upcoming actions on the basis of brain activity during the planning phase in several left-lateralized frontal and parietal regions both for the instructed and the free-choice condition. While decoding performance in the inferior parietal lobe was higher in the instructed in comparison to the free-choice condition, we observed comparable performance in the two conditions in the remaining regions.

Text-Picture Integration when Learning with Multimedia

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According to multimedia theories learning with text and pictures results in a single integrated mental representation. Based on a paradigm by Gentner and Loftus (1979), Schüler, Arndt, and Scheiter (subm.) confirmed this assumption for immediate sentence recognition, but not for picture recognition. A possible explanation for the latter is that learners used surface representations of the pictures to answer pictorial items. Therefore, in the current study we varied between subjects (N = 84) whether testing took place immediately, in which case a surface representation should still be available, or one week after learning, in which case a surface representation should no longer be available. Participants memorized series of pictures and sentences that resulted from cross-varying type of picture (general vs. specific) and sentences (general vs. specific) within-subjects. If integration occurred, participants should falsely recognize specific picture information after having seen general picture information paired with specific sentence information (and vice versa). It was hypothesized that for immediate testing, integration can be shown for sentence but not picture recognition, whereas for delayed testing the effect should occur for both dependent variables. Data gathering is still in progress, but first analyses confirm the hypothesized pattern for immediate but not delayed testing.

Prospective Memory: Comparing Ratings and Performance

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Prospective memory (PM) refers to remembering to perform an action in the future. PM is crucial in everyday life. The Prospective and Retrospective Memory Questionnaire (PRMQ, G. Smith, Della Sala, Logie, & Maylor, 2000) is a self-report measure of prospective and retrospective memory failures in daily life. The multinomial processing tree (MPT) model of event-based PM (R. E. Smith & Bayen, 2004) separates the prospective and the retrospective components of PM in laboratory PM tasks. Fifty-six high-school students participated in a PM experiment. Additionally, they as well as their parents filled out the PRMQ. We found a significant relationship between parents' ratings and self-ratings of prospective and retrospective memory as measured by the PRMQ. We did not find a relationship between model-based estimates of retrospective and prospective components of PM and any of the PRMQ ratings.

Revelation affects revealed but not intact items in the revelation effect

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In several recognition experiments, participants had to discriminate old from new words. When participants first revealed an unrelated word by solving an anagram, they judged the recognition probe as more familiar than intact probes without anagrams. This revelation effect is well documented for within-subject designs where participants solve anagrams for half the words and see the other half without anagrams. In a within-subject design, the revelation effect could be due to a familiarity bias for revealed words alone, an unfamiliarity bias for intact words alone, or a combination of both. Combining a within-subjects design with a between-subjects design, we found evidence that solving an anagram only increases the proportion of “old” judgments for revealed words but leaves judgments for intact words unaffected. Moreover, participants showed a familiarity bias for revealed words even 10s after solving the anagram. Our results cast doubt on the hypothesis that the revelation effect is due to participants comparing the relative fluency of revealed versus intact words. We discuss the implications of our findings for theories of memory and processing fluency.

Sequence effects for grasping in a laboratory versus an everyday like context

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We have shown before that arm movements, executed from the same starting position to manipulate the same object in the same way, still differ in their kinematics and dynamics when they are embedded in a different behavioral context. Thus, grasping performed as an instructed, repetitive task with no ultimate purpose (laboratory context, L) differs in multiple ways from grasping performed incidentally as part of a complex and meaningful activity (everyday-like context, E). Here we address the effects of training on the context difference L-E. For simplicity, we quantify L-E by a global metric that encompasses 28 kinematic and dynamic parameters. We show that L-E increases within a block of 20 grasping trials by 38%, and that this increase is almost exclusively due to changes that occur in context E. We further show that L-E decreases by 32% in a block of 20 trials if it is preceded by a block with the respectively other context; again, the decrease is largely limited to changes in context E. We conclude that context E, but not context L, is distinctly sensitive to prior experience. Robust performance in the laboratory may correspond to varying performance in real life.

Emotions in the movies – Is there a need for a new film set for emotion elicitation?

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A long tradition started by Hugo Münsterberg (1916) emphasizes the importance of film clips in emotion elicitation. In the end of the 20th century several standardized film sets were developed and have been used for emotion induction (e.g. Fredrickson & Branigan, 2005). Nevertheless, movies reflect the zeitgeist of their age and are subject to variations. The aim of our studies was twofold. On the one hand existing traditional film sets (Philippot, 1993; Gross & Levenson, 1995) were revisited. On the other hand contemporary film clips were examined in order to complete traditional sets. Two studies were conducted. In both investigations subjects (N1=20 and N2=16) watched 12 film clips (6 contemporary, 6 traditional) and rated their emotional states using the Affect Grid, mDES and a single-item liking scale. The results show that most of the film clips evoke corresponding emotions. However, studies reveal that it is harder for traditional film sets to elicit positive emotions. Contemporary films trigger positive emotions more intensive than traditional ones and receive higher liking ratings. Overall, we conclude that emotion elicitation using films is sensitive to the zeitgeist and film clips should continually be revisited in order to maintain their validity.

Top-down controlled integration of tactile reference frames

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Tactile localization requires the integration of anatomical and external coordinates. Here, we tested whether this integration is fully automatic, or whether it is subject to top-down control. Participants made temporal order judgments (TOJ) of two tactile stimuli vibrating with different frequencies. To respond, they lifted the finger that was stimulated first. They adopted a crossed hand posture to induce a conflict between anatomical and external coordinates. In two experiments, TOJ performance was compared across three conditions: a) TOJ only and TOJ followed by b) a spatial or c) a temporal judgment about the vibration frequencies of the tactile stimuli. For the spatial secondary task, we experimentally manipulated either the anatomical (Experiment 1) or external (Experiment 2) reference frame by referring response coding of the secondary task to the hand or to the location of the response buttons. TOJ performance with crossed hands was improved when the subsequent judgment stressed the anatomical reference frame (Experiment 1), but not when the external reference frame was accentuated (Experiment 2). The sensitivity of tactile localization to the spatial parameters of an unrelated secondary task suggests that reference frame integration can be modulated by top-down control.

Age-related changes in sensorimotor networks

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The last decade has seen a paradigm shift in neuroimaging. Whereas previous fMRI and PET studies focused on localizing cognitive functions or deficits to specific brain regions, there is now a growing movement focusing on connectivity between brain regions. This movement has been fuelled by the development of novel data acquisition techniques such as Diffusion Tensor Imaging (DTI) and resting state functional Magnetic Resonance Imaging (rs-fMRI), as well as novel analytical approaches such as Meta-Analytic Connectivity Modelling (MACM) and Graph theory. These novel tools and techniques are increasingly used to establish the neural networks underpinning healthy ageing, as well as neural connectivity changes associated with age-related disorders such as Alzheimer's disease. Although the majority of studies in this area have focused on changes in networks associated with cognitive processing, the work of Balsters et al (2013) has shown that connectivity in sensorimotor networks also change with age. In this talk I will discuss broad structural and functional connectivity changes in the brain during ageing, and additionally focus on the task-independent (DTI/rs-fMRI) and task-dependent (MACM) methods investigating connectivity changes in sensorimotor networks with age.

Bunter, aufregender, interaktiver – die Erlebnisqualität von Websites und ihre Wirkung auf Nutzervertrauen

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User Experience beschreibt die Gesamtheit der durch die Interaktion mit Produkten hervorgerufenen Empfindungen und Reaktionen. Bisher wurden hauptsächlich die Bestandteile von UX untersucht, wenig Aufmerksamkeit hingegen erhielten mögliche Folgen positiv oder negativ erlebter Nutzungssituationen. In der vorliegenden Studie wurde das vom Nutzer entgegengebrachte Vertrauen in Websites als eine Konsequenz der UX untersucht. Zwischen der Erlebniskomponente Usability und Vertrauen gilt ein positiver Zusammenhang als belegt. Die Beziehung zwischen der hedonischen Qualität von Websites und der Entwicklung von Nutzervertrauen ist jedoch noch immer ungeklärt. In einem Laborexperiment (N=28) wurden drei Online-Gesundheitsratgeber von unterschiedlicher Erlebnisqualität mittels quantitativer und qualitativer Messmethoden untersucht. Das Vertrauen der Nutzer in die Websites kann nicht nur durch deren Usability, sondern auch durch hedonische Merkmale der Internetseiten vorhergesagt werden. Interessanterweise weist nur der hedonische Aspekt der Identifikation eine signifikante Auswirkung auf, während die Stimulation durch die Website das Nutzervertrauen nicht systematisch beeinflusst. Um das Vertrauen von Nutzern durch die Gestaltung von Websites zu stärken, sollte demnach zwischen den Gesichtspunkten der Identifikation und Stimulation differenziert werden.

The CSI-Effect: Crime Scene Instructions?

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The CSI effect describes the impact of popular crime television shows such as CSI: Crime Scene Investigation on the public perception. One aspect of the CSI effect, that has not been scientifically researched yet, is the police chief effect. This phenomenon describes how criminals learn about forensic evidence through these shows and adopt countermeasures to prevent detection. We used multiple approaches to tackle the issue. First, we analyzed crime statistics to see whether crime rates have increased and/or detection has declined since the appearance of crime television shows. Second, we asked 24 convicted criminals and a control sample about their impression of the usefulness of crime shows for committing a crime. Third, we asked 20 heavy crime show consumers and a control group of non-watchers to slip into the role of a criminal to steal a laptop, and clean a murder crime scene. The crime statistics did not reflect the police chief effect. Also, criminals did think crime shows might give them useful ideas but thought they would learn more from fellow criminals than from any television show. Overall we found that the more complex the crime, the less likely is it for the police chief effect to occur.

Attentional bias in excessive users of Multiplayer Online Games: Results of two experimental studies

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Background: An increasing number of people require help regarding their excessive use of online games. In correlative studies players of Massively Multiplayer Online Roleplaying Games (MMORPGs) reported long gaming hours, lower well-being and elevated levels of depression and anxiety. In substance addiction an attentional bias for addiction-related stimuli is well documented. It was our aim to investigate whether such a bias is also present in excessive MMORPG users (gamers). Method: Gamers and controls (n=48) underwent a computerbased emotional stroop task with 20 computer-related and 20 neutral words and a spatial probe task, requiring them to react as fast as possible to a target stimulus, which was preceded by the presentation of a picture-pair (a computer-related and a neutral picture). The target was shown either in the position of the computer (C) or the neutral picture (N). Results: In the stroop task, reaction times of gamers, but not controls, were longer for computer-related words compared to neutral words. The spatial probe task showed no difference in reaction times for C or N trials for gamers or controls, but gamers reacted faster throughout. Discussion: The results suggest that differences in information processing exist between gamers and controls.

A questionnaire study about comfort inside an aircraft cabin at Hamburg Airport

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At Hamburg Airport 301 air travelers filled out questionnaires about their comfort inside aircraft cabins. On a five point scale they were asked how satisfied they felt from very bad to very well. Using factor component analysis the 24 items were reduced to 5 dimensions. What most people answer at once concerning the comfort is “space” often connected with the term leg room. A second dimension is “physical factors” with items like temperature, noise, air quality. As psychological factors are recognized the feeling of safety, the friendliness and competence of the crew. Physiological conditions as the amount and quality of food and drinking are identified in this dimension. And as a last dimension organizational influences as timeliness and a cost-benefit perspective are part of the questionnaire. As independent influencing factors the length of the flight, the fear of flying, the comfort of the flight and differences of job are examined in order to discover different groups. New insights into the field of comfort will be presented.

Material Perception in Blind and Sighted Participants

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We normally use both the visual and the haptic senses when we perceive materials in everyday life. Yet how the two senses influence each other in the emergence of a common representation of materials is so far unknown. We have recently compared material property ratings following visual exploration of materials with ratings following haptic exploration and found that for both exploration conditions, participants’ judgments of material properties are very similar (Baumgartner, Wiebel, & Gegenfurtner, 2013). However, when we let participants categorize the different material samples, visual exploration led to a better performance than haptic exploration. To explore the effect visual experience has on material perception, we asked congenitally blind participants to explore different materials haptically and rate several material properties. Additionally, we asked them to categorize our materials into one of eight categories. Principal components analyses were conducted on sighted participants’ haptic rating data as well as blind participants’ haptic rating data. A procrustes analysis revealed that the two principal component spaces were highly similar. Categorization performance was also comparable for the two groups (sighted participants: 66.6%, blind participants: 68.6%). We conclude that the representational space of materials we have observed can be formed without the influence of visual experience.

Effects of colored lights on dual-task performance

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Several studies on human psychological domains associated with color specific light effects have been reported. In the current study, we investigated the effect of colored lights on balance control in a dual-task paradigm. Participants performed the d2 test under two stance (single leg, both legs) and three light (red, blue, white) conditions. Postural sway was measured in anteroposterior (AP) and mediolateral (ML) directions during quiet standing (QS) and dual-task (DT) conditions. Results show reduced attentional performance during exposure to colored lights. AP postural sway was decreased during exposure to red and blue light compared to the control condition, increased ML postural sway was obtained in dual-task conditions during exposure to colored lights. Results indicate modulating effects of colored lights on the cognitive and postural control system mediated by the autonomous nervous system.

Reduced neural differentiation between feedback conditions after bimanual coordination training with and without augmented visual feedback in young and older adults

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The goal was to examine to what extent elderly can learn a novel bimanual coordination skill by training and the underlying changes in brain activity. Young (YA) (N=25) and older adults (OA) (N = 18) underwent functional magnetic resonance imaging (fMRI) before (PRE) and after (POST) two weeks of training. A bimanual tracking task was practiced with augmented feedback (FB, in which a cursor showed performance online) and without feedback (NFB) divided over 5 training sessions (1 hour each). A target, presented on a visual display, was tracked by rotating two dials simultaneously. OA performed much worse than YA, but showed a stronger error reduction with training. OA reached PRE-level performance of YA after training. Whereas OA activated more cortical areas such as IPL and prefrontal cortex, they showed less activity in striatum and cerebellum compared to YA. This did not change with training. To reach a reduced effect of age on the neural level, OA may need more training. In both groups, the neural distinction between feedback conditions diminished after training compared to before, reflecting a more common activation to support performance. This suggests that young as well as older adults are able to develop an internal movement template.

Anticipatory Behavior during Object Interaction

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Attention during object interaction bidirectionally modulates vision (selective attention), action preparation, and execution (motor attention). Gaze control works as a gateway between three components, linking the task (action), the object (target), and the effector (hand) in an effective way. Anticipatory perceptual exploration is indeed influenced by generic motor pre-activation related to the task (e.g. lift), leading to rapid affordance extraction. On the other hand, motor planning relies on object properties and spatial information provided by vision, again subserved by the overarching goal. We conducted eyetracking experiments showing how these factors come into play. Real world objects were presented to subjects, instructed with different tasks, one passive and two active. Heatmaps and mean fixation locations show how task-relevant locations are readily targeted before initiating the reaching phase. Reaction times also indicated a higher cognitive effort when reaching and grasping for opening compared to reaching and grasping for lifting, suggesting that the more refined the task, the longer the time needed to extract sensorimotor parameters for planning the movement. Saliency measures correlated most with fixations in active conditions, suggesting a predominant role of low-level features – such as orientation – for affordance identification mechanisms.

Age differences in social source memory

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Memory deficits are one of the most prevalent problems in aging, but emotional memory is often spared from age-related cognitive decline. In the present study, we assessed memory for negative and positive reputations, and were particularly interested in examining how younger and older adults' reputational memory is influenced by social expectations. In the encoding phase, participants played a social-dilemma game with trustworthy-looking and untrustworthy-looking partners. Half of the partners cooperated, and the other half cheated. Then a surprise memory test followed, in which participants were required to remember whether a face had been previously associated to cooperation or cheating. In both age groups, facial trustworthiness induced a bias towards guessing that the face must have been associated with cooperation. Older adults' reputational memory was quite good. However, younger adults used a flexible encoding strategy to remember the partners' behaviors (they had better memory for unexpected behaviors), whereas older adults showed an inflexible memory advantage for negative reputational information. This finding suggests that older adults are less likely to adapt their encoding strategies to their social expectations than younger adults.

Spatial attention: Differential shifts in pseudoneglect direction with time-on-task and initial bias support the idea of observer subtypes

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Asymmetry in human spatial attention has long been documented. In the general population the majority of individuals tend to misbisect horizontal lines to the left of veridical centre. Nonetheless in virtually all previously reported studies on healthy participants, there have been subsets of people displaying rightward biases. In this study, we report differential time-on task effects depending on participants' initial pseudoneglect bias: participants with an initial left bias in a landmark task (in which they had to judge whether a transection mark appeared closer to the right or left end of a line) showed a significant rightward shift over the course of the experimental session, whereas participants with an initial right bias shifted leftwards. We argue that these differences in initial biases as well as the differential shifts with time-on task reflect genuine observer subtypes displaying diverging behavioural patterns. These observer subtypes could be driven by differences in brain organisation and/ or lateralisation such as varying anatomical pathway asymmetries (Thiebaut de Schotten et al., 2011).

Individual differences in change blindness

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Observers often miss visual changes in the environment when they co-occur with other visual disruptions. This phenomenon is called change blindness. People differ in their ability to detect changes. However, it is unclear to which extent this variance is trait-specific or depends on situational factors. Because selective attention is a precondition of successful change detection, individual differences in the bottom-up or top-down control of attention may result in differences of change detection. In the current experiment participants reported changes of colored dots. In addition to a standard condition, the control of attention was manipulated by varying the number of mudsplashes (bottom-up condition) or by highlighting target positions (top-down condition). Participants were tested in these three experimental conditions at three measurement occasions each. For data analysis, we applied a latent-state-trait model, which was extended by methods factors. About 44% of the variance was explained by trait effects, about 1 - 2% by the bottom-up control and about 14% by the top-down control of attention. The results show that both trait and state effects contribute to individual differences in change blindness, which rather rely on differences in the top-down than in the bottom-up control of attention.

Spatial congruency and left-right orientation

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Spatial interference can be shown in the well-known Simon task. Participants react faster when stimulus' side and response side are congruent (i.e., both left or both right) than incongruent although the task was not related to the stimulus' side (i.e., stimulus' side is irrelevant; task is, e.g., to classify the color). This effect can be demonstrated also in situations in which left and right is not aligned to the center of the screen but shifted to somewhere left or right of the screen's center. Here, we have a "relative" Simon effect and additionally an (in)congruence between absolute presentation side and response side (here, we call this the "position effect"). Michalak and colleagues (2009; *Psychosomatic Medicine*) showed that gait patterns of depressed persons are characterized by larger lateral swaying movements. In turn, if depression is associated with a different left-right orientation, one could expect relations between BDI and the Simon effect (perhaps especially at outer positions; i.e., the "relative" Simon effect) and/or the position effect. Results showed only (at least by trend) a negative correlation between BDI and the position effect. That is, the absolute more than the relative position seems important for differences of participants with higher/lower BDI values.

Facilitating lexical access by activating experiential traces: Investigations with an anagram-solving task

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According to the experiential-simulations view of language processing, words automatically activate experiential traces that stem from the reader's interactions with their referents. In the present study, we focused on the corresponding influence in the opposite direction. By means of an anagram-solving task we investigated whether activating the relevant traces would facilitate lexical access to the corresponding words. Participants solved anagrams of nouns associated with the ocean or the sky (e.g. "dolphin" or "eagle", respectively). These anagrams were presented either on the top or on the bottom of the computer screen, with a picture in the background showing a horizon with the sky on top and the ocean below. The results were in line with the hypotheses. Anagrams were solved significantly faster when the position of the anagram was congruent with the meaning of the noun: Anagrams for a sky-word such as "eagle" were solved faster when presented in the upper compared to the lower part of the screen whereas the opposite was true for ocean-words such as "dolphin". This finding shows that activating the relevant experiential traces may facilitate lexical access and therefore provides strong support for the experiential simulations view of comprehension.

Influence of target's and mask's presentation durations on the occurrence of inter-individual differences in metacontrast masking

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In metacontrast masking the visibility of a briefly presented target stimulus is reduced by a subsequent masking stimulus, whose contours fit snugly around the contours of the target. Depending on the target-to-mask-duration-ratio, the masking function, i.e. target visibility as function of stimulus onset asynchrony (SOA) between target and mask, is either 'u'-shaped (type-B-masking) or monotonically increasing (type-A-masking). Recent studies showed that despite identical stimulation parameters participants either showed increasing or decreasing masking functions. These qualitative individual differences could be described by two underlying latent variables, reflecting prototypical type-A-masking and type-B-masking, respectively. Here, we investigated the crucial parameters for individual differences by modifying the target-mask-duration-ratio. Participants performed a masked stimulus discrimination task with SOA, mask duration and target duration as independent variables. Overall, the maximal masking effect appeared at increasing longer SOAs the more similar target and mask duration were. Additionally, individual differences on the first latent variable were mostly unaffected by target and mask duration. In contrast, individual differences on the second latent variable vanished with target durations longer than 24 ms and when target-to-mask-ratio was shifted towards type-B masking conditions. These results support the assumption that metacontrast is mediated by two independent, individually differently weighted processes.

Encoding of faces and objects into visual working memory: an event-related brain potential study

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In the present study we tested whether there is a general advantage for face stimuli in visual working memory (VWM) and whether this advantage is related to early sensory processing stages. To address these questions, participants performed a same-different task with either face or watch stimuli and with two different levels of memory load. Behavioral measures show an advantage for faces on the level of VWM, mirrored in higher estimated VWM capacity (i.e. Cowan's K) for faces compared with watches. In the event-related brain potentials, the N170 amplitude was enhanced for faces compared with watches. However, the N170 was not modulated by working memory load either for faces or for watches. In contrast, the P3b component was affected by memory load irrespective of the stimulus category. Taken together, the results suggest that the VWM advantage for faces is not reflected at the sensory stages of stimulus processing, but rather at later higher-level processes as reflected by the P3b component.

Age-related changes in prefrontal neural activation during dual-task walking: an approach using fNIRS

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Literature suggests that human locomotion is influenced by higher order cognitive processes located in the frontal lobes. Until today, only a few studies evaluated the functional cortical correlates underlying the neural control of gait. The present study used functional near-infrared spectroscopy (fNIRS) to investigate the hemodynamic responses of dual-task walking in young and older persons. We combined walking with a concurrent visual and a concurrent verbal task, and compared subjects' performance as well as their prefrontal activation. Results show that behavioral data (step duration, step height, number of steps) yielded higher dual-task costs in the older group for both concurrent tasks, and the effect was more pronounced during the visually demanding task. fNIRS yielded a reduced activation under dual-task conditions in the older group and only for the visual task. Neural activation in the young group and during the verbally demanding task were unchanged. We were able to confirm that age-related deficits of dual-task walking emerge mainly with a visual concurrent task, and document that those deficits are associated with a reduced prefrontal activation. Possibly, seniors recruit other cortical regions at the expense of the prefrontal cortex to master this challenging task combination.

Syntax in musical motor acts. What is beyond a pianist's hand?

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Listening to music elicits auditory expectations that are based on music-syntactic knowledge acquired during life. In analogy to perception, expert pianists rely on syntax-driven motoric anticipations during imitation of chord sequences. The present event-related brain potential (ERP) study investigated to what extent these anticipations are driven by musical syntax or over-learned sensorimotor patterns in the motor programming. In the absence of sound, pianists imitated picture sequences of a hand playing chord progressions. The final chord of each progression was manipulated in terms of harmonic function (Syntax congruent/incongruent) and sensorimotor pattern (Fingering correct/incorrect) in a 2 x 2 factorial design, and was presented after a long or short musical context (long/short Context) in order to induce different strengths of syntactic/sensorimotor expectations. Imitation was slower for syntactically incongruent chords, more so in the long context (Syntax by Context interaction), and elicited a late central-posterior negativity, revealing that pianists predicted the final chord based on the syntactic context. The behavioral effect was not abolished (although weaker) in the presence of a fingering violation, suggesting that high levels of motor control (musical syntax in action) take priority over the selection of a specific motor plan for the execution.

Fusiform Face Area in Chess Expertise

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The ability to recognize faces is arguably one of the most important and most practiced skills. The possible functions of the fusiform face area (FFA) also feature these two characteristics. 1) FFA could have evolved into a face specific module due to great importance of face processing. 2) FFA is a general expertise module that distinguishes between individual examples within a single category. Previous studies used stimuli such as cars, birds or butterflies with ambiguous results. Here I use chess, which does not share visible features with faces. The first study shows that chess expertise modulates the FFA activation when complex multi-object chess positions were presented. In contrast, isolated single chess objects did not produce different activation patterns among experts and novices. The second study confirmed that even a couple of isolated objects do not differently engage the FFA among experts and novices. The two studies provide support for the general expertise view of the FFA function, but also extend the scope of our understanding about the function of the FFA. The FFA does not merely distinguish between different exemplars. It also seems to engage into parsing complex multi-object stimuli that contain numerous functional and spatial relations.

Axiomatic examination of duration perception: The exponent of Stevens' Power Function varies under changes of the reference stimulus

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The relationship between the physical intensity of a stimulus and its perceived magnitude can be described by Steven's power law (Stevens, 1956), i.e., a power function with an exponent depending on the sensory modality studied. To be interpreted in a meaningful way, e.g. for making comparisons between modalities, the exponent must be invariant under changes of the reference stimulus used in the experiment. For the perception of short durations, this was tested by empirically evaluating the validity of two mathematical axioms fundamental for this kind of invariance: invertibility and weak multiplicativity of ratio productions (Augustin, 2008). Therefore, $N = 15$ participants were asked to adjust the duration of a comparison tone to specific ratios ($1/3x$, $1/2x$, $1x$, $2x$, and $3x$) of a standard duration (600ms) and to concatenations of ratios as required by the axioms. The results show that even though power function fit the data very well, both axioms were violated in 50% of all tests showing that the exponent depends on the size of the standard and therefore cannot be interpreted in a meaningful way. The results are in line with previous findings on time perception reporting diverging exponents between 0.8 and 1.2 for different standard durations.

Anticipating action effects recruits audiovisual motor representations

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Racket athletes use the sound of racket–ball contact (RBC) when they anticipate the opponent’s actions. Are audiovisual motor representations involved in the simulation of actions during anticipation? In two studies observers were examined with fMRI while watching an opposing player and anticipating the resultant ball flight. Visual information was reduced to point-light displays or stick-figures. Racket and ball were not presented. The RBC had to be inferred from continuous movement kinematics and an abrupt sound. We assumed complementary audiovisual information influences anticipation. In study one a sound was presented complementary to the veracious RBC or at a deviant time point. Participants performed best with complementary stimulation, fMRI data showed higher activation in areas of the action observation network (AON). An association between the behavioral effect and brain activation was revealed specifically in the right ventral premotor cortex. In study two the RBC was either marked by a sound or by a flashing of the figure. No behavioral effects were found. AON areas were activated differently by the marking modality. The middle temporal gyrus seemed to be sensitive to the time lag of auditory stimulation after the inferred RBC. Audiovisual representations of critical events are functionally relevant for reaction-oriented anticipation.

Contrasting Perception and Production of Tonal Stimuli – a follow-up

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The present study is a continuation of a previous one (Bittrich & Blankenberger, 2013) dealing with the dissociation in perception (i.e. identification) and action (i.e. production) of tonal stimuli, a phenomenon that is primarily known from the visual domain (Goodale et al., 1991) but recently also discussed in the auditory domain (Loui et al., 2008; Griffiths, 2008). However, due to methodological shortcomings evidence of the results for the auditory domain remains inconclusive. In our experiment two tones were presented serially and participants had to either sing both tones (production task) or indicate the second tone as higher or lower compared to the first tone (identification task). Task, pitch of the first tone, and the pitch difference within tone pairs were varied within-subjects. For the production task data were analysed with regard to the correct contour production, followed by signal detection analysis. Identification task responses were also analysed with SDT. In both tasks results reveal better performance with increasing semi-tone difference. However, production performance according to the contour criterion exceeded identification performance for small semi-tone differences. This result strengthens a dissociation between production and identification and supports recent findings of auditory perception performance.

Person-recognition and the brain: Merging evidence from patients and healthy individuals

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Recognizing other people is a key skill in social interaction, is it with our family at home or with our colleagues at work. Due to brain lesions or as a symptom of neurodegenerative and psychiatric conditions, abilities in recognizing even personally familiar people are often impaired. The underlying causes in the human brain have not been well understood, yet. Several cognitive and neuroscience models of person recognition propose a hierarchical network in which lower-level sensory processing is followed by modality-specific identity recognition and by access to person-specific semantic information at the highest, multimodal processing level. However, there is relatively little knowledge on how multimodal person-identity recognition is represented in the human brain. We provide a comprehensive review of studies reporting locations of brain damage in patients impaired in person-identity recognition and relate the results to a quantitative meta-analysis based on functional imaging studies investigating person-identity recognition in healthy individuals. By combining evidence from patients and functional imaging studies, we not only identified modality-specific brain areas involved in person-identity recognition from different person characteristics (face, voice, name), but also potential multimodal hubs for person processing in the anterior temporal, frontal, and parietal lobes and posterior cingulate.

Neural basis of object-based shifting of attention in working memory

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Working memory (WM) enables the retention of limited number of items and the prioritization of a subset of items for processing by focusing attention on them. In vision, shifts of attention between spatial positions within one object are performed faster than shifts between positions located on different objects. This within-object benefit can be explained by an automatic spread of attention within perceived object boundaries in visual cortex. Hypothesizing the same attentional mechanisms in WM as in perception, we tested whether the within-object benefit can be observed, both on the behavioral and neural level, when subjects focus attention on spatial positions in WM. Subjects were presented two objects each containing two highlighted spatial positions and memorized all four spatial positions. Attentional shifts in WM were faster for spatial positions located on the same object compared with equidistant positions on separate objects as observed in a perceptual version of the same task. When attention was shifted to a memorized position, activity in early visual areas was enhanced at the retinotopic location corresponding to the second position co-located on the same object. These results extend the hypothesized shared mechanisms of spatial attention in perception and WM by demonstrating this notion for object-based attention.

Ingredients for successful interventions targeting the out-of-home mobility in old age

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Interventions against the decreasing out-of-home mobility in old age have so far met with mixed success. Here we present a conceptual framework for the design of successful interventions. It rests on two principles: (1) Since decreasing mobility is a bio-psycho-social problem, it should be addressed by a combination of biological, psychological and sociological countermeasures. (2) Since performance in standardized laboratory and gym scenarios shows only limited transfer to real life, interventions and assessments should be as everyday-like as possible. Examples are presented to illustrate how both principles can be met through physical or virtual simulations of realistic everyday activities, and through inobtrusive mobility assessments at remote real-life locations.

Binding time: Evidence for binding processes between stimulus duration and auditory stimulus-response events

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Several lines of evidence suggest that during the processing of stimulus-response events, the perceptual and action features of these events become connected via episodic bindings. Such bindings have been demonstrated for a large number of visual and auditory stimulus features like color and orientation or pitch and loudness. Importantly, stimulus-response events typically also involve temporal features like onset time or duration. So far, however, it has never been directly tested, if temporal stimulus features are also bound during the integration of event features into coherent event representations. The present study was designed to investigate possible binding between temporal durations and other features of auditory stimulus-response events. In Experiment 1, participants had to respond with two keys to a low or high pitch sinus tone. Critically, the sinus tones were presented with two different presentation durations. Sequential analysis of RT data indicated binding effects between stimulus duration and the stimulus-response event: Performance was better when both, duration and pitch switched or repeated, and was worse when only one switched or repeated. This finding was replicated with loudness as relevant stimulus feature in Experiment 2. In sum, the results demonstrate that binding also occurs for temporal features of auditory events.

Inter-individual variability in the preference for predictable shocks is linked to differential autonomic responses

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Unpredictable threats typically induce greater anxiety as compared to predictable aversive events suggesting that people should more frequently expose themselves to the latter condition when having the choice. In a novel paradigm in which participants could choose between two shocks with varying temporal predictability, we tested whether this assumption proves true and whether deliberate exposure to predictable or unpredictable conditions varies across individuals. In our study, volunteers had the choice between two options represented by two clock faces. Either a greater or a smaller segment of these clock faces was dyed in yellow indicating the possible time of shock with higher or lower precision. Subsequent to their choice, participants were presented with a running clock which was colored like the clock face chosen. In each trial, one shock was administered and this shock occurred only when the clock hand was within the yellow segment of the clock face. Our results show that there is considerable variance in the frequency of choosing the more predictable alternative across participants. Interestingly, we found that a preference for either predictable or unpredictable shocks resulted in differential autonomic responses (skin conductance and phasic heart rate changes) during anticipation and actual occurrence of the shocks.

Evaluation of cluster analytic approaches for exploratory model specification

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Within the framework of evaluating test items, exploratory factor analysis (EFA) is a widely accepted standard for exploration of test structures. Some researchers (Bacon, 2001; Hunter, 1973; W. Revelle, 1979; Schweizer, 1991) suggested a less popular method for the initial exploratory assessment of psychological tests, which does not follow a latent variable approach - the Cluster Analysis (CA). Nevertheless, none of the hierarchical CA methods, that have been tested so far, can compete with the performance of EFA (Bollmann et al., under review). Furthermore, for item clustering there is no standardised method to determine the number of clusters, that is know to perform well. In this paper, a new k-means approach for clustering of items and a new approach for assessment of dimensionality shall be tested. This is done in a traditional simulation study in which data is generated according to a factor model and different parameters are manipulated. Additionally, the methods are tested in a real world simulation in which sub samples of a personality norm data set are analysed. Results suggest that k-means clustering is a useful alternative to EFA and that it performs better than hierarchical clustering methods.

Briefly presented action scenes activate lexical information

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Visually presented objects or scenes are major parts of spoken word production paradigms. We investigated how rapidly visually presented action scenes, serving as primes, activate semantic and lexical information. In Experiment 1, action-scene targets were preceded by identical, same-action (but different actors), and unrelated action primes presented for 50 ms, 100 ms, or 150 ms. Primes were backward masked. Even the shortest presentation duration resulted in significant facilitation relative to the unrelated condition. A neutral baseline consisting of uninformative picture fragments was added in Experiment 2. Relative to this baseline, unrelated primes resulted in inhibition while identical and same-action primes resulted in facilitation. In Experiment 3, verbs were used as targets instead of action scenes. Again, “identical” prime-target pairs were responded to fastest. Phonologically related but otherwise unrelated pairs caused inhibition relative to the baseline condition. In sum, briefly flashed action scenes provide detailed semantic and even word-form information such that target naming is affected. The data corroborate earlier results that showed how little information is needed for object or scene categorization. They extend these findings by showing that lexical information is activated in a fast and automatic manner.

Sex vs. Food: The reaction of the autonomic nervous system in case of conflict of goals

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The autonomic nervous system (ANS) is rather immune to voluntary cognitive control. In the literature it is often concluded that it acts as a reflex loop that answers a certain stimulation with a hard-wired reaction. In a first study we demonstrated a complex interaction of two different autonomous reactions: the reaction to food stimuli and the reaction to sexual stimuli. These two stimulus categories appeal to incompatible action scripts: Food intake is generally not compatible with sexual activity. We showed that for male participants the autonomous reaction to food stimuli ceased in the presence of simultaneous sexual stimuli. This can be seen as evidence of a regulation performance of the ANS serving goal-directed behavior by preparing only one of two incompatible actions. In further studies we replicated this paradigm and varied it with respect to the salience of the stimuli. Individual ratings were taken into account in order to study the constraints of the decision of the ANS for one or the other incompatible action in detail.

Der FaceReader als Instrument der Emotionsmessung?

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Im Erleben des Menschen wird den Emotionen eine zentrale Rolle zugesprochen. Aufgrund dessen stellen diese seit jeher ein stark rezipiertes Forschungsfeld der Psychologie dar. Als problematisch kann jedoch stets die Frage nach der Messung angesehen werden, da Emotionen wie Trauer, Freude oder Furcht als latente, und damit nicht direkt beobachtbare Variablen gelten. Eine Möglichkeit, diese latenten Konstrukte zu operationalisieren, bietet der FaceReaderTM von Noldus, welcher sich über „facial expressions“ eine objektive Erfassung von Emotionen zum Ziel gesetzt hat. Im Rahmen verschiedener Forschungsprojekte haben wir den FaceReaderTM in drei Bereichen zum Einsatz gebracht und bieten durch diesen Beitrag einen Einblick in die Nützlichkeit dieser Software. Der erste Teil bezieht sich auf den Unterschied zwischen kalibrierten vs. unkalibrierten FaceReaderTM-Daten und diskutiert in diesem Zusammenhang das geeignete methodische Vorgehen bei der Anwendung des Programms. Der zweite Teil befasst sich mit der Emotionserkennung des FaceReadersTM in einem Emotionsinduktions-Experiment. Im dritten Teil steht schließlich die praktische Anwendung der Software im Rahmen einer Laborstudie zur Usability einer Mensch-Maschine-Schnittstelle im Mittelpunkt. Die Betrachtung des FaceReadersTM aus drei Perspektiven ermöglicht eine differenzierte Einschätzung hinsichtlich der Einsatzmöglichkeiten der Software in der psychologischen Forschung.

The Care Penalty in the German Labor Market

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This project examines whether caregivers experience discrimination in the labor market. Children have disparate effects on women's and men's careers. While mothers earn less and have greater difficulties finding jobs than childless women, the effects of children are reversed for men (e.g. Correll et al., 2007). One explanation for this "motherhood penalty" and "fatherhood premium" is that mothers are believed to be more involved in childrearing duties than fathers. But what happens when men deviate from their traditional breadwinner role and actively engage in childrearing? In a first vignette experiment we compare the effects of different lengths of parental leave on the evaluation of fictitious male and female job applicants, with parental leave as an indicator of active caretaking. First results show that in hiring decisions women do not seem to experience disadvantages, whereas fathers with 12 months of parental leave are less likely to get a hiring recommendation than fathers with 2 months of parental leave. Interestingly, these results seem to be driven by rater sex. While male raters do not distinguish between fathers having taken 2 or 12 months of parental leave, female raters advantage male applicants with a short parental leave.

Decision making and Internet addiction: Results from modified Iowa Gambling Tasks

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Background: Individuals suffering from Internet addiction (IA) spend more time online than intended, have a problem to control their Internet use and report craving reactions. They experience a sum of negative consequences in daily life due to the Internet overuse. From a cognitive science perspective, the behavior can be considered as dysfunctional decision making, since behavior linked to short-term benefits is preferred even though that causes negative consequences in the long run. However, the cognitive mechanisms underlying this kind of dysfunctional decision making have not been investigated, so far. **Methods:** Participants (five groups, overall n=200) performed either the original Iowa Gambling Task (IGT), an IGT modified for social networking sites (IGT-SNS) or modified for Internet sex (IGT-IS). In the IGT-SNS and IGT-IS, cue-pictures demonstrating SNS or IS content were displayed on the advantageous and neutral pictures on the disadvantageous card decks or vice versa (between-subjects factor). **Results:** Compared to the original version, decision-making performance was worse when the cue-pictures were displayed on the disadvantageous decks. This effect was linked to symptoms of IA and more pronounced in the IGT-IS groups. **Discussion:** Processing Internet-related stimuli interferes with using feedback from previous decisions resulting in disadvantageous behavior.

Think positive! – Eine deutsche Version des mDES zur Erfassung von Emotionen in der Mensch-Technik-Interaktion

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Im Bereich des subjektiven Erlebens in der Mensch-Technik Interaktion liegt ein Fokus auf der Erfassung von Emotionen (Brave & Nass, 2009). Trotz der hohen Anzahl von Fragebögen, sind nicht alle dieser Instrumente auf ihre Gütekriterien überprüft worden (Minge & Riedel, 2013). Weiterhin betonen viele Instrumente insbesondere negative und vernachlässigen positive Emotionen (Hancock, Pepe, & Murphy, 2005). Um diese Kritikpunkte anzugehen, wurde die erfolgreiche, englischsprachige modified Differential Emotions Scale (mDES; Frederickson, 2013) in die deutsche Sprache übersetzt und deren Reliabilität und Faktorstruktur empirisch, d. h. an einer Stichprobe von N = 95 Studierenden, überprüft. Die Ergebnisse dieser Überprüfung zeigen, dass die bisherige Form des Instruments über einen Zeitraum von drei Monaten hinreichend reliabel ist und dessen Faktorstruktur stabil ist. Die deutsche mDEs-Version hat demnach das Potential ein praktisches Werkzeug für die balancierte Erhebung positiver und negativer Emotionen in der Mensch-Maschine-Interaktion (MMI) zu werden.

Reach trajectories reveal rapid stimulus remapping in tactile decision making

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Touch location is initially coded anatomically, that is, with reference to the skin. To specify a reach target, tactile information is recoded into external spatial coordinates. The time course of this recoding process is under debate. We recorded hand reaches of 14 participants toward tactile and visual targets located at uncrossed and crossed feet. We hypothesized that directional biases in reach trajectories would reveal the availability of spatial coordinates over time: with crossed feet, anatomical information points to the wrong side, whereas recoded, external information points to the correct side. Participants initiated a straight reach and redirected the hand towards a target presented in mid-flight. Trajectories to visual targets did not differ across foot postures, reflecting the external nature of coordinates for visuomotor processing. In contrast, trajectories to tactile targets deviated toward the correct foot later with crossed (206 [8] ms) than with uncrossed feet (161 [8] ms). Thus, external target coordinates were available 45 ms later than anatomical information. These results demonstrate that remapped information is available much earlier than has been previously suggested. We speculate that our reaching paradigm minimizes cognitive control processes and reveals the timing of tactile remapping more precisely than previous paradigms.

The time course of the processing of the uniqueness-PSP of the definite article: Evidence from a self-paced reading study

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The semantic acceptability of a sentence like “Mary saw that the physicist had grown old” containing a uniqueness and existence presupposition (PSP) triggered by the definite article “the” in a given context depends on whether the PSPs are fulfilled within this context. Focusing on the uniqueness presupposition, we investigated the time course of PSP-processing within a self-paced reading time paradigm. Test sentences containing a definite article were preceded by context sentences in which either one unique referent was given or more than one suitable referent was given. The results show an increase in reading times on the definite article in the multiple referent condition in contrast to the single referent condition. This suggests that PSP-processing, and thus context integration, is initiated as soon as possible.

Think aloud protocol data inform cognitive processes of the framing effect

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One of the of the most commonly cited deviations from rational decision making is what has been termed the “framing effect”, i.e., the tendency of being risk-averse when a decision is framed in terms of potential gains and the tendency of being risk-seeking when the decision is framed in terms of potential losses (Kahneman & Tversky, 1979). Yet, despite its propagation, the cognitive processes underlying the framing effect are still unclear. This becomes most evident when trying to get a grip on the effects of mood on the framing effect. Whereas some researchers argue that positive emotions/mood would lead to greater risk-seeking because people become more optimistic about future outcomes and therewith positive emotions/mood shall lead to enhanced framing effects, others argue the opposite. Namely, people in positive states would not rely on external cues such as the phrasing of a problem leading to a tempered framing effect. By using the think-aloud procedure accompanying a framing experiment, we tested the two contradictory assumptions and present results that suggest an again different understanding of the cognitive processes underlying the framing effect.

Manipulations of sensory feedback in tapping tasks affect only central processes of short but not of long intervals: Is there an influence of time perception?

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Human motor abilities allow for precisely timed discrete or repetitive movements. In the case of repeated movements, the notion of a simple feed forward model has been established decades ago (Wing & Kristofferson, 1973). The model assumes that there are two sources of variance: a central timekeeper and a motor delay, which can be derived from the observable variability of tapping intervals. Recent studies suggest that sensory effects also guide repetitive tapping movements. In our current study, we manipulated the tapping interval (short vs. long) and the tactile feedback (contact tapping vs. non-contact tapping). The manipulation of tactile feedback affects central variance only for short but not for long tapping intervals, viz. central variance was enhanced in the non-contact condition. A preliminary explanation for this dissociation may be provided from theoretical concepts of time perception, which assume that the time perception of short intervals (100-500 ms) is rather related to sensory processes and the perception of long intervals (> 500 ms) to cognitive processes. Such an account would nicely agree with our findings in such that we only manipulated sensory parameters. Therefore, the temporal processing rather for short than for long intervals should be affected.

Retinocentric and allocentric processes in multiple object tracking in children

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The current experiment tests the effects of abrupt viewpoint changes on tracking performance of multiple dynamic objects in a 3-D scene. Viewpoint changes have two consequences: displacement of (1) the whole scene and, (2) individual objects; the displacement is larger for objects located further away from the center of rotation. In adults, only the alteration of the scene has a detrimental effect on tracking accuracy, suggesting allocentric processing in cases of large rotations. Developmental research assumes a gradual progression of this reference frame, starting with rather primitive, low-level retinocentric processing. One-hundred twenty participants of five age groups (grade 1, 3, 5, 7 and adults) tracked 1 or 3 targets that moved independently among a total of 8 identical objects for 5s. Viewpoint remained constant or was rotated by 10° or 20° after 3s. Viewpoint changes influenced tracking accuracy. Most importantly, already at age 8 years results showed no significant, detrimental effect attributable to target displacements alone. Taken together, allocentric processing supports attentive tracking across abrupt viewpoint changes early in human development.

Exploring the discrete slot visual short-term memory model

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Visual short-term memory has been described as containing discrete "slots" for storing visual information about objects irrespective of their informational complexity. Rouder et al. (2008) developed a rigorous testing method of this assumption based on a variant of the two-high-threshold model with the inclusion of an attention parameter capturing the deviations from perfect responding when memory capacity is larger than the presented array of objects. Rouder et al.'s (2008) results in terms of a good model fit have not been replicated, and the attention parameter introduced in an ad-hoc fashion has not been validated, yet. The data sets reported here further test the ability of the model to explain the processes in a change detection task.

Spatial determinants and magnetoencephalographic correlates of visible persistence

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In a series of psychophysical and magnetoencephalographic experiments we examined visible persistence (VP) of so-called transient shapes, generated by presenting two matrices consisting of randomly distributed black and white pixels in succession. The second matrix was identical to the first apart from e.g. a circular region, in which randomly selected 50% of dots reversed luminance polarity. This single transient signal gave rise to the perception of a disk setting on abruptly and then gradually fading within roughly one second. We measured the perceived duration of VP and varied the size and thickness of transient annuli, or the diameter and eccentricity of transient disks. We found that thick annuli persisted longer than thin annuli and large disks longer than small disks, irrespective of eccentricity. In an MEG study we exploited trial-by-trial fluctuations in VP duration and compared trials with relatively long and short VP, keeping the stimuli physically identical. The results show higher cortical activation along the visual pathway in trials with long compared to short VP. The differences arise before the hypothetical emergence of conscious perception, suggesting that higher activation does not reflect stronger active maintenance of a percept but merely provides the precondition for longer passive neural reverberation.

The relation between proactive interference in working memory and selective attentional control

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The cognitive processes of selective attentional control and proactive interference (PI) in working memory have been widely investigated separately. We hypothesized that the ability of focusing attention on relevant stimuli while filtering out distractors (i.e. selective attentional control) is related to the ability of minimizing interference on decision making (i.e. control of PI in working memory). Therefore both mechanisms were examined in a sample of 48 participants by using the partial report paradigm of the theory of visual attention (TVA, Bundesen 1990) that allows to measure selective attentional control (alpha parameter) and the Sternberg task (Sternberg, 1966) that allows to measure PI in working memory. Besides the classical PI-effect we also investigated a PI condition with an additional response-conflict (response-conflict PI). The (positive) correlation between alpha and the PI-effect only revealed a statistical trend. However, we found a statically significant negative correlation between alpha parameter and the response-conflict PI-effect. The response-conflict PI revealed also significant positive correlations with measures of IQ, cognitive impairment and working memory. While subjects with higher selective attentional control tend to be better in shielding cognitive processes from interference they seemed to be more impaired if an additional response conflict was induced.

Reward Expectation Influences Audiovisual Spatial Integration

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In the ventriloquism effect, the perceived location of a sound shifts toward the location of a concurrent but spatially misaligned visual stimulus. This effect has been attributed to the higher spatial resolution of the visual as compared to the auditory system. Recently, it has been demonstrated that this cross-modal binding process is not fully automatic, but is modulated by emotional learning. Here we tested whether cross-modal binding is similarly affected by motivational factors as exemplified by reward expectancy. Participants received a monetary reward for precise and accurate localization of brief tones that were accompanied by task-irrelevant, spatially misaligned visual stimuli. Thus, the participants' motivational goal of maximizing their reward was put in conflict with the spatial bias of auditory localization induced by the ventriloquist situation. Crucially, the amount of reward differed between the two hemifields. We found that, compared to the hemifield associated with a low reward, the ventriloquism effect was reduced in the high reward hemifield, even though task-relevant unisensory localization performance was unchanged. This finding suggests that reward expectation modulated the process of cross-modal binding, rather than enhancing unisensory auditory processing. We speculate that this effect was mediated by cognitive control mechanisms associated with the prefrontal cortex.

Valence asymmetries in person memory are mediated by similarity

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Differences in processing of negative and positive information are a ubiquitous phenomenon in person perception and memory. For instance, negative traits are remembered better than positive traits (Skowronski & Carlston, 1989). According to the density hypothesis these differences are caused by differential similarity of positive and negative information, with positive information being overall more similar to other positive information than negative information (Unkelbach, Fiedler, Bayer, Stegmueller, & Danner, 2008). We test the assumption that the lower similarity of negative information is responsible for the memory advantage of negative traits for instance by causing less interference. First, we replicated the memory advantage for negative traits showing that negative traits were discriminated better in a recognition task than positive traits. Subsequently, we tested whether these differences were mediated by similarity. For this purpose, we varied similarity of negative and positive traits orthogonally to valence. As predicted, we found that the memory advantage for negative traits disappeared and an advantage for positive traits emerged when negative traits were more similar to each other than positive traits. These findings uncover the underlying processes of valence asymmetries in person memory.

Technik spielerisch begreifen. Wie ältere Nutzer die Angst vor moderner Technologie verlieren können.

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Die fortschreitende Technisierung der Lebenswelt und der demografische Wandel führen dazu, dass der Anteil älterer Menschen, die sich mit Technik auseinandersetzen, stetig zunimmt. Häufig bereitet die Kooperation zwischen Mensch und Technik jedoch insbesondere älteren Nutzern Probleme. Aus psychologischer Sicht können diese Schwierigkeiten zumindest teilweise darauf zurückgeführt werden, dass aus den zahlreichen Versuchen, mit Technik zurechtzukommen, Erfahrungen von Hilflosigkeit, Berührungängste und Motivationsverluste sowie eine verringerte handlungsbezogene Selbstkompetenz für den zukünftigen Umgang mit interaktiven Technologien resultieren. In einer Kombination aus empirischen Erhebungen und experimentellen Absicherungen wird nun untersucht, ob der Einsatz spielerischer Elemente bei der Gestaltung von Technik geeignet ist, um Motivationsbarrieren älterer Nutzer zu reduzieren und Berührungängste gegenüber interaktiven Produkten bzw. mobilen internetbasierten Diensten wirkungsvoll abzubauen. Im Rahmen einer nutzerzentrierten Befragung mit 80 Teilnehmerinnen und Teilnehmern im Alter zwischen 60 und 80 Jahren wurde zunächst ermittelt, welche spielartigen Gestaltungsstrategien gewünscht und geeignet erscheinen, um bei der Zielgruppe positive und herausfordernde Interaktionserlebnisse zu ermöglichen. In Zusammenarbeit mit Herstellern und Entwicklern mobiler Informationstechnologie wurde aus diesen Ergebnissen anschließend eine prototypische Gestaltungslösung entwickelt, die im Rahmen einer ersten laborexperimentellen Untersuchung sowohl hinsichtlich objektiver Performanzmaße (Schnelligkeit und Genauigkeit) als auch subjektiver Angaben durch die Nutzer (Erleben und Akzeptanz) mit einer Kontrollbedingung verglichen wurde.

Attention-induced lateralization of EEG alpha-oscillations reflects a psychophysical contrast gain effect.

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The brain is never resting; spontaneous neuronal activity is ever-present even in the absence of external stimulation. How does this spontaneous brain activity interact with the processing of visual information? Spontaneous alpha oscillations, as observed with electroencephalography (EEG), have been shown to impair stimulus detection. Voluntary shifts of covert attention induce lateralization of alpha power: power increases in the ipsilateral cortical hemisphere and decreases in the contralateral hemisphere, indicating suppression of distracting information in the unattended hemifield. In this study, we investigated the psychophysical mechanism underlying this effect in an orientation discrimination task using Gabor patches of different contrast levels in combination with an attentional cueing procedure. Compared to a neutral condition, attentional cueing improved discrimination performance and lateralized the power of alpha-band oscillations. However, across single trials, the degree and direction of lateralization was highly variable, sometimes even indicating lateralization directed away from the cued location. Performance was best on trials with strong lateralization towards the cued location, and this improvement was characterized by a contrast gain effect on psychometric functions. Thus, the psychophysical effect of attention-induced alpha-band lateralization is best described as a net increase in visual sensitivity, similar to an actual change in physical stimulus contrast.

How spatial frequencies affect eye movements in natural scenes

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When looking at a scene, we move our eyes several times per second to bring objects of interest into the high-acuity fovea. The fovea is most sensitive to high spatial frequencies and ideally suited for object identification and analysis of details. The peripheral visual field is most sensitive to low spatial frequencies for saccade target selection and rapid reorienting. In several experiments, we investigated how the gaze-contingent attenuation of spatial frequencies affects eye movement behavior during natural scene viewing. Using eye tracking, low- or high-pass filters were applied to the central or peripheral visual field to simulate foveal scotoma or tunnel vision. Gaze-contingent window size and degree of filtering were also varied. Compared with an unfiltered control condition, mean fixation durations increased with foveal high-pass and peripheral low-pass filtering, but were less affected with foveal low-pass and peripheral high-pass filtering. Fixation durations thus increase with processing difficulty only if the information left after filtering is still useful enough. Saccade amplitudes were shorter with peripheral and longer with foveal filtering, indicating a preference for saccade targets in unimpaired scene regions. The effects scaled with window size and the degree of filtering.

Eye tracking evidence of emotional priming of sentence processing and its modulation by age

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We report two visual-world eye-tracking experiments investigating how and with which time course emotional information from a speaker's face affects younger (N = 32, Mean age = 23) and older (N = 32, Mean age = 64) listeners' visual attention and language comprehension as they processed emotional sentences in a visual context. The age manipulation tested predictions by socio-emotional selectivity theory of a positivity effect. After viewing the emotional face of a speaker (happy/sad), participants were presented simultaneously with two pictures depicting opposite-valence events (positive/negative; IAPS) and listened to a sentence referring to one event. Participants' eye fixations on the pictures while processing the sentence were enhanced when the speaker's face was emotionally congruent with the sentence/picture compared to when it was not. The enhancement occurred from the early stages of sentence-reference disambiguation; importantly, it was modulated by age: for older adults it was more pronounced with positive faces, and for younger ones with negative faces. These findings are the first to demonstrate that emotional facial expressions, similarly to previously studied speaker cues such as eye gaze and gestures, are rapidly integrated into sentence processing and provide new evidence for positivity effects in online incremental situated sentence processing.

Saccadic adaptation following a periodic disturbance of visual feedback

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To assess adaptation of saccadic eye movements, we modified a method developed to study adaptation in manual reach movements (Hudson & Landy, 2012). In our experiments, the amplitude of the intra-saccadic step (ISS) followed a continuous sinusoidal variation between -25 and $+25\%$ of the pre-saccadic target step, which itself was drawn randomly from a uniform distribution between 4 and 12 degrees with unconstrained saccade direction. We modeled the saccade gain as proportional to the target ISS with four parameters—an overall frequency, a saccade amplitude gain, a time lag, and a global shift to account for intrinsic hypometria of the saccades. Following a Bayesian approach, we constructed a data-based joint probability; we included uninformative priors to integrate out nuisance variables and, subsequently, we computed posterior probabilities to estimate model parameter values. We show that the gain of saccades follows the ISS with few trials lag albeit with a low degree of completeness. The method is able to extract correctly the slow time-scale of the overall ISS variation—in spite of the high variability in the saccade landing error and low degree of completeness—providing further evidence of fast and sensitive response of global saccadic adaptation (Rolfs et al., 2010).

A formal model of the memory state heuristic

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The recognition heuristic (RH) theory predicts that in binary decisions, if one object is recognized and the other is not, the recognized one is chosen. The memory-state heuristic (MSH) extends the RH by assuming that not recognition judgments per se, but the memory states underlying these judgments will affect choices: recognition certainty, uncertainty, or rejection certainty. The larger the discrepancy in these states the larger the probability of choosing the object in the higher state. The RH paradigm does not allow estimation of the underlying memory states because the true nature of the objects (experienced vs. not experienced) is unknown. To overcome this, we extended the paradigm by repeating the recognition task twice in two subsequent sessions. In line with high threshold models of recognition we assumed that inconsistent recognition judgments always result from uncertainty whereas consistent judgments most likely result from certainty. We fitted two nested multinomial models to the data: an MSH model that formalizes the relation between latent states and binary choices explicitly and an approximate model that ignores the (unlikely) possibility of consistent guesses. Both models fitted the data nicely. As predicted, reliance on recognition increased with the discrepancy in the underlying memory states.

Inattentional deafness in a realistic musical setting

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Inattentional blindness is a well-known phenomenon in cognitive psychology; with the „door study“ by Simons and Levin (1998) being a popular example. Our study replicated this visual effect in the auditory domain by directing attention to a non-relevant sound so that an obvious acoustic event would remain unnoticed. To test inattentional deafness, we manipulated W. A. Mozart’s Sonata for violin and piano (KV 296) in two ways: First, halfway through the piece, the violin was replaced by a flute. Second, we introduced 26 distinguishable manipulations which differed from the original script in the piano part. We investigated if the change from violin to flute was noticed among music professionals (N=18), non-musicians (N=18), and a non-musical control group (N=12). The first two experimental groups were instructed to count the manipulations (their attention was focused on the piano) while the control group was advised to simply listen to the piece (no directed focus of attention). Of the non-musicians, 13% in the experimental group noticed the change, compared to 59% in the control group. These results are in line with previous findings on inattentional blindness. Of the music professionals, all noticed the change; the effects of expertise on attention are discussed.

Perceptual regions of interest for 3D shape derived from shading and texture flows

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Perceiving 3D shape from shading and texture requires combining different, but complimentary, information about shape features extracted from 2D images. Here, we sought to predict specific regions of interest (ROIs) within images – derived from orientation flows – where each cue leads to locally better or worse shape perception. This analysis assesses whether the visual system uses orientation flows to estimate shape. A gauge figure experiment was used to evaluate shape perception for 3D objects with Lambertian shading, isotropic texture, both shading and texture, and pseudo-shaded depth maps. Participant performance was compared to image and scene-based perceptual predictors. Shape from texture ROI models incorporated surface slant and tilt, second order partial derivatives, and tangential and normal curvatures of texture orientation. Shape from shading ROI models included image based metrics, anisotropy of the second fundamental form, and surface derivatives. Results confirmed that, individually, texture and shading are not diagnostic of object shape for all locations, but local performance correlates well with ROIs predicted by first and second order shape properties. In regions that were ROI for both cues, shading and texture performed complementary functions, suggesting a common front-end based on orientation flows locally predicts both strengths and weaknesses of cues.

The pre-attentive discrimination of instrumental timbre and equally complex noise in non-musicians

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There is growing evidence for music-specific networks within the human brain. In this context, most studies have focused on the role of pitch, while neglecting the role of timbre. It has already been shown that the mismatch negativity (MMN), an objective index of pre-attentive auditory discrimination, can be elicited by changes in instrumental timbre. However, it remains unclear whether acoustic stimuli including a harmonic overtone series might be processed differently compared to equally complex noise even at this pre-attentive level. To close this gap, two instrumental tones (saxophone and clarinet) and their spectrally rotated counterparts were presented within a passive oddball paradigm to fourteen adult non-musicians. The MMN was elicited by both stimulus types and the latency was found to be shorter for the instrumental tones compared to the spectrally rotated tones, whereas no difference was observed in the area of MMN. These results indicate that timbre differences in sounds with a harmonic overtone series are processed more efficiently by the human brain than spectral differences in equally complex noise, even at the pre-attentive level, supporting the idea of music-specific networks within the human brain.

Closed-loop control performance and workload in a flight simulator

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In closed-loop control tasks (e.g., flying), the human operator is required to continuously monitor visual feedback, so as to evaluate the consequence of his actions and to correct them according to his goal. A flight simulator environment allows us to evaluate the influence of control challenges such as visual feedback delays and control disturbances without endangering the human operator. In addition, a stable simulator environment allows for more robust eye-movement and physiological recordings, which would be difficult to obtain in an actual test-flight. Eye-movement recordings can reveal the aspects of visual information that is relied on for the execution of certain maneuvers. Meanwhile, electrophysiological recordings for heart-based and skin conductance activity as well as EEG can reflect aspects of operator workload. My talk will present work on how visual feedback visualization and latency influences both control performance and workload. This will exemplify how control behavior in a flight simulator differs from that of a comparable compensatory tracking task. In doing so, I will convey the benefits and technical challenges involved in performing behavioral studies in a fixed-base flight simulator that is suitable for evaluating closed-loop control performance, eye-movement behavior and physiological recordings.

Age-related performance differences in multitasking: Evidence from the task switching and the PRP paradigm

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In the present study, we examined cognitive control processes involved in multitasking, using two distinct but closely comparable experimental designs that were developed on the basis of the task switching and the PRP paradigm. Special emphasis was placed on the comparison of multitasking costs shown in these two paradigms. Moreover, it was investigated whether the magnitude of these paradigm-specific multitasking costs is modulated by age-related changes in cognitive functioning. A within-subjects comparison revealed a weak and non-significant correlation between these two types of multitasking costs, indicating that the processing in both paradigms might rely on different cognitive control mechanisms. Moreover, only multitasking costs resulting from the task switching paradigm (“alternation cost”) were found to increase with age. This suggests that the effectiveness of cognitive control processes enabling rapid switches between (at least) two tasks is influenced by age-related cognitive decline, whereas simultaneous processing, such as that required in the PRP paradigm (dual-task cost), is less affected by age.

Right inferior frontal junction and right anterior insula form the core network for inhibitory control – evidence from an ALE meta-analysis

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Flexible, adaptive control of behavior requires the ability to voluntarily inhibit or change established automated actions. To investigate the core neural correlates of inhibitory control, we performed a coordinate-based meta-analysis by using the revised Activation Likelihood Estimation (ALE) algorithm. In total, 173 go/nogo, stop signal, stroop and spatial interference tasks were included, which are all tasks which require participants to either withhold a prepotent action or inhibit an automated response in favor of a task-dependent one. The main effect across all experiments, independent of task, revealed a broad bilateral fronto-parietal network consisting of anterior insula (al) and adjacent inferior frontal gyrus, the dorsolateral prefrontal cortex, dorsal premotor cortex and the intraparietal sulcus extending into the superior parietal lobe as well as the right temporoparietal junction and the left inferior occipital gyrus. The right al and the right inferior frontal junction however, were the only two regions showing consistent involvement across all individual task types as revealed by a minimum conjunction analysis. We would hence suggest that these two regions form a core network for higher order monitoring processes of inhibitory control, while other frontal and parietal regions are associated more specifically depending on the specific task demands.

New insights on health preferences in non-Western populations

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Most studies on the perception of health are conducted in Western, educated, industrialized, rich and democratic societies. For this study, we tested health preferences in a group of 66 urban and 56 rural black African participants in South Africa. Using real photographic stimuli, we produced six facial and six body transforms ranging in associated body mass index (BMI; weight scaled for height) from 17kg/m² (underweight) to 32kg/m² (obese). Participants were asked to indicate which facial and body image they consider optimally healthy. Rural participants preferred a significantly higher optimum BMI compared to urban participants — whose optimum BMI preferences were in line with Western populations. The participants' sex, age and own BMI did not significantly affect their optimum BMI preferences, but we did observe a significant interaction between sex and location. Urban men and women strongly agreed on what constitutes a healthy BMI, while rural women preferred a significantly higher BMI compared to rural men. These findings shed new light on health preferences in non-Western populations, thereby contributing to a more global understanding of human health preferences. Findings are discussed in light of socio-economic, media exposure and pathogen prevalence differences between the urban and rural populations.

The reliability of cognitive control functioning: Time-of-day effects on cognitive control depend on task complexity

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We investigated the vulnerability of cognitive control functioning to variations in individual daytime optima. While previous studies on the influence of daytime effects on cognitive control have revealed a rather inconsistent picture, we specifically implemented a task that allowed for a quantitative approach investigating cognitive control. 34 extreme/moderate morning and 34 extreme evening chronotypes performed the Majority Function Task in their individual daytime optimum vs. disoptimum on two consecutive days. We systematically manipulated the amount and content of informational input, thus, implementing a parametrical manipulation of computational load. Results showed an overall effect of daytime optimum, especially pronounced for extreme evening types. Furthermore, and irrespective of chronotype, the detrimental influence of individual daytime disoptimum on task performance increased with increasing computational load, and thus, with heightened levels of cognitive control demands. At the same time, while performance was influenced by increases in perceptual load, no interaction with individual variations in daytime optima was observed. These findings highlight the role of individual variations in daytime optima on the reliability of cognitive control functioning. Furthermore, the present quantitative approach allowed for a clearer specification of the relation between daytime variations and different forms and amounts of cognitive control involvements.

Eating to stop: Tyrosine supplementation enhances inhibitory control but not response execution

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Animal studies and research in humans have shown that the supplementation of tyrosine, or tyrosine-containing diets, increase the plasma tyrosine and enhance brain dopamine (DA). However, the strategy of administering tyrosine (and the role of DA therein) to enhance cognition is unclear and heavily debated. We studied, in a healthy population, whether tyrosine supplementation improves stopping overt responses, a core cognitive-control function. In a double-blind, placebo-controlled, within-subject design, one hour following the administration of tyrosine (corresponding to the beginning of the 1h-peak of the plasma concentration) or placebo, participants performed a stop-signal task—which taps into response inhibition and response execution speed. Participants in the tyrosine condition were more efficient in inhibiting unwanted action tendencies but not in reacting to go signals. This is the first demonstration that the supplementation of tyrosine selectively targets, and reliably improves the ability to stop overt responses.

The effect of ‘active’ versus ‘passive’ auditory-motor synchronization on attention allocation: a P300 study.

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In a recent study (Schmidt-Kassow et al., 2013) we showed that auditory-motor synchronization (i.e. ergometer bicycling in time with tone presentation) enhances attention allocation to auditory stimuli. In the current study, we investigate whether this effect resulted either from the active process of synchronizing one's movements with an external stimulus, or from the result of this process, i.e. the synchronized arrival of stimuli at a particular phase of the movement. Therefore, participants listen to tone sequences and are asked to silently count rare deviant tones that differ in sound frequency from the standard tones. They do so a) during a physically inactive control condition and b) while pedaling on a cycling ergometer. In the cycling condition, they are either asked to actively synchronize with stimulus presentation ('active' synchronization) or stimuli are adaptively presented in synchrony with their leg movements, i.e. they cannot help but moving in time with stimulus presentation ('passive' synchronization). We hypothesize (1) a larger P300 in the 'active' condition if active extraction of the temporal structure of a stimulus stream is relevant for attention allocation or (2) a larger P300 for the 'passive' condition if the state of auditory-motor synchrony is more relevant for attention allocation.

Delayed pointing in a pure case of ventral pathway damage

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The so-called perception-action model (PAM) postulates two visual systems. A dorsal pathway from early visual areas to posterior parietal cortex processes information for the control of action whereas a ventral pathway from early visual areas to inferotemporal cortex serves the transformation of visual information for perception. One postulation of the PAM was that the ventral pathway plays an essential role for the guidance of delayed movements to memorised targets. Unfortunately, this assertion was only tested in patient DF who not only suffered damage to the ventral pathways but also considerable damage to the dorsal system bilaterally. We investigated a stroke patient (HWS) with a unilateral lesion in the ventral pathway who showed lateralised symptoms of visual agnosia. HWS showed accurate immediate reaching towards a visible peripheral target. However, introducing a delay between stimulus presentation and motor response, HWS was noticeably less accurate in his contralesional hemisphere compared to age-matched healthy controls. This observation not only confirms previous findings but allows for a clear attribution of a deficit in delayed reaching to the ventral stream since HWS suffered from a first-time unilateral stroke resulting in a circumscribed lesion to the occipital-temporal cortex in the right hemisphere.

Inferenzstrategien in Gebäuden

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Was erwartet mich hinter der nächsten Ecke eines Korridors? Welche Erwartungen und Hypothesen entwickeln Menschen bezüglich der Gebäudegeometrie, wenn sie nur einen Teil davon exploriert haben? Unsere Versuchsteilnehmer erleben jeweils zehn verschiedene Situationen, bei denen sie durch Teile eines virtuellen Gebäudes gefahren werden. Jede Exploration endet kurz vor einem Korridorabzweig. Die Versuchsteilnehmer entscheiden zwischen zwei dargebotenen Bildern, welches die wahrscheinlichere Fortsetzung des Korridors darstellt. Die Antwort wird auf einer kontinuierlichen Skala abgebildet, und erlaubt die Messung von Reaktionszeit, Entscheidung und Unsicherheit bezüglich der Entscheidung. In einem Teil der Trials wird erhoben, wie gut Probanden aus ihrem bestehenden Wissen Annahmen über unbekannte, aber logisch erschließbare Korridor-Fortsetzungen deduzieren können. Die dafür präsentierten Ansichten bestehen aus einer logisch korrekten und einer falschen Fortsetzung. Weitere Trials überprüfen, welche Strategien die Erwartungen der Probanden leiten, wenn eine Deduktion aus dem bestehenden Wissen nicht möglich ist. Mittels Fragebögen erheben wir die Fähigkeiten im räumlichen Denken und die Selbsteinschätzung des Orientierungssinnes der Teilnehmer. Wir gehen davon aus, dass in der Auswahl Raumstrukturen präferiert werden, welche symmetrisch zu bekannten Gebäudeteilen sind, oder dass abgeschlossene, verbindende Geometrien gegenüber offenen Formen bevorzugt werden. Wir erwarten, dass die gewählten Strategien von individuellen Fähigkeiten im räumlichen Denken und Orientierung abhängen.

Unilateral hand-contractions and their effects on the EEG alpha rhythm

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Background: Electroencephalogram (EEG) studies have shown that repetitive unilateral hand-contractions induce the dominance of extended regions in the contralateral hemisphere during their execution. This dominance has been assumed to underlie differential effects produced by each hand over performance in diverse tasks that are carried subsequently to the contractions. However the brain state after termination of the contractions has not yet been assessed to support this assumption. Methods: We recorded EEG from 20 right-handed participants (9 male) during baseline, right and left hand-contractions, and their respective post-contraction periods. The amplitude of the alpha band (8-12 Hz), and its asymmetry ratio were obtained to compare homolog pairs of electrodes, and regions of interest at each side of the scalp. Results: Alpha amplitude increased dramatically after contractions with the left, but not the right hand. During contractions, both hands produced a significant decrease in alpha activity. Asymmetry ratios did not show a clear pattern. Conclusions: Our data suggests that the behavioral effects produced by unilateral hand-contractions may result from a differential effect on the brain state induced by each hand after their termination. Enhanced alpha activity produced by the left hand implies a cessation of cognitive activity, which may facilitate subsequent task engagement.

The role of global properties in the recognition of natural scenes with increasing Time-on-Task

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Observers are able to recognize natural images accurately and rapidly with minimal attentional effort, but little is known about the process mediating this effortless recognition. It has been proposed that observers can minimize attentional effort by analyzing the spatial-functional cues of natural scenes (global properties) such as openness, depth etc. Mental fatigue induced by ToT compromises attention in many aspects but the detection of global properties has been found to be insensitive to fatigue. Therefore, ToT can be a potential paradigm to investigate the effect of compromised attention on natural scene recognition. Furthermore it can be predicted that a global property based recognition will be insensitive to the detrimental effects of fatigue. We tested this prediction by an experiment in which participants (N = 21) performed a Go/NoGo task for 2.5 hours. RT, accuracy, and subjective fatigue were recorded. Stimuli were images from 5 natural scene categories. The magnitude of 7 global properties was determined for each image in a separate rating experiment. Results indicated a decline in performance with increasing ToT, and a significant effect of global properties on performance. In addition, supporting the prediction, the role of global properties in scene recognition remained unchanged with increasing ToT.

Interaktion basierend auf Folgebewegungen des Auges

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Die Eingabe über den Blick ermöglicht nicht nur eine berührungslose und dadurch hygienische Interaktion mit technischen Geräten, sondern schützt bei der Eingabe von Passwörtern und Geheimzahlen auch vor neugierigen Blicken auf das Tastenfeld. Trotz dieser Vorteile haben sich blickbasierte Systeme bisher wenig verbreitet. Die Gründe dafür liegen unter anderem im Kalibrierungsbedarf des Systems vor einer Interaktion und der häufigen versehentlichen Auswahl von Bedienelementen bei den gängigen Interaktionen über eine verlängerte Verweildauer und durch willentliches Blinzen. Innerhalb einer experimentellen Untersuchung wurde die PIN-Eingabe über eine neuartige Blickinteraktionsform, die auf Folgebewegungen des Auges auf sich bewegenden Displayelementen basiert, getestet. Dabei wurde die jeweils vom Blick verfolgte Zahl ausgewählt. Innerhalb einer Voruntersuchung wurde mittels Fragebogendaten eine einfache und angenehme Gestaltung des dynamischen PIN-Displays abgeleitet. Um einen geeigneten Algorithmus für die Interaktion zu finden, wurden die Blickdaten von 18 Probanden analysiert. Der entwickelte Algorithmus basiert auf einer Erkennung von Relativbewegungen, um möglicherweise auf eine Kalibrierung des Systems verzichten zu können. Innerhalb eines Haupttests wurde der Algorithmus an 24 Probanden, von denen nur die Hälfte nach dem herkömmlichen Verfahren kalibriert wurde, validiert und gleichzeitig die User-Experience erfasst. Sowohl bezüglich objektiver sowie subjektiver Daten konnten überzeugende Ergebnisse für beide Gruppen gefunden werden.

Motor imagery of a bimanual movements

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People perform symmetric bimanual movements faster than asymmetric ones (motor constraints) and react faster when moving to similar than to dissimilar targets, regardless of bimanual pattern (cognitive constraints, Weigelt et al., 2007, Psychological Research). In the present study we investigated whether those constraints are also observed in motor imagery. 24 students performed bimanual symmetric and parallel movements from starting positions near the body to two of four possible targets located away from the body to the right and the left of the starting positions. Two symbolic cues (circles and crosses) were assigned to the target locations either in a left/right or inner/outer fashion, dissociating coordination patterns from cue similarity. Participants performed four conditions: Execution, Lift from start buttons (requiring planning and imagination of the movement), lift from start buttons and press of start instead of target buttons (imagined movement), and press of start instead of target buttons (imagined lifting and movement). Results show that bimanual movements were faster to same than to different targets. Further, imagination durations were always longer than execution durations. In conclusion, bimanual coordination constraints are equally represented in motor imagery and actual movements.

Using self-reports to grasp the phenomenology of insight problem solving

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Insightful problem solving is a vital part of human thinking, yet difficult to report on consciously. Since there is no clear behavioural marker for the occurrence of insight, recent studies often rely on the “Aha! experience” as subjective classification criterion for solving a problem with or without insight. However, the concept of Aha! is rather vague and relies on face validity. We aim to systematically explore the phenomenology of Aha! by breaking it down into five previously postulated dimensions. As a new approach, 34 video clips of magic tricks were presented to 50 participants who had to find out how the magician accomplishes the trick, and to indicate whether they had experienced an Aha! during the solving process. To obtain a detailed characterization of individual Aha! experiences, participants then had to perform a comprehensive quantitative and qualitative assessment which was repeated after 14 days to control for its reliability. 41% of solutions were accompanied by an Aha! experience. The quantitative assessment remained stable across time in all five dimensions. We demonstrated that despite their subjective character, self-reports about the Aha! experience are reliable and therefore it is justified to use them as an indicator for insightful problem solving.

Retinotopic priors for eyes and mouth in face perception and face sensitive cortex

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Gaze patterns towards faces typically concentrate in a region that stretches vertically from mouth to eyes (van Belle et al., 2010). This implies a retinotopic bias— eyes will appear more often in the upper than lower visual field and vice versa for mouths. Is this bias reflected in perceptual sensitivity? In a behavioral experiment, we tested recognition performance for isolated eyes and mouths. In each trial, participants (n=18) saw a brief image of a single eye or mouth, accompanied by a noise mask. Recognition performance was tested in a match-to-sample task and, crucially, as a function of retinotopic stimulus location. Results provided strong evidence for the predicted feature by location interaction ($F=21.87$, $p<0.001$). Recognition of eyes was significantly better for upper vs. lower visual field locations ($t=3.34$, $p<0.01$) while the reverse was true for mouth recognition ($t=3.40$, $p<0.01$). Preliminary results from an fMRI experiment (n=21) indicate a similar effect for face sensitive cortex. Eye vs. mouth images could be separated based on evoked activity patterns. Importantly, pattern separability was better for the canonical vs. reversed stimulus locations in right inferior occipital gyrus ($t=2.20$, $p<0.05$) and a similar trend was observed for right fusiform face area ($t=1.92$, $P=0.07$).

Classification of yes and no and responses with the left and right hand: A compatibility effect

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Recent investigation has hinted at a compatibility effect for the classification of the words yes / no and movement direction on a sagittal plane, which is interpreted as evidence for an embodiment of yes and no. A different line of research has found evidence for the association of positive and negative valence to the dominant and non-dominant hand. We investigated whether a compatibility effect when classifying yes and no emerges for the dominant and non-dominant hand. Right-handed participants classified the words yes and no by responding with their right or left hand. Shorter response times showed for classification of yes with the right hand, and for classification of no with the left hand. We discuss this compatibility effect between yes / no and the dominant versus the non-dominant hand within the embodiment framework, as well as in relation to the polarity correspondence hypothesis.

Assessing a bilingual advantage in a multilanguage context - a Swiss study

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In most published studies, bilingualism is found to benefit executive functions. In our study we assessed four groups of participants, matched for age and education in the German speaking part of Switzerland and Germany. The four groups comprised a bilingual Swiss group, a monolingual Swiss group, an immersion Swiss group who attended high school in two languages and a monolingual German group. All participants were tested on a working memory capacity (WMC) battery, a number Stroop task and a task switching paradigm. Furthermore, we assessed intelligence, language usage and competence. By using Bayesian statistics we found substantial evidence for the model which assumes no differences between groups for the Stroop task, IQ and the WMC sum score as well as the sub-tests operation and sentence span. For task switching and memory updating, only scarce evidence in favor of the hypothesis was found. We conclude that the assessment of bilingual advantages in Europe may suffer from the close proximity of different languages and the overall good performance of young adults being at the peak of their cognitive abilities.

Semantic context effect: due to semantics or visual input? Evidence from a memory-based monolingual and bilingual semantic blocking task

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In semantic blocking, pictures or written words are presented in blocks of semantically-related items or blocks of unrelated items. Pictures in a related context are usually named slower than pictures in an unrelated context. This semantic context effect is presumably evoked by continued (co-)activation of lemmas in the same semantic category, which induces competition among these items. Yet, this effect could also be due to larger visual similarity between items of the same semantic category. Two experiments were conducted using semantic blocking with words that had to be memorized and produced in a fixed sequence, therefore no visual information is presented. Experiment 1 required production of memorized words in pure first language and pure second language blocks, whereas in Experiment 2 memorized words had to be produced in mixed language blocks. A semantic context effect was observed in mixed language blocks, but not in pure language blocks. This indicates that visual similarity probably does not cause the semantic context effect, since it was found in an experiment without visual input. The difference between the two experiments was interpreted in terms of different information storage (semantic-lexical information in mixed blocks vs. phonological information in pure blocks).

Metacognitive Monitoring and Control in 6-year-olds: The role of under- and overestimation

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To be able to monitor (e.g., how sure am I that a given answer is correct?) and control (e.g., which items should I learn more?) ongoing cognitive activities and to judge one's performance accurately seems to be of relevance not only for learning and achievement in academic contexts but also in everyday life. Consequently, the goal of the current investigation was to take a closer look at individual differences in 6-year-olds in a metacognitive monitoring and control task. The sample consisted of 93 6-year-olds, instructed to learn the meaning of Japanese characters for later recognition. For analyses, children were split into three groups (under estimators, realists and over estimators), based on their performance estimation accuracy. Participants' age, non-verbal IQ, vocabulary skills and SES served as control measures. Results shows that the three groups differed significantly in their monitoring and control skills, even after controlling for the stated measures, with under estimators showing better performance and being more accurate than the others. Results call for a more differentiated examination and discussion regarding individual differences in metacognitive abilities in children.

Using JavaScript to detect cheating in online tests

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The validity of unproctored online tests is threatened by participants who decide to cheat when stakes are high. To address this problem, we developed PageFocus, a JavaScript determining whether participants leave a test page to pursue other activities such as looking up the solution to a test item. As a validation of the script, 541 members of an online panel participated in an experiment presenting 10 test items that could easily be looked up using a search engine (general knowledge questions), as well as 10 items for which the solution could not easily be looked up on the Internet (a logic test based on matrices). The incentive to cheat was varied experimentally in three steps: In a first group, participants received a monetary reward only when they performed well enough in the test; in a second group, participants were rewarded regardless of their performance on the test; and in a third group, no incentive was offered. The PageFocus script revealed that participants cheated more when performance-related incentives were being offered. As expected, this effect was however limited to those items for which it was possible to look up the solution using a search engine. Cheating participants achieved higher scores.

Validität von Prototypen in der nutzerzentrierten Gestaltung

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Wichtiger Bestandteil nutzerzentrierter Technikgestaltung ist die frühe Evaluation des Nutzererlebens anhand von Prototypen. Prototypen sind vereinfachte Repräsentationen eines Produkts oder dessen Teilaspekten, von abstrakten Darstellungen erster Ideen bis hin zu konkreten, greifbaren Artefakten. Sie erlauben schon in frühen Phasen des Produktentwicklungszyklus Einschätzungen des Erfolgspotentials. Voraussetzung hierfür, ist jedoch ein in Hinblick auf die Evaluationsfragestellung valider Prototyp, der die Konzeptidee hinreichend vermittelt. Ohne dies können Studienteilnehmer kein sinnvolles Feedback liefern und Evaluationsergebnisse werden verfälscht. Eine experimentelle Studie (N=370) untersuchte die Validität von Prototypen in der Konzeptevaluation am Beispiel von fünf Repräsentationsformen unterschiedlicher Reichhaltigkeit. Manipuliert wurden die Faktoren Bebilderung (textuell vs. bildhaft), Dynamik (statische vs. bewegte Bilder) und Abstraktionsgrad (gezeichnet vs. realitätsgetreu). Reduzierte Darstellungen zeigten sich als vielversprechend. Sie lieferten umfangreiche Einsichten in das Nutzererleben (z.B. adressierte Bedürfnisse) und waren in der Anregung zur Auseinandersetzung (z.B. vermittelte Emotionalität, Motivationspotential) teils sogar überlegen. Als zentrale Herausforderung zeigte sich die Kommunikation der Grenzen des Prototyps: hinsichtlich welcher Dimensionen (z.B. visuelle Gestaltung, Interaktion, Funktionsumfang) zeigt der Prototyp bereits konkrete Gestaltungsvorschläge, wo stehen bislang noch Platzhalter? Bleibt dies unklar, richten Teilnehmer ihre Aufmerksamkeit auf die falschen Details und zentrale Evaluationsfragen bleiben unbeantwortet. Ein weiteres Ergebnis ist eine Reihe allgemeiner Leitfragen und Heuristiken zur Auswahl valider Prototypen.

Representing the Hyphen in Action-Effect Associations: Automatic Integration of Time Intervals into Cognitive Action Structures

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This study examined whether a temporal interval between an action and a sensory effect is integrated in the cognitive action structure. In three experiments, participants learned to associate actions with specific acoustic effects (high and low tones). In a following test phase, the tones were presented as go-signals in a free-choice test (Experiment 1) or as imperative stimuli in a forced-choice test (Experiment 2). Free choice responses showed a preference for tone-consistent responses, and at the same time, a delayed initiation of consistent responses. In contrast, in the forced-choice test, participants responded faster to tones that were consistent with previously acquired action-effect associations. To account for these findings, it is assumed that retrieval of temporal information slows down response initiation. In Experiment 3, response-contingent effects were presented with a long or short delay after a response. Reaction times in a forced-choice and free-choice test were faster in the short than in the long interval condition. The results show that temporal information about the interval between actions and effects is integrated into a cognitive action structure and automatically retrieved during response selection.

Architectural models in decision making: modeling cue-based heuristics in ACT-R

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Successful interdisciplinary work depends on fields mutually informing and constraining each other and, as a consequence, significantly reducing the number of plausible solutions to a problem that must be considered. The ‘adaptive toolbox of heuristics’ theory of decision-making holds that cognition is a collection of heuristics, or rules of thumb, each adapted to a niche of the environment. Testing toolbox theories consists, firstly, in examining the plausibility of the single ‘tools’ in the toolbox, and, secondly, identifying the tool selection mechanisms. Our interdisciplinary investigation of the ‘adaptive toolbox of heuristics’ aims at further constraining and specifying decision strategies within the well-developed integrated theory of cognition ACT-R. In the current work we focus on building cognitively plausible process models of three cue-based decision strategies from the adaptive toolbox – the take-the-best and tallying heuristics, and the complex integrative weighted-linear model. We developed the instruct paradigm to identify the response and response time patterns associated with a strategy, which together with the collected memory information will allow us to identify the correct implementations of all three decision strategies as cognitive models within ACT-R.

Disentangling word reading processes of incongruent and congruent stimuli in the classical Stroop task

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In a seminal study, Lindsay and Jacoby (1994) applied the process dissociation procedure to dissociate word reading and color naming processes in the classical Stroop task. As they relied on the invariance assumption (different contributions of color naming and word reading processes are assumed to occur with equal probabilities in inclusion and exclusion conditions, i.e., in congruent and incongruent trials), word reading and color naming parameters were not estimated separately for congruent and incongruent trials. Moreover, separate parameters could not be estimated in their paradigm due to the limited number of equations. However, it seems plausible that at least word reading processes of congruent and incongruent stimuli differ because word reading is only helpful in congruent trials. In a first experiment, we extended Lindsay and Jacoby's paradigm to estimate separated word reading parameters for congruent and incongruent trials. In fact, we found a violation of the invariance assumption: As expected, the word reading parameter of congruent stimuli turned out to be larger than the word reading parameter of incongruent stimuli. In two further experiments, we examined the nature of the word reading parameters by applying a cognitive load manipulation and a manipulation of legibility of Stroop words.

Making a low-budget eye tracker

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In our research, we attempted to make a low-budget eyetracking device. The first step in building an eyetracker was to construct a prototype. Pair of safety glasses were repurposed into a headgear. The lenses from the safety glasses were removed. Also, we used two cameras to build an eyetracking device – one eye camera, which was equipped with six LED diodes, later replaced with two IR diodes; and one scene camera. The important thing was to adjust our IR diodes to the proper voltage, which we managed to do by using 2 resistors and making a short circuit. In order to get less illumination and protect the pupils from the infrared light, we assembled eye camera with a homemade IR filter. After making a prototype, we tested it in ExpertEyes software and calculated the accuracy of eye tracker. The results showed the accuracy of this device is 1.5 degrees. After testing prototype, we decided to print out the headgear for device using a 3D printer. First, we modeled the frame casings for cameras in Catia and then printed it out with a monochromatic 3D printer. Later, we used eyetracker in a research about forming patterns in biological motion perception.

Stereotype Effects in Cross-cultural Cooperation: A multi-national investigation

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According to theories of social interactions, the tendency to cooperate is dependent on beliefs about the opponent's cooperation behavior that are based on naïve theories of how individuals and specific groups operate. In three comprehensive studies involving 2368 participants from ten different countries we show that (a) people have shared beliefs (stereotypes) regarding the cooperation behavior of people from various cultures, (b) these stereotypes are shared by persons from different countries, and (c) these stereotypes influence persons' tendency to cooperate in cross-cultural interactions although they do not fully reflect reality. A first study involving participants from the US shows that information concerning the opponent's country of origin systematically influences persons' beliefs and tendency to cooperate in a hypothetical one-shot Prisoner's Dilemma Game. In a second, incentivized study we show that stereotypes or naïve theories concerning the cooperativeness of different countries are shared across nations. Finally, in a third study we demonstrate the stability of our findings using population-representative samples and show that stereotypes do only partially reflect average cooperativeness of nations.

Temporal and Spatial integration windows: the case of Vernier Fusion

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The visual system constructs a percept of the world across multiple spatial and temporal scales. This raises the question of whether different scales involve separate integration mechanisms and whether spatial and temporal factors are linked. We investigated this using Vernier Fusion, a phenomenon in which the features of two successive Vernier stimuli are fused into a single percept. With increasing spatial offset, perception changes dramatically from a single percept into apparent motion and later, at larger offsets, into two separately perceived stimuli (Scharnowski et al., 2007). The paradigm consisted of two successive Vernier stimuli presented at varying spatial (0.5-3') and temporal (0-200ms) offsets. We found the type of percept to interact with both spatial and temporal parameters, transitioning from "single" at short intervals through "motion" to "double" at long intervals. The size of the perceived spatial offset varied systematically with temporal offset; subject estimates peaked at 30-40ms ISI. We found systematic indications of spatial fusion even on trials in which subjects perceived temporal segregation. These findings imply that spatial integration/fusion may occur even when the stimuli are perceived as temporally separate entities, suggesting that the mechanisms responsible for temporal segregation and spatial integration may not be mutually exclusive.

To fly or not to fly? The automatic influence of negation on spatial simulation processes during sentence understanding

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To date, converging evidence suggests that language understanding is closely coupled with sensorimotor processes. Here we investigated whether negation is automatically integrated in these simulation processes during language understanding. Participants read sentences describing entities either in an upper or lower location (e.g., “The kite flies in the sky”) or their negated counterparts (e.g., “The kite does not fly in the sky”). Subsequently, a colored dot was presented in the center of the screen, and participants responded by an upward or downward arm movement according to the color of the dot. In line with previous studies, responses were faster in conditions in which the response direction matched rather than mismatched the meaning of the location word in the sentence (e.g., an up response after reading a sentence mentioning “sky” compared to a sentence mentioning “ground”). However, importantly the negation operator modified this interaction between the location words and the response direction. These results suggest that participants automatically integrated the negation into their simulations during sentence comprehension. Implications for the simulation view of language understanding will be discussed.

How the "Rest" Affects "Take the Best" - And What Decision Times Can Tell us About it

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Take the Best (TTB) is a non-compensatory decision strategy that has been shown to work well in situations where one has to decide which of two alternatives scores higher on a criterion, and where the probabilistic relations between different cues and the criterion (cue validities) are known. According to TTB, the cues are sequentially processed in descending order of their validity (search rule); if a cue discriminates between the alternatives, search terminates (stopping rule) and a decision is made, implying that subsequent cues of lower validities are ignored and should not affect decisions. In the present experiment, we measured decision latencies to investigate effects of manipulating a) the validity of the first discriminating cue and b) whether subsequent cue values converged or conflicted with the first discriminating cue. In line with the TTB search rule, the lower the validity rank of the first discriminating cue was, the longer it took Ss classified as TTB-users to make their decisions. Contrary to the stopping rule assumption, however, TTB-users were slower when cue values following the discriminating cue pointed into the opposite direction as compared to the same direction, suggesting that TTB-users are not completely ignorant of additional information from subsequent cues.

Two Sequences, One Code: How interference in implicit learning can be overcome by changes in action coding

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In implicit learning, it is by now widely accepted that several contingencies can be learnt in parallel via unidimensional, encapsulated modules (Keele et al., 2003). If two sequences rely on the same dimension, interference occurs. But does this interference occur automatically whenever two such contingencies are present in the environment? Newer approaches stress the role of action coding in implicit learning (Gaschler et al., 2012). The task set determines which stimulus- and response dimensions are bound into the representation of an action. Only these dimensions should interfere whereas irrelevant dimensions should not. In the current study, participants received a spatial stimulus location sequence together with an uncorrelated spatial response location sequence. Importantly, the latter sequence could either be coded in terms of response location or in terms of the color of the to-be-pressed keys. Thus, interference between stimulus and response locations could be avoided if the participants were induced to code their responses by color. The results show that the stimulus location sequence could only be learned if the concurrent response location sequence was coded by color. If both sequences drew on the same location-code however, only the response location sequence could be learned.

Influence of Verbal Instructions on Automatic Acquisition of Action-Effects

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According to modern ideomotor theory, people incidentally acquire bidirectional associations between movements and their effects and then use these associations for goal-directed action. Our experiments examined whether verbal instructions that direct attention to the response effects and/or that inform about a contingency between responses and sensory effects affect response selection without prior acquisition phase. Results show that instructed contingency knowledge is sufficient to produce a congruency effect in a test phase, even when participants are instructed to ignore the response-contingent effects. These results show that contingency knowledge acquired through verbal instructions can affect response selection in a similar way like contingency knowledge acquired through direct experiences in a learning phase.

Stretching the boundaries of linguistic context: How our mood enriches comprehension

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I will discuss behavioral, EEG and recent fMRI research my colleagues and I have conducted showing how language processing is strongly affected by people's mood. On the basis of these findings I argue that happy and sad moods function as a context that shapes integration during discourse comprehension in a way that fundamentally changes what is considered as consistent content. I first review behavioral research showing that when people read logically consistent endings, happy people still judge positive endings as more consistent, while sad people judge negative endings as more fitting. An EEG study showed that mood primarily affects integration of (logically consistent) negative information: N400 for negative endings was stronger for happy than sad people, but the two groups did not respond differently to positive endings. Finally, I present recent fMRI data collected while happy and sad participants listened to stories that ended with consistent or inconsistent sentences. Differences in the BOLD response for the two endings correlated with self-reported mood scores. As a whole, this research shows that mood affects integration in at least two ways: by providing additional extra-textual information or by polarizing the function of the core language network.

Effects of strength and endurance training programs on cognitive function in older men

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Physical activity may be an effective approach to improve the cognitive performance of older people. However, it is unclear which mode of training is most effective. Therefore, the objective of this study is to compare the effects of strength and endurance training programs on cognitive functions in older persons. Thirty six older inactive men (range = 70-82 years) were included. The testing protocol comprised assessments of physical performance (maximum dynamic strength of the upper and lower limbs, VO₂max) and cognitive performance (general fluid function, information processing speed, memory, working memory). The sample was randomly divided into three interventions groups: an endurance training group (walking at 60-65% of HR_{max}, n=11), and two strength training groups; a moderate-resistance (60-65% 1RM, n=13) and a high-resistance (80-85% 1RM, n=12) training group. After three months of training, all training groups showed higher levels in aerobic fitness and strength. A significant time x group interaction was found for Corsi-Block-Tapping and Digit-Symbol. Whereas visual memory was increased in the high intensive resistance training group, general fluid function was improved in the endurance training group. This study demonstrates that different training programs may improve different cognitive functions. However, the differential effects on cognitive functions need further explanation.

The Role of Contextual Objects in Action Recognition

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Our current work is concerned with contextual objects present during everyday actions. Contextual objects are part of a particular scene yet not integrated in the action itself. We investigated the influence of contextual objects on action recognition. Two factors were tested: the contextual object's location relative to the observed actor (location ergonomics), and the semantic relation between the contextual object and the observed action (goal affinity). Objects at actor-ergonomic locations may be particularly likely to be involved in the upcoming action. Accordingly, we tested whether the convenience with which an object can be reached by an actor has an effect on action observation. To this end, a rating study (N=24) for different objects and their locations on a table was employed. Data resulted in a map depicting object location ergonomics. A second experiment addressed goal affinity, i.e., the semantic relation of a particular contextual object with the observed action. It was expected that the higher the goal affinity, the more an observer expects the contextual object to be integrated in the ongoing action. Goal affinity was determined on the basis of subjective ratings in a large sample (N=800) of students.

Extrinsic Motivation Can Reduce the Effectiveness of Testing in Enhancing Long-term Memory

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Numerous studies have demonstrated that testing can promote better long-term retention than restudying, suggesting that the number of tests in education should be increased. However, in real-life educational settings the motivation of learners often plays an important role for performance, a factor that has not been taken into account in previous research. This is particularly interesting since extrinsic motivation often undermines intrinsic motivation which may in turn decrease the long-term retention of tested knowledge. To examine this issue, participants first learned foreign language vocabulary words, followed by an initial test in which one third of the words were tested and one third restudied. To induce an extrinsically motivated state during initial testing, one third of the participants was rewarded (money receipt) for correct responses and one third was punished (money withdrawal) for wrong solutions (the remaining third served as a control group). After one week, a long-term memory test for all words was conducted. Reward impaired long-term memory for both restudied and tested words, even when words were initially successfully retrieved. By contrast, punishment did not influence the benefits of restudying and testing. These findings indicate that extrinsic motivation can reduce the effectiveness of testing in enhancing long-term memory.

Individual differences in the activation of mental representations of famous faces by lookalikes: an ERP study

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We investigated whether participants performing high or low in a Famous Face Recognition Test differ in the activation of mental face representations by priming. In an immediate-repetition-priming paradigm, famous target faces were either preceded by i) a different image of the famous face, ii) the face of a “lookalike”, i.e. an unfamiliar face resembling the famous target face in appearance, or iii) a different famous face. Participants performed a face familiarity task on the targets. In addition to response times and accuracies, event-related potentials (ERPs) for target faces were analyzed. First, in line with previous studies, repetition priming effects occurred when famous faces were preceded by different images of the same faces (RT, ACC, P200, N250r, N400). Second, attenuated repetition priming effects were found when famous target faces were preceded by faces of unfamiliar lookalikes (RT, ACC, N250r, N400). Third, repetition priming effects in the N250r and N400 for lookalike primes were more reliable for participants with high face recognition skills. This suggests that i) mental representations in good recognizers are characterized by a larger flexibility, and ii) that high and low performers also differ at the level of post perceptual access to semantic information about familiar persons.

Effects of complexity of postural control affordances on attentional performance and heart rate variability

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Several studies have demonstrated a close connection between the cognitive and postural control system. In the current study, we tested whether complexity of postural control affordances has an effect on attentional performance and modulation of the cardiovascular system. Subjects performed short-term attentional and vigilance tasks under two different sitting conditions (static, dynamic) at two types of tables (static, random rotating). Electrocardiographic (ECG) data were recorded before, during and after the attentional tasks. Behavioral data show improved attentional performance in conditions with complex postural control affordances. Higher processing speed in short-term attentional tasks and shorter RTs in vigilance tasks are observed. ECG data show a main effect for type of table and an interaction effect of postural control complexity and time: NN50 was increased in conditions with random rotating table. In high complexity postural control conditions NN50 was increased for the first 20 minutes, decreased compared to static conditions during the second half of the test. Results indicate positive effects of dynamic postural control on attentional performance and modulation of the cardiovascular system as an indicator of alertness. Recommendations for application of environments that stimulate the postural control system, and therefore lead to enhanced cognitive performance, will be discussed.

Exploring the "Mere" in the Mere Ownership Effect on Memory

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In a series of studies using the so-called shopping paradigm, Cunningham et al. (2008) have shown that objects that are arbitrarily assigned to one's self become more likely to be remembered. A conscious evaluation of self-descriptiveness does not appear necessary – mere (real or imagined) ownership alone seems to convey a memory advantage. A remaining issue is how minimal the constraints are for finding this so-called "Mere Ownership Effect", that is, whether it occurs under even more reduced and indirect conditions of self-association than in the published studies. We investigated ownership in a conceptual replication of published studies on the phenomenon. The most obvious difference was that we did not introduce a real partner to the participant, who – in the original experiments – received the non-self-assigned objects. Our experiment failed to produce any memory advantage of ownership. These results are seemingly at odds with previous research and raise questions about the necessary and sufficient conditions for the occurrence of the Mere Ownership Effect and about the factors that might be critical in determining the impact of self-relevance on information processing. Those factors include, but are not limited to, the social reality of the experimental situation or the possibility of task recoding.

Effects of Distractor AoA and Semantic Relatedness in the Picture-Word Interference Paradigm

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Semantic interference in the picture-word interference (PWI) paradigm is commonly interpreted as evidence for lexical selection by competition (LSC). This view has been challenged by supporters of the response exclusion hypothesis, who locate the effect at a post-lexical output buffer. Oft-cited arguments for this hypothesis are the reversed distractor frequency effect in PWI experiments and the absence of an interaction of frequency and semantic relatedness (Miozzo & Caramazza, 2003). However, word frequency probably operates on a word form level, unlike AoA, which has a lexical-semantic locus. Hence, models incorporating LSC predict that, if anything, semantic relatedness should interact with AoA. We carried out three PWI experiments, manipulating distractor AoA and semantic relatedness. When the frequency confound in distractor AoA was controlled for, distractor AoA, but not semantic relatedness or its interaction with distractor AoA, affected naming times. When frequency confounds were not controlled for, we obtained effects of distractor AoA and semantic relatedness but no interaction. We discuss implications of these results for investigating AoA and frequency effects in the PWI paradigm. Miozzo, M. & Caramazza, A. (2003). When more is less: A counterintuitive effect of distractor frequency in the picture-word interference paradigm. *Journal of Experimental Psychology: General*, 132, 228-252.

Goal Orientated Adjustment of Performance Based on Unconscious Knowledge

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A widely held assumption is that unconsciously acquired knowledge automatically affects performance whenever the retrieval context matches the context of acquisition. The underlying idea is that the expression of unconscious knowledge cannot be controlled by conscious contents. Albeit the idea of a crucial role of conscious intentions determining which action is carried out automatically is not new (Neumann, 1994), mechanisms of how conscious intentions can influence unconscious processing are rarely targeted explicitly. For instance, research on implicit learning has focused mainly on exploring the contents that can be acquired without conscious knowledge by testing the expression of this knowledge in similar retrieval situations. In the current study, participants implicitly learned a sequence consisting of two dimensions (i.e. color and shape). In a following induction phase either the color- (color condition) or the shape-dimension (shape condition) were weighted. Subsequently, all participants received a transfer test including deviant trials that violated either the color or the shape sequence. Results suggested that the induction phase modulated the expression of implicitly acquired knowledge in the transfer test. Thus, the experiment is an important step towards understanding the interplay between voluntary action control (Hommel et al., 2001) and the expression of unconsciously acquired knowledge.

Organizing information in decision tasks with suboptimal information acquisition sequences

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In multi-cue inference tasks, participants often get information in a matrix-format (e.g., Mouselab paradigm)—which is atypical for everyday decisions. Sometimes we cannot even get information in a preferred sequence. Therefore, not only information search but also organization is necessary in order to conveniently apply a specific decision strategy. With our recently developed Search and Organization Task (SOT), information organization can be assessed and quantified in addition to and independently from information search. In the current experiment, we used two different pay-off environments (compensatory vs. non-compensatory) and we either let the sequence of information search up to the participants or we restricted it in a beneficial (i.e., corresponding to the search sequence of the adaptive strategy for each environment) or unbeneficial manner (i.e., mismatching the adaptive strategy's search rule). With the SOT, participants have the possibility to compensate for disadvantageous information presentation sequences by organizing information advantageously. Contrary to our expectation, people did not make use of this possibility, but organized information depending on the sequence in which they got it. Additionally, there was an overall preference for organizing information in an option-wise manner. Nevertheless, participants succeeded in adaptive strategy selection.

The face sensitive N250r ERP component is associated with perceived (rather than physical) facial identity

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Originating from the fusiform cortex the face sensitive N250r ERP represents an increased negativity over inferior temporal regions of the right hemisphere, which has been related to the activation of mental representations of familiar faces. Since the N250r effect is typically larger for same-image (compared to different-image) repetitions of a familiar face, it is debated whether it reflects physical stimulus similarity between prime and target, or perceived similarity between prime and stored face representation. In an EEG-study participants performed a four-choice identification task on famous target faces (1500 ms), which were always preceded by the same average face (500 ms, prime-target SOA 1000 ms). Crucially, by adapting participants to specific anti-faces (5000 ms), we aimed at inducing facial adaptation effects in the prime. We found no significant performance difference between “Primed” and “Unprimed” trials (when pre-prime adaptation involved the anti-face specifically corresponding to the target, vs. a non-corresponding anti-face), but later demonstrated such adaptation effects in a behavioural study. Importantly, the N250r was significantly larger for “Primed” than “Unprimed” trials over the right hemisphere. Our results support the notion of N250r representing a neural correlate of perceived facial identity, even when the actual physical stimulus is kept constant.

Does the degree of constancy in transparency perception depend on the experimental task?

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Previous investigations of how constant the perceived color of transparent objects remains under changes in the illuminant yielded different degrees of constancy depending on the selected experimental task. Almost complete constancy was found with a performance-based identification task (Khang and Zaidi, 2002), whereas matching experiments revealed incomplete constancy. A possible explanation for these task-related discrepancies would be that different processes are triggered in each task. Alternatively, the higher degree of constancy observed in the identification task may simply be due to the fact that the comparison stimuli were even worse candidates than the stimuli predicted under constancy. To decide between these two alternatives, we replicated the above-mentioned identification task but with comparison stimuli including the best settings found in a matching task under similar conditions. Our subjects preferred these “best matches” over “constant stimuli” throughout. This suggests that the same mechanisms underlie both tasks and that the apparent superiority of the identification task is an experimental artifact. Furthermore, contrary to the somewhat unintuitive results of the original study, we found clearly lower degrees of constancy if the stimuli contained no X-junctions and thus appeared less vividly transparent.

Robust simplicity? Limited search is more susceptible to working memory load than weighting cues equally

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How does working memory (WM) load affect the execution of decision strategies? In a dual-task paradigm, participants judged which of two animals has a longer life span given several cues while at the same time having to count as many as three bird voices. For the decision task, participants were instructed to use either a lexicographic strategy that considers cues sequentially, making a decision as soon as one cue favors one of the animals (take-the-best; TTB) or a compensatory strategy that takes all cues into account (equal weighting; TALLY). Although under high WM load both strategies were executed with high accuracy, WM load produced decision time costs for both strategies. Interestingly, these time costs appeared to be higher for TTB than for TALLY (i.e., increasing WM load slowed TTB down to a greater degree than TALLY, except when the first cues discriminated). Further, the secondary task used to load WM suffered less when TALLY was used. Results indicate that a lexicographic strategy can require more WM capacity than a compensatory strategy (i.e., TALLY), especially when cues considered early do not discriminate. This points to the important and often neglected cognitive costs incurred by strategies implementing controlled, albeit limited, search.

Prioritization of relevant and suppression of irrelevant information is facilitated in homogeneous contexts

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Attention deployment is more efficient in homogeneous than in heterogeneous contexts. Efficient selective attention requires prioritizing relevant (top-down control) and suppressing irrelevant information (bottom-up processes). In the present experiment we used behavioral and neurophysiological measures in an additional singleton paradigm to show that the relative contribution of top-down and bottom-up processing depends on the homogeneity of the context stimuli are embedded in. A target and a salient distractor were presented together with 456 line elements that could be arranged as a homogeneous or a heterogeneous context. Target and salient distractor were presented laterally or on the vertical midline which allowed disentangling target- and distractor-related activity in the lateralised ERP (Hickey et al., 2009). The target-elicited NT component of the ERP showed faster and more pronounced attention allocation for targets in homogeneous than for targets in heterogeneous contexts. The distractor-elicited PD showed delayed distractor suppression in heterogeneous contexts and attentional capture by the distractor in heterogeneous, but not in homogeneous contexts. The present results suggest that both prioritization of relevant and suppression of irrelevant information is facilitated in homogeneous contexts, reflecting enhanced top-down control in homogeneous compared to heterogeneous contexts.

Selective processing within the brain: The contribution of temporal, spatial, and feature-based attention

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Our environment contains a vast amount of visual information. To orient ourselves within this complex environment, we need to select relevant from irrelevant information. The most prominent selection mechanism considered in Cognitive Science is attention. But – how does attention perform the selection of relevant stimuli? We investigated this question by focusing on three different dimensions of attention: spatial, temporal, and feature-based attention. Our participants performed a visual search task and had to respond to a target, specified by its spatial position and a conjunction of color and shape. To manipulate temporal attention, the time interval between warning signal and search display varied. The measurement of event-related brain potentials (ERPs) allowed us to monitor the temporal progression of the different attentional selection processes. The ERP results (N1, N2pc, SPCN, and P3) revealed an unspecific enhancement of stimulus processing by temporal attention. This benefit prevailed until the response to the target. Spatial attention interacted with feature-based attention by preventing processing of irrelevant stimulus features at the unattended side. After this selection, feature-based attention picked the target out at the attended side. Taken together, the results show how different attentional mechanisms work together to ensure effective stimulus processing.

Looking at Outcome Distributions Differently: How Social Preferences Guide the Transformation of Objective Payoffs

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Previous work has demonstrated that Social Value Orientation (SVO) is related to cooperative behavior in social dilemmas. However, little is known concerning the underlying processes. In a first eye-tracking study investigating decisions in simple money allocation tasks, we show that differences in SVO are accompanied by consistent differences in information search. Decision time, number of fixations, the proportion of inspected information, the degree of attention towards the others' payoffs, and the number of transitions from and towards others' payoffs gradually increase with absolute SVO deviation from a pure selfish orientation. In a second experiment we investigated this relationship further by looking at the temporal dynamics of the information search in decisions about outcome distributions. We show that on the one hand individualists weight their own outcomes most over the entire decision process, but that the attention is particularly strong biased at the beginning and the end of the decision. For pro-social participants on the other hand the attention distribution between own and other payoff, as well as payoff difference and sum of payoff information is fairly evenly distributed. These results are discussed with respect to the common social preference models.

Reference frames for delayed action

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The visual two-stream model suggests that the dorsal stream carries out actions in real-time on the basis of egocentric representations (e.g., gaze-, or body-centered reference frame) while the ventral stream is involved in memory-guided actions and retains allocentric information (e.g., environmental-centered reference frame) over a longer time scale. Based on this assumption, delayed actions are supposed to make use of a perceptual allocentric target representation and thus should be unaffected by changes in gaze. We tested this hypothesis by varying the temporal delay between target presentation and reach (0, 5, 8, 12 s) and the direction of gaze relative to the target. In addition, we introduced a condition where we added constant visual landmarks serving as allocentric cues. Reach endpoints systematically varied as a function of gaze relative to target irrespective of whether the action was executed immediately or after a temporal delay. We even found gaze-dependent reach errors when allocentric cues were present; however, they were slightly reduced compared to the condition without landmarks. Our findings suggest that reach targets for delayed actions are coded in a combined egocentric (gaze-dependent) and allocentric reference frame arguing against a complete switch from egocentric to allocentric coding.

The effect of visible skin condition on perception of male facial age, health and attractiveness

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Recent research suggests that in both women and men a decrease in facial skin colour homogeneity leads to older, less healthy and less attractive judgements. Here we elaborate on the significance of visible skin colouration and surface topography cues in men by testing the hypothesis that systematic alterations of these features significantly affect perception of male facial age, health and attractiveness. We report the results of two experiments investigating male and female perceptions of men's faces before and after digital skin colour smoothing (Experiment 1) and skin surface topography removal (Experiment 2). We show that that – like in women – skin colour evenness and skin surface topography smoothing leads to a significant decrease of age perception and to a significant increase of health and attractiveness judgements. Our findings are discussed with reference to the implications for human social perception and the male grooming market.

The regulation of cognitive control in dual tasks: Bottom-up priming of temporal task overlap determines the shielding of prioritized primary task processing

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The simultaneous handling of two tasks requires an adaptive regulation of cognitive control to shield prioritized primary task processing from crosstalk-interference caused by secondary task processing, especially when both tasks are highly similar. In the present study we investigated the flexible bottom-up regulation of primary task-set shielding. For this we manipulated the proportion of trials with high vs. low temporal task overlap (SOA frequency) in an item-specific manner. In particular, selected stimuli of Task 1 predicted high temporal task overlap (short SOA) in 80% of trials whereas other stimuli of Task 1 predicted low temporal task overlap (long SOA) in 80% of trials, resulting in an overall equal number of short and long SOA conditions, respectively. Participants were not informed about this manipulation. Results showed that the predictive value of Task 1 stimuli is used to adjust the level of prioritized Task 1 shielding. That is, crosstalk-interference from secondary task processing was significantly reduced for the Task 1 stimulus set predicting high temporal task overlap compared to the Task 1 stimulus set predicting low temporal task overlap. These findings highlight the importance of a contextual regulation of cognitive control (e.g., primary task-set shielding) in dual-task performance.

Social Sampling: Decisions from Experience in Mini-Ultimatum Games

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In many social situations, we depend on others in what we can achieve. The uncertainty we face is not due to a natural mechanism but to the possible actions of other persons. Sometimes we may have statistical information about what to expect ('decisions from description'), yet often we need to rely on a sample of observations from our social environment ('decisions from experience'). We investigate (a) how the way people acquire social information affects their behaviour in a social bargaining situation and (b) how such decisions under social risk differ from risky decisions in lotteries. We manipulate the way information is acquired (description vs. matched sampling vs. free sampling) in two types of decision situations (Mini-ultimatum game vs. lottery). Before making their offer, proposers receive information about how often an allocation is typically rejected by responders. In the description condition, rejection rates are given as probabilities (description), whereas in experience proposers are either forced to sample a fixed number of responses (matched sampling) or stop whenever they wish (free sampling). We find a gap between description and matched sampling. However, it's direction and people's sampling behavior in free sampling suggest a different explanation than for the non-social situation.

Visually disentangling shading and surface pigmentation when the two are correlated

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Many surfaces, such as weathered rocks or tree-bark, have complex 3D relief, featuring cracks, bumps and ridges. It is not uncommon for dirt to accumulate in the concavities, which is also where shadows are most likely to occur. By contrast, convex features are exposed to light and often get buffed a lighter shade. Thus, shading and pigmentation are often spatially correlated with one another, making it computationally difficult to distinguish them. How does the visual system separate shading from pigmentation, when they are correlated? We performed a statistical analysis of complex rough surfaces under directional and diffuse illumination to characterise the relationships between shading, illumination and shape. We find that image intensities carry important information about surface curvatures, and show that the visual system uses the relationships between curvatures and intensities to distinguish between shadows and pigmentation. We also find that subjects are remarkably good at separating shadows and pigmentation even when they are highly correlated. Together, these findings provide key novel constraints on computational models of human shape from shading and lightness perception.

Violation of Weber's law in grasping is independent of the availability of visual information

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Weber's law is one of the most fundamental psychophysical principles of human information processing. For example, when a participant sees an object and estimates its size, the uncertainty of the size estimate will increase with the physical size of the object. Surprisingly, it was suggested that Weber's law is not valid for the size estimate used by the motor system when grasping an object. This was interpreted as further indication of qualitative differences between vision-for-perception and vision-for-action (Ganel, Chajut & Algom, *Current Biology*, 2008). We show that this apparent dissociation between vision-for-perception and vision-for-action is completely independent of the availability of visual information. We compared grasping and manual size estimation in conditions with visual information and without visual information but instead semantic information about object size. Regardless of whether the object was visible or not, we found an adherence to Weber's law in manual size estimation and a violation of Weber's law in grasping. Consequently, visual coding mechanisms cannot solely account for the dissociation between grasping and perceptual tasks in terms of Weber's law. Other, more task-specific aspects have to be taken into account to shed light on the violation of Weber's law during grasping.

Keep tracking: Effects and aftereffects of dishonesty

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Being dishonest implies a conflict between truthful and dishonest behavioral tendencies: Truthful responses seem to be activated automatically and have to be inhibited to give way to dishonest behavior. This conflict is evident in several measures, such as in terms of increased response times for dishonest responses. The current study goes beyond these immediate effects of dishonesty by addressing its impact on subsequent behavior. To this end, we used sequential analyses – a common and powerful tool in research on cognitive control that has never been considered in the context of deception, however. Participants answered questions about daily routines and the font color indicated if they had to respond either truthfully or dishonestly. Honest and dishonest answers differed in response times and errors. Crucially, subsequent behavior was also differently affected by preceding honesty or dishonesty. The additional observation of subsequent actions paints a more detailed picture of (dis-)honesty. In addition to understanding of its aftereffects, our results might be especially interesting to enhance lie detection by drawing on sequential analyses.

Evidence for benefits of eye-guidance in the absence of visual information

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Usually, eyes guide manual movements in space and time enhancing manual accuracy. Is this benefit solely based on extracted visual information or are the eyes also used as attentional pointers for target locations? If the latter is the case, benefits should also arise when visual information is not available. We manipulated eye guidance and visual information in a sequential sensorimotor task. Participants clicked in ascending order on numbered circles on a computer screen. 100 trials were performed with the same spatial arrangement of 8 numbered circles (first phase). In the consecutive 50 trials (second phase), participants had to click on an empty screen in the same order as before. Participants' gaze was restricted to central fixation in the first, the second, no or both phases. Eye-(cursor) guidance resulted in better performance than fixed gaze when visual information was available. Without visual information, performance dropped. Importantly, early during the second phase, the groups that learned the configuration with central fixation performed better than the free gaze learning groups. However, late during the second phase eye-guidance benefits emerged. We conclude that the eyes are indeed used as attentional pointer – however, only after a spatiotopic target representation is learned.

The mutual influence of Evaluative Conditioning and Attribute Conditioning

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Attribute (AC) and Evaluative Conditioning (EC) refer to how people acquire their preferences and their mental image of people and objects. AC refers to changed attribute-assessments of neutral CSs; whereas, EC refers to changed evaluations of neutral CSs. Both are based on mere stimulus pairings; yet, their relation and mutual influence are unknown. This study shows how attribute, attribute's valence and CS's valence interact and influence people's assessment of CS's valence and attributes. I conditioned valence to neutral forms (CSs) through pairing with dis/liked emoticons (USs). Afterwards, I conditioned the attribute health to the now dis/liked forms. Between participants, I manipulated un/healthy food USs' valence. Results showed conditioning of health to non-neutral (i.e., valent) CSs. Yet, AC and EC effects' strength depended on a fit between CS's and attribute's valence. These effects showed on direct ratings, on AMP and SMP. This study implies two things: First, global valence and stimuli's attributes interact in influencing people's evaluations. Second, AC only works for valence-neutral CSs or CSs having the same valence as the conditioned attribute. Practically, if the new brand represents negative cigarettes, showing it with autonomous cowboys will not make it stand for positive freedom and adventure.

Pain-specific modulation of hippocampal activity and functional connectivity during visual encoding

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Pain automatically attracts attention and thus interferes with cognitive functioning. This interruptive effect of pain has been described in detail on the behavioral level; however, neuroimaging studies have only recently begun to unravel its neurobiological underpinnings. Here, we discuss the most important behavioral studies and present own imaging data. In an fMRI study, we investigated the specific influence of pain on memory encoding in healthy volunteers. To investigate the specificity of the interruptive effect of pain on visual encoding, neutral objects were either presented alone, with painful heat stimuli or with auditory stimuli that were matched for unpleasantness. The effect of aversive stimulation was assessed in a categorization task and a subsequent recognition task. Pain specifically interfered with object processing (slower reaction times) and the encoding of visual stimuli (lower recognition rate). Pain catastrophizing amplified this finding. On the neural level, this pain-related disruption was associated with reduced activity in encoding-related brain regions (hippocampus) and an alteration in connectivity with extrastriate regions during painful relative to auditory stimulation. In sum, our results show a pain-related disruption of encoding over and above the unpleasantness of a stimulus, suggesting a pain-specific interruptive mechanism that interferes with an early stage of memory formation.

If Creativity is related to diversity and unusualness, do creative persons have a more diverse and unusual sex life?

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Recent research supports evolution as an explanatory framework for creativity, i.e. creativity evolved, at least in part, through sexual selection to attract mates. Specifically, it has been shown that for men, creative activity is related to short-term mating success. However, it is unclear why women should engage in short-term mating with creative men or what are potential benefits from it. In general, for women who engage in short term mating, experiencing sexual gratification is perceived by them to be highly beneficial. Thus, one possible explanation for short-term mating especially with creative individuals might be the interest in or the curiousness about a diverse and unusual sex life. Our study targeted this question using self-report questionnaires and an experimental condition with an implicit goal priming on honesty to avoid socially desirable answering. Our results suggest that, first, creative people participate in more diverse and unusual sexual practices and, second, a priming on honesty helps reducing the effects of social desirability in sexually sensitive questioning.

Subjective fluency influences liking

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According to the processing fluency theory, the easier a stimulus can be processed the more it is liked. Previous research has shown that higher ease of processing elicits a subjective feeling of fluency, which can be explicitly reported (Forster, Anson, & Leder, 2013). Furthermore, the subjective feeling even has a stronger relation to liking than the actual objective manipulation of fluency. What, however, so far remained untested is the causal relationship between the subjective feeling of fluency and liking. Therefore, in a behavioural study in each trial we manipulated both the objective fluency by presenting simple line drawings at different presentation (between 100 and 400 ms) durations and the subjective feeling of fluency by giving false feedback about the participant's subjective feeling of fluency. A sample of 69 participants rated liking and their felt fluency. The results show that both objective fluency and felt fluency influenced the liking ratings. At longer presentation durations and at high compared to low felt fluency feedback liking ratings were increased. This for the first time shows that the feeling of fluency is causally related to liking. Furthermore, these findings back the feeling-as-information account and show that the feeling of fluency indeed breeds liking.

Interhemispheric recruitment in the face perception network

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Perceiving faces and their social cues is essential in everyday life. Imaging studies have attempted to unveil the neural correlates of face perception, revealing multiple regions (e.g., fusiform face area FFA, occipital face area OFA) mostly lateralized to the right hemisphere. However, the neural mechanisms underlying face perception are largely unknown. Here we investigate intra- and interhemispheric interactions in the core network of face perception using functional magnetic resonance imaging and dynamic causal modeling. Our results show that face-selective interhemispheric recruitment occurs at the early stage of the OFA. Importantly, we found this recruitment to be reciprocal; hence, left OFA recruits the dominant right OFA, but also vice versa. This suggests a significant role of the left OFA in face perception. Still, right OFA is significantly more recruited compared to left OFA, providing a mechanistic explanation for the typical lateralization. Notably, such face-selective interhemispheric recruitment is absent at the later stage of the FFA. We find this in line with pupillary constrictions to faces showing a significant correlation with the interaction between bilateral OFA, but not FFA. Hence, we for the first time provide a mechanistic model of the face perception network accounting for intra- and interhemispheric interactions.

The Basel-Berlin Risk Study: First Results on Experiential Measures of Risk Taking

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Despite having strongly diverging theoretical views on risk and risk taking, both economics and clinical disciplines such as psychology have documented large inter-individual variability in people's risk taking. Moreover, in some of the paradigms used to investigate risk taking, biological factors such as a person's genetic make up and hormone level have been suggested to contribute to a person's preference to take risks. It remains unclear, however, whether there is a common psychological phenotype of risk taking across paradigms, and whether it is possible to identify the genetic and hormonal underpinnings thereof. The Basel-Berlin Risk Study addresses these questions with a large sample of 1,500 participants. In a day-long session, participants complete a battery of the most prominent measures of risk taking as well as measures of cognitive performance and affect. In a subsample of the data that we present here, we examine the relationship between measures of risk taking derived from different experiential paradigms. First evidence suggests that these measures reflect different components of risk taking.

Spatial Tactile Negative Priming – Is There Evidence For Feature-Mismatch?

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Spatial Negative Priming has long been debated as a variant of the classic Negative Priming effect, showing the generality of the phenomenon but perhaps nothing more. Yet, recent evidence suggests that there may be something truly interesting here, as explanations of the spatial variant differ between audition and vision. In fact, whereas in vision feature-mismatch was neglected as an explanation for spatial Negative Priming it seems that in audition the effect is solely driven by feature-mismatch. Here we are going to present data from a tactile variant of the spatial Negative Priming task (N = 21). In particular, we found that spatial Negative Priming in touch is independent of feature-mismatch, suggesting that the ignoring of spatial distractors is comparable between vision and touch but might be different from audition.

Hard to set, hard to forget: Exploring continuous goal dynamics with mouse tracking and computational modelling

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Adaptive goal-directed behavior requires focusing on a task in the face of distraction as well as releasing this focus when adopting new goals. Accordingly, classic task-switching studies suggest that switching goals requires control processes that slow down responses. To gain deeper insight how these processes unfold over time, thus, shaping continuous goal-directed behavior, we tracked mouse movements during a set-switching paradigm. As expected, goal switches induced temporal switch costs. More intriguingly, mouse trajectories pointed towards two processes as sources for this slowing. First, we found evidence for a persisting activation of former goals: when switches required ignoring previously relevant information, movements were heavily deflected. Second, we found evidence for a time-consuming goal activation process: when switches required attending to new information, trajectories remained indifferent for a longer time. Notably, trajectories did not differ whether this new information had been relevant or irrelevant beforehand. Hence, goal-specific inhibition is unlikely to account for the observed switch costs. Strengthening this interpretation, changing levels of goal activation sufficed to replicate the data in a dynamic neural network model. Implications for the representational nature of goals are discussed.

The differential influence of positive affect, random reward, and performance-contingent reward on cognitive control

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Growing evidence (from independent studies) suggests differential effects of positive affect and reward on cognitive control. Here, we present one behavioral study, investigating the influence of positive affect and reward (contingent and non-contingent) on proactive control. A version of the AX-Continuous Performance Task with well-proven sensitivity to reward and affect manipulations was used. In a first phase, two experimental groups received either neutral or positive affective pictures before every trial. In a second phase, one half of a given affect group additionally received performance-contingent or random reward, respectively. Results replicated both typical affect effects associated with reduced proactive control under positive affect and typical reward effects associated with increased proactive control. Interestingly, the positive affect effect was counteracted by performance-contingent reward, but mirrored by random reward. In sum, this study provides first evidence for oppositional effects of performance-contingent reward, on the one side, and positive affect and performance non-contingent reward, on the other side: only performance-contingent reward showed a motivational effect in terms of a strategy shift towards increased proactive control. Positive affect alone and performance non-contingent reward reduced proactive control. Moreover, the integrative design of this study revealed the vulnerability of positive affect effects to motivational manipulations.

Proficiency Dictates Reading Strategy in L2

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According to the psycholinguistic grain size theory readers of deep orthographies rely on larger orthographic units than readers of shallow orthographies. Use of small grain size is reflected in an increased word length effect (WLE) whereas use of large grain sizes attenuates the WLE. We investigated whether readers of a shallow orthography (German) adapt their reading strategy when reading in a deep orthography (English). Native German (L1) speakers with high (HP, $n = 17$) or low (LP, $n = 14$) English (L2) proficiency performed lexical decision tasks in each language. We used cognates, words, and pseudowords to assess reading of identical, language-specific and novel stimuli. Overall responses were faster in L1 than in L2 with larger differences in the LP group. For cognates and words the WLE in both languages did not differ between the HP and LP groups. Crucially, for pseudo-words, LP participants showed stronger length effects than HP participants in English, but not in German. Our results suggest that proficiency affects the use of an adequate grain size in L2 when reading novel words. While low proficient readers maintain the L1 reading strategy, high proficient readers adapt L2 optimal grain sizes.

Object-centered spatial encoding in monkey parietal reach region and dorsal premotor cortex

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During visually-guided reach movements, neurons in the parietal reach region (PRR) and the dorsal pre-motor cortex (PMd) encode spatial location of visual cues and the planned movement in different egocentric reference frames [1]. However behavioral studies suggest that when reach goals need to be localized relative to other objects humans use both egocentric and allocentric spatial information for localizing spatial targets [2]. We asked whether neurons in PRR and PMd use object-centered or egocentric reference frames when a monkey memorizes a visual cue to plan a reach movement relative to another object. Many neurons indeed were selective for positions on the object during memory of the visual cue or movement planning, independent of the egocentric location of the object. Other neurons showed egocentric or intermediate reference frames. On average, encoding of the visual cue memory was more object-centered, encoding of the motor goal more egocentric, both in PRR and PMd, but more prominently in PRR. This means, if task-demands require then parietal and frontal reach planning areas can encode task-relevant spatial information in an object-centered reference frame. 1. Y.E. Cohen, R.A. Andersen, *Nature Review Neuroscience* 3:553-562(2002) 2. P.A. Byrne, J.D. Crawford, *J Neurophysiol* 103:3054-3069 (2010)

Why does extrinsic motivation enhance adaptation to a visuomotor rotation?

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Adaptation to visuomotor rotations (VR) is either based on an implicit (via an internal model) or an explicit (via acquired strategic knowledge) component. Research from our lab showed that extrinsic motivation can enhance adaptation to VR (Gajda, Sülzenbrück & Heuer, in preparation). The present study aims to investigate the reason for this enhancement. One possible explanation why extrinsic motivation enhances adaptation may be a differentiated processing of the provided feedback. In this study subjects adapt to a 60° CCW VR. While participants in control group received a fixed financial reimbursement for participating in the experiment, participants in the experimental group received additional financial incentives for high-endpoint-accuracy (to increase extrinsic motivation). Attention during the movement of the hand to compensate for the rotation can either be on the distal part of the tool (the cursor) or on the proximal part (the hand). We measured the backward movement from the target to the starting position to elucidate where the focus of attention is directed to. We expect to find that extrinsic motivation directs the attention towards the cursor. Other possible explanations for the enhancement of adaptation by extrinsic motivation need to be discussed (for example a better acquisition of explicit knowledge).

Cardiovascular responses in the Concealed Information Test

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The Concealed Information Test (CIT) has been proposed as an alternative to direct lie detection methods such as the Comparison Question Test (CQT). Compared to the CQT, the CIT does not allow for revealing deception itself but enables the detection of concealed crime related knowledge by comparing physiological responses to critical probe items with equally plausible neutral alternatives. The possession of crime related knowledge was found to enhance electrodermal responding, reduce respiratory activity, and elicit heart rate deceleration. By contrast, significant changes in blood pressure – that were frequently observed in CQT examinations – were never reported for the CIT. In the current study, participants either accomplished a mock crime or remained ignorant to crime details (innocent group). In addition to standard electrodermal, respiratory and heart rate measures, we recorded beat-to-beat changes in blood pressure as well as peripheral vasoconstriction using photoplethysmography. We observed a biphasic pattern of blood pressure changes with higher systolic and diastolic blood pressure for probes as compared to neutral CIT items in the group of guilty subjects. However, these changes were confined to an early time window and leveled off after several seconds. Findings are discussed with respect to response fractionation of sympathetic and parasympathetic outflow.

„Ihr Erkrankungsrisiko ist gering“: Warum positive Informationen nicht immer akzeptiert werden

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Stellen Sie sich vor, Sie würden von Ihrem Arzt mitgeteilt bekommen, dass Sie ein deutlich erhöhtes Risiko haben, in den nächsten 10 Jahren an „Burn-out“ zu erkranken. Wie würden Sie reagieren? In der bisherigen Forschung besteht weitgehend Konsens, dass „schlechte Nachrichten“, wie die Mitteilung eines erhöhten Risikos, abgewertet werden („motivated reasoning“). Interessanterweise zeigen aber Feldstudien (z.B. Krebs screenings), dass auch gute Nachrichten (z.B. Ihr Risiko ist gering) nicht akzeptiert werden. Um diese widersprüchlichen Befunde zu untersuchen, wurde in Online-Experimenten sowohl positives als auch negatives Feedback zu einer fiktiven Erkrankung (chronisches Fatigue-Syndrom) dargeboten. In Experiment 1 (N=187) wurde den Probanden Informationen bezüglich ihres eigenen Erkrankungsrisikos und in Experiment 2 (N=565) wurde zusätzlich Informationen über das Erkrankungsrisiko eines durchschnittlichen Peers gegeben. In beiden Experimenten schätzten sich die Probanden trotz positiver Risikorückmeldung („Ihr Erkrankungsrisiko ist gering“), als gefährdet ein, wenn die guten Nachrichten unerwartet für sie waren. Experiment 2 zeigte außerdem, dass die Informationsverarbeitung nicht selbst-defensiv erfolgte, da – in Abhängigkeit von der Erwartung – sogar der eigenen Person ein höherer Risikostatus als den Peers zugeschrieben wurde (unrealistisch pessimistische Risikoeinschätzung). Das Ergebnismuster spricht gegen einen motivationalen und für einen adaptiven Erklärungsansatz. Konzeptuelle Implikationen für Risikoinformationsverarbeitungsprozesse werden diskutiert.

Modulation of visual attention by object affordance

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Studies suggest that objects with an inherent potential for action, referred to as object affordance, attract an observer's attention more than objects devoid of such a clear action link. Another line of research indicates that an important factor in object affordance may be an object's distance to the observer, with near, directly reachable objects triggering more affordance-related processing than far ones, which are not immediately reachable. To bring these two lines of research together, we investigated allocation of visual attention to objects as a function of their affordance and distance to the observer in a probe detection task. In line with previous evidence, our results indicate that attention is preferentially allocated to affording objects which are at the same time close to the observer, as compared to when they are presented at the far position or when a non-affording object is reacted to. Our data therefore confirm that visual attention to affording objects is modulated by an object's distance to the observer.

Filmic ellipses influence perceived duration of movie shots

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Movie duration seldom reflects the time course of the presented events. In most cases, movie time is much shorter than story time: The events of several years can be presented in a two hour movie. Only sometimes movie duration is exactly the same as story time or even exceeds story time. To vary the duration of movies filmic ellipses are often used, i.e. presentation time is shortened by skipping events and leave it to viewers to infer what happened between two successive shots. This study examined if filmic ellipses influence the cognitive processing of single movie shots. The duration of ellipses, i.e. the amount of event time they skipped, was varied within in 24 film clips, and 44 participants estimated the on screen duration of single film shots. Results showed that viewers significantly estimated movie shots as shorter if shots followed long ellipses and as longer if they followed short ellipses. This can be interpreted in terms of more abstract processing of film shots surrounded by long ellipses, as well as in terms of attentional models of time estimation.

Learning to reverse - Reversal learning transfers to novel stimuli

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In everyday life we learn that valence can alternate between options of choice: e.g., in deciding between public transport options, route A might result in quick and reliable journeys for some days, but eventually this changes so that route B would be preferable, until, it is again option A,... In behavioral and neurocognitive research, reversal learning has been employed as a means to study the interplay of learning processes and executive function. This implies that reversal learning entails a control component. It suggests that people should be able to shift preferences more flexibly than would be possible based on associative links between specific stimuli and outcomes alone. The learning-to-learn literature demonstrates that task structures such as deterministic choice reaction can be acquired by humans and monkeys on an abstract level so that they can immediately respond correctly to novel material. We extend this idea to reversal learning. In a line of 3 laboratory experiments we show that people indeed transfer their knowledge about the occurrence of shifts in reward schedule to novel sets of stimuli. Efforts in overcoming the impact of specific stimuli underline that reversal learning is suitable for measuring the interplay of learning and executive control.

The SNARC effect on line bisection by open-loop reaching

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The SNARC (Spatial–Numerical Association of Response Codes) effect describes the close association between number and space processing. Low numbers elicit an automatic bias to left-side and high numbers to right-side space. Number-induced spatial shifts of attention have been demonstrated in bisection tasks in which lines were directly associated with digits. We asked whether line bisection is also biased by global number primes under open-loop reaching conditions. In two experiments (each N=30), participants were presented with a prime consisting of either Chinese characters or numbers. Following, a line appeared and the participants had to reach for the perceived midpoint. Upon movement start, the line was removed. We analyzed reaction time, movement time, and accuracy of line bisection. In the first experiment, we found no effect of prime condition. In the second experiment, we introduced an additional parity judgment task which was supposed to ensure deep semantic processing of numbers. Here bisection accuracy was significantly biased by number magnitude. Reaction and movement time did not differ across conditions. Our results provide evidence for a global number-induced spatial bias of attention and emphasize the importance of deep semantic processing for the SNARC effect.

The role of false belief and source-of-knowledge understanding in early metamemory development

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Understanding how we acquire knowledge (source-of-knowledge, SoK) or how variables influence memorization (metamemory) is part of metacognition. Studies on metamemory have shown that metamnemonic knowledge significantly increases during the preschool period. But what are the cognitive predictors of such development? Recently, a link between metamemory and theory-of-mind has been found in the literature (Lockl & Schneider, 2007): false-belief (FB) understanding at ages 3 to 5 years is a significant predictor of metamemory knowledge at the age of 5. In our study, we (1) longitudinally investigated the development of declarative metamemory in French preschoolers through three variables of interest: number of items, study time available and organizational strategy; and (2) explore the roles played by two metacognitive competences – SoK and FB understanding – on the emergence of declarative metamemory. Thirty-one children were observed every 4 months between the ages of 4;0 to 5;7. Results indicated that (1) the influence of number on memorization was earlier understood than that of study time or organizational strategy and (2) both FB and SoK were implicated in the understanding of number and strategy influences while only FB understanding was predictor of that of study time influence.

Intercultural differences in defeasible reasoning with legal conditionals

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In everyday reasoning, considering counterexamples often makes people refrain from applying conditional rules. However, when reasoning with legal conditionals, laypeople often ignore potential counterexamples (i.e., exculpatory circumstances) if the transgression described in the conditional is highly morally outrageous. Though this effect is quite robust, some first results point to an exception: if the counterexamples describe situations of self-administered justice, even laypeople may consider them exculpatory. Since the acceptance of self-administered justice is often related to trust in the legal system, we decided to test this effect further in an intercultural study with laypeople from countries with varying levels of trust in the legal system. In an online experiment we presented legal conditionals and potential counterexamples to laypeople from Germany (high trust) and Peru (low trust). These counterexamples described either situations of self-administered justice (e.g. “an eye for an eye”) or potentially legally exculpatory situations (e.g. instances of coercion). Results show that whereas laypeople from both countries accepted legally exculpatory circumstances as valid counterexamples to the same extent, Peruvian laypeople were more prone to accept circumstances of self-administered justice as valid counterexamples than German laypeople. Results provide new evidence for the role of intercultural differences in (legal) conditional reasoning.

Short-term exercise effects on neuroelectric and behavioral measures of concentration

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Introduction: A large number of studies postulate a beneficial relationship between physical activity and cognition. In comparison, only a few studies exist, examining acute effects of exercise on cognition. The aim of this study was to investigate the effects of a short-term exercise program on behavioral and neuroelectric measurements. **Method:** 28 subjects took part in this study. The experimental group carried a short-term exercise program before and after conducting the d2, a performance test for concentration, meanwhile the control group was allowed to read through magazines. During the whole experiment EEG-data was recorded. **Results:** Performance on the d2-test was significantly influenced by the short-term exercise program. Additionally, the sportive subjects showed significantly higher performance of concentration than non-sportive. EEG assessment showed significant positive correlations between the alpha-rhythm and the performance of concentration at parietal and occipital electrodes of the right hemisphere and significant negative correlations at similar electrodes of the left hemisphere. **Conclusion:** A short-term exercise program consisting of mobilizing and coordinative movements has a positive influence on the performance of concentration. The correlation between performance of concentration and alpha-power assumes an influence of acute exercise on cognition. Further studies are necessary to evaluate and consolidate this effect.

Movement planning in ambiguous situations

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Human posterior parietal cortex (PPC) and dorsal premotor cortex (PMd) are critically involved in movement planning when a movement goal is specified. So far, it remains unclear whether movements are also planned when the movement goal remains ambiguous. Using fMRI we conducted a delayed-reaching task and manipulated the point in time when a context rule (pro vs. anti) specifying the movement goal was given (specified vs. underspecified conditions). We hypothesized that if reaches are planned in underspecified conditions similar activation patterns should occur as compared to specified conditions. Specifically, we focused on activation of the parietal reach region (PRR) and the PMd. In the specified conditions, parietal and premotor areas were activated supporting previous results. In the underspecified conditions, we found activation in the PPC, including PRR; however, activation in the PMd was lacking. Our results suggest that even in ambiguous situations putative movement goals are maintained in the PRR, whereas a precise motor command seems not to be established in the PMd. Whether these findings are effector-specific or can be extended to saccade planning will be examined in future studies.

EEG correlates of auditory goal-directed behaviour of young and old adults in a dynamic “cocktailparty” scenario

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The ability to understand speech under adverse listening conditions deteriorates with age. In addition to genuine hearing deficits, age-related declines in attentional and inhibitory control may contribute to these difficulties. Here, the impact of task-irrelevant distractors on speech perception was studied in 24 younger and 24 older participants in a simulated “cocktailparty” scenario. A rapid succession of short speech stimuli (“on” and “off”) was presented at a frequent standard location or at a rare deviant location in silence or with a concurrent distractor speaker. Behavioral responses and event-related potentials (mismatch negativity, P3a, and reorienting negativity) were analyzed to study involuntary shifts in attention to the task-irrelevant changes in target location. While rare switches in target location decreased performance of both age groups, this effect was much more pronounced in the older group. Especially in the distractor condition, the electrophysiological measures indicated a delayed attention capture and a delayed reorienting to the task-relevant stimulus feature in the old group, relative to the young group. In sum, the results suggest that deficits in the orienting-reorienting mechanism contribute to the age-related decline in speech perception in dynamic listening situations with multiple speakers.

Perceptual grouping and saccadic eye-movements

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We examined the influence of perceptual grouping on different properties of goal-directed eye-movements. We found that saccadic latency was a more reliable implicit measure of grouping strength than saccadic curvature or saccadic landing site. Then we used saccadic latency to compare the strength of grouping by proximity and good-continuation. Our initial results suggested that circles (perceptual group) formed by a set of dots embedded in a background of randomly placed dots reduced the time to initiate a saccade to a target when the circle appeared in a location congruent with the target compared to incongruent locations. To distinguish between the effects of grouping by proximity and by good-continuation we used fields of oriented Gabor elements instead of dots. The circles were defined by proximity and by good-continuation, or by proximity only or by good-continuation only. We found that grouping by proximity and good-continuation resulted in significant differences in saccade latencies between congruent and incongruent trials but proximity or good-continuation per se failed to show any significant effect in the absence of the other cue. Lastly, comparison with typically used manual reaction-time and percent-correct measures for grouping show that these subtle effects can only be seen with eye-movement based metrics.

Hirnkorrelate der frühen Verarbeitung visueller Ästhetik

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Mittels Bildgebung konnte gezeigt werden, dass die Verarbeitung ästhetisch ansprechender Reize mit verstärkter Aktivierung visueller Hirnareale einhergeht. ERP-Studien fanden Amplitudenerhöhungen der Positive Slow Wave und der Early Posterior Negativity, seltener bereits eine attraktivitäts-bezogene Erhöhung der posterioren P1. In unserer Studie nutzten wir erstmals ein Hinweisreiz-Paradigma, bei dem anhand von Vorversuchen als schön bzw. weniger schön klassifizierte Landschaftsbilder durch valide (50%) oder invalide (50%) Hinweisreize angekündigt wurden. Dies ermöglichte ERP-Vergleiche für identische Reize zur Kontrastierung der Verarbeitung erwarteter vs. unerwarteter Schönheit. 48 Probanden beurteilten 90 schöne und 90 weniger schöne Landschaftsbilder, während ein 64-Kanal-EEG aufgezeichnet wurde. Die beiden Bildklassen unterschieden sich nicht in elementaren visuellen Eigenschaften wie Farbe, Helligkeit, vertikalem Schwerpunkt, Kontrast und Größe. Es zeigte sich eine erhöhte C1-Komponente striatalen Ursprungs (Gipfellatenz 68 ms) spezifisch für invalide angekündigte schöne Bilder. Die P1-Komponente (108 ms) war spezifisch erhöht für valide angekündigte schöne Bilder. Die N1-Komponente (140 ms) war valenz-unspezifisch erhöht für invalide vs. valide angekündigte Bilder. Spezifische ERP-Effekte für weniger schöne Bilder zeigten sich erst an der N2-Komponente (282 ms), als N2-Erhöhung nach invalidem Hinweisreiz. Die Befunde zeigen erstmals eine Modulation der C1-Komponente bei der Verarbeitung visueller Ästhetik und belegen die extrem frühe Detektion unerwarteter (C1) und erwarteter Schönheit (P1).

Taking a field trip – A comparison of train-drivers' perceived workload and gaze behaviour in simulation and real-life operation

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Simulator-studies are the method of choice to understand operator behaviour and evaluate effects of new technologies and designs for information- and assistance-systems in various domains. They offer high internal validity and standardization and the opportunity to elicit critical situations without exposing participants to hazard. The complex socio-technical context, in contrast, is hard to recreate in a laboratory environment and effects related to it might remain undiscovered, impairing external validity of results. Since socio-psychological factors like time-pressure, responsibility towards passengers and dangers to the operating system (e.g. vehicles on level crossings, objects/ persons near the tracks) are believed to be of great importance to the train-driving task, we made use of a consecutive approach to examine transferability of simulator findings to the field. We compared data of professional train-drivers (N=14 simulator, N=24 field) receiving 2 types of speed recommendations in 8 situations. The results revealed shifted priorities between monitoring of track and on-board instruments, as well as altered cross-checking of timetable information. However, evaluation criteria for the speed recommendation types showed no context effects. It is concluded that future train-driver studies need to consider if their objectives directly relate to socio-technical factors and chose settings accordingly.

Copying competitors? Interdependency modulates stimulus-based retrieval of observed responses

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We investigated whether stimuli are integrated with responses that are merely observed, but not executed by oneself, and examined the moderating role of mutual dependency between co-actors on the binding and retrieval of stimuli and observed responses. In the present experiment, a sequential prime-probe design was shared between two co-actors who took the roles of actor and observer in turns. Stimulus relation and compatibility between observed (prime) and to-be-performed (probe) responses was varied orthogonally within participants; interdependency between the pairs of participants (cooperation vs. competition vs. independence) was varied between participants. Results indicate that prime observers showed stimulus-based retrieval of observed responses when it was their turn to act in the two interdependent conditions, whereas prime observers in the independent condition did not. We conclude that binding and retrieval of stimuli and observed responses is a conditionally automatic process that is contingent on mutual dependency between actor and observer.

The Reversed Description-Experience Gap

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Previous research suggests that risky choice patterns in general - and probability weighting in particular - are strikingly different in experience-based as compared to description-based formats. In a reanalysis and three new experiments, we investigate differences between experience-based and description-based decisions using a parametric approach based on Cumulative Prospect Theory (CPT). Once controlling for sampling biases we consistently show a reversal of the classic Description-Experience gap, that is, a reduced sensitivity to probabilities and increased overweighting of small probabilities in decisions from experience as compared to decisions from description. We show that previous findings are limited to specific types of decision tasks with minimal complexity and that the findings reverse when adding non-reduced binary choice tasks.

Navigation performance and strategy selection mechanisms

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The field of spatial navigation debates the influence of age, gender and cultural background. Here we investigated in how these factors account for differences in navigation strategy selection and performance. By an online study we recruited 1165 participants. They watched videos with passages through star-fields including one turn around either the yaw or pitch axes. At the end they selected one out of four homing arrows pointing towards the initial starting location. We measured error rate (axis confusion), reaction time and navigation strategy (turner vs. non-turner type response). An ANOVA reveals significant main effects of factors age, gender and cultural background on error rate. With respect to reaction time main effects of age and gender were significant. Analysing interactions, only the product of gender and culture showed a significant effect on error rate. We base analysis of navigation strategy on a logistic regression. Results reveal a strong influence of cultural background with a minor contribution of gender and age on strategy selection. In summary, this study demonstrates significant influences of all three variables, age, gender and cultural background, on navigation. Navigation strategy and performance is therefore dependent on internal as well as external variables.

Hide or Seek!

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In the following study, the legal definition of ‚intimidation‘ by the German Federal Constitutional Court (1983) was conceptualized as internalized normative social influence (Deutsch & Gerard, 1955) on behavioral regulation. On the cognitive level, this normative social influence requires a discrepancy between how one sees himself (actual self) and societal expectations towards the self (ought other self, Higgins, 1987). According to the so called ‘intimidation assumption’ (Federal Constitutional Court, 1983), individuals are motivated to reduce such a discrepancy because otherwise they might suffer negative social consequences. As a consequence, individuals prefer behavioral strategies that do not disappoint societal expectations by avoiding publicity to the actual self. Higgins (1997) calls this motivational focus on avoiding an anti-goal ‘prevention focus’. Limitations: The intimidating expectations must be personally relevant (Schwarz & Strack, 1981), since otherwise social negative consequences would not touch oneself. On basis of this theoretical framework, hypotheses for behavioral regulation and affective consequences were tested with two versions of an intimidating scenario (‘decree against political extremism’). After a short ought-prime, subjects showed significantly stronger intimidated reaction to the scenario located in Germany than subjects with the Austrian version. Self-awareness had no influence. These results support the suggested theoretical framework.

There is more to contingent capture than feature search

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Top-down search goals can guide attention in visual search tasks in the form of so-called contingent capture. Here, we investigated whether contingent capture depends on recently experienced cue utility. To this end, we employed the spatial cueing paradigm of C. L. Folk, R. Remington, and J.C. Johnston (1992), and analysed cueing effects (i.e., differences between longer RTs in invalid than valid conditions) in trial N as a function of cue validity in a preceding trial N-1. Experiment 1 showed that a valid cue in trial N-1 boosted the cuing effect in a subsequent trial N. The cuing effect especially benefitted if cues in trial N-1 matched the search set. In addition, valid cues in N-1 even boosted the cuing effects of irrelevant cues in trial N. Experiment 2 ruled out that our results can be explained by position priming. Experiment 3 extended our findings to tasks where the search set consisted of two different colours. Our results provide a new perspective on contingent capture.

Why do people smile? – Testing the taxonomy of smiling according to the Zurich model of social motivation.

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The various types of smiling have until now been classified according to mimic or situational criteria. However, so far, there's a lack of theory able to explain the occurrence of smiling in all possible situations. Bischof's Zurich model of social motivation provides such a theory, explaining smiling by a momentary reduction of an individual's autonomy claim, shown in six different motivational states. We tested the Zurich Model's taxonomy for smiling compared to Ekman's types of smiles, hypothesizing a correspondence of classification with joyful smiles in all three motivational states of appetence, with Non-Duchenne-smiles in states of aversion. We expected that the Zurich Model provides a further differentiation, assigning a specific emotion to any type of smile. Participants were watching theory-based chosen smiles from movies/TV series and characterized them according to both theories. The Zurich Model's classification rate was high above chance in five categories including the correct assignment of predicted emotions. Smiles in the three states of appetence corresponded to joyful smiles, in the three states of aversion to Non-Duchenne-smiles, further differentiated by the state-specific emotion. Results indicate that the Zurich model provides a theory that is able to describe the whole phenomenon of smiling and promises further progress.

Estimation of response speed in the presence of contaminated response times

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In experimental psychology, psychometrics, and applied evaluative research, behavioral performance is often measured by means of task completion times (e.g., the time it takes to respond to a visual signal, or to choose among a number of alternatives in a multiple choice task). Participants usually do not respond with 100% accuracy, however. Estimation of response speed is then difficult because the task completion times are contaminated by outliers, omitted and erroneous responses. Analysis of the subset of correct responses yields biased estimates and does not make full use of the available information. We present simple ad hoc data cleaning methods for task completion times contaminated by outliers, omissions and erroneous responses, and we show that these methods can substantially reduce bias and uncertainty of estimates of response speed. The method is illustrated using data from an evaluation of integrated displays in intensive care units.

Attention modulates visual-tactile integration in a novel spatial pattern matching task

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Extensive research in the field of multisensory perception has established a set of principles governing integration processes and cross-modal interactions between different sensory modalities. Beside factors like temporal synchronicity and spatial coincidence between stimuli occurring in multiple modalities, semantic or contextual congruence have also been shown to facilitate integration. Here we evaluate the role of attention in a novel visual-tactile pattern matching task that requires the identification of spatial patterns that are concurrently presented visually and in the tactile domain by means of a Braille stimulator. Our hypothesis was that cross-modal stimulus congruence would influence behavioral performance differentially depending on the focus of attention. We expected congruence gains in detection performance to be more pronounced under divided attention demands as compared to modality specific focused attention. Our results show robust stimulus congruence driven advantages in detection performance under different attention demands. For visual, tactile and combined visual-tactile targets, congruent stimulus pairs led to quicker and more accurate detection compared to incongruent stimulation. As assumed, this congruence facilitation effect was more prominent under divided attention. These findings shed light on the dynamic interplay of top-down attentional control and multisensory processing in a visual-tactile setting.

Reduction of the Attentional Blink Through Training: Increased Processing Capacities?

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In a RSVP paradigm, the probability of identifying a target item (T2) preceded by another target item (T1) is seriously impaired, if the SOA between T1 and T2 is relatively short. This so called attentional blink is usually explained by limited processing capacities during the sequential processing of items. Considered to be a robust effect, Choi et al. (2012) recently showed that a simple training procedure, in which T2 was made color salient, might completely overcome the attentional blink. However, Tang et al. (2013) argued that the elimination of the attentional blink through the method of Choi et al. (2012) might be the result of temporal expectations, since Choi et al. (2012) did not vary the positions of T1 and T2 in the RSVP stream. Based on these studies, we implemented a three day training procedure with randomized positions for T1 and T2, in order to rule out possible temporal expectations. We found, that the three day training indeed significantly improved the performance for T2 items at short SOAs, even though the performance for T2 items at long SOAs remained superior. As a result, our training procedure could reduce but not entirely eliminate the attentional blink.

Validating a Two-High-Threshold Measurement Model for Recognition Memory and Ternary Response Scales

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Albeit being an intensely debated topic, a number of recent results have indicated that recognition memory performance is more adequately measured by models assuming discrete latent memory states instead of a continuous memory distribution (Kellen, Klauer, & Bröder, 2013; Province & Rouder, 2013). However, the classical discrete state model, the two-high threshold model (2HTM; Snodgrass & Corwin, 1988), is unidentified for the simplest recognition memory task with two response options ("old" and "new") unless questionable parameter restrictions are introduced (see Kellen et al., Table 4). We validated a fully identified extension of the 2HTM for a recognition memory task in which we introduced an "unsure" response option (Singmann, Kellen, & Klauer, 2013). Specifically, we established a double dissociation of memory strength and response tendencies (response caution) providing strong evidence for the theoretical interpretation of the model parameters. To manipulate memory strength some items were shown once whereas other items were shown trice in the learning phase. To manipulate response tendencies we implemented different payoffs associated with correct, unsure and erroneous responses between test blocks (between subjects we used two different such manipulations). As expected, memory manipulation solely affected memory parameters, whereas different payoff schemes solely affected guessing parameters.

Spiel oder nicht Spiel - Der Einfluss von Kontext und Erwartungen auf UX

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Ein ansprechendes Produktdesign und eine gelungene User Experience (UX) zählen zu den wichtigsten Verkaufsargumenten digitaler interaktiver Produkte. Starke Konkurrenz fördert innovatives UX-Design und die Entwicklung neuer Design-Techniken. Den Benutzer mithilfe unerwarteter Produkt-Features zu überraschen hat sich als vorteilhaft für die Interaktion zwischen Produkt und Benutzer erwiesen. Leider sind diese Befunde meist auf klassisches Produktdesign beschränkt. Die Übertragung dieser Erkenntnisse aus der Perspektive klassischen Produktdesigns auf digitales interaktives Design ist der Schwerpunkt dieser Arbeit. In zwei Studien haben wir versucht, im Nutzer Überraschung während eines digitalen Tetris-Spiels hervorzurufen und den Einfluss von angenehmen und unangenehmen bzw. neutralen Überraschungen auf die UX-Bewertungen des Spiels untersucht. Die Manipulationen hatte Einfluss auf die affektiven Zustände der Nutzer, angenehme Überraschung sorgte für eine Erhöhung des emotionalen Zustands der Nutzer, und umgekehrt. Interessanterweise erhöhte unangenehme Überraschung in Form von herausfordernden Botschaften die Produktloyalität für unangenehme Überraschung im Vergleich zu neutraler oder angenehmer Überraschung. In einem nächsten Schritt wird Überraschung in einer zielorientierten mobilen Anwendung umgesetzt, um die Gültigkeit dieser Ergebnisse in einer Non-Gaming-Umgebung zu testen. Eine App für öffentliche Verkehrsmittel wurde entwickelt und wird auf einem Tablet getestet.

I spy with my little eye - The unconscious processing of head fakes in basketball

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Two masked priming experiments were conducted to investigate the unconscious processing of head fakes in basketball. Basketball player and novices had to classify target pictures as either reflecting a basketball player passing a ball to the right side (right button) or passing a ball to the left side (left button). Before the target appeared, a masked prime picture was presented (17 ms), also showing a passing basketball player. At half of the prime pictures the head orientation was contrary to the pass direction (i.e. head fake). To manipulate the benefit of an intentional suppression of the task irrelevant feature head orientation, the target set was changed between experiments. Results generally revealed congruency effects for the factor pass direction for both groups, indicating an unconscious processing of the task relevant feature. Regarding the task irrelevant feature head orientation, both groups of participants unconsciously processed the head orientation if there was no task relevance to suppress its processing (i.e. only target pictures without head fakes). However, if the head orientation hampered the classification of the pass direction (i.e. only target pictures with head fakes) results differed between groups: Basketball player did not unconsciously process the head orientation whereas novices did.

Latent Semantic Analysis Accounts of Lexical Priming

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Latent Semantic Analysis is a procedure that represents the meaning of words and texts as vectors in a high-dimensional semantic space, derived from a corpus of text documents. This representation allows for a formal definition of semantic similarity, namely the cosine of such vectors. In two experiments, we investigated whether these formal similarities can be used to predict human behavioural data. In both experiments, a priming paradigm with a lexical decision task was employed. In Experiment 1, single concrete nouns were used as primes. Targets (also single concrete nouns) were selected purely on the basis of their cosine similarity to the prime. It turned out that including the cosine similarity in a Linear Mixed Effect Model significantly improved the prediction of latencies after an unfit prime-target pair was removed from analysis. In Experiment 2, two-word phrases consisting of a single concrete noun and an intransitive verb were used as primes. Again, including the cosine similarity in a model improved its predictions. This was true for various ways of computing the meaning of the phrase, including simple addition of vectors, the context-sensitive predication process by Kintsch (2001), as well as just taking the vector corresponding to the phrase noun.

How Boredom Impedes Creative Performance

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Boredom has, so far, been mostly examined as a dysfunctional negative achievement emotion. Exceptions are earlier studies finding beneficial effects of boredom-inducing repetitions in creativity tasks. However, those studies did not explicitly control for potentially alternative explanations such as practice effects. Our aim was to examine how task-related boredom influences creative performance. To examine this issue, we conducted an experiment where participants performed twelve subsequent semantic generation tasks and rated their degree of boredom after each experimental block of two tasks. Analyses of variance with repeated measures revealed that participants' boredom increased over the six subsequent blocks, as did fluency performance. Additional analyses combining these two measures revealed that both boredom and experimental block were significant predictors of individual performance. However, boredom was a negative predictor and experimental block a positive predictor. These findings indicate that boredom has detrimental effects on creative performance, particularly in late idea production. However, such detrimental effects of task-related boredom seem to have been masked in earlier studies by practice effects which can have strong effects on fluency performance in creativity tasks.

Fast visuomotor processing of morphed spider pictures in spider-fearful and non-anxious participants

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In a recent study, Kolassa and colleagues [2007, *Behavioral and Brain Functions*, 3(1), 59] reported an interpretative bias in spider phobic participants. These participants rated ambiguous schematic images that gradually transformed from a flower into a spider more readily as a spider compared to non-anxious control participants. We wanted to know whether this bias is already present in fast visuomotor processing. In a response priming paradigm, we tested a group of spider-fearful and control participants with the images by Kolassa and colleagues. In each trial, a morphed schematic picture (prime) and a schematic flower or spider (target) were presented in rapid sequence. Participants had to perform speeded keypress responses to classify the target as a flower or as a spider. We found that primes resembling a spider (or flower) also primed like a spider (or flower). This effect was moderated by the similarity of the prime to a flower or spider (i.e., strengthened with increasing similarity). Additionally, we observed an advantage in information processing in spider-fearful participants (i.e., spider targets led to faster response times). We compare and discuss these findings with respect to rapid and automatic information processing of emotionally significant stimulus material in fearful individuals.

Information integration in the Wheel of Fortune task

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Gambles, such as the Wheel of Fortune Task (WoF; Ernst et al, 2004) or the Cake Gambling Task (Van Leijenhorst et al., 2010) are often used to study aspects of decision making. For two competing options, a choice is usually considered as optimal if the option with higher expected values ($EV = \text{probability} \times \text{reward}$) is chosen. However, many gambles are designed in a way that participants do not need to integrate information by calculating EV's, but can choose optimally based on a single information (e.g., high winning probabilities). To examine the dynamics of information integration in gamble situations, we modified the two-option WoF task in a way that either the higher winning probability but not the larger monetary value indicates an optimal choice (value-incongruent condition), and vice versa (probability-incongruent condition). Distributional analyses of response times revealed a preference for choosing options with a larger winning probability that was particularly strong for fast responses. With longer response times, participants increasingly considered both types of information, which, however, also led to less optimal choices in some conditions. We additionally examined how feedback influenced participants' choices and further tested how well different decision theories can explain our results.

Zusammenhänge kognitiver Leistungsfähigkeit und der Performance bei Aufgaben mit unterschiedlich benutzerfreundlichen Interfaces an einem Tablet Computer

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Der CFT-20-R misst das allgemeine intellektuelle Niveau einer Person, welches als Fähigkeit verstanden werden kann, figurale Beziehungen bzw. formal-logische Denkprobleme mit unterschiedlichem Komplexitäts- oder Schwierigkeitsgrad zu erkennen und innerhalb einer bestimmten Zeit zu verarbeiten (Weiß, 2006). Doch erleichtert die kognitive Leistungsfähigkeit auch die Bearbeitung von wenig benutzerfreundlichen Aufgaben? In einer Laborstudie im Rahmen des Forschungsprojektes EVE (Effiziente VerbraucherEinbindung) erfassten wir zwei Untertests des CFT-20-R und eine Reihe spezifischer Leistungsaufgaben bei der Nutzung einer selbstentwickelten App zur Kontrolle des persönlichen Stromverbrauches. Es konnte gezeigt werden, dass das Ergebnis der CFT-20-R Untertests stark negativ mit der Bearbeitungsgeschwindigkeit und der Anzahl der Fehlklicks bei Aufgaben an einem leicht zu bedienenden Interface korreliert. Bei einem schwer zu bedienenden Interface hingegen korreliert das CFT-20-R Ergebnis nicht signifikant mit der Bearbeitungsdauer und der Anzahl der Fehlklicks. Die Befunde sprechen dafür, dass kognitive Leistungsfähigkeit bei einer schlechten Bedienbarkeit keinen Einfluss auf die Bearbeitungsgeschwindigkeit oder die Anzahl der Fehlklicks hat. Nur bei gut bedienbaren Interfaces können kognitiv leistungsfähigere Personen eine bessere Performance zeigen.

Visual landmark salience in human wayfinding – How important are color and shape?

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Landmarks are typically considered very helpful in human wayfinding due to visual (inherent) properties making them to stand out from their immediate environment, such as color, shape, size, texture, etc. Empirical research on these features is rare. We therefore investigated participants' preferences for colors and shapes when there is the possibility to create "your own landmark" for use in path learning. Fifty-six students from Giessen University participated (mean age: 24 years; SD: 4.5). They had to choose a combination of color and shape as landmarks for each of four intersections with two left and two right turns. The task was to use their subjectively preferred combinations in order to learn and later remember the path correctly. Each color and shape could only be used once (e.g., a red square and a blue square were impossible). Results showed a significant preference for certain colors and shapes over others, e.g., red and triangle. However, the most important aspect seemed to be the position of landmarks. Out of the four possible positions the position before the intersection and in direction of the turn was significantly more often used than all the others. Findings are discussed within a revised model of landmark salience.

What aspects of early mathematical abilities are resistant against socioeconomical influence?

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Parental social background has been found to influence children's mathematics performance (e.g. Jordan & Levine, 2009). Gilmore, McCarthy and Spelke (2010) showed that socioeconomic status only affected symbolic arithmetic abilities of 5-6 year-olds, not their nonsymbolic arithmetic skills. However, this latter task required estimation and was nonsymbolic. Thus, it remains unclear what aspect exactly is responsible for the resistance against socioeconomical impact – the activation of the approximate number system or a nonsymbolic problem representation. Some studies already have focused on this question. However, they either did not instantiate all possible combinations or the studies had some methodological problems (cf. Jordan, Huttenlocher & Levine, 1992; Mejias & Schiltz, 2013). In the current study, we tested first graders at the beginning of the school year in a 2 (task format) × 2 (calculation versus estimation) design. That is, children received tasks measuring their competencies in exact arithmetics and estimation in a nonsymbolic versus in a symbolic format. Results suggest that not problem format but the approximate number system is the crucial factor which is unaffected by parent's socioeconomical background. Results will be discussed in light of theoretical as well as practical implications.

Acquisition vs. memorization trade-offs: individualized and adapted to task constraints

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In view of optimizing task performance, the application of visual working memory (enabling memorization) and gaze or body movements (enabling acquisition) must be balanced based on their occurring costs (i.e., time, energy, etc.) resulting in an acquisition vs. memorization trade-off. For changing costs (memorization as well as acquisition), it could be shown that this trade-off was adapted adequately in a robust and cost-optimized manner. In this study, we present continuing results concerning trade-off adaptations in a simplified version of a comparative visual search paradigm where costs for acquisition as well as memorization can be manipulated easily. In order to control time available for actions, a mask (covering always one stimulus array) must be shifted between the two arrays by using the mouse buttons. Here, costs for acquisition were manipulated by changing the time subjects had to wait before the mask moved and new information of the other array could be perceived (delay: 0, 0.5, and 1 s). Additionally, the costs for memorization were manipulated by using stimuli with varying complexity regarding perception (color vs. complex objects). The overall results show a robust, significant, but differing degree in trade-off adaptation depending on the manipulated task constraints (costs) and the individual subjects.

Positiver Transfer von im außerschulischen Instrumentalunterricht erworbener Fertigkeiten auf instrumentenspezifische (generische) musikpraktische Kompetenzen bei Schülern

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Die Leistungs-Heterogenität von Lerngruppen im Schulfach Musik wird vielfach auf den außerschulischen Instrumentalunterricht zurückgeführt. Im Zuge eines von uns entwickelten Kompetenztests ist es möglich, den positiven Transfer („Wettbewerbsvorteil“) der Instrumentalschüler zu quantifizieren. In Gruppensitzungen bearbeiteten insgesamt 51 Schüler der Klassenstufe 10 jeweils 10 unterrichtstypische Melodieaufgaben entweder an einem Keyboard (n=22) oder einer neu entwickelten Instrumenten-App (n=29). Die auf Computer aufgezeichneten Schüleraufnahmen wurden dann von drei Musiklehrern auf einer 6-stufigen Skala bewertet (ICC[2,1] = .86; ICC[2,3] = .95) und jedem Schüler anschließend eine gemittelte Bewertung zugeordnet (Cronbach Alpha der 10 Aufgaben .94). Eine Korrelation der App- und Keyboard-Ergebnisse von 18 Probanden, die ein zweites Mal mit dem jeweils anderen Eingabegerät teilgenommen hatten, ergab $r=.85$. Die Eingabegeräte sind also miteinander vergleichbar. Ein T-Test zeigte, dass die Instrumentalisten erheblich besser abschnitten als Nicht-Instrumentalisten ($t[49]=7.79$; $p(\text{einseitig})=.001$; $d=2.38$). In einer weiteren Studie wird derzeit festgestellt, welche Dauer von Instrumentalunterricht für einen praktisch relevanten Wettbewerbsvorteil (von $d=.50$, $.80$, 1.00 etc.) notwendig ist. Hierfür werden bereits erhobene Daten von 460 weiteren Schülern herangezogen. Diesbezügliche statistische Analysen werden zur Tagung auf dem Poster präsentiert.

Having a drink with Tchaikovsky: The crossmodal influence of background music on the taste of beverages.

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There is evidence that background color influences the taste of wine. We investigated whether an auditory background can likewise modify the taste of a beverage. First, we collected ratings of the subjective "flavor" of different musical pieces. Then we used a between-subjects design to cross the musical backgrounds with taste evaluations of several beverages. If descriptive and evaluative aspects of musical pieces are crossmodally transmitted from auditory to gustatory perception, the "flavor" of the background music should – to some extent – carry over to perceived taste. Furthermore, we hypothesized that such an effect is stronger for musical novices than for musical experts, and that it is weaker for aqueous solutions than for wines. Participants tasted four different samples of beverages under two contrasting audio conditions and rated their taste experience. The emotional "flavor" of the music had significant effects on the taste of the beverages. Neither group differences nor differences between wines and solutions could be found. We discuss implications of this audio-gustatory interaction for the food industry.

Subgroups of Persons Share a Specific “Taste” for Abstract Artworks

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Within the last decades, abstract art has become an interesting research topic in the field of empirical aesthetics. Strikingly, subjective ratings on abstract artworks are commonly quite heterogeneous. To investigate whether subgroups of participants show diverse tastes for abstract paintings, we used a k-means clustering method to divide participants, who rated the beauty of abstract artworks, into seven subgroups that each reflected a specific rating pattern, or – in other words – a specific “taste” (Exp.1). Next, we demonstrated that, within the subgroups, participants preferred a particular pattern of statistical image properties in the artworks. These properties include several color measures, as well as self-similarity and complexity (Exp.2). Additionally, we performed an experiment on shifts of evaluation within the subgroups and found a clear pattern of perceptual contrast. The perceived beauty of abstract paintings decreased after exposure to paintings that were rated as more beautiful, and it increased after exposure to less beautiful paintings (Exp.3). We speculate that the shift in evaluation is, at least in part, based on low-level adaptation to the statistical image properties. Our findings demonstrate that subgroups of people share a specific “taste” for abstract paintings that correlates with patterns of statistical image properties.

The neural integration of intrinsically meaningful gestures – an EEG and fMRI study

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Previous research has identified posterior superior temporal sulcus/middle temporal gyrus (pSTS/MTG) and left inferior frontal gyrus (LIFG) to be the most possible neural substrates of gesture-speech integration during online comprehension of co-speech gesture. Moreover, the two areas are found to be differentially involved in multimodal integration: pSTS is related to the matching of gesture and speech whereas LIFG is found to be activated only when a new semantic representation is constructed (e. g. in iconic gestures but not in pantomimes). In the current study, we tested intrinsically meaningful gestures (IMGs) with event-related fMRI and EEG by comparing three conditions: IMGs with German speech (GG), IMGs with Russian as a foreign speech (GR) and only speech (SG). As the online integration of IMGs with speech does not require the construction of new semantic representation, we expected only activation of pSTS but not LIFG for integration (GG>GR∩GG>SG). The results of the fMRI experiment support this prediction. In the EEG experiment, we found that a centrally-distributed alpha (7-13 Hz) power decrease 600-1000 ms post onset of the critical integration word is related to the gesture-speech integration process. This is, to our knowledge, the first temporal and oscillatory evidence for gesture-speech integration.

Transitive Causal Induction and Distorted Betting Decisions

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In causal learning it is often implicitly assumed that the structural implications of causal models and empirical evidence are consistent. For probabilistic causal relationships, however, this may not be the case. Mismatches between structural implications and empirical evidence may occur, which can lead to distortions of empirical evidence. People may use generative causal relationships $A \rightarrow B$ and $B \rightarrow C$ to infer substantial positive relationships between events A and C, despite data showing that A and C are actually independent (von Sydow et al., 2009; 2010). In two experiments we show that assumptions of transitivity also affect people's decision making: In a chain of four events local probabilistic relationships ($A \rightarrow B$, $B \rightarrow C$, $C \rightarrow D$) were strongly positive while the global relationship $A \rightarrow D$ was strongly negative, violating transitivity. Participants who focused on local relationships during several learning phases wrongly judged $A \rightarrow D$ to be positive. Participants who only focused on the global relationship accurately judged $A \rightarrow D$ to be negative. When asked to bet on D or $\neg D$ based on information about A, the local-only group performed significantly worse than the global-only group. Unwarranted assumptions of transitivity therefore not only lead to distorted judgments of causal relationships, but also to non-optimal betting decisions based on these beliefs.

Processing cheaters: Intergroup differentiation and individual differences

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Cheaters must be detected and remembered in order to maintain ingroup cooperation. Scientific evidence shows that an enhanced memory for cheaters is due to general mechanisms, namely a better memory for emotional and expectancy incongruent information. We extended these findings by an intergroup context, expecting that only ingroup cheaters are remembered better. Positive ingroup regard and less positive outgroup evaluation imply inconsistencies especially for negative action of ingroup members and positive outgroup behavior. Additionally we expected individual differences in cheater memory, which are linked to differential concern about norm deviance (e.g., right-wing authoritarianism, RWA). In a series of experiments, we presented and recalled faces and behavioral descriptions of in- and outgroup targets. We applied multinomial models to disentangle source memory and guessing biases. Results show that source memory parameters are highest for ingroup cheaters and outgroup trustworthy persons. Furthermore participants' guessing indicates the assumption of ingroup trustworthiness and outgroup cheating. Furthermore, the results reveal that the relation between RWA and source memory reflects an ingroup cooperation enhancing pattern. Hence, the ingroup cheater memory extends our understanding of psychological mechanisms underlying collective action.

Translating knowledge into action: Age-related differences in the application of explicit strategies in visuomotor adaptation

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Previous studies showed that age-related differences in visuomotor adaptation primarily pertain to the generation of explicit knowledge. The present study aimed to assess whether these age-related differences are limited to the acquisition of explicit knowledge or extend to the application of the acquired explicit knowledge in terms of deliberate strategic corrections. Old and young participants performed aiming movements controlling a cursor on a computer screen with rotated visual feedback. One half of the participants received explicit pretraining of the rotation. The other half practiced a similar task which was unrelated to the upcoming rotation. Results show a residual age-related deficit in visuomotor adjustment despite comparable amounts of explicit knowledge. While younger adults were able to use this knowledge to fully compensate the rotation during goal-directed reaching movements, older adults still undercompensated the rotation in actual movement execution. This effect was particularly pronounced at higher levels of explicit knowledge. The study shows that the age-related difference in visuomotor adjustment affects the application of explicit knowledge. We suggest that these results reflect a recalibration of motor and perceptual space in the elderly, which limits their application of explicit knowledge represented in perceptual space through strategic corrections of hand movements in motor space.

Automatic processing of relational information in sequential priming tasks

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The sequential priming task is a popular paradigm to measure automatic stimulus processing. Classic priming models assume that the mere presentation of a prime stimulus results in an automatic retrieval of all its stimulus attributes. We instead propose that prime processing is constrained by the nature of the target task because it results from a misapplication of the task to the primes. This viewpoint also implies that prime processing can be far more complex than previously assumed possible. We tested these assumptions in five experiments in which participants were asked to categorize objects as larger or smaller than a reference object (football or car). Some primes depicted objects that were larger than the small reference object but smaller than the large reference object (e.g., bike; larger than the football and smaller than the car). For these primes we found task-dependent priming effects, that is, the same primes facilitated “larger than” or “smaller than” responses depending on the size of the reference object. This result was obtained when reference objects changed per block, trial, and even when primes were presented below subjective recognition thresholds. The notion of task-specific prime processing might allow for a more detailed measurement of implicit cognitions.

Kulturelle Unterschiede bei mentalen Modellen für Webobjekte

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Websites, die basierend auf den mentalen Modellen der Nutzer gestaltet wurden, sind für Nutzer leichter zu bedienen. Werden Webelemente entsprechend platziert, d.h. entsprechend den Erwartungen der Nutzer, können Fehler vermieden und die Effizienz der Interaktion mit Webseiten gesteigert werden. Bisherige Studien haben Daten über mentale Modelle verschiedener Arten von Webseiten gesammelt, jedoch stützen sich die Erkenntnisse dieser Studien auf Untersuchungen mit spezifischen Zielgruppen und berücksichtigen den Einfluss kultureller Aspekte nicht. Darüber hinaus hat sich die Gestaltung von Webseiten im Laufe der Zeit verändert und die erhobenen mentalen Modelle könnten veraltet sein. Um diese Einschränkungen zu beheben wurde eine Onlinestudie durchgeführt und die mentalen Modelle der Nutzer verschiedener Kulturen und Länder erfasst. Die Studienteilnehmer wurden gebeten, mit den gängigsten Webelementen (z.B. Navigation, Suchfeld) die Struktur einer für sie typischen Unternehmenswebseite, eines Nachrichtenportals und eines Online-Shops zu skizzieren. Diese mentalen Modelle wurden verglichen und länderspezifische sowie kulturell bedingte Unterschiede herausgearbeitet. Die Erfassung aktueller mentaler Modelle unter Berücksichtigung kultureller Unterschiede bietet die Möglichkeit, eine Vorlage für die Platzierung von Webelementen zu schaffen, die beim Design von erfolgreichen, länderspezifisch angepassten Websites zu Hilfe genommen werden kann.

Working memory training effects on brain response and untrained cognitive tasks in aging

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Age-related decline in working memory (WM) was found to correlate with alterations in blood-oxygen-level-dependent (BOLD) contrast in fronto-parietal brain areas. Recent research has indicated that WM training may influence task-related neural activity. In this study, functional Magnetic Resonance Imaging (fMRI) was used to compare BOLD response during n-back performance between younger and older participants, and to investigate training-related changes in older adults. Forty healthy older participants were randomly assigned to a training or control group, and 18 healthy younger participants served as a young control group. The older training group participated in a four-week adaptive n-back WM training. At pre- and posttest, the n-back task was conducted during fMRI in addition to neuropsychological tests outside the scanner. We found that increased neural efficiency and capacity, as reflected by more “youth-like” brain response patterns in fronto-parietal WM areas were associated with better behavioral training outcome in older adults. After WM training, decreases in BOLD response at low task demand were found, while behavioral performance in n-back and untrained cognitive tasks increased. These results suggest that WM training may lead to an increase in processing efficiency of the WM network, and that transfer to other cognitive domains remains possible in aging.

The emergence of ingroup favoritism in repeated social dilemmas

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The present study (N=168) addresses ingroup favoritism in social dilemmas and investigates whether people favor their ingroup from the very beginning or whether ingroup favoritism is a dynamic construct that develops over time during repetitive ingroup (own university) and outgroup (other university) interactions. Ingroup favoritism is assessed through cooperation behavior in a repeated prisoner's dilemma where participants interact 10 rounds with different members of the ingroup (outgroup) and 10 rounds with outgroup (ingroup) members. Based on people's need for positive distinctiveness (Social Identity Theory) and the tendency for expectation conforming perceptions we hypothesize that the same action can be processed differently depending on the actor's group affiliation: Positive (negative) experiences with ingroup (outgroup) members are selectively focused which in turn leads to an increasing gap between cooperation towards ingroup and outgroup members. The results confirm this hypothesis and indicate that ingroup favoritism is not a fixed state but develops over time.

Interference Effects in Concurrent Movement Perception and Action

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In daily life we are asked to adapt our behavior to the constantly changing and often unpredictable conditions in our environment. This adaptation can be influenced by perceptual processes, such as action observation. Based on this knowledge research on motor resonance shows that observing biological motion influences simultaneously executed actions (Kilner, Paulignan, & Blakemore, 2003). Biological motion provides motion-mediated structural and dynamic information (Troje, 2002), but so far there is no conclusive evidence on how these stimuli influence our motor system. On this background the present study examined if interference effects differ in terms of different types of biological motion information. 19 right-handed (9 female, mean age = 24.3 years, SD = 2.6) subjects performed lateral arm movements rhythmically while watching PLD-stimuli of similar movements. The stimuli differed in relation to the presence of structural and/or dynamic information. Kinematic data were recorded using a motion capture system. The results showed that subjects assimilate their actions to the observed stimulus contained dynamic but no structural information. In addition, movements were rhythmically more in time when observing biological motion stimuli in general. Therefore, it is concluded that dynamic information play a more decisive role in interfering with our motor system.

The effects of olfactory stimuli on motion sickness

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Visually induced motion sickness (VIMS) is commonly experienced when a subject is immersed in a virtual environment and sensory information from the vestibular and visual senses is discordant. We examined whether pleasant and unpleasant olfactory stimuli would modulate the effects of motion sickness. Subjects watched a 10-minute video in a seated position with a stabilized head. The video depicting a continuous bicycle ride, was filmed with a camera mounted to a bicyclist's head. The Fast Motion Sickness Scale was employed to continuously measure the subjects' well-being. We used a Nintendo Wii Balance Board to measure postural sway prior to and after exposure to the video. Sway was characterized by a best-fit-ellipse encompassing the dominant cluster of pressure points. The relationship between sway and motion sickness will be discussed.

Smartphones Equal Peacock Tails: Conspicuous Consumption of Mobile Devices as Men's Sexual Signal of Short-Term Mating Intentions

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Based on handicap principle and costly signaling theory (Zahavi, 1975) studies show that individuals engage in wasteful behavior and purchase conspicuous luxury products to signal their mate quality to potential sexual partners (Griskevicius et al., 2007; Sundie et al., 2011). Moreover, men display mobile phones serving as lekking device to attract women and to deter rivals (Lycett & Dunbar, 2000). As today the use and display of mobile devices has become ubiquitous, we examined the conspicuous consumption of smartphones as sexual signal. Using a sample of 319 students we conducted an online experiment with a 2 x (sex: men vs. women) x 2 (relationship status: single vs. committed) x 2 (mating motive vs. control) between-participants design. Results revealed that short-term mating strategy predicted men's selection of a high conspicuous smartphone ($\beta = .27$, $t(106) = 2.89$, $p < .01$). Mating motive induction, relationship status, and their interaction with mating strategy, did not affect men's smartphone consumption. For women we found no significant effects of mating strategy, mating motive activation or relationship status. Our findings suggest that men use conspicuous smartphones to costly signal their short-term mating intentions similar to the peacock displaying its ornamental tail to attract peahens.

Global memory models or simple heuristics? A model-based examination of the Social Circle Heuristic

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The social circle heuristic (SCH) was recently proposed as a non-compensatory strategy for inferring population-level frequencies from instances stored in memory, for example disease prevalence or popularity of sports. Rather than exhaustively searching the entire memory, the SCH relies on a stepwise estimation based on successively larger ‘social circles’ in one’s social network. In particular, if ‘early’ circles provide sufficient evidence to make an inference, no further information is considered and instances in ‘later’ circles are ignored – thus (potentially) reducing cognitive processing effort. However, evidence for such an ordered, circle-wise, non-compensatory mechanism is still scarce and little is known on how the SCH relates to already existing models that account for frequency judgments from memory. To this end, we apply formal models of memory to social statistical inference tasks. In particular, we focus on established global memory models, which can account for a variety of common memory phenomena. Through simulations, we assess the degree to which the predictions of these models differ from those of the SCH. In addition, we reanalyse the original dataset presented as a demonstration of the SCH, and reappraise its descriptive utility in light of the alternative models.

I do not need to think about you! Co-representation during cognitive load in the social Simon task

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The joint go-nogo task is a frequently used paradigm in the research on joint actions. In this task two participants share a stimulus-response mapping by making a response to only one of two stimulus features – responses and stimuli can be spatially compatible or incompatible leading to what has been called a social Simon effect. In the typical ‘one participant’ version of the Simon task the Simon effect remains stable under cognitive load. This suggests that the underlying processes are rather automatic than deliberate. However, so far it has not been tested, whether the same is true of the social version of the Simon Effect. In our Experiments participants had to perform a standard joint Go/No-Go tasks under cognitive load. Cognitive load was produced by presenting a stream of spoken random digits via headphones, and asking the participants to nod when three consecutive odd numbers were presented. As a control condition, participants had to perform the same task without cognitive load. A spatial compatibility effect was found in both conditions, which suggest that the social Simon effect is caused by automatic processes.

Attentional effects of practising Qigong with and without music: an EEG study

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Qigong is a common technique of Traditional Chinese Medicine which is applied to strengthen physical and mental health. Several electroencephalogram (EEG) studies have reported changes in spectral band frequencies during Qigong meditation indicating a relaxed mental state. Much less is reported on effects of brain activation patterns induced by dynamic Qigong techniques which involve bodily movements to direct attention to movement control and kinaesthetic sensations. In the current study, we tested effects of background music on EEG theta and alpha activation administered during physical Qigong training. Participants performed the dynamic Qigong technique “Wu Qin Xi” under two different conditions (music, no music) and a control condition (listening to music) in a within-subjects design. Eyes-open and eyes-closed resting EEG was recorded before and immediately after each 15-minute exercise. Results show an effect of decreased alpha and theta activity after Qigong training accompanied by background music in comparison to the no music condition. We suppose that the observed effects on EEG-activation patterns result from shifts of attention induced by music to the external environment and therefore result in a reduction of intensity of the meditational state.

The role of blinking in cognitive processing

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While searching for possibilities of mobile neurophysiological measurements in realistic and complex working situations, we found blinks to be natural events that are correlated with cognitive processing in several ways. Offline identified blinks from electrooculography datasets of different studies were used to gain a deeper insight into those correlations. Spontaneous blinking is timed with cognitive processing in a reasonable way. Blinks are executed preferentially when a visual perceived information chunk is complete or shortly after the response in an experiment. Blinks from a choice reaction time experiment were found to be executed reliably after the response and increased in amplitude over time, indicating emerging mental fatigue. The same trend was found in blinks during a workplace simulation experiment, where participants could move freely, with a physical and a cognitive demanding task. The amplitudes were generally lower during the physical task, compared to the cognitive task, while increasing over time in both conditions. Blinks from an additional rest condition did not show such trends.

The Effect of Learning on Grasp Selections before Multistep Object Manipulations

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When grasping an object, the grasp foreshadows subsequent object manipulations. Two possible mechanisms could account for anticipatory grasp selections. Grasps could be computed based on intricate knowledge of arm biomechanics. Alternatively, grasps that were successfully applied earlier in similar situations could be recalled. To disentangle both accounts, participants were asked to rotate a pointer with a knob over an extended period of time. During learning blocks, a single-rotation group rotated the pointer to individual targets, a double-rotation group rotated the pointer subsequently to opposing targets (e.g. 90°, -90°), and a triple-rotation group rotated the pointer to opposing targets and then back to the initial target (e.g. 90°, -90°, 90°). In test blocks, single rotations had to be executed in all groups. Differences between grasps for clockwise and counterclockwise rotations (end-state comfort effect) remained unchanged in the single-rotation group. The end-state comfort effect decreased continuously in learning blocks of the double- and triple-rotation group, even though both groups did not differ. For the latter groups, the end-state comfort effect was larger in test trials than learning trials, albeit it was smaller than that of the single-rotation group. Thus, grasp selections seem to rely on recall as well as computational processes.

Hammock or rat race? The unconditional income from a psychological perspective.

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The unconditional basic income (UBI) is part of the medial and political discourse in Europe for several years now. One major critique of this concept is that the population would stop working immediately, if they received it. However, this assumption has never been tested to date. For this purpose we conducted an online study and randomly assigned 700 participants to 4 different conditions: Besides the control group (1), participants were presented with scenarios guaranteeing them 1000€ per month for the rest of their lives due to UBI (2), a lottery winning (3) or a major inheritance (4). Afterwards they indicated what they would change in their lives if they had the money. The control group was only asked whether they plan to change something in their lives in the near future [items designed in agreement with theory of planned behavior]. Analyses revealed that more people in the UBI-group would stay in their current jobs than in the control group. Additionally, a satisfied need for self-fulfillment and job satisfaction positively predicted this intention. However, the UBI-group was in fact more likely to reduce their weekly working schedule to spend more time with their friends and family, especially women with children.

Individual differences in dispositional cognitive reappraisal modulate the neural basis of fear acquisition and extinction

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Adverse learning experiences play an important role in the etiology of anxiety disorders. Individual differences in the regulation of negative emotions (by cognitive reappraisal) might be associated with different responses towards those negative events. There is, however, no study, investigating the association of individual differences in dispositional cognitive reappraisal with neural correlates of fear conditioning, in order to elucidate individual differences in negative emotional responses towards aversive events. The aim of this functional magnetic resonance imaging study was to examine the association of dispositional cognitive reappraisal with subjective, electrodermal and neural correlates of fear acquisition and extinction. Forty-one healthy individuals participated in a socially relevant differential conditioning paradigm (acquisition and extinction learning: day 1, extinction recall: day 2). Dispositional cognitive reappraisal was related to reduced right insula, and hippocampus activation during acquisition and stronger rostral anterior cingulate cortex activation during late extinction learning. On the second day, reduced recovery of conditioned arousal and reduced anterior cingulate and dorsomedial prefrontal cortex activation was observed in individuals with higher cognitive reappraisal scores. These results point to the important role of dispositional cognitive reappraisal in the development and modification of conditioned emotional responses and might further improve our understanding of anxiety disorders.

On the relationship between visual working memory and attention: New insides from the memory-based global effect

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Recent work indicates that covert visual attention, eye movements, and visual working memory (VWM) are closely interrelated. More specifically, it has been shown that the landing positions of memory-guided saccades are deviated towards the location of a task irrelevant distractor that was briefly flashed within a sector of $\pm 20^\circ$ around the target axis during the memory interval (memory-based global effect, Herwig, Beisert & Schneider, 2010, JOV). The two experiments of the present study address the question whether the previous finding of a memory-based global effect is in line with the suggestion that VWM may simply be visual attention constantly oriented to the representation of previously visible stimuli. To this end, one or two distractors were presented at different points in time (early vs. late) during the memory interval. In both experiments deviation was pronounced towards late distractors. This time dependent modulation of the memory-based global effect is not in line with the idea that VWM representations are actively retained by visual attention. The results are discussed in light of recent dual-state models of VWM.

The Garner-interference in perception and action: An alternative account

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When humans perform a perceptual classification task in which they have to judge the length of a rectangular object, their classification speed depends on whether there are also irrelevant variations of the object's width. Reaction times (RT) are considerably quicker when the irrelevant object dimension is kept constant (Garner interference). In contrast, in visuomotor tasks (grasping the object), RTs are unaffected by irrelevant variations of object width. This finding is accepted as reliable evidence that vision for perception (holistic) is functionally different from vision for action (analytic). Here we present evidence that this apparent perception-action dissociation can be attributed to differences in how interference effects are measured in perceptual and visuomotor tasks. When the perceptual task was manipulated such that the perceptual decision process could be extended beyond the RT-interval (responding by moving the hand to an answer button) the Garner-interference disappeared. Additionally, we show that interference effects can be induced in a grasping task by confining vision of the stimulus to the movement initiation phase. In summary, our experiments suggest that the occurrence of Garner-interference does not depend on whether perceptual or motor responses are required but on the time course available for response selection.

The importance of being attended: Internal attention and the maintenance of information in visual working memory

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Recent studies have demonstrated that visual working memory can be dynamically modulated according to behavioural goals. This is achieved via attentional orienting towards specific representations the observer wants to maintain. The present study further explores this modulation with a double-retrocue paradigm, in which attending and memorizing of items is systematically decoupled. Performance as well as event-related potentials associated with attentional selection and with the maintenance of information were analyzed. Results confirm that representations can be flexibly adjusted according to changing task goals, and strongly support the idea that no longer attended items are not discarded, but that attentional selection serves to protect those items that are most relevant for current task goals from decay. The present findings provide new insights into the way in which attention and working memory interact in order to cope with a constantly changing environment and into how an update of representations is obtained.

The functional anatomy of arm movements to peripheral targets

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The dual visual stream model is not at least based on the behaviour of neurological patients suffering from optic ataxia. Reaching for objects in the visual periphery, these patients demonstrate gross directional errors. In contrast, reaching for targets in the central visual field the patients' movements are rather accurate. The correlating brain damage should reveal structures that are crucial for the transformation of peripheral visual positions to motor parameters. Almost simultaneously with the publication of the typical lesions in patients with optic ataxia a few years ago, an fMRI study in healthy adults reported a cluster of cortical signals that was apparently in good agreement with the observed lesions. Recently, we demonstrated that this remarkable overlap was based on a fundamental misunderstanding of the original fMRI data. Furthermore, we extended the previously available anatomical description of optic ataxia through a considerable increase of the number of patients included in the anatomical analysis. Our data argue against the existence of a single, delineated parieto-occipital module for peripheral reaching. Instead, we should take into account the flexible distribution of visual and motor information processing across multiple, heavily interconnected visuomotor regions between the parieto-occipital cortex and the anterior dorsal superior parietal lobule.

“There and back again” – The influence of verbalisation and structural salience on finding the return path

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Previous findings in wayfinding research revealed effects of a landmark's position at an intersection (crossroad) on wayfinding performance and were accompanied by theoretical assumptions on the importance of mental transformation and language (Hamburger et al., 2013). Addressing these theoretical assumptions in this study, we investigated whether there is a variation in the influence of a landmark on finding the return path depending on its position at a crossroad and how spatial directions are verbalised on an initial path. Therefore, participants (N=34; age: M=25.15 years, SD=4.16) began with learning an initial path either with direction specific (left/right) or unspecific (e.g., in direction of) material. Afterwards, they had to find the return path of the learned route and, additionally, write down verbal route directions. Results revealed an effect of the influence of a landmark on finding a return path as a function of its structural position and verbalisation of spatial directions (trend). Moreover, a significant effect on the accuracy of the information in the route directions as a function of landmark position and verbalisation could be shown, supporting the findings of the wayfinding task. Our findings will be discussed within the current research literature on wayfinding with landmarks and spatial cognition.

Visual context modulates the influence of associations and production-based mechanisms on language-mediated anticipatory eye movements

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Influential recent theories of predictive language processing (e.g., Pickering & Garrod, 2013) suggest that humans use word associations and production-based mechanisms to anticipate upcoming language input. We investigated the contribution of associations and production fluency to language-mediated anticipatory eye movements. In a “visual world” experiment, participants looked at sets of four objects and listened to sentences featuring varying verb-noun association strength (e.g., Strong: The man peels an apple. Weak: The man misses a train.). On predictive trials, only the target object fitted the semantic constraints of the verb. When the objects were presented before the verb was heard (Experiment 1), participants looked at the target object before it was mentioned, but there was no effect of association strength. Interestingly, participants’ predictive looks correlated positively with their production fluency. When participants were given only a short preview of the display (after the verb was heard, Experiment 2), strongly associated targets were anticipated earlier than weakly associated targets and the correlation between predictive looks and production fluency was absent. We conclude that associations and production-based mechanisms play different roles depending on the situational context (e.g., the amount of visual input). Theories of prediction need to be revised to accommodate these findings.

Dissociation of stimulus visibility and fear-related processing

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Existence and extent of non-conscious processing in the human cortex are widely disputed. In the past, non-conscious perception was attributed exclusively to subcortical structures like the amygdala. While early involvement of the cortex in affective perception is included in recent theories, non-conscious processing is still assumed to impact only early stages of perception. There is no theoretically convincing evidence for affective evaluation independent of stimulus visibility. The necessary dissociation of visibility and affective processing has not been experimentally realized. We show that large cortical networks involved in affective processing operate independently of stimulus visibility. Results of a new method of analysis for MEG/EEG data yield maps of cortically localized dependencies of affective processing and stimulus visibility, the later manipulated on a cortical level by metacontrast masking featuring aversively conditioned stimuli. Under certain conditions, large frontal, prefrontal and temporal cortex areas show differential processing negatively correlated with stimulus visibility, starting ~100 ms after stimulus onset and steadily increasing up to > 500 ms after stimulus onset. This result suggests the theoretical independence of conscious processing and affective evaluation. Furthermore, non-conscious affective processing strongly outreaches previous assumptions in both the spatial and temporal dimension.

Learning rules in judgment: Comparing the delta-learning rule with linear regression models

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Making accurate judgments such as choosing a job candidate presumes an adequate weighting of more and less important aspects, say the candidate's skills. In social judgment theory, these weighting processes have often been successfully modeled with linear models. How people learn to make judgments has received less attention. The delta-learning rule can perfectly learn to solve linear problems and was proposed as a candidate describing rule-based learning processes. In a reanalysis of two experiments, we compared how well a linear regression model and two versions of the delta-learning rule can describe the learning process and generalize to new items in two linear judgment tasks: a perfectly predictable task and a noisy one. In the predictable task, the linear model described and predicted participants' judgments better than the delta-learning rule. In the noisy task, however, the delta-learning rule was comparable to the linear regression in describing and predicting participants' judgments. Further analyses showed that the delta-learning rule systematically overestimates how accurately people abstract less important cues in the predictable task. In the noisy task, however, all cues received similar weights. Taken together, these results suggest that successful rule-based learning models need to account for the attention paid to different cues.

Some remarks about the parameterization of the error negativity

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The response-related error negativity (Ne) reflects error processing or response monitoring processes. Only few studies investigated how close the Ne is related to the kind of response collected by the experimental hardware. The present study investigated whether the Ne differs between force locked and button press related data. Indeed, the Ne was more pronounced for force onset compared to button presses and was related to the steepness of the raise of force. The results implicate that the parameterization of the Ne has to be treated with caution under certain circumstances and it appears to be advisable to use force onset or the electromyogram to detect response onsets if timing or latency is relevant.

Volitionale Bewegungen: eine quantitative Meta-analyse bildgebender Verfahren

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Die Frage nach der Existenz des „freien Willens“ entzieht sich einer empirischen Untersuchung. Anders steht es um neuronale Grundlagen volitionaler Bewegungen. Die vorliegende Studie untersucht die neuronalen Korrelate selbstinitiiertter Handbewegungen und insbesondere die Frage, ob zwei distinkte neuronale Netzwerke mit der Auswahl einer Bewegung und mit dem „Timing“ der Bewegung assoziiert werden können. Neuronale Korrelate volitionaler Bewegungen wurden mit Hilfe des Aktivations Likelihood Estimation (ALE) Algorithmus [1] über ~70 fMRI und PET Experimenten modelliert. Subanalysen wurden durchgeführt für Experimente mit (A) einer Wahlmöglichkeit und (B) der Wahl des Zeitpunktes einer Bewegung. Eine Konjunktion über konvergente neuronale Aktivierung, assoziiert mit (A) „Auswahl“ und (B) „Timing“ einer Bewegung, zeigte sich im präsupplementär motorischen Areal, dem anterioren medialen Zingulum, dem linken dorsolateralen präfrontalen Kortex (aDLPFC) und dem rechten inferioren parietalen Sulcus (IPS). Spezifisch für (A) „Auswahl“ zeigte sich der dorsale premotor Kortex und der superiore parietale Kortex, für (B) „Timing“ das Striatum und die anteriore Insula. Die quantitative Meta-Analyse über Studien der funktionellen Bildgebung zu volitionalen Bewegungen zeigte sowohl konvergente wie auch distinkte Regionen neuronaler Aktivierung der Aspekte „Auswahl“ und „Timing“. Neben spezialisierten Systemen für „Auswahl“ und „Timing“ scheinen der neuronalen Realisation volitionaler Bewegungen geteilte Prozesse der Bewegungsvorbereitung zu Grunde zu liegen.

Why does visual search not always benefit from repetition?

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Searching a display repeatedly improves search efficiency for physically larger displays (Solman & Smilek, 2012) but not for smaller ones (Kunar, Flusberg & Wolfe, 2008). We investigated whether this lack of improvement for smaller displays is due to such searches being already extremely efficient from the beginning (floor effect). Participants searched displays with three, six, or nine letters 90 times and made a mouse click on the target. The display remained either stable throughout the searches or changed (partially or completely) with every search. Additionally, we included respective baseline conditions in which participants had to click on the target without searching for it. By contrasting each display condition with the respective baseline, we isolated the time devoted to the search process from the time necessary for planning and executing the manual response. For display sizes 6 and 9, search performance slightly improved with repetition. For display size 3, there was no such improvement. Search performance was close to baseline right from the beginning and did not vary over time. This suggests that repeated search benefits from repetition only if search performance is not already close to its optimum level.

Is extinction in Evaluative Conditioning context-dependent?

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Evaluative Conditioning (EC) is defined as a change in valence of initially neutral stimuli (CSs) after being paired with positive or negative stimuli (USs). Contrary to Pavlovian Conditioning, in most previous studies EC effects were not reduced by extinction, that is by presentations of the CS without the US. A recent meta-analysis, however, challenged this notion indicating a small effect for extinction in EC (Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010). Drawing on recent theorizing on extinction in Pavlovian Conditioning (Bouton, 2004), we hypothesized that extinction in EC is context-dependent. Concretely, we expected that EC effects are extinguished if they are measured in the same context in which extinction trials were shown before, but not if they are measured in the context in which conditioning trials were shown. In our experiment (N = 148), we orthogonally crossed the factors extinction and context of measurement phase. We used different background colors and sounds as context manipulation. Contrary to our expectations, however, we did not find extinction in any of the conditions. Our results might suggest that participants used the extinction phase to rehearse previously learned pairings, particularly if EC effects were measured in the extinction context.

Improving creativity through meditation and sport: a control-state approach

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Scientific interest in the impact of meditation and sport on human cognition has significantly grown in the past years; however, the available evidence is inconsistent. We attribute that state of affairs to the lack of functional theorizing and insufficient conceptual differentiation. As a solution, we suggest that particular types of meditation or other activities induce particular control states that support some, and interfere with other cognitive operations. We will show that this approach allows the successful prediction of improvements and impairments in creative (convergent and divergent) thinking, induced by focused attention and open monitoring meditation, and by physical exercise.

Predicting reading performance with visual-verbal paired associate learning (PAL) - Results of a longitudinal study

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A fundamental ability of learning to read is visual-verbal paired associate learning (PAL). Robust correlations between visual-verbal PAL and reading are found in school children. Moreover, children with dyslexia show a deficit in this domain. It is still under debate whether this cross-modal association deficit can be considered as causal for success or failure in reading development or if it is the result of reading experience. To investigate the predictive role of visual-verbal PAL on later reading performance, we conducted a longitudinal study. Visual-verbal PAL tasks were administered to 250 children before formal reading education (T0); reading performance was measured at first and second grade (T1, T2). Children with severe reading problems at T2 differed significantly in their performance on the PAL-tasks at T0. Furthermore, we found that visual-verbal PAL explains a significant part of the variance in reading performance, additional to commonly used predictor variables (phonological awareness, rapid naming, working memory). We concluded that cross-modal PAL in kindergarten age is a unique and specific predictor for later reading development.

Impression Management im umweltspsychologischen Kontext

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Umweltfreundliches Verhalten ist in den vergangenen Jahren in den Mittelpunkt des politischen und gesellschaftlichen Diskurses gerückt und heute flächendeckend anerkannt und erwünscht. Diverse Studien zeigen, dass Menschen häufig eine positive Einstellung zu umweltfreundlichem Verhalten kommunizieren, sich dieses jedoch nicht im tatsächlichen Verhalten widerspiegelt (z.B. Huber, 2001). Dies könnte dafür sprechen, dass Menschen dazu neigen, sich umweltgerechter gegenüber anderen darzustellen, als sie es eigentlich sind. Die Selbstdarstellung von sich als umweltbewusste Person könnte als eine Strategie des Impression Managements (Mummendey, 1995) verstanden werden. Im vorliegenden Experiment wird untersucht, ob das umweltfreundliche Verhalten durch die Präsenz anderer Personen beeinflusst wird. Die Probanden erhielten im Vorfeld einer Energiespar-Aufgabe am Tablet-PC die Anweisung, sich aus hygienischen Gründen ihre Hände zu waschen. Die eine Hälfte der Stichprobe vollzog die Waschbedingung unter Anwesenheit einer Mitarbeiterin, die andere Hälfte war in dieser Zeit alleine, d.h. ohne Beobachtung. Als abhängige Variable wurde die Anzahl der benutzten Papiertrockentücher als operationalisiertes umweltfreundliches Verhalten erfasst. Die Ergebnisse zeigen, dass die Anzahl der verbrauchten Papiertücher in der „Person anwesend“-Gruppe signifikant geringer ist als in der „Person abwesend“-Gruppe. Impression Management kann somit auch im Umweltkontext ein wirksamer Ansatzpunkt sein, um gewünschtes Verhalten zu fördern.

Biasing attention by a novel (surprising) feature

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According to the surprise capture hypothesis, surprising or novel stimuli involuntarily attract attention. This has been empirically shown with the unannounced first presentation of a novel color during a search task, which eliminated set size effects, improved performance at short display durations, and induced validity effects. Most of this research presented the novel color as a singleton. While there are good reasons to discount the role of singleton capture in these experiments, it seems still desirable to test the surprise capture hypothesis for non-singleton novel stimuli. The present study employs eye-tracking to assess the biasing of attention towards a novel non-singleton color during a visual search task. Results reveal that early fixations are more frequently directed to the novel than to the familiar color, indicating that attention is biased towards the novel color. This result is consistent with the surprise capture hypothesis, and shows that a singleton status of the novel color is not a necessary condition for the biasing of attention.

Detection of Mental Workload Through Thermal Imaging – A Pilot Study in Real Road Traffic

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The continuous monitoring of mental workload can support the detection of comfort and safety-critical overload situations. For example, accurate monitoring could indicate that a driver is in need of support in instances of road traffic. One possible technique for the development of mental workload monitoring systems is the thermographic analysis of facial temperatures, especially changes in surface temperature in the regiofrontalis, regiobuccalis/infraorbitalis, as well as the glabella region, which are all promising indicators of mental workload status. The peripheral-vasodilation of human skin is caused by the release of adrenaline and noradrenaline from the adrenal medulla. Based on this knowledge, a 20 minute car ride through urban traffic (N=10) was executed, during which, the mental workload of the driver was stimulated every 5 minutes and was varied in two steps by a task of mental arithmetic. The results demonstrated a clear correlation between the increase of mental workload reported by the driver, and an increase of surface temperature in the associated regions of the face.

The Role of Response Speed Awareness for Conflict Adaptation

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Evidence from masked priming suggests that awareness of conflict in a trial $n-1$ plays a crucial role for conflict adaptation in a subsequent trial n (Desender et al., in press). However, how the influence of conflict is brought about remains unclear. Maybe conflict delays responding, and a passive carry-over of slower responses from trial $n-1$ to trial n compromises quick reactions in congruent trials n , and, hence, congruence effects (cf. Kinoshita et al., 2011). Therefore, we tested the connection between carry-over and speed awareness. Are participants aware of their response speed? Is this awareness crucial for a conflict adaptation? To answer this question, we used masked semantic priming, in which participants judged their response speed in each trial, immediately after their response to the target. We found a reliable congruency effect, with faster responses to congruently than incongruently primed targets, but no conflict adaptation. Instead, a linear mixed-model analysis revealed a main effect of response time in trial $n-1$ that interacted with congruency in trial n , and that was independent of the participants' awareness of their response speed.

Politically correct: Effects of political skill on the ability to fake good

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The aim of the experiment was to examine the role of political skill in recognizing job requirements and presenting oneself accordingly in a personnel selection context. Participants were randomly assigned to one of three conditions differing in demand characteristics: Participants were told that they were either part of a test run of scales (control), or that a company wished to optimize their recruiting strategy in one of two attractive fields. Political skill was assessed, before participants in the experimental conditions read one of two job descriptions implicitly requiring a high (accounting) vs. low (health-promotion) level of conscientiousness. Finally, conscientiousness was measured via self-report scales and performance in a concentration task. Among participants low in political skill, neither self-reported conscientiousness nor performance differed across experimental conditions, but were lower in the control condition. Participants high in political skill, however, adjusted their self-description according to job-requirements and performed significantly better in the concentration task, if the position required high conscientiousness rather than low. The latter condition did not differ from the control condition here. Thus, a high degree of political skill not only lead to tailored self-descriptions, but also triggered consistent performance. Implications for the "faking" discussion in personnel selection are discussed.

How realistic can behavioral investigations become?

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One big advantage of virtual environments is that they are smaller than many real world scenarios. This advantage is due to the fact that real depth is flattened. Of course, besides the own charm of presenting flat images that appear to be deep, there are also several limitations for perception. These limitations have to be known in order to estimate the limitations of the simulation effects on behavior. As pointed out by Marty Banks and co-workers since several years, the most important difference between real and virtual depth perception is the dissociation between vergence and accommodation. That is, in contrast to vision in real world, in virtual surrounds the perceived location mainly controlling vergence differs from the optimal accommodation point which is always on the screen. This artificial dissociation leads to eye strain. However, how large is this effect exactly? That is, how accurate are vergence and accommodation usually? Do they sometimes dissociate anyhow, or are they usually strictly associated? In this talk, first attempts are described aiming at establishing the range of effects. These first results showed rather huge effects on visual performance. Based on these results, the development of new methods will be presented and discussed.

Contextual information in visual working memory is viewpoint-dependent

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Objects are represented in relation to the contextual information provided by other memorized objects in visual working memory (VWM). We examined whether the contextual information provided by the spatial configuration of all objects is viewpoint-dependent. In two experiments we asked participants to detect changes in locations between memory and probe for one object highlighted in the probe image. We manipulated the viewpoint changes between memory and probe (Experiment 1: 0°, 30°, 60°; Experiment 2: 0°, 60°) as well as the spatial configuration visible in the probe image (Experiment 1: full configuration, partial configuration; Experiment 2: full configuration, no configuration). Location change detection was higher with the full configuration than the partial or no spatial configuration at viewpoint changes of 0°, thus replicating previous findings on the non-independent representation of individual objects in VWM. Most important, the effect of spatial configurations decreased with increasing viewpoint changes, suggesting a viewpoint-dependent representation of contextual information in VWM. We discuss these findings within the context of the question whether research performed within the slot-versus-resources debate and research on effects of contextual information might focus on two different storage systems within VWM.

Zur Ergonomie prosozialen Verhaltens: Kontextabhängige Einflüsse von Körperhaltungen auf die Ergebnisse in einem Diktatorspiel

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Aktuelle Arbeiten im Bereich „Embodied Cognition“ legen nahe, dass körperliche Zustände Einfluss auf unser Denken und Verhalten nehmen. Ausgehend von Befunden die zeigen, dass eine aufrechte Körperhaltung abstrakte mentale Konzepte wie „Moral“ und „Dominanz“ aktiviert, wurde experimentell untersucht, ob auch die durch die Interaktion mit Technik bedingt eingenommene Körperhaltung Einfluss auf mentale Vorgänge und damit einhergehendes Verhalten nimmt. Dazu bearbeiteten Probanden eine lexikalische Entscheidungsaufgabe, die entweder die abstrakten Konzepte Dominanz oder Moral aktivierte. Anschließend wurde ein Diktatorspiel durchgeführt, in dem entschieden werden musste, wie viel von einem fiktiven Geldbetrag an einen Mitspieler abgegeben werden soll. Die entscheidende Manipulation lag in der Körperhaltung, die Probanden zur Aufgabenbearbeitung an einem Touchscreen einnehmen mussten: während an einem auf Augenhöhe an der Wand angebrachtem Display eine aufrechte und geöffnete Haltung eingenommen wurde, saßen Probanden an einem tischbasierten Display in geschlossener und gebückter Haltung. Wie vorhergesagt moderierte das Priming von Dominanz oder Moral den Effekt der Körperhaltung auf die Höhe der Abgaben im Diktatorspiel: ein Dominanzpriming hatte zur Folge, dass Probanden in stehender Position weniger Geld an ihre Mitspieler abgaben als in sitzender Haltung. Wurde vorher Moral geprimt, zeigte sich das umgekehrte Verhalten: stehende Probanden gaben mehr an Mitspieler ab als in sitzender Haltung.

Surface reflectance dominates shape information for face matching and recognition

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Both shape and surface reflectance contribute to face recognition. Recent evidence suggests a decreasing diagnostic value of shape with increasing familiarity, and stronger reliance on shape for poor recognizers. In two experiments we compared contributions of both dimensions to matching and recognizing unfamiliar, newly learned, and personally familiar faces. Within each familiarity condition, either shape or reflectance information was selectively morphed between two faces (18 pairs in total). Experiment 1 comprised an identity matching task with unaltered S1 followed by morphed S2 stimuli. In Experiment 2, recently learned and personally familiar faces had to be recognized from morphs. Percentages of same responses (Exp.1) and percentages of original identity responses (Exp.2) were assessed. To investigate individual differences, quotients for each familiarity condition - indicative of whether shape or reflectance was more diagnostic - were correlated with performance in face cognition tests. Overall, a dominance of reflectance was found. In Exp.1 this effect was modulated by familiarity, with a stronger reliance on shape for unfamiliar and on reflectance for familiar faces at intermediate morph levels. These findings were only weakly modulated by individual differences. Overall, the results indicate that surface reflectance is more important than shape for face matching and recognition.

Comparison of three driver coaching approaches for electric vehicles

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Several driver coaching approaches exist that aim at supporting eco-friendly driving. Most of these have been designed for vehicles with combustion engines and could not simply be adapted to electric vehicles as of the different vehicle architecture (e.g. regenerative braking). Therefore, three driver coaching approaches (verbal instruction, specific online feedback, unspecific online feedback) that are based on a driving style evaluation were specifically developed for electric cars. In a baseline-controlled 2x3 mixed-subject design (N=30), the benefit of these approaches regarding consumption and acceptance were investigated using a driving simulator. The results show that all three approaches could significantly decrease the consumption compared to the baseline (up to 30%) with significantly lower savings for verbal instruction. Specific and unspecific feedback led to comparable savings, but had different impact on driving behaviour (e.g. sailing time). These two feedback approaches are rated rather low on workload and high on acceptance scales. Anyhow, specific feedback is recommended due to lower distraction potential and due to the possibility of advice-free driving. Further studies will investigate the added benefit of an active accelerator pedal by which means advices could be removed from the visual channel of the driver.

Emotional Quality of Targets and Distractors Modulates Dynamic Visual Attention

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The distribution of visual attention on static displays can be modulated by the emotional quality of distractors and search targets. We employed multiple object tracking (MOT) to study analogous effects on dynamic visual attention. The basic MOT task requires to track a set of target objects among indistinguishable distractor objects across several seconds of motion. In the present experiment, the identities of targets and distractors were visible at the beginning of MOT trials prior to motion onset. Across four conditions, we varied whether targets and distractors were of neutral or negative emotional quality. Images of spiders were negative targets or distractors. During motion, identities were occluded and either all objects looked the same throughout motion or object identities were briefly flashed during motion. Tracking performance suggested that the visual distinctiveness of target and distractor images determined how much the brief uncovering of identities supported tracking. More interestingly, subjective ratings of valence, arousal, and spider phobia correlated with the degree to which spiders as targets improved tracking and spiders as distractors impaired tracking. These results are consistent with theories postulating involuntary capture of attention by phylogenetic fear-relevant stimuli and demonstrate interindividual variability in tracking performance explained by subjective emotional responses.

Who is talking in backward crosstalk? Disentangling response- from goal-conflict in dual-task performance

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Specific interference phenomena can influence dual-task costs, and commonly their direction and size are ascribed to overlaps in stimulus and response features of both tasks. One particularly interesting example is a variant of the backward crosstalk effect (BCE), where improved Task 1 performance is observed if the Task 2 response shares features with the response or stimulus of Task 1. Here I ask which aspects of responses are critical for BCEs. Inspired by effect-based models of action selection (e.g., the ideomotor theory) I suggest that not the bodily movement per se but rather its contingent, change in the environment (i.e. its action effect) is the crucial aspect. Across several experiments this assertion is supported: BCEs occur when Response 1 shares features with the visual effect of Task 2 (instead of the mere observable motor movement), and they occur when both responses yield similar visual effects. These results contribute to the understanding of dual-task performance and give some indications on how to facilitate dual-task performance.

Test-Retest Reliability of Dynamic Causal Modelling for fMRI data

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Although functional asymmetries of brain functions are known for more than 150 years, the underlying mechanisms are far from understood. In our research, we aim to characterize the principles of hemispheric lateralization in terms of asymmetries of brain connectivity combining imaging methods and network models. A commonly used technique investigating network characteristics of the brain is dynamic causal modelling (DCM). The reproducibility of DCM results however is largely unknown, despite its relevance for the assessment of single subject characteristics. We therefore investigated the test-retest reliability of DCM (using intra-class correlation coefficients, ICCs) measuring 35 healthy subjects twice using functional magnetic resonance imaging (fMRI) during a commonly applied motor task requiring interhemispheric interactions. Our results show that (1) the underlying motor network ($ICC_{max} \sim 0.52$), (2) the model selection parameters ($ICC_{max} \sim 0.95$), and (3) the DCM model parameters ($ICC_{max} \sim 0.52$) are reliable. However, these results are highly dependent on the implementation of DCM. Newer software versions incorporating more sophisticated applications (e.g. stochastic DCM, two-state DCM) yielded less stable results. Also results from previous studies could not be fully replicated with newer DCM versions. The application of DCM therefore requires advanced knowledge of the properties of the underlying algorithms.

Subband decompositions are inherently incompatible with (most) non-linear models of visual perception

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Image-driven models in vision predict image perceptibility. Typically, such models combine subband decomposition (e.g. Steerable Pyramid) with a late, non-linear decision stage (e.g. Minkowski norm). The interaction between subband decompositions and the decision non-linearity, however, creates a problem. A subband decomposition represents images as a set of overlapping bands with different peak sensitivities in frequency and orientation. Image content that matches a peak sensitivity is represented as a maximal value in its band. Frequencies or orientations that fall between two peak sensitivities, however, are represented as multiple smaller values in adjacent bands. For example, the Minkowski norm---a standard decision non-linearity---maps the "activity" values within the bands to a single value. Depending on the Minkowski-exponent beta, the norm weighs the values in the vector equally or increasingly favours the highest values. Thus, the contribution of imagecontent falling close to the peak sensitivities of the bands is treated differently to that falling between peaks. As a result, models combining subband decomposition with non-linear processing show an undesirable dependence of their response on the---arbitrarily chosen---peak sensitivities. Such a dependence implies, for example, that image detectability should oscillate with viewing distance. This is clearly not observed in reality.

Effects of executive functioning on adult place learning: A training study

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Navigating through space, finding your goal location and being able to successfully relocate targets are central to human nature. Good navigational skill, but also high executive functioning (EF) might be helpful in developing an effective strategy to find the correct location. The current study examined learning induced behavioural changes in preselected adults with high and low levels of EF. Participants were trained over the period of seven consecutive days in a desktop virtual environment. The goal was to encode the location of an object relative to multiple local and distal landmarks. In the subsequent retrieval phase, participants were instructed to return the object to its original location with all landmarks present in a standard condition. To examine strategy use, in two further conditions landmarks were manipulated such that either local or distal landmarks were available to support navigation. Individuals with higher levels of EF showed improvement in all conditions and benefited more from training than individuals with low levels of EF. High EF participants showed a stronger preference for local landmark as compared to low EF participants. These results show that place learning competence can improve with training. Furthermore, they speak for an involvement of EF in spatial competence.

More similar than you'd think? Perceptuomotor, cognitive and description-based decisions

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Classical high-level cognitive decisions (e.g., choosing between financial options) have been characterized as markedly sub-optimal. In contrast, low-level decisions (e.g., choosing where to put your feet on a rocky ridge) seem near-optimal: the perception-cognition gap. Furthermore, in high-level decision-making tasks, based on described information, people choose as if putting too much weight on unlikely events. Yet, when people rely on experienced information they choose as if putting too little weight on unlikely events: the description-experience gap. We presented participants with precisely matched decision-making tasks and found that A) the perception-cognition gap seems to be due to the different methods used to evaluate performance in low- and high-level studies and thus illusory, B) the description-experience gap replicated when choices were evaluated on the basis of people's actual abilities, but not when people's subjective beliefs about their abilities were taken into account, C) people's decision-making performance seems better than that implied by the classical literature, and that D) differences between individuals seem more important for predicting choices than differences between tasks.

Designing environments for optimal learning in probabilistic decision making

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A teacher can choose the order of problems she presents to students in the classroom. Some orders might lead to less effective learning than others (e.g., presenting difficult tasks early). In the current study, participants were asked to choose which of two bugs is more poisonous based on six bug-features (e.g., hairy or not hairy) with a predictive validity unknown to participants. After each of the 270 trials of the bug-task, participants received feedback on the accuracy of their decision and thus also on the predictive validity of the features. Based on computer-simulations within the framework of the parallel-constraints satisfaction network model of decision making (PCS), we identified prior to the study task-orders that either lead to a high or low performance for solving the bug-task. Results show that participants working on the tasks in the order that were predicted to lead to a high performance actually make more correct decisions than participants working on the same tasks in a different order predicted to lead to a low performance. Results from an additional model comparison show that PCS can explain participants' learning better than the alternative reinforcement strategy-selection learning theory from the adaptive-toolbox-framework.

Facial coloration and the behavioral immune system

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Research linking variation in facial attractiveness judgments to concerns about infectious disease suggests that face preferences are a component of the behavioral immune system. However, these studies have typically focused on preferences for shape cues in faces or used stimuli in which shape and surface information were confounded. In the current research, we first show that aspects of facial coloration (red and yellow) are correlated with a composite measure of reported health and incidence of infectious disease (Study 1). Consistent with earlier work, we also show that manipulating these color characteristics in face images affects health perceptions (Study 2). We then show that exposing subjects to pathogen-related stimuli increases attraction to healthy facial coloration (Study 3). Finally, using a longitudinal design, we show that attraction to healthy facial coloration is generally stronger on days where subjects report greater germ aversion (Study 4). Together, these findings implicate germ aversion in attraction to healthy facial coloration, supporting the proposal that facial attractiveness judgments may be an important component of the behavioral immune system.

Self-reported risk taking across the life span: The role of life domains

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Do risk preferences change as a function of age? We conducted a systematic literature search on studies using the Domain Specific Risk Taking Scale (DOSPERT) and complemented our analysis with a representative sample analyses. The qualitative review of published papers shows that age may lead to decreased self-reported risk taking but that alterations in risk preferences are dependent on the life domain. Age-related changes in perceived costs and benefits of engaging in risky behavior may be underlying causes driving these differences. The analysis of two waves of the German Socioeconomic Panel (GSOEP) supports the domain dependency of age-related trajectories in risk preference in a large panel dataset but leaves open the question of how age-related changes in the balance of perceived costs and benefits may drive this effect. In order to fill this gap, we conducted a study in which we asked participants about personal risk preference but also about perceived costs and benefits of engaging in risky behaviors. The results indicate that age-related changes in the balance of perceived costs and benefits of risky behavior may indeed be underlying factors driving age differences in risk preferences in different life domains.

Reduced filtering efficiency and working-memory performance when switching between filter settings

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The capacity limitation of working memory requires that only relevant material gains access to the workspace while irrelevant material is prevented from being stored. Thus, the ability to filter out irrelevant information seems to be an important factor of how efficiently the limited storage space is used. Recent studies provided evidence that filtering ability contributes to age and individual differences in working-memory performance. Here, we took a different approach and investigated conditions under which filtering efficiency is reduced. We present data from a novel “filter-switching paradigm” indicating that when selection criteria need to be adjusted, filtering out distractors is more demanding. Participants were presented with visual objects in two different colors and a cue presented in advance indicated which objects had to be stored. The contralateral delay activity of the EEG measured in the retention interval was used to assess filtering efficiency. The data showed that when filter settings switched and, hence, need to be adjusted, more irrelevant material passes the gate to working memory. This switching-induced filtering deficit suggests that attentional control processes determine how efficiently the limited workspace can be used.

The influence of habitual grasp orientation on the end-state comfort effect in children

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When grasping objects, adults adapt their initial hand orientation to insure a comfortable posture at the end of the movement, while at the same time accepting an uncomfortable orientation at the beginning. This phenomenon has been termed the end-state comfort effect. We studied grasp selection in children interacting with four different objects, a glass, a bottle, a pen and a shovel. The task was to turn each object upside down. The focal question was whether the respective habitual object orientation would influence children’s grasp choice in the sense that it would facilitate or impede end-state comfort planning. The results indicate that habitual object orientation played a role in children’s grasp choice.

Task-Transfer of spatial learning is more efficient for unattended material

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In visual search, reaction times are shorter after searching through repeated target-distractor configurations, compared to unrepeated configurations. This advantage is termed contextual cueing (Chung & Jiang, 1998), and it is unclear to what extent it is due to task-specific or task-unspecific learning. The present study investigated how task-unspecific learning can lead to contextual cueing. Spatial configurations of targets and distractors were presented in a change detection task. Only parts of the configuration were attended. In a subsequent search task, previously attended and unattended configurations were reused, and RT were compared to new configurations. Results showed a transfer of material learned in the change detection task, indicating that contextual cueing can be induced by other training than search. Interestingly, search RT developed more beneficial for previously unattended than for previously attended configurations. This suggests that the nature of the transfer is influenced by the attentional state originally associated with the material.

The influence of practice on the perception of unfamiliar musical chords

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Vogel's music theory (1993) states that some unfamiliar ways to set a chord, e.g. a minor chord with a low third such as Eb C' G', are beneficial for the fit of the partials and should lead to the perception of a high consonance. A first test of this prediction (Karaś & Kaernbach, 2012) showed, however, that semi-expert listeners (1st year music students) rated these chords not only as unfamiliar but also as dissonant. It was hypothesized that familiarity plays an important role when rating consonance. The present study test this hypothesis by calling in professional keyboard musicians and by introducing a training session that should make these participants more familiar with these chords. In the training session participants had to identify normal and unfamiliar chords by clicking on the appropriate keys of a keyboard. Rating data show a less pronounced dissonance rating by expert listeners as compared to the first group of participants and a decrease of dissonance for unfamiliar chords after training.

Reduced attentional competition between objects that follow real-world regularities

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In virtually every real-life situation humans are confronted with complex and cluttered visual environments that contain large amounts of visual information. Because of the limited capacity of the visual system, items within a scene are competing for attentional resources. But what is the “unit” of this attentional competition? What counts as an item? Here, we report reduced attentional competition between objects positioned according to commonly experienced configurations, such as a lamp above a table. In an fMRI study designed to measure competitive interactions between objects in visual cortex (Kastner et al., 1998), we found reduced neural competition between objects that were shown in regular configurations. Using a visual search task we then related this reduced competition to improved target detection when distracters were presented in regular configurations. We interpret the current findings as reflecting the grouping of objects based on higher-level spatial-relational knowledge acquired through a lifetime of seeing objects in specific configurations. This grouping effectively reduces the number of objects that compete for representation. Because scenes contain a large number of objects that occur in regularly positioned groups of two or more objects, such grouping could greatly enhance the efficiency of real-world perception.

Motor Imagery and Mental Training among Older Adults

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It has been shown that older adults have difficulties to mentally simulate walking, more so with increasing track length and path width. The present contribution addresses the motor imagery (MI) performance of walking among older adults and the benefits of using MI as mental training. In two studies, younger (20-30) and older (65-80) participants walked mentally and then actually. Study 1 was administered in a typical laboratory space and required subject to walk straight, with two changes of direction, on uneven ground, and while additionally flipping switches. Study 2 took place in an everyday-like shopping scenario and required subjects to walk straight, with two changes of direction, and with two changes of direction while retrieving products. Finally, a pilot-intervention on mental balance training in older adults gives first tentative insights concerning effects on MI performance and balance abilities. In study 1 we found no age-related differences of imagined walking performance ($F(3,120) = 2.34; p = .07$). Results of study 2 revealed age-related differences of imagined walking performance which were due to the more complex tasks ($F(2,76) = 3.13; p = .049$). Further results on the effects of mental training on balance abilities will be discussed.

Shall we risk it? How group decision making impacts risky choice

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Decision making in groups can be both a curse and a blessing. How is risky decision making - where options have to be evaluated in light of their outcomes and the probability that the outcomes occur - impacted by whether decision makers choose individually or collectively? Participants (N = 120) were asked to choose one of two lotteries in a series of 92 lottery pairs, including gain, loss, and mixed gambles. All participants made their choices first individually and then in groups of four. Groups interacted freely to arrive at a joint decision. It emerged that groups picked the better option (i.e., the one with the higher expected value) more often than individuals, even if this choice was not initially favored by a majority. Further, groups were more risk seeking than individuals in the loss domain. Analyzing the video-recorded group discussions, we also examine the social processes underlying these effects of collective decision making.

Effects of a single mirror training on intermanual transfer learning and EEG μ -rhythm activity

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The aim of this study was to investigate the effects of a one session mirror training on intermanual transfer by hand movements. We expected improved performance as well as changes in the μ -rhythm (8-13 Hz) of the electroencephalogram (EEG). 32-channel EEG was recorded to examine the changes in the left and right motor cortex (C3 and C4). During training two rubber balls were rotated for approximately 20 minutes with the right hand accompanied by either looking at the mirror image of the right hand (inducing the feeling that the participants left hand would actually rotate the balls) or by simply looking at the left hand lying at rest on the table. Before and after training the ball rotation task performance of the left hand was assessed. The behavioral results show performance improvement of the left hand in both conditions, indicating that the visual mirror image is not crucial for intermanual transfer. An increase of μ -power values at the motor areas of the hands after training indicates less cognitive effort for movement execution. Interestingly we found strong bilateral M1 activity during left hand ball-rotation.

Relationship of side of onset and number of spatial errors in recall phase of Rey-Osterrieth Complex Figure visual memory test in Parkinson' disease patients

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Several studies showed inconsistent relationship between side of onset of Parkinson's disease (PD) and cognitive dysfunction of visuo-spatial abilities. In the Rey-Osterrieth Complex Figure standard test, Taylor's scoring system of recalled visual blocks can not establish the relationship between hemispheric side of neuropathology and visual memory impairment. We can demonstrate the impact of left-sided onset PD on visuospatial memory function if we use Loring scoring system in ROCF tests which measures the quantity of spatial errors in recall phase of ROCF. In our study we evaluated the non-demented, non-depressed PD patients' performance in copy and recall phase of ROCF. We used Taylor's and Loring's scoring system to assess visual memory. There are no significant differences between left-onset and right-onset patients in Taylor's scores of copy and recall task of ROCF. In using Loring's scoring system left-onset patients have significant higher scores of spatial errors than right-onset patients. Using Loring's scoring system demonstrates significant higher numbers of spatial errors in delayed recalled blocks of copied complex figure in left-sided Parkinson's disease patients. As Loring's scoring system is sensitive for right hippocampal pathology there is a possibility of right temporal lobe pathology presented in left-sided Parkinson's disease.

How high is the low road? On the role of fear conditioning and consciousness in the dual-stream RSVP task

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The right hemisphere has been found to be dominant for attention, efficient for initial visuospatial processing, but also crucial for recognition of negative emotions. Most of the studies using the dual-stream rapid serial visual presentation (RSVP) task, an alternative form of the attentional blink paradigm, focus on perceptual and attentional processes. There is a lack of studies on the effect of negative emotions and especially of fear conditioning on the performance of RSVP task. According to LeDoux's model (1996) cognitive processing uses a thalamo-cortical path – the "high road", whereas affective processing uses a thalamo-amygdala pathway – the "low road". Both processes share the same initial brain pathway up to the thalamus and might interact at a late level of processing. Following the model of Pessoa and Adolphs (2010) the pathways of cognitive and affective processing are even more overlapping. The present study aimed to investigate how affective significance influences hemispheric asymmetry of visual processing. We measured skin conductance in a dual-stream RSVP task with some of the target letters being fear conditioned. We found comparable asymmetries for cognitive and affective processing. On the basis of these results we discuss the role of conscious and unconscious affective processing.

Effects of motor-cognitive coordination training and endurance training on cognitive functions

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Physical training has been shown to improve a wide range of cognitive abilities, such as executive control, spatial abilities, and perceptual speed of processing. While the effects of cardiovascular training are well documented, findings on motor-cognitive training are scarce. In the present study, we investigated seventy-six individuals (mean age = 23.2 years, SD = 3.3) in a pretest-training posttest design. At pretest and posttest, participants performed a battery of cognitive tasks. During training, they either performed 12 sessions of motor-cognitive training (N=28), 12 sessions of medium intensity cardiovascular training (\approx 60% HRmax; N=28), or no training (N=20). The motor-cognitive training consisted of adaptive training exercises including a motor coordination task and a secondary cognitive task; the cardiovascular training was completed on stationary bikes. Results showed improvements on the training tasks in both training groups. Importantly, we found larger gains in terms of attention and mental rotation ability in the motor-cognitive training group than in the cardiovascular training group and the control group.

Wired for cooperation? Brain electrical resting-state connectivity encodes stable preference for social outcomes in humans

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Humans display individual differences in cooperative behaviour. While an ever-growing body of research has investigated the neural correlates of task-specific cooperation, the mechanisms by which situation-independent, trait-related differences in cooperation render behavior consistent across a wide range of situations remain elusive. Addressing this issue, we show that the individual tendency to behave in a prosocial or individualistic manner when sharing resources – commonly termed Social Value Orientation (SVO) – can be predicted from human brain electric resting-state connectivity. Specifically, we predicted SVO based on EEG resting-state connectivity in 58 healthy adults (26 individualists; 32 prosocials) using a linear Gaussian Process Classifier in a leave-one-out framework. Our results shed light on the neural mechanisms that underlie individualists' and prosocials' habitual social decision-makings by showing that resting-state dynamics encode stable cooperative behavior.

Memory Consolidation during Slow-Wave Sleep: Pictures work better than Words.

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Episodic memory consolidation during slow-wave sleep (SWS) was often tested with verbal and pictorial memory paradigms. However, research neglected whether sleep-dependent memory consolidation is more efficient for verbal or pictorial learning. In this study we employed a recognition paradigm with both stimuli types to address this question. An associative encoding task, applicable to pictures and words, was used: words and grayscale pictures were presented on unicolored backgrounds while participants were asked to form stimulus-color associations. Recognition for half of the stimuli was probed immediately after encoding and served as a baseline. Baseline performance was compared to the memory performance after 3 hours of sleep (predominantly SWS, experimental group) or an awake interval (control group), tested with the remaining stimuli. d2 tests did not reveal any differences in concentration endurance after sleeping or waking. Results show that the overall memory performance for pictures was better than for words (picture superiority). Interestingly, our data revealed that only consolidation of pictorial material benefits from sleeping: Test performance significantly decreased after being awake but not after sleeping. Verbal memory consolidation did not show any differences between groups. These findings indicate a preferential consolidation of pictorial, as compared to verbal, study material during SWS.

The automatic temporal alignment of speech in German for psycholinguistic purposes

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In most language production studies, the dependent variables are the latency with which speakers produce a spoken response to a stimulus, and/or the temporal structure of a spoken utterance, such as the onset- and offset-times of words. Exact measurements of these times through the visual inspection of the recordings are extremely time-consuming and resourceful. We present AUDIOMAX, a research tool for the exact automatic temporal analysis of spoken utterances based on the automatic speech recognition device ESERALDA. In preliminary work, we have programmed AUDIOMAX to perform a forced alignment of simple spoken German utterances with existing transcripts of the utterances. We have now improved its accuracy and usability and present its new layout along with the results of an accuracy evaluation with German single- and multiple-word utterances.

Individual differences in effects of caricaturing featural vs. configural information: An ERP study

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Recent research showed that effects of shape caricaturing are particularly prominent in poor face recognizers. By presenting faces upright and inverted, we studied in poor and good recognizers whether caricaturing effects are driven by configural or featural information. As inversion is believed to hamper configural information, preserved caricature effects could be attributed to features. After learning veridical and spatially caricatured faces, learned and novel faces were tested upright and inverted. Response times for upright faces replicated poor recognizers exhibiting caricaturing effects for novel and learned faces, and good recognizers demonstrating effects to novel faces only. In accuracies, caricaturing benefits were only significant in poor recognizers. For inverted faces caricaturing effects on response times disappeared in both groups, and only poor recognizers showed a small caricaturing benefit in accuracy. ERPs replicated established effects of face inversion on N170, and effects of caricaturing on P200 and N250, which again were clearer for upright faces. Moreover, good recognizers exhibited both a larger P200 overall, and a larger N250 familiarity effect. Overall, results suggest that i) the shape caricature effect is mainly, but not exclusively driven by configural information and ii) poor recognizers focus more on features than good recognizers.

Der Aufbau räumlicher Repräsentationen komplexer Verkehrskonfigurationen an urbanen Straßenkreuzungen als Funktion kognitiv-räumlicher Ablenkung während der Annäherungsphase

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Für sicheres Autofahren ist eine räumliche Repräsentation des umgebenden Fremdverkehrs nötig. Umso besser diese Repräsentation aufgebaut werden kann, desto sicherer können Spurwechsel oder Abbiegemanöver durchgeführt werden. Kognitive Ablenkung während der Aufbauphase kann zu einer unzureichenden räumlichen Repräsentation des Fremdverkehrs führen. Vor allem lichtsignalgeregelter Straßenkreuzungen mit komplexem Straßenlayout, hoher Verkehrsdichte und ohne gesondert geregelten Linksabbiegeverkehr können für einen links abbiegenden Autofahrer eine hohe Belastung darstellen. In diesem Zusammenhang ist von besonderem Interesse, wie kognitive Ablenkung den mentalen Aufbauprozess der räumlichen Repräsentation zu verschiedenen Zeitpunkten der Annäherungsphase an Straßenkreuzungen beeinträchtigt. Um sowohl den kognitiven Aufbauprozess der räumlichen Repräsentation, als auch deren Beeinträchtigung durch kognitive Ablenkung zu untersuchen, wurde eine experimentelle Untersuchung durchgeführt. Für diesen Zweck wurde zu verschiedenen Zeitpunkten (sechsfachgestuft) während der Kreuzungsannäherung eine auditiv-räumliche Nebenaufgabe (leicht vs. schwer) dargeboten, auf die so schnell wie möglich per Tastendruck reagiert werden sollte (links vs. rechts). Als Maße wurden sowohl Pupillenweite als auch Reaktionszeit der Probanden erhoben. Die Ergebnisse zeigen, dass in einem bestimmten Entfernungsbereich zur Kreuzung die Reaktionszeiten in der Nebenaufgabe erhöht waren. Dies lässt Rückschlüsse auf den Zeitpunkt des Aufbaus der räumlichen Repräsentation während der Kreuzungsannäherung zu. Die hier vorliegenden Ergebnisse können die Grundlage zur Auslegung und Parametrisierung von Kreuzungsassistenten bilden.

Unfallentstehung im urbanen Raum – Haben die Aufmerksamkeitsverteilung und das Alter einen Einfluss?

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Abbiege- und Einbiegeunfälle sind im innerstädtischen Bereiche 26% aller tödlichen Unfälle. Eine besondere Herausforderung für Fahrer scheint in diesem Zusammenhang das Linksabbiegen an X-Kreuzungen zu sein. Bislang ist für viele dieser Unfallsituationen unklar, wie sie geschehen und welche Rolle die visuelle Aufmerksamkeit sowie das Alter der Fahrer spielen. Ausgehend von Unfallstatistiken wurden fünf relevante städtische Szenarien identifiziert und in den statischen Fahrsimulator der TU Braunschweig implementiert. Die Eigenschaften der anderen Verkehrsteilnehmer (z. B. des Gegenverkehrs oder querender schwächerer Verkehrsteilnehmer) wurden systematisch variiert, um deren Einfluss auf Blick- und Fahrverhalten von 12 jüngeren und 12 älteren Fahrern zu untersuchen. Die Ergebnisse zeigen, dass die Variation des Gegenverkehrs keinen Einfluss auf die Kollisionanzahl mit schwächeren Verkehrsteilnehmern hatte. Ältere Fahrer fuhren signifikant langsamer, warteten länger an der Haltelinie und hatten bei Kollisionsvermeidung einen größeren Abstand zum schwächeren Verkehrsteilnehmer als jüngere Fahrer. Letztere kollidierten hingegen signifikant öfter mit schwächeren Verkehrsteilnehmern. Die Blickdaten zeigen, dass jüngere im Vergleich zu älteren Fahrern prozentuell häufiger auf schwächere Verkehrsteilnehmer schauen, ihre Blicke jedoch kürzer dort verweilen. Die Studienergebnisse tragen dazu bei, die psychischen Prozesse bei der Entstehung von Unfällen besser zu verstehen. Die erarbeiteten kritischen Situationen bilden eine Grundlage für die Entwicklung von Fahrerassistenzsystemen im urbanen Kreuzungsbereich.

The role of right DLPFC and right IPL in location negative priming: a single pulse TMS study

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Location negative priming (NP) refers to slowed responses if a target appears in a location (probe trial) which was a distractor location in a previous trial (prime trial) compared to conditions of no location repetitions (e.g. Tipper, 2001). It has been shown that both the right dorsolateral prefrontal cortex (DLPFC) and the right inferior parietal lobe (IPL) are involved in the processing of a distractor location repetition (Krüger et al., 2007). However, the timing and causal role of the involved brain structures remain unclear. Therefore we combined a location NP paradigm with a single pulse navigated transcranial magnetic stimulation (TMS). In nine participants, TMS was applied in three different sessions (order balanced) at five different time points (50, 100, 150, 200, and 250 ms) after probe stimuli onset over right DLPFC, right IPL and sham (no) TMS as a control condition. A significant interaction for the 200 ms condition between DLPFC and sham stimulation reflect that the NP-effect in reaction times during DLPFC stimulation is enhanced while the target repetition effect is reduced compared to sham stimulation. We suggest that the right DLPFC plays a causal role in location NP 200 ms after probe stimuli onset.

New Tests for Comparing Continuous and Discrete-State Assumptions in Recognition-Memory Modeling

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A classic discussion in the recognition-memory literature concerns the question of whether recognition judgments are better described by continuous or discrete processes. The comparison of these two hypotheses has almost invariably relied on single Receiving Operating Characteristic (ROC) data. A new model-comparison approach based on ranking judgments is proposed here. This approach does not rely on particular distributional assumptions for the models, and it does not require costly experimental manipulations. These features permit the comparison of the models by means of simple paired-comparison tests instead of goodness-of-fit results and complex model-selection methods that are predicated on many auxiliary assumptions. Empirical results from two experiments are consistent with a continuous memory process such as the one assumed by SDT. Further implementations of this approach and its contrast with general model fitting are discussed.

Enhancement of bottom-up processing in visual cortex during unpredictable motion

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Recent theories about the functionality of the mammalian brain stress the importance of predictive coding in a hierarchical organization of the cortex. According to these views, internal models of the outside world are stored in higher order regions. Hierarchical predictive processing postulates that these models are continuously tested and updated by matching the predicted sensory input with actual states of the sensorium. Unpredictable stimuli should therefore result in a synaptic gain from lower to higher regions, because the ensuing prediction error needs to be passed up the hierarchy in order to update the (inappropriate) model. We tested this hypothesis in healthy volunteers by means of dynamic causal modeling (DCM) for functional magnetic resonance imaging. Thirty-five subjects watched a moving ball in three different conditions with decreasing predictability. For the response condition, Bayesian model selection strongly supported the notion of hierarchical predictive processing because the winning model entailed a modulatory enhancement of the bottom-up connection from V1 to V5 during the two unpredictable conditions. Although a second bottom-up connection, namely from V5 to posterior parietal cortex, was not affected by a modulatory input of unpredictability, these results corroborate hierarchical predictive processing in human visual cortex within this constrained network.

What we see and what we take - Eye-movements do not predict performance in an everyday episodic memory task

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An everyday life episodic memory task (supermarket) was conducted to measure memory performance of older and younger adults. In addition eye-movements were recorded to clarify if the reduced visual acuity of older adults is accountable for reduced memory performance. As expected older adults performed worse in the episodic memory task and showed increases in number of fixations, number refixations and fixation time of to be found items. Hence, the eye movement behavior could not predict the performance in the episodic memory task in both age groups. Therefore, we conclude that memory performance in everyday life is not allegeable by the performance of finding to be remembered items.

Manual target selection as a function of time

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Research on saccadic target selection has demonstrated that raw stimulus-salience only affects selection performance when saccadic latencies are short; with longer latencies, stimulus-salience typically no longer affects performance. We investigated whether a similar time course occurs for manual reaching movements. Participants were asked to reach a bar tilted to the right in a context of vertical bars. A bar tilted to the left served as distractor. Stimulus-salience was varied via color: Either target and distractor had the same color as the context elements (gray), the target was red, or the distractor was red. We measured the trajectory of reaching movements and analyzed the curvature. In all conditions, trajectories curved toward the distractor, but there was no main effect of saliency: A gray distractor produced deviations of the same magnitude as a red distractor. The effect of stimulus-salience seemed to decrease with time, though this effect was not reliable. In contrast, a constant bias to move to the most likely target location was much stronger for fast than for slow responses. We conclude that the time-course of performance in manual target selection is different from saccadic target selection and seems to depend more on later mechanisms related to decision-making.

The involvement of the prefrontal cortex in the processing of emotional words

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In the affective neurosciences, the prefrontal cortex has been linked to several emotional processes including valence processing and emotion regulation. By now, several fMRI studies have confirmed these functions for emotional words. However, in this area, little is known about the spatiotemporal dynamics of these processes and networks. We will first present a combined EEG-MEG study which shows that distributed networks including prefrontal structures are involved in valence processing as early as 100 ms. Second, by applying right vs. left prefrontal inhibitory rTMS, we further examined the causal regulatory role of the PFC in valence processing. Both, behavioral data as well as ERPs/ERFs provide strong evidence for a very fast, valence specific regulatory role of the PFC in the perception of emotional words. Regarding clinical and subclinical populations, we show that PFC-Amygdala connectivity is crucial to the understanding of disorders as e.g. social phobia. The results indicate an inverse correlation between disorder severity and fronto-limbic connectivity for the contrast of emotional compared to neutral words. In sum, we regard the interplay between the left and right PFC, the amygdala and sensory areas as crucial for the understanding of emotional word processing in healthy and clinical populations.

The Curse of Knowledge – The Neural Basis of Interference in Decision Making through Automatic Knowledge Activation

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In memory-based decision making people often rely on so-called lexicographic, one-reason decision making strategies, such as the take-the-best (TTB) heuristic. Despite the heuristic's limited search, its use might be hampered by the amount of available attribute information through automatic activation spread—similar as has been observed for the fan effect in memory tasks. In an fMRI study we investigated the neural underpinnings of the fan effect in memory-based decision making. Participants memorized attribute information about fictitious companies, with the attributes consisting of visual information assumed to be represented in different parts of the posterior cortex (e.g., faces); importantly, the number of attributes associated with an object (i.e., fan level) was manipulated. Then participants were instructed to make inferences about the companies using TTB. It emerged that TTB performance was negatively impacted by a higher fan level. The fMRI data showed increased neural activation of attribute knowledge even when the attribute was not required for the decision. These results suggest that information that TTB “ignores” for a decision is nevertheless activated in memory, exerting a detrimental effect on decision making.

Task sets modulate unconscious affective priming with pictures and words differentially: Insights in the mechanisms underlying affective priming

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In our attentional sensitization model we propose that unconscious processing depends on attentional enhancement of task-congruent processing pathways. In line with this assumption, previous studies showed that subliminally presented stimuli can only elicit facilitatory effects (priming) on subsequent visible targets if the process-relevant stimulus dimension belongs to the active attentional set. Here, we investigated in two experiments using the affective evaluation task whether masked affective priming with pictures and words depends on the same cognitive mechanisms (e.g. semantic processing) and is thus sensitized by the same task sets: In our induction task paradigm, participants categorized a stimulus preceding the masked prime either with regard to semantic or perceptual features, which should activate a semantic and perceptual task set, respectively (induction task). Thereafter, a pictorial or verbal version of a subliminal affective priming paradigm was presented. Behavioral and electrophysiological priming effects were found for pictures only subsequent to the perceptual induction task. For words, in contrast, priming was observed subsequent to either induction task. Hence, pictorial and verbal unconscious affective priming in an affective evaluation task depends on partially different processes. Pictorial priming seems to rely on visual pathways whereas verbal priming is supported by both visual and semantic pathways.

Self-directed vs. externally controlled multiple cognitive task requirements

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Performance when facing multiple cognitive task requirements is usually worse than performance when engaging in single cognitive tasks. Yet, in real work contexts, organizational psychologists consider extreme forms of division of labour as disadvantageous and ask for work conditions that maximize freedom of action. Here we assessed whether this obvious contradiction between experimental cognitive psychology in the lab and organizational psychology in real work conditions results from different dependent measures. We applied a task switching paradigm with complete preview of the next-to-do tasks. One group of participants freely chose task order while another group of participants were instructed to perform the tasks in the same order (yoked-design). Results revealed the usual pattern of increased RTs in switch compared to repetition trials. These switch costs and also overall RTs were larger in the yoked group than the free choice group. Interestingly the self-chosen break times in-between the experimental blocks were larger in the free choice group so that overall duration of the experiment was similar in both groups. Additional self-assessment measures revealed that participants in the free choice group felt less subjective effort than participants in the yoked group indicating that depending variables are differentially affected by freedom of action.

Risky choice in non-WEIRD populations: A model comparison study in the rural Philippines

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A central question in judgment and decision making research is how people proceed when choosing between risky outcomes. To explain these risky choices, numerous decision strategies have been proposed. Besides, many comparison studies have been conducted to determine which of these strategies are actually used by decision makers. However, most studies have based their conclusions entirely on WEIRD samples, that is, samples from western, educated, industrialized, rich, and democratic societies. Given that substantial variability in experimental results between WEIRD and non-WEIRD populations has been found for a variety of cognitive domains, it remains unclear what risky choice strategies might be used in non-WEIRD populations. To answer this question, we conducted a strategy comparison study using a large sample of participants (N = 1008) from a rural population in the Philippines. Participants were presented with items (gamble pairs) tailored to differentiate between thirteen different risky choice strategies. Subsequently, participants were classified as users of the strategy that best explained their choices and reaction times. Contrary to previous studies, no evidence was found for a predominance of either decision heuristics or integration models. In addition, the influence of cognitive abilities and gamble domains (gains/losses) on strategy usage is examined and discussed.

How does an emotional context influence memory for details? Mechanisms and implications

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A negative context enhances memory for central details while impairing memory for peripheral information. This trade-off effect is generally assumed to be mediated by attentional processes. However, this explanation has rarely been tested and previous findings were partly inconclusive. In two experiments, negative and neutral naturalistic picture stories were presented in an incidental encoding phase, followed by a recognition test for specific central and peripheral story details. In the first study eye movements were measured as an index of overt attention and in the second study neuronal activity (fMRI) was additionally recorded. As expected, encoding context differentially affected recognition of central vs. peripheral details. However, contrary to the common assumption, the emotional trade-off effect on memory was not mediated by attentional processes. Moreover, different brain structures were recruited during encoding when items were presented in an emotional as compared to a neutral context. These results indicate that processing information of a negative context differs qualitatively from that of a neutral context. The current findings have implications for field applications in the forensic domain, for example with respect to memory-based deception detection techniques or the validity of eyewitness testimonies.

Emotion regulation is differentially affected by stress-induced cortisol increases

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The capacity to regulate emotions is vital for mental health. The stress hormone cortisol has been shown to attenuate negative emotions in response to stress and thus might prevent an emotional overshoot. However, the relationship between cortisol and affect is far from understood. This study aimed to explore, how stress-induced cortisol increases affect three different emotion regulation strategies. For this purpose 72 healthy men and women were either exposed to a stressor or a control condition. Subsequently participants viewed positive and negative images and were asked to up- or downregulate their emotional responses or required to solve an arithmetic problem (distract). After picture presentation, participants rated their current emotional state. In contrast to controls, stressed participants were less effective in distracting themselves from both, negative and positive pictures. Stress furthermore enhanced the ability to decrease negative emotions in men while impairing the ability to increase emotional reactions to negative stimuli in women. These results highlight the differential effects of acute stress on emotion regulation in men and women. The findings indicate that in a sex-dependent fashion cortisol is associated with an increased efficiency to actively reduce negative emotions, while it rather impairs the augmentation and distraction from emotional stimuli.

Hitting a target may decrease its perceived size

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The relation between motor performance and perception of object's size in near space was examined. The general task was to repeatedly hit a circular target under restricted feedback conditions by means of pointing movements and to estimate target's size. In opposite to previously published findings, the results of Exp. 1 and Exp. 2 indicated that participants who hit the target relatively often judged it to be smaller than participants whose motor performance was relatively bad. In Exp. 3, the target was judged as smaller when it was easy rather than difficult to hit already before the movement initiation. These results suggest that under certain conditions an increase in experienced action ability may reduce the apparent size of an object to which action is related.

Eureka! – Neural correlates of learning by insight

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Recently, problem-solving by insight has been reported to enhance long-term-memory formation. Insights, such as the famous "eureka!" moment of Archimedes, are defined as sudden comprehension following incomprehension and are usually accompanied by a positive feeling. Here, we investigated neural correlates of learning by insight by means of the Compound Remote Associates (CRA) Task. In this task, three words are presented that are not obviously related (e.g., "tennis, manners, cloth"), and a fourth word needs to be found which can be combined with each of them to create a compound word (here, "table"). We compared processing of the solution for CRA items with an unsolvable control items consisting of uncombinable words (i.e., no insight should occur upon the presentation of the fourth word). Consistent with the hypothesis that insight involves detecting a novel relationship that, nevertheless, extends existing knowledge, and that this sudden comprehension is rewarding, we found highly increased activation of bilateral hippocampus, amygdala, caudate nucleus, and left medial prefrontal cortex (mPFC) for CRA compared with baseline items. Furthermore, mPFC showed increased activation for later successfully remembered compared with forgotten solutions during encoding, suggesting that most critical for learning by insight is the sudden comprehension of schema consistency.

Verbal working memory load reduces phonological, but not semantic planning scope in sentence production

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Semantic and phonological encoding during sentence production can span beyond the initial noun phrase prior to speech onset (e.g., Jescheniak et al., 2003; Meyer, 1996; Oppermann et al., 2010). However, there is little research on the flexibility of advance planning. In a series of picture-word interference experiments, we tested whether the scope of semantic and phonological advance planning is influenced by concurrent visuospatial or verbal working memory (WM) load. Participants produced simple subject-verb-object sentences. Auditory distractor words semantically or phonologically related to the object were contrasted with unrelated distractors to index semantic and phonological activation of the object name prior to speech onset. A no-load condition (sentence production only) was compared to two load conditions (concurrently performing either a visuospatial or verbal WM task). We observed semantic interference effects from object-related distractors regardless of load manipulation. In contrast, phonological interference effects from object related distractors were observed in the no-load and visual load condition, but not in the verbal load condition. These results indicate that the phonological but not the semantic planning scope is reduced under verbal WM load. This pattern suggests that processes required for phonological, but not for semantic speech planning overlap with verbal WM processes.

Burnout and the fine-tuning of cognitive resources

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We examined the performance in a Constant Foreperiod (CFP) task in two samples screened for either high or low scores on the core burnout dimension emotional exhaustion. In line with our expectations, participants scoring high on emotional exhaustion exhibited a specific deficit with respect to maintaining a high level of response readiness at longer foreperiods. This demonstration of a modulation of CFP performance by burnout adds to the growing body of evidence suggesting that exhaustion is related to deficits in basic cognitive mechanisms underlying the fine-tuning of cognitive resources according to task demands.

The Quiet Eye and motor performance – Introducing fixation duration as an independent variable

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Evidence suggests a strong relation between superior motor performance and the duration of the last fixation before movement initiation (called Quiet Eye, QE). Although this phenomenon proves to be quite robust, to date, only little is known about its functional role. Therefore, in two experiments, a novel paradigm is introduced, testing the QE as independent variable by experimentally manipulating the duration of the last fixation in a throwing task. In addition, this paradigm allowed for the manipulation of the predictability of the target position. Results of the first study revealed an increase in throwing accuracy as function of experimentally prolonged QE durations. Thus, the assumption that the QE does not surface as a mere by-product of superior performance could be confirmed. In the second study, this dependency was found only under high task-demand conditions in which the target position was not predictable. This finding confirms the hypothesis that it is the optimization of information processing which serves as the crucial mechanisms behind QE effects.

Differentielle Konditionierung mit erotischen Reizen bei sexsüchtigen Probanden

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Internetsexsüchtiges Verhalten gewinnt durch die Verbreitung und den Ausbau von Internetverbindungen im klinischen Kontext zunehmend an Bedeutung. Trotz der klinischen Relevanz gibt es aktuell nur wenige Studien, die sich mit den Grundlagen, die diesem Verhalten zugrunde liegen, beschäftigen. Dabei werden Konditionierungsprozesse als ein wichtiges Modell für die Entstehung angesehen. Ziel dieser Studie war der Vergleich von konditionierten Reaktionen zwischen Probanden, die sich als internetsexsüchtig beschreiben und einer Kontrollgruppe. Während eines Konditionierungsparadigmas wurde ein visueller neutraler Reiz (CS+; farbiges Quadrat) mit erotischen Reizen gepaart (UCS), während ein zweiter visueller neutraler Reiz (CS-) das Ausbleiben erotischer Reize ankündigte. Dabei wurden subjektive Bewertungen der konditionierten Stimuli, elektrodermale Reaktionen und die BOLD-response gemessen. Es zeigten sich signifikante Haupteffekte der CS-Art in der elektrodermalen Aktivität und in den subjektiven Bewertungen. Der CS+ löste im Vergleich zum CS- mehr elektrodermale Aktivität aus ($p < .05$) und wurde positiver bewertet ($p < .05$). Zusätzlich konnten erhöhte neuronale Aktivierungen im Kontrast CS+ vs. CS- in der Patientenstichprobe im Vergleich zur Kontrollstichprobe gefunden werden. Die Ergebnisse deuten darauf hin, dass Probanden, die sich als sexsüchtig beschreiben, im Vergleich zu gesunden Kontrollpersonen veränderte Lernprozesse aufweisen, die neuronal abbildbar sind.

Parametric Assessment of Cognitive Decline in Multiple Sclerosis based on a "Theory of Visual Attention" (TVA)

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Cognitive impairment is highly prevalent in patients with multiple sclerosis (MS; 40-75%), varying widely both inter- and intraindividually. Therefore, the core deficit in MS is assumed to be a decline of processing capacity, which is crucial for attention and working memory functions and supported by widespread cerebral networks. The present study assesses processing capacity with the method of whole report of brief letter arrays based on a "theory of visual attention" (TVA) proposed by Bundesen and relates it to MRI data. We hypothesize that the decline in processing capacity of MS patients exceeds the nonclinical decline of healthy subjects.

True and false intentions: Mental images of the future

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Being able to detect deception about future actions has clear societal value. At best, it could prevent crimes before they happen. One phenomenon that has been found to accompany thinking of the future is mental images which allow us to vividly pre-experience the future. The research question is how mental images can help to discriminate between true and false intentions. To examine this, half of the participants (truth-tellers) were instructed to tell the truth about their intentions whereas the other half (liars) was instructed to hide their intentions with a cover-story. The mental images were tapped by (a) an investigative interview in which all participants described the mental image they may have experienced while planning for their stated intention and (b) a post-interview-questionnaire in which all participants rated how vivid they had experienced their mental image. The results showed that truth-tellers (vs. liars) reported a mental image significantly more often. Furthermore, the descriptions provided by liars and truth-tellers did not differ with regards to content (e.g., visual and spatial details). This is surprising as truth-tellers (vs. liars) tend to experience their mental image as more vivid.

Effects of an acute exposure to 200 ppm toluene on behavior and neurophysiology in a visual attention task

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Toluene is an organic solvent, which is widely used in industry. Chronic exposure to toluene above certain thresholds leads to several impairments both behaviorally and neurophysiologically. Acute effects are less clear and heavily dependent on toluene concentrations and exposure modalities. In our study two groups had to perform a visual attention task for six blocks while behavioral and EEG data were recorded. After the second block the groups were either exposed to a peak air concentration of up to 200 ppm or only constant 0.9 ppm of toluene for 40 minutes accompanied by light physical activity. Our results show that the high-exposed group performs significantly worse in terms of visual selective attention than the low-exposed group during the fourth block, which was about 30 minutes after exposure, while performance did not differ significantly in the other three blocks after the exposure. These results indicate that even acute exposure to toluene leads to short-term effects which impair distinct control mechanisms that are crucial for executing selective visual attention.

Self-drawn similarity maps reveal valence asymmetry in the density of naturally sampled concepts

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The density hypothesis states that positive information is more similar to each other than negative information. Similarity is usually assessed with multi-dimensional scaling (MDS). Due to the high cost and time investment of MDS studies, evidence for the density hypothesis is so far limited to the similarity scaling of a small selection of concepts. However, testing the validity and generality of the density hypothesis must involve excluding sampling biases and constraints. In Experiment 1, we investigate cumulative spatial arrangement (CSA), a new measurement tool to assess the similarity of a given selection of concepts in a contextualized and highly cost/time efficient way. CSA measures the similarity of concepts based on how spatially close they are arranged on the computer screen. Results show that the concurrent and predictive validity of CSA is high. In Experiments 2a and 2b, relatively large, self-selected samples of MTurkers use CSA to assess the similarity of their own or an unknown person's natural selection of positive and negative concepts. Our results show that representatively selected positive concepts are spatially arranged in a more dense way than representatively selected negative concepts, and this finding implies that the density hypothesis holds true for the single individual's mind.

The relative benefit of spatial auditory selection over non-spatial selection is offset in unprepared attention switches: Evidence from an explicit attention-switching paradigm

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Dichotic listening, in which different information is presented to the left and right ear, is a classic paradigm to examine selective attention in the auditory domain. Typically, participants are instructed to attend to one stream of information while ignoring the competing distracter information, based on a specified selection criterion, such as gender of speaker. Recently, we employed task-switching methodology to develop a procedure that requires explicitly cued trial-by-trial attention switching and observed switch costs both with gender-based and ear-based target selection. Notably, performance on attention-switch trials was similar across selection criteria, but ear-based (i.e., spatial) selection resulted in a relative benefit on repetition trials. The present experiments introduced blocks with a fixed selection criterion (single-task blocks) in addition to attention-switching (mixed) blocks to examine the role of preparation. Experiment 1 (ear-based selection) showed substantially better performance in single-task blocks than on repetition trials in mixed blocks (mixing costs), but Experiment 2 (gender-based selection) did not show significant mixing costs. Switch costs in mixed blocks were similar across experiments. Together, the data suggest that attentional biasing can be more efficient for spatial than for non-spatial selection parameters, but that this relative spatial selection benefit is offset in unprepared attention switches.

The neurophysiological interaction of lexical information and movement execution

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Embodiment theories assume that abstract, cognitive representations such as the meaning of linguistic object representations (e.g., noun meaning) partly overlap with concrete, sensory and motor representations. Hence, we predict that goal-oriented (i.e., intentional) complex movements and lexical-semantic representations interact on the neurophysiological level. To investigate such interactions, the electroencephalogram (EEG) was recorded while 26 participants performed a dual task. Letter strings were presented in one of three positions on the screen for lexical decision. If it was a German word, participants had to grasp and lift an object of different size at the corresponding table location. (Pseudo words indicated no go trials.) Word meaning (small vs large object) and the size of the cube-like objects were manipulated. Hence, the object size and the word meaning (affordance associated with the object name) could be (in)congruent. (The named objects and the physical objects could require either precision or power grips.) The EEG analyses yielded the earliest interaction effects at parieto occipital electrodes between 100-200 ms after word onset. In a control block (pointing instead of grasping), qualitatively different results were obtained. The combined results suggest that abstract, lexical meaning representations and concrete movement information of grasping interact on the neurophysiological level.

Neural network of cognitive emotion regulation – an ALE meta-analysis and MACM analysis

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Cognitive regulation of emotions is a fundamental prerequisite for intact social functioning which impacts on both well being and psychopathology. The neural underpinnings of this process have been studied intensively in recent years, without, however, a general consensus. We here quantitatively summarize the published literature on cognitive emotion regulation using activation likelihood estimation in fMRI and PET (23 studies/479 subjects). In addition, we assessed the particular functional contribution of identified regions and their interactions using quantitative functional inference and meta-analytic connectivity modeling, respectively. In doing so, we developed a model for the core brain network involved in emotion regulation of emotional reactivity. According to this, the superior temporal gyrus, angular gyrus and (pre) supplementary motor area should be involved in execution of regulation initiated by frontal areas. The dorsolateral prefrontal cortex may be related to regulation of cognitive processes, while the ventrolateral prefrontal cortex may not necessarily reflect the regulatory process per se, but signals salience and therefore the need to regulate. By focusing on regions commonly active across multiple studies, this proposed model should provide important a priori information for the assessment of dysregulated emotion regulation in psychiatric disorders.

Frühzeitige Fahrerunterstützung bei zeitkritischen urbanen Verkehrskonflikten – ist eine rein visuelle Fahrerinformation ausreichend?

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Das Forschungsprojekt Ko-PER zielt auf Verbesserungen der aktiven Fahrzeugsicherheit durch eine möglichst vollständige Umfelderkassung mittels sog. verteilter Sensornetzwerke ab. Diese ermöglichen es, Fahrer frühzeitig über potenzielle Konfliktsituationen zu informieren. Bisher behandeln jedoch wenige Forschungsarbeiten die Frage, wie dringlich solche frühzeitigen Fahrerinformationen zu gestalten sind. N = 81 Probanden wurden in einem statischen Fahrsimulator mit oder ohne Fahrerunterstützung mit kritischen Konfliktszenarien im Kreuzungsbereich konfrontiert. Diese variierten in der Art (z.B. Konflikt mit PKW oder Radfahrer) und Richtung des drohenden Konflikts (z.B. drohender Konflikt aus linkem oder rechtem Kreuzungsarm). Aufbauend auf Vorarbeiten zur Gestaltung der Mensch-Maschine Schnittstelle wurden verschiedene Varianten der Fahrerunterstützung untersucht: visuell-auditive Fahrerinformation vs. rein visuelle Fahrerinformation vs. keine Fahrerunterstützung. Die Information bestand aus der Anzeige der Richtung aus welcher der jeweilige Konflikt droht und wurde eine Sekunde vor dem letztmöglichen Warnzeitpunkt dargeboten. Die Ergebnisse zeigen, dass die Probanden erwartungsgemäß schneller auf visuell-auditive als auf rein visuelle Informationen reagieren. Beide Arten der Fahrerinformation entschärfen jedoch die Konfliktsituationen gleichermaßen und finden eine hohe Akzeptanz bei den Probanden. Auf Basis der Untersuchungsergebnisse können rein visuelle Fahrerinformationen empfohlen werden, sofern diese frühzeitig erfolgen. Diese Studie wurde im Rahmen des vom Bundesministerium für Wirtschaft und Technologie geförderten Forschungsprojekts Ko-PER durchgeführt (Förderkennzeichen I9S9022B).

The role of distractor practice in attentional control

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Top-down control over attentional capture in efficient visual search is possible, yet theories diverge on the mechanisms involved. We tested the assumption that distractor practice is a key component behind attentional control. We employed an additional singleton task and induced feature versus singleton search mode by using heterogeneous and homogeneous distractors, respectively. In addition we manipulated the amount of practice with the color distractor: Participants either were confronted with a singleton distractor during practice trials or did not encounter it. The color of the singleton distractor varied from block to block to investigate whether distractor practice is tied to specific features or can be transferred to other features. We expected that interference is reduced in feature search mode compared to singleton search mode. Second we assumed that participants in singleton search mode profit from distractor training and are better at suppressing the distractor. Third we expected distractor interference in singleton search group to increase with each color change, but to decrease over the course of the experiment. Results confirmed the first two hypotheses and provided partial support for hypothesis three, suggesting that distractor practice is an important element in attentional control.

The SNARC Effect in Chinese Characters and Hand Symbols

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We investigated the horizontal SNARC effect (quicker left/right responses to relatively small/large numbers, respectively) in native Chinese participants living in Beijing in three different modalities: Arabic digits, Chinese characters, and Chinese hand signs. We used a parity judgement paradigm (N = 26) and a magnitude judgement paradigm (N = 25). Previous studies (Hung, Hung, Tzeng, & Wu, 2008) had found only a vertical SNARC effect for Chinese characters in Taiwanese subjects. There are, however, differences in reading habit between Taiwan (horizontal writing officially adopted in 2004) and mainland China (horizontal writing officially adopted in 1955). For Chinese hand signs, there had been no prior SNARC effect studies. We found a horizontal SNARC effect for Arabic digits ($p < .001$), Chinese characters ($p < .001$), as well as Chinese hand signs ($p = .017$). This complies with common interpretations that emphasise the importance of reading direction habit. It also specifies that previous results that found no horizontal SNARC effect for Chinese characters are likely due to participants' reading habits. This is the first time that a horizontal SNARC effect has been demonstrated for Chinese characters and Chinese hand signs, and reiterates the importance of reading habit over properties of notation.

Maintaining the Fabrications: Knowledge about Having Lied to a Question is Retrieved Automatically

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In order not to be revealed as a liar, individuals have to maintain fabrications over longer periods of time. The present research examined the underlying cognitive mechanisms of successfully maintaining fabrications. Using the framework of instance-based theories of automaticity, we hypothesized that knowledge about having lied to a certain question is retrieved automatically from long-term memory whenever the critical question is encountered again. In two studies, participants were first orally interviewed and instructed to lie to a subset of the questions. Subsequently, all questions were presented as irrelevant prime stimuli in a categorization task in which the target words “dishonest” and “honest” had to be identified by pressing one of two keys. Both experiments revealed a congruence effect, indicating faster identification of the target “dishonest” following the presentation of a question that had been answered untruthfully in the previous interview. Results are discussed with regard to theoretical implications for instance-based learning theories as well as for lie detection in forensic settings.

Aberrant Social Feedback Processing in Borderline Personality Disorder

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Borderline Personality Disorder (BPD) is characterized by aberrant decision-making in interpersonal relationships. However, it remains unclear how BPD patients process social information within interpersonal contexts. Recently, we have shown that healthy people show a positivity bias when processing social feedback about their character traits after a real life interaction. Here, we tested whether BPD patients show an absence of this social positivity bias. In each experimental session (16 sessions in total), one BPD patient and four matched healthy controls got to know each other by playing a board game and rated each other on 80 trait adjectives. Afterwards, participants first rated themselves and then received feedback on how three others had supposedly rated them. This feedback could be desirable (better than own rating) or undesirable (worse than own rating). To assess how participants updated their views, they rated themselves a second time. BPD patients rated themselves initially as less favorable than controls. In contrast to controls, BPD patients showed no positivity bias in feedback processing. That is, controls updated more for desirable than for undesirable feedback while BPD patients updated equally for both feedback types. Our study shows that BPD patients lack a self-related positivity bias in decision making.

Memory formation in 7 year-olds and adults: What theta- and alpha-band analysis may tell us

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Using electroencephalography, we investigated the formation of memories in 7 year-olds and adults. Analysis focused on neuronal oscillations in the theta- and alpha-band. We employed a subsequent-memory design with incidental and intentional encoding: Participants saw pictures and made indoor-outdoor judgments and were asked to memorize stimuli in the intentional condition. During retrieval, participants indicated whether an object was new, old or changed (for slightly changed stimuli). To identify critical neuronal processes underlying memory formation, we contrasted neuronal activity during encoding of later remembered and later forgotten stimuli, i.e. subsequent memory effects (SMEs), as well as intentional vs. incidental learning. Prefrontal theta oscillations predicted successful encoding in children (900-1900ms) and adults (1200-2200ms). The delay of this effect closely resembles children's longer reaction times during indoor-outdoor judgments. Intentional encoding was associated with qualitative differences between age groups: Adults showed increased parietal alpha, while children had elevated prefrontal theta activity. SMEs in post-stimulus theta might reflect task related control processes, which lead to deeper encoding and later recognition. Intentional encoding seems to undergo a qualitative change between 7 year-olds and adults: Theta in children suggests active usage of frontal control functions (e.g. learning strategies), whereas alpha in adults suggests higher attentional efforts.

Collaborative virtual environments as experimental research tools

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Computer-mediated communication has evolved from purely texted typed messages to more complex and sophisticated medium, which has undoubtedly altered computer-mediated social interaction and collaboration. Collaborative virtual environments (CVE) inaugurate new possibilities for experimental research in psychology and social sciences. Two current theories of social influence will be introduced that try to explain differences in behavioral reactions to different forms of virtual characters (avatars as digital representations of a human-being versus agents as digital representations of a computer), as well as behavioral reactions in real-life situations. Additionally, a series of studies with different CVEs will be presented. Their findings indicate that social interactions within virtual environments provoke behavioral and physiological responses in users, which are comparable to real-life situations. Moreover, some studies will be discussed using CVEs as research tools in areas in which real-life investigations would be impossible or restricted by ethical concerns. However, the challenges and limitations of studying social interactions within virtual environments shall be discussed in the light of the mentioned theories of social influence. At last, some field reports regarding the use of CVEs as research tool in stress research will give implications for future research and developments.

Can Content-based Knowledge Awareness Help Overcome Collaborative Inhibition and Improve Relations by Fostering Transactive Memory?

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Recent years have seen a growth of research arguing for the benefits of collaborative learning. Students learning collaboratively tend to find the learning process more enjoyable and motivating. On the other hand, a substantial amount of literature also shows that learning together has a negative impact on the amount of information that is being memorized. It has been suggested, however, that this collaborative inhibition can be overcome in situations where the learners have a transactive memory system (TMS), and are thus able to coordinate who memorizes what. Yet, the development of such a system takes time and effort and is thus particularly difficult if communication is not face to face, (online learning groups). A solution might be Content-based Knowledge Awareness (CoKA), which is the provision of insight into the partners' knowledge content at the outset of the collaborative interaction. Previous research has demonstrated that CoKA facilitates fast establishment of a TMS. Hence the current study investigates whether online groups with CoKA memorize more details of a to-be-processed biological model than groups without, or than nominal groups in which participants learn individually. Results are pending.

Modulation of the bilateral field advantage in visual-short-term-memory by repetitive TMS over the right precuneus

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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 on an early level of visual processing for bilateral displays (e.g. Alvarez & Cavanagh, 2005). 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 (e.g. Kraft et al., 2013). Here we test whether hemisphere-specific resources are also evident on later stages of visual attentional processing. We used a whole report paradigm based on the Theory of Visual Attention (TVA; Bundesen, 1990) that allows measuring VSTM capacity variability in unilateral and bilateral displays during navigated repetitive transcranial magnetic stimulation (rTMS) over the precuneus. Fifteen healthy subjects participated in the study. A robust BFA in VSTM storage capacity was observed in the control condition without rTMS and after rTMS over the left precuneus (both $p < 0.01$). In contrast, the BFA diminished with rTMS over the right precuneus ($p > 0.05$). We suggest that the right precuneus plays a causal role in VSTM capacity, particularly in bilateral visual displays.

Can we Infer Personality Traits from Vocal Correlates?

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Estimating personality traits from vocal features of speech remains an open question. Thus, we present an acoustic models of neuroticism and extraversion that aim to explain the relationship between acoustic features of a speaker's voice and personality perception by considering the physiology of speech production. For this purpose, a large corpus of 139 speakers was judged on the Big Five personality dimensions by at least 15 independent raters. Univariate and multivariate associations between the mean personality ratings and 45 selected acoustic features related to the processes of respiration, phonation and articulation were computed. Our results suggest that vocal features of speech (e.g. jitter, shimmer, harmonics-to-noise ratio, and statistics of formants 1-5) have an important influence on the perception of extraversion, neuroticism and openness to experience. Furthermore, our results largely support the proposed acoustic models of neuroticism and extraversion.

Source memory of visual imagery: a hierarchical multinomial processing tree model

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The present study investigated, based on a study of Finke, Johnson, and Shyi (1988) how the ease of imagery influences the probability of source confusions of perceived and imagined completion of natural symmetric shapes. The stimuli consisted of, slightly adapted, binary pictures of natural objects, namely symmetric pictures of birds, butterflies, insects and leaves. When inspecting the behavioral data of the source monitoring experiment, we could show that confusion of the sources becomes more likely, when the imagery process was relatively easy. However, if the converging processes of the source monitoring process, item memory, source memory and guessing biases, are disentangled, the interpretation of this effect must be reconsidered. The data was modeled with a hierarchical multinomial processing tree model, based on the latent-trait approach of Klauer (2010). This hierarchical model was extended by linear regressions, predicting the model parameters for every stimulus with the stimuli's features, ease of imagery and discriminability. After the data analysis with this model, not the source memory decreases, but the bias to guess that an item has been perceived, increases for easily imagined stimuli. Yet, the discriminability of the items is influencing the item memory accuracy.

Neuronal correlates of attention during preparation in basketball free-throws

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So far, sport related EEG studies were mainly conducted in golf putting or shooting. The aim of this investigation was to examine possible neuronal correlates of attention during the preparation in basketball free-throws. EEG recordings of 12 experienced male basketball players ($M = 30.33$; $SD = 9.7$) were compiled during 60 standard free-throws. The number of successful throws and the deviation from the center of the basketball ring was collected to separate good from bad performance. The average score was 43 successful out of 60 throws ($M = 42.5$; $SD = 9.72$). Independent of the performance, EEG data revealed a decrease in parietal alpha power during the preparation phase. Furthermore, there was a tendencial significant effect ($p = .070$) on right-frontal electrodes for theta and low alpha, such that good performance was related to higher activity. The results indicate the relevance of frontal and parietal regions during the preparation in basketball free-throws, which is in line with neurophysiological theories of attention. A study in progress should reveal some more information about which specific regions are mandatory for the basketball shooting task.

Do individual differences in cognitive abilities contribute to inattentional blindness?

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People sometimes fail to notice salient but unexpected objects when their attention is otherwise occupied, a phenomenon known as inattentional blindness. In inattentional-blindness tasks, some people notice and others miss the unexpected object, but it is unclear whether that pattern reflects any stable individual differences in cognitive ability, with some studies showing a link to working memory capacity and others not. We explored whether these discrepant results derive from the use of different types of inattentional-blindness tasks, those that induce failures of awareness due to limited cognitive resources (central tasks) and those that induce failures by diverting attention spatially (peripheral tasks). We used both central and peripheral unexpected stimuli in a static inattentional blindness task and correlated noticing with multiple measures of working memory, inhibition, and attentional breadth (N = 123). We expected noticing in central tasks to correlate with measures of working memory and noticing in peripheral tasks to correlate with attentional-breadth measures. Unexpectedly, measures of both attentional breadth and working memory correlated with performance on the central task but not on the peripheral task. This finding suggests a link between noticing an unexpected object and individual differences in the ability to distribute attention within a given task.

Neural correlates of instructed extinction

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Extinction is known as an important mechanism in exposure therapy of anxiety disorders. Previous studies showed beneficial effects of instructed extinction on conditioned skin conductance responding (SCR) and unconditioned stimulus (UCS) expectancy. It did not influence subjective evaluation of the conditioned stimulus (CS). The goal of the present study was to identify neural correlates of instructed extinction. In a functional magnetic resonance imaging (fMRI) experiment 43 healthy subjects underwent a four-day social conditioning paradigm consisting of acquisition, extinction, extinction recall, and delayed extinction recall. Before extinction one group was instructed that no more UCS will be presented. Bold response, SCR and CS ratings served as dependent variables. Results indicated reduced activation in the fear and extinction circuit (amygdala, insula, anterior cingulate cortex, hippocampus, ventromedial prefrontal cortex) during extinction in the instructed group compared to the group without instruction. There were no significant activation differences between groups during (delayed) recall and no significant group differences in SCR data and CS ratings. Reduced fear recall or no need to extinguish in the instructed group could explain activation differences of groups during extinction. In contrast to activation differences during extinction, instruction did not prevent spontaneous recovery of conditioned fear during (delayed) extinction recall.

Crossmodal attention switching in numerical and spatial visual-auditory tasks

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Mental flexibility is a crucial factor for adaptive behavior. In this study, underlying processes of flexibility encountered in crossmodal attention were investigated in a cued-task-switching paradigm. To study crossmodal selective attention, stimuli were presented bimodally. The imperative modality was indicated by a cue. Participants (n=16) switched attention between modalities (auditory or visual task) either with numerical or spatial stimuli. In the numerical condition, participants were asked for a magnitude comparison of the number (2 and 8) presented in the relevant modality in relation to the fixed standard 5. In the spatial condition, participants were asked for a left/right judgment of the stimulus (rhombi and sounds) presented in the respective modality. As a control condition, single-modality blocks with unimodal stimuli were included. Results show modality switch costs (asymmetrical across input-modalities in the numerical condition) and congruency effects (asymmetrical in the spatial condition), suggesting visual dominance. To account for our findings, we propose a modality-weighting account and we discuss the role of pure spatial associations vs. numerically mediated spatial associations.

Is personal relevance an important aspect for cheater detection?

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Evolutionary psychologists often claim memory functions can only be understood through an analysis of the specific selection pressures that have shaped the cognitive system during human evolution. Within 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 exploitation by this person in future encounters. In the present study, we were interested whether our student participants were able to discriminate between descriptions of behavior, which were very probable to happen to them during the next few years and descriptions of behavior, which were very unlikely to happen to them during the next few years. A multinomial processing tree model was used to disentangle old-new discrimination and source memory for cheating (relevant for students vs. not relevant for students), altruistic (relevant for students vs. not relevant for students) and neutral behavior descriptions. The results showed that source memory was enhanced for faces combined with negative trait information which was relevant for students.

Functional equivalence of action simulation and action execution: How effectors are represented?

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The organization of motor maps within the human motor areas during action simulation and execution is an intensely debated issue. Jeannerod (2001) hypothesized that action execution, imagery, and observation are functionally equivalent what led to the prediction that these motor states are based on the same motor representations. On this background, the present study examined how hand and foot movements are represented during action execution, imagery, and action observation by using fMRI. 18 right-handed and right-footed volunteers (9 female, mean age = 26 years, SD = 2.7) ran through ten conditions: three execution conditions, three imagery conditions, three observation conditions, and one baseline condition. In the nine experimental conditions, participants had to execute, observe, or imagine right-hand extension/flexion movements or right-foot extension/flexion movements. The fMRI results revealed a somatotopic organization within the contralateral premotor and primary motor cortex during motor imagery and motor execution. However, there was no clear somatotopic organization of action observation within these regions, although observation of the movements activated these areas significantly. Therefore, the present data suggest that the functional and neuroanatomical overlap of motor imagery and action observation with action execution differs to some extent.

Interindividuelle Unterschiede bei appetitiver Konditionierung

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Bei der appetitiven Konditionierung wird ein neutraler konditionierter Stimulus (CS+) mit einem angenehmen Stimulus (UCS) gepaart. Ein vergleichbarer neutraler Stimulus (CS-) wird hingegen nie mit dem UCS präsentiert. Appetitive Konditionierungsprozesse stellen eine mögliche Erklärung für Rückfälle oder Craving dar. Im Kontext von Suchterkrankungen können beispielsweise neutrale Reize durch Paarung mit dem Suchtmittel zum CS+ werden. Jedoch ist nicht jeder Mensch gleichermaßen anfällig für Suchterkrankungen und auch Patienten unterscheiden sich in Bezug auf ihr Rückfallrisiko. Bisher ist unklar, welche interindividuellen Unterschiede mit appetitiven Konditionierungsprozessen in Zusammenhang stehen. Es wurde ein appetitives Konditionierungsparadigma durchgeführt, bei dem neutrale geometrische Figuren als CS+, bzw. CS- und erotische Bilder als UCS dienten. Die Ergebnisse zeigen einen Effekt der Konditionierung in relevanten Strukturen, der elektrodermalen Aktivität und der subjektiven Bewertung der Stimuli. Dabei zeigten sich interindividuelle Unterschiede, die zum Verständnis der differentiellen Reaktionen auf appetitive Reize beitragen können.

Visual language discrimination in 6-month-old infants

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The present study aimed to investigate whether monolingual German-learning 6-month-old infants are able to discriminate between German and French fluent speech utterances on the basis of visual speech cues only. Moreover, this study examined whether infants are capable of visually-only distinguishing between their native language (German) and a foreign language (English) with similar prosodic-rhythmic characteristics. By using a preferential looking procedure, infants (N = 57) were presented with two side-by-side video images of a bilingual female speaker who was silently talking German fluent utterances on one side and French or English utterances (with the same amount of syllables) on the other side. During a second trial, again the silent videos were presented with reversed position of side. A higher proportional amount of looking time to one visual speech as compared to the other was assumed to indicate a preference and therefore discrimination. Results show that infants preferred to look at the French or English visual language. This visual preference for the foreign language indicates that infants are sensitive for phonological and prosodic language cues and are capable of using these cues to visually distinguish between two languages.

The Direct Effect of Testing in Action Phrases

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Testing has often been regarded as a passive assessment tool of what has been previously learned. However, testing itself is a learning event and acts as a “memory modifier” (Bjork, 1975). It has numerous times been shown that repeated testing, compared to repeated study, appears to mitigate forgetting over time. In the present study, we investigated for the first time the direct effects of testing with a new type of material: action phrases (e.g., “lift the glass”). 48 participants studied a list of 40 action phrases in three trials either by enacting or reading them aloud. 20 action phrases were only studied (SSS) and 20 action phrases were studied once and tested twice (STT). All participants took final cued-recall tests over short (2-minute) and long (1-week) retention intervals (RIs). Immediate memory performance was superior for study-only after the short RI, however, did not differ between both conditions after the long RI. Importantly, testing decreased the rate of forgetting compared to reading over 1 week. The results are discussed in terms of the bifurcation model of item strength by Kornell and Bjork (2010).

Forgetting: The Psychological Relativity of Time

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Hundreds of studies have demonstrated that memories decay with the passage of physical time, suggesting that the relationship between forgetting and physical time follows a natural law. However, there is also an inner experience of time, and the subjectively experienced time is not isomorphic to physical time. Accordingly, it may be that forgetting increases as a function of subjectively experienced time, rather than as a function of physical time. To examine this issue, participants performed a memory task, and we independently varied the subjectively experienced passage of time and the physical passage of time between learning and testing, using a manipulated clock. Participants were either given the subjective impression that different retention intervals were used although actually the same physical retention interval was used, or they were given the impression that always the same retention interval was used, although actually different physical retention intervals were used. In a control condition, subjectively experienced time and physical time were matched. Compared to the control condition, the same amount of forgetting was observed even when participants were only given the subjective impression that different retention intervals were used. This finding suggests that forgetting can increase as a function of subjectively experienced time.

Children's Emotion Recognition in Human Voice and Face. A Developmental Study

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Background: Children's emotion understanding develops with age. This has either been found for visual (Grossmann, Striano & Friederici, 2006) or for auditory stimuli (Rothman & Nowicki, 2004) – but not for both independent modalities in parallel investigated by within-subject designs. Additionally, not many studies have included reaction times as well as accuracy measures of emotions. This research investigates developmental differences in emotion processing. Methods: 54 English children (5-10 yo) and 53 English adults (18-67 yo) rated Ekman faces (Ekman, 1976) as well as non-verbal affect stimuli (Belin, Fillion-Bilodeau & Gosselin, 2008) for perceived emotion intensity. Results: Children's RT's for rating emotions decreased with age. This was true for voices and for faces although faces were processed faster than voices in two out of three child groups. Voices showed higher error rates than faces – independent of age. Children rated emotions in general significantly slower than adults but improved with age. This was true for visual as well as for auditory emotion stimuli across all trials. Discussion: Findings suggest that children have a similar understanding of all six basic emotions to adults. However, children are less efficient in rating emotions, especially in the voice trials indicating visual domain dominance.

Measuring the User Experience of mobile applications. An empirical validation of a quantitative method.

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Nowadays, the creation of positive User Experience is a main goal when designing interactive products. User Experience (UX) can be characterized as a multidimensional phenomenon that consists both of the perception of different product qualities and related user emotions. Important aspects of UX have been described by the CUE-model (Thüring & Mahlke, 2007). Based on this model, a new instrument, the meCUE questionnaire, was developed (Minge & Riedel, 2013). MeCUE consists of 34 items that assess instrumental and non-instrumental product perceptions, emotions, consequences and overall judgment. In contrast to existing questionnaires, which lack central aspects of User Experience, this tool offers a new method that assesses the major components in a comprehensive manner. This study addresses the validity of the questionnaire. An expert review was conducted to identify three public transport apps which differed with respect to usability and design. These different apps served as independent variables in the main study where meCUE and other UX questionnaires (AttrakDiff, UEQ, PANAS, VisAWI) were applied by 24 participants to evaluate the apps. The results of the experimental study show that meCUE produces valid results and can be of special interest in product development of interactive systems.

Attention Development and Learning: Recent Insights From Eye-tracking and EEG

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The ability of infants to switch attention from a central fixation stimulus to a peripheral visual target, measured in the Fixation Shift Paradigm (FSP), is a reliable measure of normal and abnormal attention development in infancy (cf. Atkinson, J., & Braddick, O., 2012. *Dev Med Child Neurol*, 54, 589-595.). The switching of attention occurs later if the central fixation stimulus stays visible when the target appears (competition condition), than if the central stimulus disappears (non-competition condition), as a shift under competition requires additional disengagement from the central stimulus. This difference decreases with age, most likely as a result of emerging cortical control of attention. We have developed an automated approach using remote eye-tracking (Tobii X120) which offers improved accuracy and shorter testing times in comparison to former methods. It furthermore allows combination with electroencephalography (EEG) to investigate underlying neural mechanisms. Our results from infant and adult subjects confirm a developing ability to disengage attention which will be illustrated with EEG results. Furthermore, the ability to shift attention improved with the number of completed trials, indicating a learning effect. The new method is suitable for fine-grained assessment of typical and atypical development of attention and its underlying brain mechanisms.

Effects of physical and cognitive training on executive functioning in older adults: An ERP study

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Older adults often have difficulties in flexibly adapting to changing task demands. In keeping with this, they perform worse than younger adults in Stroop- as well as task-switching tasks. Even healthy aging thus appears to be associated with marked deficits in executive functions, such as interference processing and cognitive control. In the present event-related potential (ERP) study, we examined to what extent different training regimes can counteract some of this age-related decline. Across 4 months, older adults (> 65 years) received either unspecific cognitive training or physical training focused on endurance and strength. Pre- and post-training, we administered a cue-based combined Stroop-switch-task in which the relevant stimulus dimension (color vs. word meaning) could change from trial to trial. Compared to passive and active control groups (4-month relaxation training), both training groups showed performance gains in the post-test that were, however, more pronounced for the cognitive training group. In the physical but again especially in the cognitive training group, we additionally observed increased amplitudes in ERP components associated with task preparation (CueP3) and cognitive control (N2/N450). Our study thus indicates that physical and especially cognitive training can modulate these core processes of executive functioning and in turn ameliorate age-related performance deficits.

How do different learning conditions influence place recognition?

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Place recognition is based on the local position information available from each place. However, learning conditions could influence the acquisition of local position information. This study addresses the question whether the place recognition performance differs between explicit and incidental learning. In a virtual reality setup participants were trained to the junction of a plus-shaped board-walk across a pond featuring four distinguishable landmark objects. One group of participants was explicitly instructed to learn the junction point. Another group navigated to distant goals, which required turns at the board-walk junction, thereby learning this point incidentally. During the test phase, the pond and the board-walk were covered by ground fog and the participants had to find the junction via four outstanding landmarks. The participants hit a button when they thought they reached the junction. In the explicit learning group, the average decision points per participant were scattered isotropically about the true location. By contrast the average decision points of participants in the incidental learning group were systematically biased in a direction common to all participants. We conclude that the place codes built in incidental and explicit learning differ, presumably in the amount or type of local position information represented.

Attentional effects of emotional faces in different spatial frequencies

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Using variants of the flanker paradigm, we tested the attention grabbing/holding capacity of faces with different facial expressions. In one experiment, facial expressions were the target dimension, maximizing the room for expression-flanker effects. In another experiment, expressions were task-irrelevant. We further varied the faces in terms of spatial frequency filtering. The main idea was to test, whether different facial expressions exhibit their strongest flanker effects for different spatial frequency bands. To ensure processing of the flankers, the stimuli were shown at varying positions on screen and participants had to process one stimulus dimension (like gender) in order to identify the target. Flanker effects were surprisingly small or absent, raising doubts about quick and automatic attentional effects of emotional faces. However, we did find influences of identical flankers and effects of spatial frequency filtering on target discrimination times. To our surprise emotions could be discriminated fastest when removing low spatial frequency information from the images.

Working memory for action: Evidence for using motor representations in encoding visuo-spatial stimulus sequences

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We studied the neural correlates of translating visuo-spatial stimulus sequences into delayed (memory-guided) sequential actions to examine whether motor representations are involved in the encoding of visual sequences that are to be reproduced subsequently. Using fMRI, we measured brain activity in 36 healthy adults while they encoded and, after variable delays, manually reproduced sequences of 4–7 dots appearing on fingers of a left or right schematic hand. Recall became less accurate with longer sequences and was initiated faster after long delays. Across hands, both encoding and recall activated bilateral prefrontal, premotor, superior and inferior parietal regions as well as the basal ganglia, whereas hand-specific activity was found (albeit to a lesser degree during encoding) in contralateral premotor, sensorimotor and superior parietal cortex. Furthermore, basal ganglia activity during encoding selectively predicted correct recall. Taken together, these results suggest that to-be-reproduced visuo-spatial sequences are encoded as prospective action representations ("motor intentions"), possibly in addition to retrospective sensory codes. Overall, our study supports and extends multi-component models of working memory, highlighting the notion that sensory input can be coded in multiple ways depending on what the memorandum is to be used for.

Examining response-related processes in auditory attention switching

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Using an auditory attention-switching paradigm, we examined potential effects of preparation on response-related processes in three experiments. To this end, two number words, spoken by a female and a male speaker were presented dichotically via headphones. In each trial, a visual cue indicated the gender of the to-be-attended speaker. The interval between the cue and auditory stimulus presentation (cue-stimulus interval, CSI) was either short or long. In Experiment 1, participants were asked to shadow the relevant number word or judge its magnitude as being smaller or larger than five by saying “smaller” vs. “larger” (i.e., direct vocal responses). In the magnitude-judgment task, switch costs were larger and the preparation benefit smaller. In Experiment 2, participants performed the magnitude judgment task and responded either with direct vocal or abstract (i.e., “left” vs. “right”) vocal responses. Performance was worse when responses had to be transformed into a more abstract response category, but also benefitted more from preparation. In Experiment 3, participants either responded with abstract vocal or abstract manual responses. Responses were faster with the manual responses, but benefitted less from preparation. We discuss results on the basis of response selection processes.

Skin carotenoid colouration – a signal of current health

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Recently, the importance of skin colour for facial attractiveness has been recognised. In particular, skin colour linked to dietary intake of carotenoids has been proposed as a signal of health and consequently attractiveness. However, several important questions are outstanding: Are preferences specific to carotenoid colouration and are they specific to faces? Do preferences for carotenoid colouration extend to other social judgements? And, what are the physiological mechanisms underlying carotenoid colouration of the skin? Here, in a series of experiments with Caucasian participants, we investigated the perceptual significance of carotenoid colouration for attractiveness and trust judgments, as well as associations between this skin colouration and testosterone. We find high carotenoid colouration: (a) is preferred to low carotenoid colouration and to high melanin colouration; (b) is preferred in the context of a face but not in the context of scrambled face patterns; (c) is associated with social judgements such as increased trustworthiness; and (d) is associated with low baseline and reactive testosterone levels in men. Taken together these findings are consistent with skin carotenoids providing a colour signal of current condition in humans and indicate an intricate physiological interplay between diet, hormones and immune function in control of carotenoid levels.

Frugal search in medical decisions from experience

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How does experience influence patients when deciding about which medical treatments to follow? For a decade, research on risky choice has examined how people make decisions based on experiential and descriptive sources of information. The majority of studies, however, used monetary gambles as their main methodological tool. We examine whether and how people differ in the way they approach medical and monetary uncertainty when making decisions from experience. We studied how people search for information and make choices using an experimental design that allowed us to administer comparable monetary and medical prospects within participants. Our results show that participants made medical decisions based on smaller samples of information than their monetary decisions, ultimately leading to different choices. In the monetary domain, most decisions accorded to the option with the higher expected value. In the medical domain, however, the proportion of decisions for the better option was slightly above chance level. Consistent with previous findings, there was a description-experience gap in the monetary domain. But more importantly, this gap was also present in the medical domain, revealing a case of the description-experience gap beyond the scope of monetary decisions.

On the trouble of being a polyglot: Language conflict in trilingual word production

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When people speak three languages, language selection becomes a complex problem. Little is known about which of a trilingual's languages interfere with each other to which degree. We carried out three picture-word interference experiments on language conflict during trilinguals' production of the weakest foreign language. Participants were German native speakers with English as L2 and Dutch as the later acquired, but currently more active foreign language (L3). They named pictures in English while being presented with a Dutch or German distractor. In Experiment 1, auditory distractor words that were phonologically related to the target's German or Dutch translation slowed down the (English) responses compared to unrelated distractors, which is in line with previous bilingual findings. Importantly, the effect size was comparable for Dutch and German distractors. In Experiments 2 and 3, we used the direct translations as distractors, for which previous bilingual studies puzzlingly observed facilitation. Our results showed a stable, invariant inhibition effect for Dutch translation distractors, while the size and direction of the German translation effect depended on distractor modality (auditory vs. visual) and SOA. These findings indicate that while L3 invariably interferes with L2 production, the effect of L1 co-activation is more susceptible to strategic factors.

Less can be more - when more restricted parameter models lead to better estimates in diffusion model analysis

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In recent years, there is a strong increase in applications of the Ratcliff diffusion model (Ratcliff, 1978) to experimental paradigms based on binary classification tasks. The strength of diffusion modeling lies in the comprehensive utilization of information on reaction time distributions (not only on response time means or error rates). Thereby, the identification of different cognitive components (e.g., response criteria, speed of information uptake) becomes possible. The growing interest in diffusion modeling is accompanied by the emergence of practical questions concerning the applicability of the diffusion model. In particular, the questions of how many trials are required for diffusion model analyses and of how many parameters should be estimated in order to achieve reliable estimates are repeatedly raised. In simulation studies these issues were approached using different trial numbers and different numbers of estimated parameters. Furthermore, parameter estimation was executed with three different optimization criteria. The findings indicate that reliable parameter estimation can be achieved even with small trial numbers (< 100). Besides, the number of required trials is lower when some parameters (intertrial variabilities) are fixed to given values (even if these fixations do not match the true values) than when these parameters are included in the estimation procedure.

Kognitiver Abruf komplexer räumlich-situativer Verkehrsinformationen im Kontext urbaner Straßenkreuzungen

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Der Abruf einer räumlich-situativen Repräsentation einer komplexen Verkehrssituation setzt neben dem Aufbau dieser Repräsentation auch Aufmerksamkeit voraus, die für die Enkodierung und den Abruf von Gedächtnisinhalten unabdingbar ist. Diese aufmerksamkeitsintensiven Prozesse sind darauf ausgerichtet, die für eine komplexe Verkehrssituation relevanten Aspekte zwischenzuspeichern und diese Verknüpfungen aktiv zu halten. Dies ist erforderlich, um den umgebenden Fremdverkehr zu verstehen und eine mentale Repräsentation zu erzeugen. Kommt es während der Aufbauphase zu kognitiver Ablenkung, so kann dies die Qualität der räumlich-situativen Repräsentation in minderer Weise beeinträchtigen. Um sowohl den kognitiven Abrufprozess der räumlich-situativen Repräsentation von Verkehrsinformationen, als auch deren Beeinträchtigung durch kognitive Ablenkung zu untersuchen, wurde eine experimentelle Untersuchung durchgeführt. Hierfür wurden 60 Probanden kurze Videoclips aus der Fahrerperspektive präsentiert, die eine Annäherung an eine urbane Straßenkreuzung ohne gesondert geregelten Links- und Rechtsabbiegeverkehr zeigten, während eine auditiv-räumliche Nebenaufgabe dargeboten wurde. Danach wurde den Probanden eine von vier abstrakten Bilddarstellungen der Videoclip-Straßenkreuzung präsentiert. Sie wurden gebeten zu entscheiden, ob es sich dabei um den letzten Moment der komplexen Verkehrssituation aus dem vorangegangenen Videoclip handelt. Als abhängige Variablen wurden Pupillenweite, Reaktionszeit, und Anzahl korrekt erkannter Bilddarstellungen erfasst. Die Ergebnisse zeigen, dass kognitive Ablenkung sowie perspektivische Merkmalsdarbietung einen Einfluss auf die Qualität kognitiven Abrufs haben.

Identification of suspects: What do ERP tell about underlying cognitive processes?

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The relevance of cognitive control during deception detection has been demonstrated by means of event-related potentials (ERP). A widely unanswered question is how individuals learn to discriminate suspects and non-suspects. Therefore, we investigated in a sample of 29 participants (age: $M = 25.06$ years, 13 male) whether variations of conflict-monitoring and error-monitoring intensity are predictive for the learning rates in a suspect-identification task based on a task vignette. We expect that a successful identification of suspects is associated with an intensified conflict-monitoring and that learning rates are associated with error-monitoring. In the task vignette participants were informed of a murder. Participants were asked in a face go/nogo discrimination task to learn by means of trial-and-error who of the presented persons was suspect of the murder and who was not. We present findings of behavioral data (e.g., sensitivity d' , commission error rates), of the N2-component as an indicator of conflict-monitoring, and of the Error(-related) negativity (Ne/ERN) as an indicator of error-monitoring. The data extend our knowledge on cognitive processes of suspect identification and they are discussed with regard to recent frameworks of cognitive control in neuroscience.

Rehearsal in working memory: The White Knight of decay theories?

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The notion of decay in short-term or working memory cannot be upheld without the notion of rehearsal to counteract decay. We examine the many explanatory roles that have been ascribed to various forms of rehearsal or refreshing in contemporary decay theories of working memory. We instantiate the most common assumptions about rehearsal in a generic decay model and apply it to benchmark paradigms ranging from immediate serial recall to complex span and delayed recall. The results show that articulatory forms of rehearsal are unable to completely prevent forgetting through decay, and causes the model to predict behavior incompatible with the data (e.g., serial-position curves with strong recency and very little primacy, and decreasing performance with increasing presentation time of the list). Rapid attentional refreshing performs considerably better, but so far there is scant empirical evidence that people engage in refreshing during short-term memory tasks. We conclude that articulatory rehearsal as a maintenance mechanism does not bail out decay theories, and invoking refreshing is not yet backed by sufficient evidence. Explanatory appeals to rehearsal are therefore largely vacuous unless buttressed by precise modeling.

Der Einfluss einer Speed-Accuracy Manipulation auf schildergeleitetes Navigationsverhalten in einer virtuellen Umgebung

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Die Studie untersucht die Auswirkungen von Speed-Accuracy und Speed-Confidence Tradeoffs bei schildergeleitetem Navigationsverhalten in einer virtuellen Umgebung. Tradeoffs dieser Art sind schon mehrfach experimentell untersucht und nachgewiesen worden, jedoch nicht im Kontext von schildergeleiteter Navigation. Als Umgebung dient ein 3D Modell eines Abflugterminals im Frankfurter Flughafen. Dieses wird mittels einer Cyberbrille präsentiert, die durch ein dreidimensionales Blickfeld und Berücksichtigung der Kopfbewegungen ein sehr realitätsnahes Raumempfinden ermöglicht. Die Versuchsteilnehmer/Innen bekommen in dieser Umgebung wiederholt Ziel-Gates genannt, die sie entweder so schnell wie möglich (Speed-Bedingung) oder so sicher wie möglich (Accuracy-Bedingung) finden sollen. Anschließend sollen sie auf einem Fragebogen ihre empfundene Sicherheit über die Navigationsentscheidungen einschätzen. Wir erwarten, dass in der Speed-Bedingung richtungsweisende Schilder weniger lang fixiert werden, jedoch mehr Fehlinterpretationen und damit Umwege auftreten, und die Confidence-Ratings niedriger ausfallen. Im Gegenteil dazu erwarten wir längere Schilderfixierung bei gleichzeitig weniger Fehlinterpretationen sowie höhere Confidence-Ratings in der Accuracy-Bedingung. Im Mittel erwarten wir vergleichbare Suchzeiten in beiden Bedingungen. Um eine mögliche Interaktion zwischen Schildeigenschaften und Navigationssicherheit zu untersuchen, werden am Frankfurter Flughafen real verwendete Beschilderungssets in einer früheren und in der aktuellen Version nachgestellt und gegeneinander getestet. Wir erwarten allgemein höhere Performanz beim aktuellen Beschilderungsset im Vergleich zu der früheren Version.

Multiple Fingers - One Gestalt

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The Gestalt theory focused on how distributed visual sensations are combined into a structured experience, “Gestalt”. Here we show that also haptic sensations at two fingertips are integrated in the perception of a single object. During lateral arm movements virtual bumps were presented simultaneously to thumb and index finger of the right hand. Participants combined both signals into the perception of one single bump. A discrimination task measured the perceived bump location and the perceptual precision (assessed by differential thresholds) for four finger configurations. The finger configurations varied in their adherence to the Gestalt principle of proximity (small vs. large finger separation) and in their adherence to the Gestalt principle of common fate (virtual spring to link finger movements vs. no spring). The manipulation of finger separation and virtual spring affected precision. Differential thresholds were smaller for maximal compared to not maximal common fate. Only for not maximal common fate higher proximity led to lower differential thresholds. Thus, with higher adherence to Gestalt principles thresholds approached optimal values predicted by the Maximum Likelihood Estimation (MLE) model. The results suggest that the Gestalt principle of common fate and the Gestalt principle of proximity interact and can promote trial-by-trial multi-finger integration.

A Role of Human Posterior Parietal Cortex in Action Selection?

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How do we select a particular course of action given the various alternative options that are available in a specific situation? To isolate the brain processes that underlie the generation of human goal directed reaching movements we resort to time-resolved functional magnetic resonance imaging (fMRI) during delayed response tasks. These tasks allow separating planning processes from the sensory representations on which they depend and from the motor acts they produce. Using this technique we characterized human posterior parietal cortex (PPC) as a sensorimotor interface for the preparation of goal-directed motor acts (Lindner A et al. 2010 J Neurosci). In recent experiments we now demonstrate that PPC can simultaneously represent multiple action plans – even if these plans are mutually exclusive. Moreover, we were able to reveal that motor planning-related fMRI activity in human PPC is modulated by incentives, namely by the amount of reward or punishment human subjects associated with their upcoming behavior (Iyer A et al., 2010 PLOS Biol.). The results of these experiments identify human PPC as a “saliency map for action” - representing the various available behavioral options and their behavioral import. Human PPC thus seems ideally suited to reflect a cortical substrate for action selection.

Sound inflation: Auditory cues are sufficient to trigger false memories of having performed an action

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Research has identified different processes that can trigger the formation of illusory memories of having performed actions. However, all these processes are primarily (or even solely) visual in nature. For instance, merely watching someone performing an action can later lead to a false recollection of having performed the corresponding action oneself. Yet, when performing an action, other modalities—such as audition—come into play, too. With the present study, we therefore explored whether auditory cues alone—in the absence of any visual cues—can trigger false action memories. In addition, we examined how auditory and visual cues interact with regard to the formation of false memories. After performing a series of simple actions, participants either heard someone performing various actions, watched someone perform the actions, or simultaneously both heard and watched someone perform them. Some of these actions had been earlier performed by the participants and others were new. A later source-memory test revealed that all three types of processing (only heard, only watched, both heard and watched) led to comparable increases in false claims of having performed actions. Source monitoring and motor simulation are discussed as potential mechanisms underlying this kind of memory illusion.

The Impact of Criterion Noise in Signal Detection Theory: An Evaluation across Recognition Memory Tasks

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Signal Detection Theory (SDT; Green & Swets, 1966) assumes that stimulus information is represented by continuous evidence distributions. According to SDT, responses are given by establishing response criteria across the evidence scale. It is tacitly assumed that the positioning of response criteria is stable across trials, but recent work in the domain of recognition memory has questioned it, arguing for the presence of criterion variability or criterion noise (Benjamin, Diaz, & Wee, 2009; Benjamin, Tullis, & Lee, 2013). The interest behind criterion noise lies on its ability to distort SDT parameter estimates and explain problematic findings (e.g., Balakrishnan, 1999; Van Zandt, 2000). We report evidence from three experimental studies as well as simulations showing that criterion noise is absent or of negligible magnitude, not providing any improvement to the traditional SDT model.

Tying Fremdschämen and Embarrassment Together: Behavioral, Cognitive and Physiological Links Explained Through a Two-Process Model.

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Embarrassment, while being a very common occurrence, has not been explained at a process level. In the same sense, the enigmatic phenomenon of Fremdschämen has, at most, only been described. Departing from this phenomenological tradition, I propose a two-process model which aims to predict both. This model, based on the Reflective-Impulsive-Model (Strack & Deutsch, 2004) and on the findings of Oyserman (2011) on Culture as Situated Cognition, aims to explain not only the behavioral, cognitive and physiological aspects of both emotions, but also the apparent link between them. Contrary to common beliefs, I propose that Fremdschämen is different from vicarious embarrassment, and deny that empathy is the basis of the phenomenon, what would contradict ample findings in empathy research. I present four studies addressing predictions of the model on (1) behavioral, (2) awareness and (3) physiological levels, as well as (4) concerning empathy as a mediator. Results support the predictions and challenge the relevance of empathy for the process, even suggesting an Fremdschämen-inhibitory effect. Hence, I propose a common process for both Embarrassment and Fremdschämen, based primarily in cultural-situational factors, as well as a new term for Fremdschämen, which should disambiguate its meaning: Remote Embarrassment.

Attraktivität von Unternehmen: Symbolische Merkmale sind wichtiger als instrumenteller Nutzen

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Der zunehmende Fachkräftemangel zwingt Unternehmen, ihre Arbeitgeberattraktivität gezielt zu steigern (vgl. Rietz & Lohaus, 2013). Da die Identifikation mit Unternehmen bereits vor einer direkten Interaktion mit dem Unternehmen beginnt (Griependrog et al., 2012), wird verstärkt die frühe Phase der Personalrekrutierung berücksichtigt (DeArmand & Crawford, 2011), um herauszufinden, was die Zielgruppe als attraktiv bewertet. Diese Frage wurde mit Bezug auf die Social Identity Theory untersucht. In drei Experimenten, in denen Studierende verschiedener Fachrichtungen die Attraktivität von Stellenanzeigen bewerteten, wurden symbolische und instrumentelle Faktoren der Arbeitgeberattraktivität (Highhouse et al., 2007) variiert. Die Ergebnisse zeigen, dass Label, die instrumentellen Nutzen repräsentieren (gute Personalarbeit, positive Unternehmenskultur) keinen signifikanten Einfluss auf die Arbeitgeberattraktivität haben, sondern lediglich das Image des Unternehmens. Die Ergebnisse werden als Beleg interpretiert, dass symbolischer Nutzen wichtiger ist als Hinweise auf instrumentellen Nutzen. Die Befunde stehen im Widerspruch zur Wichtigkeit von Attraktivitätsfaktoren, wie sie von Befragten geäußert werden (Lohaus, Rietz & Haase, 2013) und sind erneut ein Beleg dafür, dass Meinungsäußerungen und Verhalten voneinander abweichen können. Im Beitrag wird auch eine Erweiterung der Studie auf Stichproben aus dem Non-Profit-Bereich vorgestellt.

Relationship between brain morphometry and mental rotation strategies

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Mental rotation is a mental ability which plays an important role in imaging spatial elements and influences how successfully can we manipulate these informations. Previous research findings have shown that we can distinguish two categories, based on the test solving strategies: rotators and non-rotators. These categories can be classified from subjective reports of participants. Considering, that the cerebral processing depends on the modality of the particular stimulus (it contains simply perceptual, functional or abstract information), we can assume, that the rotator group performs an abstract activity, contrary to the non rotator group, which performs a concrete, non-abstract activity. As the processing modes can be distinguished on brain level, we examined the possible differences in brain morphology of rotator and non-rotator groups. Our study sample consisted of 85 healthy, adult volunteers (30 male), between 19 and 30 years (Mean: 23.19 yrs). We used the modified, computerized version of the mental rotation task, developed by Shepard & Metzler (1971). The results of the voxel- based morphometry showed larger volume of right postcentral gyrus, precentral gyrus, ventral posterior cingulate gyrus, lingual gyrus, and parahippocampal gyrus in subjectively non-rotator group, which areas have an important role in concrete, simple processing of stimuli.

Pupil dilation as a response to auditory affective stimuli

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In many studies, pupil dilation as a response to intensely valent (i.e., low and high rated) affective stimuli (images, words and sounds) could be shown. Pupil dilation occurs independently of whether the stimuli have a negative (low) or positive (high) valence. Affective stimuli also differ in how they impact humans. This leads to the dimension of arousal, a continuum that ranges from calming to exciting. It has been assumed that pupil dilation occurs as a response to highly arousing stimuli. However, the interaction between valence and arousal is less clear, especially for auditory affective stimuli. In order to help clarifying how valence and arousal of auditory stimuli affect the pupil dilation, we presented negative, neutral and positive valent sounds with different scales of arousal. We discuss our findings with respect of the rating dimensions valence and arousal.

As good as a fifteen year old: “Oculomotor ageing” in the anti-saccade task

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In an ageing society, neurodegenerative diseases are a severe public health risk. Researchers are trying hard to find markers for the early detection of these diseases. One promising tool is the anti-saccade task, which provides measures for reflexive and voluntary eye movements (“pro-saccades”/“anti-saccades”), as well as for cognitive control by the amount of reflexive eye movements (“error rate”). Before the anti-saccade task can be employed as a valid diagnostic tool normative data over a huge age range is needed. Therefore, we measured 674 healthy people aged 15 to 83 years. As expected, reaction times of pro-saccades increased with age and were shortest in the youngest subjects. Anti-saccade reaction times also increased with age, but were shortest only in young adults, whereas teenagers were closer to subjects aged 51 to 59. The same age dependency showed up in the error rates. When we looked at the peak velocity of the eye movements, no age dependency was found. The increased voluntary reaction times and error rates in teenagers may be attributed to delayed maturation of the frontal lobes. Longer reaction times and elevated error rates in elderly people may be a good indicator for an age-related decline in cognitive control.

Testing Continuous and Discrete Models of Signal Detection: The Effect of Stimulus Strength and Perceptual Noise

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Two approaches compete for measuring the cognitive processes involved in signal detection. Continuous-strength models (e.g., signal-detection theory) assume that subjective evidence strength varies along an evidence continuum. Responses are given whenever the evidence strength exceeds a response criterion. Discrete-state models (e.g., threshold models) postulate discrete detection and guessing states. Responses under certainty are given when a detection threshold is crossed; otherwise a response is guessed. Hence, the detection thresholds enclose an area of subjective uncertainty on the objective evidence continuum. In this uncertainty region, continuous models predict response probabilities that increase strictly monotonically with evidence strength, whereas discrete models predict a saddle point. In two perceptual discrimination tasks, objective evidence strength and perceptual noise were varied. The first task asked whether random checkerboards contain more light or more dark squares, while the second task asked whether checkerboards contain an equal number of light and dark squares. Including perceptual noise increased the model fits only in the first task, and the discrete-state models fitted best. In the second task, the continuous-strength models fitted better. To decide whether signal-detection performance should be analyzed assuming continuous vs. discrete subjective evidence strength, the characteristics of the task need to be taken into account.

Delay discounting = trait variable?

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Discounting refers to a decrease in the subjective value of a reward (or loss) as its delay increases. Steep discounting of delayed outcomes is of growing interest because of its relation to a number of socially important problems (e.g. pathological gambling, drug abuse). Although delay discounting is clearly related to some personality characteristics, there has been little formal consideration of whether delay discounting itself might be considered a trait. What evidence is there that the degree of discounting in which a person engages might be an overt component of such a trait? In general, experiments which will be presented examined how delays to an outcome affect its value. In each study, participants answered questions about money, and in separate questions, about consumable commodities (e.g. food). The results obtained suggest that the degree of sensitivity to delayed outcomes may be a stable and pervasive individual characteristic. Moreover, research in neuroscience, and behavior suggests delay discounting may prove to be a beneficial target for therapeutic attempts to produce global reductions in impulsivity related to delay discounting. Along with additional evidence reviewed, these data suggest that delay discounting may be considered as a personality trait.

Towards a cognitive endophenotype of developmental stuttering: experimental evidence on motor inhibition and executive control.

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Stuttering is a speech disorder with severe impact on a person's functioning and emotional well-being and with largely unknown etiology. Clinical assessment usually focusses on behavioral observations and questionnaire measures. The establishment of a language free endophenotype of stuttering would be of great value to inform etiological models and to derive an assessment tool for relevant deficits that is not obstructed by secondary symptoms of negative affect and that can be administered in unaffected relatives to establish potential links to genetics. Evidence suggest that a neurological deficit in frontostriatal loops contribute to core stutter symptoms. These loops control motor functioning but also underly executive control. In consequence, theoretical models on stuttering and executive control have striking similarities. To elucidate the possible relationship between stuttering and executive control, we conducted a case-control study in a group of adult ideopathic persons who stutter and an age- and gender-matched control group without any cases of stuttering in their family history. We assessed cognitive inhibition and executive functioning by a stop-signal task and a task-switching paradigm. Compared to healthy controls, persons who stutter had increased stop-signal reaction times in the motor control task but no deficit in task-switching.

The influence of object distinctiveness on reach-to-grasp signals at the human anterior intraparietal sulcus

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The implementation of movement kinematics is associated with dorsal parietal structures. The anterior intraparietal sulcus (aIPS) has been associated with reach-to-grasp movements to objects, of different sizes and orientations, independent of non-spatial features (i.e. colour or surface patterns). However, neurophysiological data from monkeys has shown that neurons in the dorsal parietal cortex encode an object's colour if this information has relevance for a particular task. Everyday objects provide lots of task-relevant information, we examined whether aIPS shows different signal levels when grasping everyday objects in comparison to grasping simple cuboids. Healthy participants grasped different sized objects, everyday objects or monochrome cuboids, in a slow event-related fMRI experiment. In a control experiment participants only saw the same objects in a blocked presentation. The contrast between grasping object categories revealed significant signal differences at the aIPS; vPMC; and lateral occipito-temporal cortex (LOC). Analyses of the control experiment, at these locations, showed differences at the LOC to be present without movement execution. Whereas no signal differences were found at the vPMC and aIPS without movements. We conclude that the aIPS not only receives and processes spatial parameters for action but also accounts necessary non-spatial features.

Executive functions and their relation to regularization in the serial reaction time task

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Regularization refers to the finding that errors display a tendency toward high-probability sequences, i.e., toward representations that already exist in long-term memory. The aim of the present study was to investigate the role of three executive functions - working memory updating, mental task-set switching, and inhibition of prepotent responses in the regularization effect based on the serial reaction time task. Specifically, participants learned a deterministic second-order condition sequence (SOC A) under incidental learning conditions. At two time points (block 4 and 8 out of 9) the (high-probable) SOC A sequence was randomly interspersed with a (low-probable) SOC B sequence. Our results indicate that a positive relation between working memory updating and regularization exists. Further results based on the development of errors toward the high-probable sequence between the two manipulated time points and the specific role of updating, switching, and inhibition in this process are presented. Our findings are discussed in the light of the role of the executive functions in the formation of long-term memory representations.

The Impact Of The Irrelevant: A Frugal Compilation Of Action-Triggers

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According to the action-trigger account (Kunde, Kiesel, & Hoffmann, 2003), primes activate responses due to the match between the top-down created action release conditions (action-triggers) and the prime features. By varying the number of manifestations on a response-irrelevant supraliminal prime feature in a response priming task, we investigated the feature-overlap between primes and action-triggers. In two experiments (N = 24; N = 36), the strength of priming effects for perceptual identical prime-target sequences varied as a function of variance on a completely response irrelevant prime feature (the number of possible prime positions in Experiment 1; the number of possible prime colors in Experiment 2). Priming effects linearly increased with increasing variance on the response irrelevant prime feature. The results suggest a frugal and efficient compilation of action-triggers that takes into account the whole experimental context: only features helping to improve task performance (in our experiments by separating primes from targets) are added to the current action-triggers and thereby influence behavior.

The role of visual and motor information of gestures during learning hand-manipulative tasks

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A broad range of tasks benefit from gesturing. However, the exact nature of the effect is unclear. We report two experiments that examined the influence of visual and motor information of gestures on learning a manipulative task. In the first experiment, participants learned to tie nautical knots by means of a stop-motion animation. We manipulated the availability of visual and motor information during learning. The animations either depicted hands tying the knots or not (visual information). Motor information was manipulated by instructing participants to gesture or to sit on their hands during learning. Results showed a beneficial effect of motor information but not of visual information. In the second experiment, we examined whether gestures help during initial encoding or final testing. In a 2-x-2 design, with the factors gestures during learning (yes/no) and gestures during testing (yes/no) participants completed the same task as in Experiment 1. Results showed a significant interaction effect. If participants gestured during learning, performance was not affected by gestures during testing. However, if participants did not gesture during learning, performance was significantly impaired if they gestured during testing. We conclude that motor information of gestures during learning is most effective for human learning and understanding.

Memory for irrelevant sounds and their locations: Evidence from the spatial negative priming paradigm

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Responding to previously ignored stimuli is usually slowed down — a phenomenon that has been called the negative priming effect. It can be explained by the retrieval of response-inadequate prime information and/or an inhibitory model. A similar after-effect has been found in visuospatial tasks: Participants are slowed down in localizing a stimulus that appears at a previously ignored location. In the auditory modality, however, an after-effect of ignoring a sound at a specific location has never been reported. Instead, participants are impaired in responding when the sound at the previously ignored location changes identity, a finding which is compatible with the feature mismatch hypothesis. We report two auditory localization experiments that specify the nature of this after-effect. Experiment 1 shows that the detection of identity-location mismatches is a genuinely auditory phenomenon that can be replicated even when the sound sources are invisible. Experiment 2 reveals that the detection of identity-location mismatches in the probe depends on the processing demands in the prime. This finding implies that the localization of irrelevant sound sources is not the inevitable consequence of processing the prime scenario but depends on the difficulty of the target search among distractor sounds.

Effects of varied spatial scale on perception of shape from shiny surfaces

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Humans are generally remarkably good at inferring 3D shape from distorted reflection patterns on mirror-like objects (Fleming et al, 2004). However, in certain conditions shape perception fails (complex planar reliefs under certain illuminations; Faisman and Langer, 2013). Here we map out systematically those conditions under which subjects fail to estimate shape from specular reflections. Specifically, we simulated surface reliefs with varying spatial frequency content and rendered them as perfect mirrors under spherical harmonic light probes with varying frequency content. The participants performed a depth discrimination task, in which they indicated which of two locations on the surface—selected randomly from a range of relative depth differences on the object’s surface—was higher in depth. Congruent with previous research, subjects were able to readily determine 3D shape using the information provided by specular reflections; however, performance was highly dependent upon surface and environment complexities. Results show that while participants were accurate within a given range for each manipulation, there also existed a range of spatial frequencies – namely very high and low frequencies – where participants could not estimate surface shape. Image analysis reveals the specific conditions that subjects rely on to perform the task, explaining the pattern of errors.

The Paradox of Interoception: Evidence against the Default Interventionist Model

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The "Paradox of Interoception", characterized by the observation that „experience is subjectively self-evident but empirically inscrutable“ (Schooler & Schreiber, 2004) provides interesting grounds to further call into question the currently most popular model of reasoning and decision making; Namely: the default-interventionist model (DI-Model). The notion that a reflective mind (or Type 2 Processes, e.g., Evans & Stanovich, 2013) can intervene upon autonomous (Type 1) processes breaks apart when one considers examples of interoception in tasks such as think-aloud protocols (e.g. Ericsson & Simon, 1980). We posit that abundant evidence from think-aloud protocols and the verbal overshadowing effect (Schooler & Engstler-Schooler, 1990) supports a kind of default-disruption model, rather than the DI-Model. Specifically, in non-verbalizable experiences the DI-Model is turned on its head as the recruitment of higher-order reasoning actually leads to disruptions in underlying experience and declines in performance and accuracy. Based on this we propose the deconstruction of dual-process models along further avenues and dimensions.

Multiple Strategies for Spatial Integration

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Spatial integration of separately experienced information is a rarely examined everyday task. Within four experiments we showed that participants flexibly adjust their spatial integration strategy, i.e., the reference frame used, according to the circumstances. Participants saw part of an object layout in screen 1, another part in screen 2, and reacted on the integrated layout in screen 3. Layout presentations between two screens coincided or differed in orientation. Aligning misaligned screens for integration is known to increase errors/latencies. The error/latency pattern was thus indicative of the reference frame used for integration. We showed that task familiarity combined with self-paced learning, visual updating, and knowing from where to act yielded the increased employment of initial, updated later, and acting reference frames respectively. Participants also heavily relied on layout intrinsic frames. Results suggest that spatial integration is not a largely monolithic process, but humans flexibly adjust their integration strategy to the way they perceive, act, and to the structure of the integrated layout.

Can post-retrieval extinction prevent the return of contextual fear in humans?

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Even after successful extinction, conditioned fear may return through spontaneous recovery, reinstatement or renewal. In order to weaken the fear memory itself and prevent its return, current studies focused on the reconsolidation period, in which a memory is fragile for several hours post-retrieval, and susceptible to pharmacological or behavioral interruption until its reconsolidation. Post-retrieval extinction learning was suggested to prevent the return of contextual fear in rodents as well as cued fear in humans. However, its effects on human contextual fear for fear-relevant stimuli remained unknown, and are thus the focus of this study. The experimental design consisted of 3 consecutive days: acquisition; memory reactivation and extinction; re-extinction. 2 zoo frames served as different contexts, 5 fear-relevant stimuli served as conditioned stimuli (CS), and electric shocks served as unconditioned stimuli (UCS). Expectancy ratings and skin conductance response (SCRs) were used as conditioned responses (CR). The results showed spontaneous recovery regardless of group and no robust renewal effect. The fear-relevant stimuli, context and manner of reactivation are suggested as explanations for the lack of reconsolidation effect. The results suggest that the use of post-retrieval extinction learning to prevent the return of fear may be sensitive to methodological alternations.

Words vs. Pictures: Stimulus Modality and the Probability of Task Recoding in the Implicit Association Test

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Implicit Association Tests (IATs) employing pictures as target stimuli usually reveal smaller IAT scores than those using words as target stimuli, suggesting weaker attitudes in the former compared to the latter case. As, on the other hand, the attribute dimension is typically represented by word stimuli, we hypothesized that the effect of stimulus modality is not due to differences in attitude-based evaluative associations but to task recoding: If targets and attributes comprise the same modality, it is more likely that participants simplify the task via forming superordinate categories, resulting in boosted IAT scores. We tested our assumption by conducting a study where stimulus modality was manipulated for both targets and attributes. For words as attribute stimuli, we replicated the typical result of smaller IAT scores for target pictures compared to target words. However, as expected, we observed the reversed pattern (i.e., larger scores for target pictures) if pictures were used as attributes. Analyzing our data with the ReAL model, a multinomial model that separates the contributions of recoding and evaluative associations, revealed stronger recoding whenever targets and attributes share the same modality while evaluative associations remained unaffected by such a modality match/mismatch between targets and attributes.

Do you like what you see? Combining facial electromyography and eyetracking to indicate the affective quality of stimulus elements

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On the one hand, facial electromyography offers an excellent access to affective changes with high temporal precision. On the other hand, eyetracking allows for the exact measurement of visual attention allocation with high spatiotemporal precision. The time-synchronous co-registration of both data recordings potentially provides an opportunity to indicate the affective quality of single elements within a complex visual stimulation, such as a photograph, a website or an ad. For lack of an empirical basis, the present study aimed at testing the functionality of the newly proposed measurement approach. In each trial participants were presented two affective pictures while their gaze behavior and facial muscle activity were continuously recorded. Physiological reactions were locked to the fixations and scored for each picture. The results showed that activations over corrugator supercilii and zygomaticus major muscle regions were indicative of the pictures' affective valence. Methodological considerations, future directions and potential applications are discussed.

Calculating beauty? The higher-order image statistics of faces

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We asked whether pictures of attractive – versus unattractive – faces are characterized by specific higher-order image statistics of face photographs and studied the influence of these statistical properties on perceived attractiveness. To this aim, we correlated higher-order statistics (such as scale-invariance in the Fourier domain and self-similarity) of face images with chronological age and ratings of attractiveness. The images of unattractive (older) faces were more self-similar and possessed a shallower slope in log-log plots of radially averaged Fourier power (i.e. the ratio of high versus low spatial frequency power was increased; Study 1). However, when we manipulated the face images directly, observers preferred images with Fourier plots that were shallower (Study 2). Images of natural scenes and artworks, such as portraits, also possess shallow slopes in Fourier plots. Additionally, the attractiveness of unaltered faces was affected by the spatial frequency spectrum of a random-noise background around the images (Study 3). We conclude that facial attractiveness ratings can be influenced by specific higher-order image characteristics, perhaps because they lead to more efficient and/or more fluent processing in the human visual system.

Acute stress attenuates fear retrieval in healthy men

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The stress hormone cortisol reduces retrieval of emotional memories, which has been proposed to support the treatment of psychiatric disorders characterized by exaggerated fear-related memories. Indeed, the success of exposure therapy in patients with anxiety disorders can be enhanced with accompanying cortisol application. Fear renewal refers to the clinically relevant phenomenon that successfully extinguished fear can return after a context change. In this study, we investigated whether the effects of stress hormones on fear retrieval also generalize across different contexts. Healthy men were exposed to fear acquisition (context A) and extinction (context B). Pictures of rooms served as contexts, colored lights as conditioned stimuli (CS), and an electrical stimulation as unconditioned stimulus. On the next day, participants were randomly assigned to a stress or control condition. We tested for fear retrieval in contexts A and B during peak cortisol concentrations after stress induction. Overall, a context x stress interaction occurred, revealing that stress attenuated skin conductance responses in the extinction context B. Additionally, stress abolished the renewal effect (CS differentiation in context A) at the electrodermal level. These results demonstrate that stress seems to interfere with the retrieval of the original fear memory, thus decreasing the return of fear.

Is source memory enhanced for emotional stimuli? A critical test of the object-based framework

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While item memory for emotional material seems to be enhanced compared to neutral material, research regarding the influence of emotion on source memory yielded inconsistent findings. The object-based framework (Mather, 2007) predicts within-object binding to be enhanced because negatively arousing stimuli attract attention. To test this prediction, we examined source memory for intrinsic features of threatening objects. Data were analyzed using multinomial models. Item memory was enhanced for threatening material. In contrast to the predictions of the object-based framework, no enhancement of intrinsic features of emotional compared to neutral objects were found.

Auditory-induced bouncing is a visual (rather than a cognitive) phenomenon: Evidence from illusory crescents

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When two discs move toward each other, superimpose, and continue moving after afterwards, human observers typically perceive them as streaming past each other. If a brief tone occurs at the moment of overlap, however, then they perceive the discs as bouncing off each other. Recent research has attributed this effect to decisional rather than perceptual processes. Here we test this using ‘illusory causal crescents’: if observers view disc A move until fully overlapped with disc B, after which A stops and B moves, they may perceive either streaming or launching — but when perceiving launching, they also see B move before being fully overlapped with A (i.e. leaving an uncovered crescent). We measure such illusory crescents in bouncing/streaming displays with auditory tones. In three experiments, we show that a brief tone at the moment of overlap induces an illusory crescent, but only when the tone occurs at (or slightly before) the moment of full visual overlap. Moreover, illusory crescents disappear when a synchronized tone sound is heard as part of a larger group of sounds. Collectively, these experiments suggest that sound-induced bouncing is a visual (rather than a cognitive) phenomenon, resulting from changes in visual (rather than decisional) processing.

Distracter-induced blindness in letter sequences

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In the distracter-induced blindness paradigm the detection of a simple visual feature is impaired when task irrelevant, target-like distracters are presented prior to the target. This effect is well known for coherent motion episodes in a random dot kinematogram and for orientation flips of diagonally oriented lines. There is also evidence for effects of distracter-induced blindness in the attentional blink. In the present experiment, distracter-induced blindness effects are examined in letter sequences. In contrast to the setup of the attentional blink, there is no identification task. The first target only serves as a cue for the second target, which should be detected. Distracters prior to the cue were the same letters as presented as second target. Similar to other classic distracter-induced blindness experiment, strongest impairment in detection of the second target occurred in shorter lags between cue and target and with higher numbers of distracters. Distracter-induced blindness takes not only place in paradigms using simple visual feature like coherent motion and orientation changes. Furthermore, it extends to more complex information like the identities of letters.

Stability in use of the recognition heuristic

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According to the recognition heuristic (RH), when faced with a recognized object and an unrecognized one, people decide based on recognition alone. Previous research has shown that use of the RH differs significantly between individuals. To investigate whether these differences are due to variation in personality traits, stability in use of the RH has to be demonstrated. In a series of four experiments, we assessed stability of RH use across two repetitions of the decision task. In the first experiment, participants worked on the city-size task separated by a one-minute break. In the second experiment, participants completed the city-size task twice, but this time with a delay of one day or one week using the same objects. As a more crucial test, we replicated the second experiment with different objects from the same object domain (world cities) in the two sessions. Finally, in the fourth experiment, participants completed the judgment task twice within one session using stimulus materials from two different domains (condition 1: success of celebrities and success of movies; condition 2: size of islands and success of musicians). The results of all experiments support stability in use of the RH, both across time and across stimulus materials.

Effects of social labeling and justice sensitivity on source memory for cheaters

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While theories in evolutionary psychology imply a specific module for the memory of cheaters, recent studies showed that reputational memory is more flexible as it is modulated by expectations. The present study used verbal labels (e.g. „scientist“ or „satanist“) to manipulate initial trustworthiness. These labels create initial expectations regarding the representation of the persons. Descriptions of trustworthy or untrustworthy behaviors violated or confirmed the initial expectations. In an unexpected memory test, participants were asked to remember the type of behavior which was presented along with the pictures and labels. A multinomial model was used separately to measure source memory, item memory, and various types of guessing processes. For source guessing an expectancy-congruency bias was found. For source memory, an expectancy-violation effect was found for negative labels: descriptions which were incongruent to participants' initial expectations were better remembered than descriptions that fitted the expectations. Both effects were stronger for participants high (vs. low) in dispositional victim sensitivity. This indicates that people high in victim sensitivity show an increased sensitivity for cues of untrustworthiness.

Color categorization of natural objects

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Individuals can give a single color name to a natural object, even though these objects often have non-uniform color distributions. It is unclear how observers exploit the information in natural objects to give them a single color name. Since autumn leaves have varying color distributions, we instructed 7 naive, observers to assign color names to them. Observers viewed high-resolution, 16-bit photos (shot under constant focus, camera distance, and background conditions with a D65 illuminant) of 275 autumn leaves that ranged from pure "red" to pure "green". Observers stated whether each leaf appeared "red" or "green." The leaves in each photo were segmented and converted to their corresponding DKL coordinates for our monitor. Various statistics were computed for the isoluminant color distributions (mean, standard deviation, number of pixels in "red" vs "green" regions, etc.). The statistics and the observers' responses were used to train linear classifiers, in order to find the most informative statistics. We found that the mean color predicts 76.41% of observer's classifications on average, explaining most of the variance. Using the mean color and the standard deviations of the leaf's color distribution along the R-G and Y-V cardinal axes strengthens predictions, capturing 83.72% of observers' classifications on average.

Benutzererlebnisse quantitativ messen mit dem meCUE Fragebogen

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Auf Basis eines weithin etablierten und empirisch abgesicherten Modells zur User Experience, dem CUE-Modell von Mahlke & Thüring (2007) wurde der meCUE Fragebogen zur modularen Evaluation zentraler Aspekte von Benutzererlebnissen entwickelt. In seiner Endversion besteht meCUE aus vier separat anwendbaren Modulen, die sich auf die „Produktwahrnehmung“ (Nützlichkeit, Benutzbarkeit, visuelle Ästhetik, Status und Bindung), auf „Nutzeremotionen“ (positive und negative Emotionen), auf „Konsequenzen“ aus der Interaktion (Loyalität und Nutzungsintention) und auf das globale „Gesamturteil“ beziehen. Die Konstruktion des Fragebogens und die Auswahl von Items erfolgte auf Basis zweier online durchgeführter Datenerhebungen, an denen jeweils $n = 238$ Probanden teilgenommen haben. Die anschließende Überprüfung der Reliabilität und Validität erfolgte sowohl unter Einsatz weiterer online Erhebungen als auch im Rahmen von laborexperimentellen Studien, in denen die faktorielle Struktur von meCUE mehrfach stabil repliziert werden konnte. Die Annahme interner Konsistenz der konstruierten Skalen kann durch Cronbachs Alpha Werte zwischen .76 und .94 als gut gestützt angesehen werden. Ebenso deuten substantielle Korrelationen zwischen den Skalen des meCUE und denen anderer Verfahren (AttrakDiff, UEQ, PANAS, SAM) auf eine angemessene Konstruktvalidität hin. Mit insgesamt nur 34 Items ist meCUE ein besonders ökonomisches und empirisch gut abgesichertes Instrument zur standardisierten Messung von Kognition und Emotionen in der Mensch-Technik-Interaktion.

The influence of social value orientation on spontaneous cooperation behavior

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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. We tested the generality of their findings by investigating a potential interaction between response time and social value orientation. We conducted three experiments in which participants played one-shot public goods games in groups of four; one study involving two samples that were representative for the US and German population. In the representative study we replicate the main effect of decision time on cooperation. In all three studies we furthermore find a main effect of social value orientation on cooperation. Most importantly, we also find the predicted interaction between decision time and social value orientation. For proselves, there is no influence of decision time on cooperation behavior. Independent of decision time, they stick to low contributions. In contrast, the contribution of prosocials decreases with increasing decision time. As expected, their intuitive response seems to be to cooperate but this spontaneous response can be overruled by longer deliberation. Overall, these findings qualify the findings by Rand et al. by showing that cooperative behavior is not intuitive per se, but just for prosocials.

Effects of practice and mental fatigue in a simon task – an EEG study

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Mental fatigue leads to an increasing error rate and problems in keeping attention focused. Previous research on this topic mostly consists of relatively short experiments, which we think are not representative to investigate mental fatigue. Therefore in the present study 16 healthy subjects performed a simple simon task for over 3 hours to address the effects of mental fatigue on behaviour and neurophysiological components. During the experiment electroencephalography was measured. The experiment was subdivided in three equal blocks. Interestingly the behaviour as well as event-related components showed a different result pattern for the first compared to the second and third block. While reaction times and error rates did not vary in the first block with time on task, they increased significantly over the second and third block. In contrast the N2 amplitude showed a large increase only in the first block. The P3 amplitude likewise showed the largest decrease within the first block. This indicates that N2 and P3 amplitude compared to the behavioural performance are not affected by mental fatigue. Instead, changes in N2 and P3 may reflect the impact of practice. These confounding effects indicate that short experiments are not adequate to investigate mental fatigue.

Selection-for-perception and selection-for-action during saccade preparation

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The visual attention model proposes a tight coupling between selection-for-action and selection-for-perception during movement preparation. Visual attention is supposed to be bound to the saccade target during movement preparation even when the time to prepare is extended. In contrast, recent studies demonstrated that attention can be allocated to multiple target locations during sequential movement planning or during movement planning and perceptual processes. In addition, it is not yet clear whether attentional selection processes also affect movement performance. We applied a modified dual-task paradigm in which participants performed a rapid visual discrimination task while they prepared a saccade. We manipulated spatial congruency of the location of the discrimination and the saccade target and the time to prepare the movement. Spatial congruency affected discrimination and movement performance in a predicted manner. In addition, saccadic curvature, a sensitive measure of attentional allocation in space, varied for each saccade target depending on the discrimination target location. Our results suggest that visual attention can be divided upon saccade target and discrimination target locations in incongruent compared to congruent trials resulting in costs for perceptual and movement performance.

How distractors influence our actions

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In selection tasks where target stimuli are accompanied by distractor stimuli, responses to target stimuli, target stimuli and distractor stimuli can be encoded together as one episode (i.e., as an event file) in memory. Subsequent repetition of any aspect of such an episode can lead to the retrieval of the whole event file including the response. Thus, repeating a distractor can retrieve the response given to a previous target, a phenomenon labeled distractor-response binding. Yet, past studies did not differentiate whether entire distractor objects or only certain distractor features are integrated and can trigger retrieval. In two experiments (N = 30 and N = 32) we aimed to get a better insight into the structure of bindings between distractors and responses. Participants responded to letters that were superimposed on distractors consisting of two orthogonally varied response irrelevant dimensions (color and shape). The results show that each distractor-feature could separately retrieve an earlier response and in addition that both retrieval effects were additive. The results give first insight into the structure of conjunctions that lead to distractor-response binding effects.

Neural Basis of Underdiversification in Portfolio Decisions

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According to Portfolio Theory investors should always hold a well-diversified portfolio, i.e. combine investments to reduce the risk. In real life, however, investors hold fairly underdiversified portfolios. We tested in an fMRI experiment if individuals risk perceptions are in line with Portfolio Theory. Subjects made a series of choices between either a single investment, a portfolio with correlated returns, or a portfolio with uncorrelated returns, and a save investment. Importantly, the return history of the risky options was exactly the same in all three conditions. We found that the save investment was chosen significantly more often when the portfolio with uncorrelated returns was displayed compared to the other two conditions. A model comparison revealed that Correlation Neglect, a model assuming that individuals compute the portfolio risk simply as the average of the standard deviations of the investments in the portfolio, performs better than Portfolio Theory. In line with these behavioral results, we found higher brain activity in the risk network (e.g., aINS and DMPFC) when the portfolio with uncorrelated returns was displayed compared to the other two conditions. Our results show that individuals have distorted risk perceptions when making decisions that involve portfolios of different investments.

Executive functions in children with motor coordination impairments

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Links have recently been discussed between motor coordination impairments and the development of executive functions (i.e. inhibition, shifting and updating). In the current study cognitive and motor coordination skills of children (N = 96) aged 5 and 6 with and without motor coordination impairments were compared. The sample consisted of n = 48 control children and n = 48 children with motor coordination impairments. Groups were matched according to sex, age and non-verbal intelligence. Children with motor coordination impairments showed a marked deficit in the development of executive functions, particularly in inhibition processes. Furthermore children with minor motor coordination problems outperformed children with severe motor coordination problems in accuracy, not in speed measurements of inhibition processes. Above that, a subsample of children with motor coordination impairments showed no deficits in executive functions. Underlying processes and implications for interventions are discussed.

Spatial response coding does not alter the mechanisms of auditory selection: Evidence from spatial negative priming with keypress and head movement responses

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Prior studies of spatial negative priming suggest that the inhibition of distractor-assigned responses is a mechanism of visual, but not auditory selection. The absence of inhibitory after-effects might have been caused by insufficient activation of manual keypress responses by auditory distractors. We aimed to provide direct response activation to irrelevant sounds by demanding spatially-directed responses. Participants localized a target sound while ignoring a concurrent distractor either by performing manual keypress responses or head movements toward the source of the target sound. Relations between prime distractor and subsequent probe target sounds were systematically manipulated (repeated vs. changed) with respect to identity and location. Irrespective of response type, performance was not generally impaired when the probe target appeared at the location of the former prime distractor and required a previously withheld response. Instead, performance was only impaired when either spatial or sound identity features mismatched between prime distractor and probe target presentation. Together, the results suggest that response inhibition effects do not emerge in auditory selection even if response activation is strong. Instead, the pattern of results fully supplements the prediction of the feature mismatching hypothesis.

Vividness of Mental Imagery as a Moderator for Discrepancies between Conveyed and Perceived Brand Personality

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Our study explored whether suggestional processes, i.e. vividness of mental imagery, can be accountable for discrepancies between consumers' perceived brand personalities and the companies' suggested brand personality. Within a quasi-experimental design a test measuring perceived brand personality globally and on five subscales (Geuens et al., 2009) was applied in two groups. One group consisted of managers (n=9) of a manufacturer producing a popular German shoe brand. Their ratings defined the suggested brand personality. The other group was made up by consumers who used to buy this brand (n=102). Within the latter group additionally a scale measuring vividness of mental imagery (Marks, 1995) was administered. This variable was hypothesized to explain differences between the managers' intended brand personalities and the consumers' perceived brand personalities. Correlational Data as well as regressions supported this hypothesis substantially: Consumers' vividness of mental imagery and differences between their and the intended perception of brand personality was negative. This was the case for the global personality as well as for the five subscales. Furthermore, data revealed a correlation between buying frequency and fit between perceived and suggested brand personality. Limitations and implications of these findings are discussed.

Aftereffects of completed intentions: Evidence for residual activation levels of completed action representations

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While many studies have frequently reported aftereffects of completed intentions on subsequent behavior, the interpretation of the underlying mechanism is to date controversial. Some studies suggested that the semantic content of intended actions is inhibited after intention completion resulting in costs in case of later re-activation. In contrast, other studies have argued that intention representations residually persist activated after intention completion, revealing interfering influences on ongoing-task performance. The present study was aimed at testing these two propositions. Participants executed one of two previously memorized action scripts. In a subsequent word-flanker task, task-irrelevant flankers contained words either from the previously performed script or from the post-learning irrelevant script. We hypothesized that residual activation of completed action representations should lead to increased flanker interference by flanker words from the performed script. Contrary, if completed action representations are subject to inhibition, less flanker interference should be found. Results were straightforward: Performance on central target word categorizations was slowed when the task-irrelevant flankers contained words from the previously performed script compared to words from the post-learning irrelevant script. Therefore, the present results speak in favor of residual activation as underlying source of aftereffects of completed intentions.

Placebo effects in the treatment of chronic back pain

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Research into placebo analgesia has mostly focused on healthy subjects, research in patients is sparse. There is evidence, however, that patients may react differently to classical conditioning (Klinger et al., 2007). Previous treatment experience is known to influence placebo analgesia (Colloca & Benedetti, 2006). We investigated the influence of previous treatment experience on placebo effects in chronic back pain patients with respect to pain perception and underlying neurobiological mechanisms. 28 chronic back pain patients received a pharmacological placebo along with verbal suggestions (VS) of a potent painkiller, while half of the participants additionally underwent a classical conditioning procedure (VS+CC). Pain ratings to intraepidermal electrical stimulation to the lower back were assessed before and after the placebo. Cortical activity was examined. Both groups showed reduced experimental and habitual pain (all $p < .001$) after the placebo. Increased activity in hippocampus, amygdala and striatum was observed during placebo. No differential effects have been found for VS and VS+CC. Positive prior experience with medication was associated with an increase in activity in mid-frontal gyrus and mid-cingulate cortex. Our results suggest that neural activity underlying placebo analgesia in chronic back pain patients may differ from those of healthy controls, possibly indicating a different mechanism.

Why where you look (sometimes) matters when you localize touch: Gaze-dependent spatial updating of somatosensory stimuli.

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While previous research consistently showed that visual stimuli are coded and updated in a gaze-dependent reference frame, the coding scheme of somatosensory stimuli is less clear. We conducted 2 experiments which investigated whether somatosensory stimuli are represented in gaze-dependent coordinates and whether the use of this reference frame is affected by effector movement. In the first experiment subjects reached to somatosensory targets while gaze direction was varied relative to target location. Additionally, we varied whether or not an effector movement (eyes or arm) occurred between target presentation and reach. In the second experiment participants performed a perceptual localization task in which they judged the location of a tactile stimulus relative to the location of a visual stimulus while an effector movement (eyes) was present or absent. Results of both experiments indicate that the use of a gaze-dependent reference frame for somatosensory stimuli critically depends on the presence of an effector movement intervening between stimulus and response. We argue that effector movement causes the need to update the remembered spatial location which is preferably performed in gaze-coordinates irrespective of the sensory context in which the target was originally perceived.

Investigating evacuation behavior in virtual emergency situations in road tunnels: Challenges and benefits

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Human factors are crucial for efficient evacuation of buildings in case of an emergency. Since the evaluation of behavior in real events is based on single events and, thus, cannot easily be generalized to future events, the use of virtual environments is a promising approach to experimentally investigate such scenarios. Several studies using head mounted display and CAVE based settings have been conducted to assess relevant factors of flight behavior (e.g., demographic characteristics, instructions, information, and behavioral training) during fire emergencies in road tunnels. Methods and results of these studies will be presented. Relevant parameters such as pre-movement time, movement time, evacuation destination and route choice will be presented. Benefits and challenges as well as ethical considerations will be illustrated. Overall, behavior can be reliably assessed, results fit well with the observations during real events, and thus we conclude that virtual environments are a powerful tool to investigate human behavior in flight situations. Finally, the expected future contributions of virtual environments for behavioral investigations of emergency situations will be discussed.

Neural correlates of Metacognition – an EEG study

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While there are plenty of fMRI studies on metacognition, EEG studies investigating the time course of this phenomenon is scarce. In the present study, we explored the neurocognitive underpinnings of Judgments of Learning in contrast to normal memory judgments in healthy young adults. By comparing metacognition monitoring with memory monitoring, we were in the position to identify the specific neural responses associated with metacognitive monitoring. Participants had to learn pairs of objects and had to indicate whether they could remember the right object when only perceiving the left object later on or whether the colour yellow was present in one of the two objects. During this task, their ERP response was measured. Results showed that while the frontal P200 response was stronger for the memory condition, this pattern changed around 300ms. Additionally, we found stronger frontal positivity and stronger occipital negativity in the metacognition condition, a pattern connected to mental imagery. Possible explanations are discussed.

Implicit associations in patients with internet addiction: A pilot study on automatic responses and implicit personality traits

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Background: Clinical reports as well as neuroscientific studies show parallels between addictive internet use (Internet Addiction; IA) and substance use disorders. Especially incentive sensitization regarding drug-associated cues and automatic (positive) expectancies that lead to motivational activation can be observed in both types of disorders. **Methods:** To further investigate automatic responses in IA, 50 patients suffering from IA (recruited from a specialized outpatient clinic) were compared to 50 healthy regular users of the internet. Both groups completed the Implicit Association Test (IAT), a measure relying on response times. The IAT was administered in two different versions: With the arousal-IAT we intended to investigate if patients with IA will show more positive and appetitive associations regarding internet related cues (words). A personality-related version of the IAT regarding the trait conscientiousness was applied additionally. Low conscientiousness has been reported in questionnaire-based surveys as a risk factor in developing IA. **Results:** The results show that IA-patients display more positive associations regarding the internet on an implicit level. **Discussion:** Results indicate that psychotherapeutic interventions should include techniques aiming in weakening positive responses regarding internet-related cues to prevent patients from relapse. Likewise, IA-patients scored significantly lower in conscientiousness, emphasizing results from epidemiological surveys.

Interindividual differences in cognitive flexibility: Influence of gray-matter volume, functional connectivity and trait impulsivity

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Cognitive flexibility, a core aspect of executive functioning, is required for the speeded shifting between different tasks and sets. Using an interindividual-differences approach, we examined whether cognitive flexibility is associated with gray matter volume (GMV) and functional connectivity (FC) of regions in a core executive-control network as well as with different facets of trait impulsivity. The core executive network was derived from three large-scale meta-analyses and only included regions that showed consistent associations with sustained attention, working memory as well as inhibitory control. We tested to what extent self-reported impulsivity as well as GMV and resting-state FC in the executive network predicted performance in the Delis-Kaplan card-sorting test independently and incrementally. Our analyses revealed that card-sorting performance positively correlated with GMV of the right anterior insula, FC between left anterior insula and midcingulate cortex/supplementary motor area as well as the impulsivity dimension “Premeditation”. Importantly, GMV, FC and impulsivity together accounted for more variance of card-sorting performance than every parameter alone. Our results therefore indicate that various factors contribute individually to cognitive flexibility, underlining the need to search across multiple modalities when aiming to unveil the mechanisms behind executive functioning.

Elaborated event segmentation yields the same event boundaries as natural event segmentation

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Natural event segmentation yields event boundaries that play an important role in memory and learning. Here, we compare event boundaries assessed during natural event segmentation of a video with event boundaries assessed during thorough elaboration of the same video, i.e. during instruction creation. We conducted an empirical study in which one group of participants (N=22) performed an event segmentation using the established method of button-tapping whenever they think one meaningful event ended and another began. They segmented videos of two industrial-like scenarios into fine and coarse events. Another group of subjects (N=20) was asked to segment the same videos; however, with the explicit aim to create instructions. Using our self-developed IBES tool they segmented the videos offline into steps without any time constraints and with the opportunity to modify their choice. Afterwards, they added pictorial and textual information. We found that the steps chosen by the participants for creating the manuals had corresponding events in the event segmentation. We conclude that the IBES tool enables the creation of instruction manuals with a structure similar to natural event segments thus enabling a better understanding and learning of the process.

Constrained Postures and the Simon Effect

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The spatial relations between stimuli and responses affect human performance even in situations in which the stimulus position is irrelevant for the task at hand (Simon effect). The relationship between constrained postures and spatial compatibility were investigated in two experiments applying the auditory Simon task. In the experiments, participants operated a rocker switch or a control knob either in the front or in the back of their body and while either sitting or kneeling. Perceived musculoskeletal exertion was gathered with a questionnaire. Results showed differently perceived comfort, but spatial coding in the back compares to a virtual turn of the observer towards the control device. Other effects of constrained postures on cognitive performance were less pronounced.

Deconfounding Ownership and Liking: How Large is the Endowment Effect for Objects People Own, but Don't Like?

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People attach more value to objects they own as evidenced by the ratio of their willingness to accept a price for the object to their willingness to pay for the same object from another person. This is known as the endowment effect. The standard economic explanation for the endowment effect is that people fear losing an object more (loss aversion) than they rejoice over acquiring a new object. However, Morewedge et al. (2009) showed that the endowment effect disappears when sellers do not own the object and buyers do. The authors concluded that ownership rather than loss aversion elicits the effect because people associate objects they own with themselves, therefore like the objects and consequently value them more. However, this explanation confounds ownership and liking. To deconfound ownership and liking we conducted an online experimental study (N = 258) showing 1) a main effect of liking and 2) a significant liking by ownership interaction, indicating that the endowment effect is largest for objects people own but don't like.

When they disrespect, I detach - investigating the role of group-respect

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Does respect unite us and does disrespect break our unity? Although respect has attracted some research efforts recently (Baretto & Ellemers, 2002; Cremer et al., 2002; Renger & Simon, 2011), its conceptual nature and function for group life has to be examined more closely. We, therefore, present a series of experimental studies aimed at identifying the distinctive aspects of respectful treatment, the influence on group identification, and motivation to participate in group-serving efforts (DV). All participants were randomly assigned to varying respect-message conditions, while a computer task was used to simulate an online-group discussion to exchange messages. Accordingly, study 1 (N=66) examined whether the perception of respectful treatment corresponds to the approval of group-members' opinions, using a 2(Approval vs. Disapproval) x 2(Respect vs. No Respect) between-subjects design. Results show that respect as an equal (Simon, 2007), but not the approval of opinion, leads to ingroup identification and motivation for group-serving efforts. Using the same experimental paradigm, two further studies (N=76, N=60) assessed whether respectful or disrespectful behavior, as compared to different neutral conditions, drives identification and group motivation. Respectful behavior slightly enhanced ingroup identification and group-serving efforts whereas disrespectful behavior reduced identification and group-serving efforts. Theoretical implications are discussed.

Situative Faktoren in der Entstehung von Kreuzungskonflikten und Wirksamkeit einer frühzeitigen Fahrerunterstützung

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In Entwicklung befindliche Kommunikationstechnologien (z.B. C2x-Kommunikation) ermöglichen in Ergänzung zu dringlichen Fahrerwarnungen eine frühzeitige Fahrerunterstützung in drohenden Konfliktsituationen. In der vorliegenden Studie wurden relevante Einflussfaktoren auf die Wirksamkeit einer solchen Fahrerunterstützung bei verschiedenen urbanen Konfliktsituationen im Kreuzungsbereich untersucht. N = 20 Probanden absolvierten hierzu eine längere Fahrt in einem statischen Fahrsimulator mit gelegentlich auftretenden Verkehrskonflikten mit unterschiedlichen Konfliktpartnern (Fahrzeuge und Radfahrer) und Konflikttypen (Abbiegen- und Kreuzen-Situationen). Es wurde (1.) die Möglichkeit zur Antizipation von Verkehrskonflikten über die jeweilige Vorfahrtsregelung (Antizipation niedrig: Fahrer hat Vorrang vs. Antizipation hoch: Fahrer muss Vorrang gewähren), und (2.) die Sichtbedingungen in der Anfahrt an die jeweiligen Konflikte über die Randbebauung der Szenarien (Konfliktpartner ist sichtbar vs. verdeckt) variiert. Die Probanden absolvierten die Konfliktsituationen mit und ohne frühzeitige Fahrerunterstützung (Information über die drohenden Konfliktsituationen zwei Sekunden vor dem letztmöglichen Warnzeitpunkt). Die Ergebnisse zeigen, dass Verkehrskonflikte vor allem dann auftreten, wenn deren Antizipation erschwert ist. Sichtverdeckungen erhöhen die Kritikalität der Szenarien zusätzlich. Durch frühzeitige Fahrerinformationen können die Konfliktsituationen jedoch deutlich entschärft werden. Diese Studie wurde im Rahmen des vom Bundesministerium für Wirtschaft und Technologie geförderten Forschungsprojekts Ko-PER durchgeführt (Förderkennzeichen 19S9022B).

Distractor-based SR retrieval in deliberative decision making processes

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The distractor-response binding (DRB) effect states (Frings, Rothermund, & Wentura, 2007) that distractors appearing on the prime display are integrated with the prime response. The prime episode is retrieved when, in the probe, the distractor is presented again. Thus, a repeated distractor retrieves a previous response which can be compatible or incompatible to the currently demanded probe response. We analyzed if SR binding influences decision making. We tested this hypothesis with a task in which the participant had to decide as fast as possible whether an imagined patient suffered from which of two diseases. This decision was based on two cues; one which did not discriminate between the two diseases and another which was either strong or weakly associated with one of the two diseases. We found a significant influence of repeating the distractor on choice behavior. To examine, if the underlying process only occur in decision making under time pressure or if also more deliberative decision processes are influenced, we conducted the experiment without time pressure and replicated the main result – repeated distractors increased the likelihood to repeat decisions. Thus, DRB also has an effect on decisions under uncertainty without time pressure.

Effects of social rejection on reaction times for evaluating positive and negative stimuli—A diffusion model analysis

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Thwarting the need to belong by social rejection has been linked to increased aggression, reduced prosocial behavior and reduced motivation to engage in self-regulatory behavior. However, effects on reported mood are generally small or non-existent. Previous research suggests that rejection leads to faster recognition of positive stimuli compared to negative stimuli, and thus to a tuning towards positivity. The current study aims to investigate what specific cognitive processes are underlying this effect by applying stochastic diffusion models to reaction time data of (experimentally) rejected participants. Participants received a (randomly assigned) feedback ostensibly based on the answers they gave on a personality test. Some participants were told they would end up alone later in life, while other participants received different feedback (rich social life, being accident prone, have fewer relationships than others, no feedback). We expect that rejected participants show a response bias towards positive stimuli (i.e., a shift in starting point toward the decision “positive”), while speed of processing positive vs. negative information (i.e. the drift of the diffusion process) is not expected to differ between the groups. Additionally, the response bias effect is expected to be more pronounced for social stimuli (faces) as compared to non-social stimuli (words).

A new phenomenon: The self-induced rubber hand

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A new visuo-tactile phenomenon is introduced: the self-induced rubber hand illusion (SIRHI). While in the classical rubber hand illusion an experimenter usually induces the effect by stimulation of a rubber hand (e.g., with a brush) and under conditions of occlusion of the participants' true hand, we here demonstrate that it is possible to elicit similar effects with self-stimulation and without visual occlusion (i.e., seeing three hands simultaneously). We investigated a total of 14 participants in this study. They stimulated the middle fingers of their own right hand and of the rubber hand using the index or middle finger and thumb of their left hand for several seconds. Experiences ranged from feeling “nothing at all” to the impression of “a third hand”. Most of the participants felt some kind of “alienation” or “numbness” in their own right hand and/or the rubber hand. The findings are discussed within the context of neural plasticity and possible applications of this phenomenon will be provided (e.g., therapy of phantom limbs; artificial limbs).

Ironic Effects of Sexual Minority Group Membership: Are Lesbians Less Susceptible to Invoking Negative Female Stereotypes than Heterosexual Women?

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The traditional typical woman has been described as “nice, but incompetent”. However, there are female sub-stereotypes, such as career women and lesbians, that diverge considerably from the typical woman, being regarded as higher in typically masculine, agentic characteristics such as task competence. We hypothesized that if a woman displays ambiguous behavior with regard to the information about her gender-role, it is more readily interpreted as that of a stereotypical woman if performed by a heterosexual woman than by a lesbian, and subsequently may provoke lower competence judgments for the heterosexual woman as compared to the lesbian. Participants (total N = 308) read a hypothetical job interview in which we manipulated the target’s sexual orientation (between subjects). Findings demonstrated that a lesbian was judged more competent than a heterosexual woman in the presence of ambiguous gender-stereotypical behavior (Experiments 1-2). This difference in competence judgments was not found in the absence of ambiguous gender-stereotypical behavior (Experiment 1). Judging the heterosexual woman low in masculinity was related to her lower competence judgment (Experiment 2). Our findings demonstrate that there are conditions under which lesbians, a group often stereotyped negatively, are less susceptible to invoking negative female stereotypes than heterosexual women are.

Pseudoneglect and non-conscious perception in penalty kicking

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Recently, Nicholls, Loetscher, & Rademacher (2010) extended the findings regarding pseudoneglect for distant line bisections to the more representative task of goal kicking in (Australian) football. Masters, van der Kamp and Jackson (2006) showed that the position of the goalkeeper relative to the centre of the goal plays an important role in a penalty kicker’s decision where to kick the ball. Strikingly, that is also the case if penalty takers perceive the goalkeeper to be in the centre of the goal, pointing to an influence of non-conscious perception on decision-making. To compare pseudoneglect and the goalkeeper positioning effect participants were instructed to verbally guide the goalkeeper to the exact middle of the goal after which they had to carry out a penalty kick. The rightward deviation for line bisections in extra-personal space extends to penalty kicking in soccer in a field setting. In cases participants did not position the goalkeeper in the exact centre of the goal (without knowing) they nevertheless kicked to the bigger side of the goal more often. That indicates that the accuracy of perception in the kicking task is higher than in the positioning task and that pseudoneglect occurs at a conscious level of perception.

Multi-alternative decision by sampling

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The attraction, compromise, and similarity effects in multi-alternative decision making demonstrate that the preference for an alternative is not independent of the other alternatives in the choice set. To explain these context effects, we propose the multi-alternative decision by sampling model. The model has three components: 1) an alternative is evaluated through a series of comparisons of pairs of alternatives on a single attribute value, 2) similar alternatives are compared more often, and 3) relatively small differences in attribute value are ignored. We discuss empirical evidence for each of these components, and explain how multi-alternative decision by sampling explains context effects in multi-alternative choice.

Modeling Visual Working Memory

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Whereas (working) memory for verbal materials has mostly been modeled as cue-based retrieval, a popular theory of visual working memory rests on the assumption that items can be directly “read out” of memory slots. Support for the slot model has been obtained from experiments asking participants to reproduce continuously-varying features (e.g., color) for one specific item in a memory array. Data from this procedure have been modeled with a mixture model assessing the probability of having the tested item in a memory slot, and the precision of feature memory for stored items (Zhang & Luck, 2008). We will present an alternative model of visual-feature reproduction that incorporates the idea of cue-based retrieval. We present two color-reproduction experiments and competitively test variants of the slot model, the resource model (Bays et al., 2009), and our cue-based retrieval model.

Detektion gradueller Intensitätsänderungen in auditiven Stimuli

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Zur Diskrimination von zwei in ihrer akustischen Intensität differierenden Stimuli oder zur Entdeckung abrupter Intensitätsänderungen in einem Geräusch existieren umfangreiche Daten. Es gibt jedoch nahezu keine Erkenntnisse darüber, wie sensitiv Versuchspersonen für die Entdeckung gradueller Intensitätsänderungen sind. Dies ist auch deshalb erstaunlich, da der graduelle Anstieg der Intensität einer sich nähernden Schallquelle verhaltensrelevante Informationen über Bewegungsparameter der Schallquelle liefert. Im vorgestellten Experiment wurde in der "looming"-Bedingung ein Sinuston dargeboten, dessen Intensität über die Darbietungsdauer (500 ms bzw. 2000 ms) hinweg anstieg. Der Intensitätsverlauf entsprach einer sich mit konstanter Geschwindigkeit annähernden Schallquelle. In der "receding"-Bedingung wurde das zeitlich umgekehrte Signal dargeboten (sich entfernende Schallquelle). In der "linear-increase"-Bedingung stieg der Schalldruckpegel linear über die Zeit an. In jedem Trial wurden in zufälliger Reihenfolge der sich in der Intensität verändernde Ton und ein Ton mit konstanter Intensität dargeboten. Zusätzlich wurde eine klassische Intensitätsdiskriminationsaufgabe präsentiert. Bei einer Stimulusdauer von 2000 ms war die Sensitivität in allen Bedingungen mit graduellen Intensitätsänderungen und in der klassischen Diskriminationsaufgabe identisch. Bei der Stimulusdauer von 500 ms zeigte sich eine deutlich niedrigere Sensitivität als bei der längeren Dauer, bei der klassischen Diskriminationsaufgabe jedoch der entgegengesetzte Effekt. Die Ergebnisse werden in Bezug auf Modelle des auditiven Systems diskutiert.

Differential Adult Development of Familiarity in Face Memory

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Processing horizontal information is a key element in younger adults' (YA) face recognition. Older adults (OA) have difficulties using these cues when recalling previously unfamiliar faces. Repeated learning of unfamiliar faces could make up for impaired processing of horizontal information in OA. 71 YA, 42 high-contact OA, and 18 older low-contact OA were tested under different conditions, where variations in the number of targets and stimulus exposure increased experience with target faces. In the present study, high- and low-contact OA (but not YA) exhibit lower sensitivity performance for human faces when matching previously unfamiliar facial identity information using only horizontal cues to memory. Age-related differences are noticeable for face stimuli with all frequencies, albeit one where both older adult groups differ from each other as well as to YA. Low-contact OA were able to increase memory performance for natural faces once stimuli were few in number and high in exposure. Results suggest that the importance of horizontal frequencies for recognizing human faces declines before the age of 60. While this impairment affects general face processing in OA, compensation mechanisms at a higher age can in fact cultivate when there is regular and repeated interaction with previously unfamiliar individuals.

Does making decisions in a foreign language abolish cognitive biases?

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Recent evidence suggests that well-established biases in decision-making such as the framing effect may be abolished when decisions are made in a foreign language (L2). We investigated whether making decisions in a foreign language affects the classical Asian Disease task, financial framing, loss aversion, and positivity bias in belief updating. Furthermore we investigated whether the effects of foreign language processing depend on L2 proficiency. Participants were native speakers of German and either high (HP) or low proficient (LP) in their L2 (English or French). First, in a web-based experiment, we tested 287 HP participants in the Asian Disease task. This study showed the same magnitude of the framing effect in native and foreign language. In a second web-based experiment, we tested 760 HP and LP participants on several framing paradigms. We found comparable effects of framing across all tasks and proficiency levels. Third, in a lab study (n = 30), we investigated the effects of foreign language use on financial framing and life event belief updating. Our results indicate that even in a lab setting performing in L2 does not abolish framing effects. Overall, our results suggest that making decisions in an L2 does not necessarily abolish cognitive biases.

Saccades deteriorate visual short term memory for non-target locations

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Visual short term memory allows flexible processing of visual events even after the sensory input has disappeared from view. We show that saccadic eye movements, planned and executed some time following the disappearance of a visual array, strongly bias the memory maintenance process in favor of the targets of saccades. Observers fixated the center of an array of test items—oriented Gabor patches arranged on an imaginary circle—that appeared for 100 ms and then disappeared again. Following the removal of the item array, a movement cue instructed observers to make a saccade to one of the patches. After movement execution, and a total of 1200 ms after the array disappeared, a response cue highlighted a position previously occupied by an item, prompting participants to report its remembered orientation (clockwise vs. counterclockwise relative to vertical). Although the saccade target was equally likely to be the test location as any other location in the array, memory performance was markedly inferior when saccade target and test location did not coincide. These results reveal a strong impact of saccades on visual short term memory and highlight the role of action for which parts of a scene we remember and which we forget.

Cortical processing of different tastes in humans – A matter of time

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In spite of decades of research, we know very little about the time-course of cortical activations during gustatory perception in humans. Behavioral as well as electrophysiological data indicate variable response latencies for different tastes. The various stimulation techniques used in these studies, however, hinder comparisons between tastes. Aim of the study was to characterize the gustatory event-related potential (ERP) to tastes of four basic qualities and to investigate the nature of differences in response latency. Participants tasted salty, sweet, bitter and sour solutions passively and in a speeded response-time task; they also rated taste intensity and pleasantness and identified taste quality. The ERP yielded amplitude and latency differences between tastes. Behavioral and ERP response latencies were strongly correlated; responses to salty and sour were faster than responses to sweet and bitter. When accounting for latency differences, source analysis of the initial gustatory component (PI) revealed similar, yet not identical, cortical activation patterns involving the insula and opercula for all tastes. The results suggest that different tastes share a common cortical network that is activated at different times and that this network gives rise to gustatory awareness.

How to find a shortcut within a city? Mental walk vs. mental model

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Survey tasks such as finding novel shortcuts or pointing to distant, non-visible locations within cities or buildings seem to be limited to human navigators. We tested two conflicting explanations for survey tasks. In the mental walk hypothesis familiar routes are represented by hippocampal place cells. Each cell represents one route location and cells are successively activated while mentally travelling along this route. This process underlies location estimation of distant targets. Its duration depends on place cell number and therefore route length. Contrary, the mental model hypothesis assumes building a mental model of non-visible environment parts without mentally walking there. Model construction is piece-wise, one street after the other. Duration of distant location estimation depends on the number of streets, not their length. To test these predictions participants learned four unconnected routes through a virtual city by walking on an omnidirectional treadmill. We independently varied route length (120 vs. 360 virtual meters) and number of turns (2 vs. 6) and measured latency in pointing between route locations after learning. Both route length and number of turns increased pointing latency. Neither hypothesis can fully account for the data. Maybe multiple systems based on vision vs. bodily cues contributed independently.

Desynchronization of oscillatory brain activity reflect semantic and phonological processing in a language task

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In a magnetoencephalographic study, we examined semantic and phonological priming in a language production task. Participants repeated sentences after a delay period (e.g., “The mouse ate the cheese”). During the retention interval, an auditory prime word was presented that could be semantically or phonologically related or unrelated to one of the nouns in the sentence (either “mouse” or “cheese”). Primes were followed by a strong decrease of oscillatory power in the alpha and beta bands in widely distributed brain networks. Related prime words yielded a stronger decrease compared with unrelated words in specific brain networks. While semantic primes showed a decrease in the left middle and inferior temporal cortex, phonological primes showed a decrease in more widespread areas including the left middle and superior temporal cortex as well as the inferior frontal cortex. Depending on the noun position in the sentence, the phonological effects were different in the temporal but not in the inferior frontal cortex. This might reflect differences in the phonological planning of individual parts of the upcoming utterance. The results show that decreases in alpha and beta power can be used to map lexical activation with spatiotemporal resolution.

Feedback related brain activity and counterfactual outcome comparisons

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To uncover the neurocognitive mechanisms of decision outcome processing, past studies have frequently analyzed two ERP components: the Feedback Related Negativity (FRN) and the P300. In the present study, we investigated whether and how these two deflections are related to counterfactual comparisons between outcomes of chosen and unchosen options. EEG was recorded in 61 participants while they completed a simple two-choice gambling task. In each trial, individuals first received feedback about the results of the chosen option (i.e., winning 50 Cent, losing 45 Cent or breaking even), before feedback about the unchosen option was given. Our results clearly show that the early FRN does not reflect local favorableness of the outcomes but rather a pure dichotomy of win vs. no win for both chosen and unchosen outcomes. In contrast, the amplitude of the later P300 appeared to reflect motivational salience derived from the comparison between chosen and unchosen outcomes. Our findings imply that a) the early appraisal mechanism indexed by the FRN evaluates external events in terms of a good-vs.-bad distinction, irrespective of personal relevance and b) more complex computations of counterfactual comparisons take place at a later stage of outcome processing as reflected by the P300.

Semantics compensates for language complexity during grammar acquisition

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Syntax and semantics are closely interrelated in natural language. In order to assess the role of semantics during the process of grammar acquisition we compared grammar learning with and without semantic information. Three grammars of different formal complexity were investigated: a regular language (easy), a context free language (intermediate complexity) and a mildly context sensitive language (high complexity). The artificial vocabulary was presented to two groups of participants by means of a word learning task on two consecutive days. One of the groups was presented with semantic information in this task, the other was not. On Day 2, participants learned one of three grammars in an AGL task, again one group with and the other without semantic information. The subsequent test phase of the AGL task was identical for both groups of participants. We hypothesized that semantic information would especially facilitate the learning process of more complex languages. Results showed that both groups of participants learned the regular language equally well. In contrast, for the two more complex languages participants performed better with than without semantic information. This finding supports the idea that semantics may function as a compensator for language complexity during the process of grammar learning.

The endowment effect from experience: Disentangling learning, evaluation, and response bias accounts

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The endowment effect refers to the phenomenon that people often attach a higher subjective value to an object when they own it (i.e., as seller) than when they do not own it (i.e., as buyer). In addition, the stated selling prices typically approximate the objective value of the object more closely than the buying prices. Which cognitive processes contribute to this phenomenon? Using computational modeling, we disentangle influences from learning, memory, evaluation, and response bias to the endowment effect in an experiential sampling paradigm (where people learn the value of the objects by repeated sampling). Various formal learning models were fitted to buyers' and sellers' evaluations of monetary lotteries. The models could accommodate buyer-seller discrepancies either in terms of learning rate, forgetting, outcome evaluation, choice sensitivity, or response bias (or combinations thereof). Best-fitting parameter values showed that the observed endowment effect was consistent with buyer-seller differences in memory decay, learning rate, outcome sensitivity, and response bias. Overall, however, a simple reinforcement model attributing the endowment effect to differences in a response bias showed the best model fit.

Evidence for an early vs. late generation of German word order

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It is a matter of debate whether word order is determined early when thematic roles are mapped onto syntactic functions (Cai, Pickering & Branigan, 2012) or late when constituents are assembled (Hartsuiker & Westenberg, 2000). In a series of structural priming experiments in German, we dissociated early effects of word order tight to thematic roles from late ones reflecting parallels in phrase structure. We manipulated word order and phrase structure of primes. The crucial question was whether word order in primes affected word order in responses within and across phrase structure. In Experiment1, we presented double object (DO) primes and DO targets and found an effect of word order that can be due to parallels in thematic roles, phrase structure, or both. In Experiment2, prepositional object (PO) primes preceded DO targets. Despite differences in phrase structure, we found an effect of word order that was attributed to parallels in the order of thematic roles. Experiment3 used DO and PO primes within one group of participants. It replicated the effect of word order and did not reveal any differences in effect size within vs. across phrase structure. We conclude that word order is generated early during sentence production.

Prosocial Commitment Increases Generous Behavior

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Despite recent efforts to investigate the neurobiology of prosocial behavior, surprisingly little is known about whether generous behavior can be enhanced and importantly how this is mediated by the brain. Here, we test whether committing to behave prosocially promotes other forms of generous behavior and if so, how this is reflected in neural processing. Participants were told that they will be endowed with money. One half of the participants made a commitment to spend this money for other people (Other group), whereas the other half of the participants made a commitment to spend the money for themselves (Self group). Subsequently, subjects underwent an independent decision-making task while blood-oxygen-level-dependent (BOLD) responses were measured using functional magnetic resonance imaging. Here, subjects could accept or reject an option that involved monetary costs for themselves and monetary benefits for another person. Analysis of the behavioral data revealed that the subjects in the Other group showed significantly more generous behavior than subjects in the Self group. On the neural level, modulation in functional connectivity between temporo-parietal junction and orbitofrontal cortex predicted commitment-induced generous behavior. These data suggest that simple commitment to be prosocial can promote generosity, an effect that is underpinned by parieto-orbitofrontal links.

Influence of material properties and object orientation on precision grip

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We manually interact with a variety of different objects in our daily live. How we grasp and hold objects depends on numerous factors. These include extrinsic object properties like orientation as well as intrinsic features like shape, weight and size. Beyond these, the way we interact with objects certainly depends on the materials they are made of. We investigated how participants grasp equally sized cylinders of different materials: foam, wood, brass and brass covered with vaseline. Target objects were presented at six different angles with respect to the participant in a task in which s/he had to grasp, lift and carry the object to drop it elsewhere. We found that timing of the movement towards and while holding the object was influenced by its material properties. For example, participants took more time to approach, handle and transport the cylinder with the more slippery surface. Object orientation appeared to primarily affect spatial characteristics of the movement like position and orientation of the grasp axis.

Modeling Sequential Risk Taking with Cumulative Prospect Theory

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A central goal in psychology and economics is to understand how people make risky decisions and how they differ in therein. One of the most influential psychological models explaining risky decisions is Cumulative Prospect Theory (CPT). The parameters of this model quantify psychological components such as outcome-sensitivity, the relative evaluation of gains and losses, and probability-sensitivity, allowing to decompose the psychological processes that lead to individual differences in risk taking. While CPT is typically used in the context of choices between gambles with defined probabilities and outcomes, here we develop a CPT-model for sequential risk taking in the Columbia Card Task (CCT), which has been argued to be more predictive for real-world risk taking. Several specifications of the CPT-model were fitted to behavioral data of 191 healthy subjects and tested for their goodness of fit and how accurately model parameters were recovered. In addition, we examined convergent and external validity, by relating overt behavior and estimated model parameters to other risk-taking measures. While a parsimonious specification of a CPT-model performs well in predicting decision-making, CPT-parameters estimated with a maximum-likelihood procedure did not correlate with self-reported risk-taking measures. Applying Bayesian hierarchical modeling, in contrast, revealed correlations with these measures.

The influence of countermeasures on physiological responses in the Concealed Information Test

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The Concealed Information Test (CIT) is a forensic procedure, that allows for validly detecting crime related knowledge. For this purpose, changes in autonomic responses are compared between crime related and neutral details. Until now, only few studies investigated the influence of countermeasures (CM) on this response pattern, even though this aspect is relevant for field applications. Studies vary regarding the applied CM technique, and only one study directly compared mental and physical CM. In the current study, 80 subjects were assigned to one of four groups: guilty without CM, physical CM, mental CM, innocent. Guilty subjects committed a mock crime prior to the CIT investigation and the CM groups were specifically instructed how to manipulate their responses in the CIT. To compare the CIT with a different approach, an autobiographical Implicit Association Test (aIAT) was conducted as well. Results revealed an influence of CM on electrodermal responses of guilty subjects during the CIT. Physical CM seemed to be more efficient compared to mental CM. In line with prior research, respiratory responses were found to be less sensitive to CM usage. Reaction times during the aIAT were not influenced by CM usage, but aIAT validity was weaker compared to the CIT.

On the relationship between time to contact judgments and pedestrians' decisions to cross the road

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The identification of safe gaps to cross a street between passing cars is a task most of us accomplish successfully on a daily basis. It is reasonable to assume that the assessment of vehicles' approach rates (time to contact, TTC) is a critical element of that gap selection. Yet research has repeatedly found that pedestrians seem to be relying more on physical distance than TTC when deciding on gaps to cross the street. However, it is unclear if this effect is the result of an explicit strategy, or if it might be caused by pedestrians' errors in the assessment of vehicles' TTC, a variable which has been shown to be influenced by a variety of factors, including vehicle speed and distance. In our experiment, we investigated both crossing decisions and TTC judgments. Participants were presented with short video clips of vehicles approaching at different speeds with different TTCs. One of the participants' tasks was to choose or refuse to cross in front of the vehicle, the other task was to judge its TTC. Results show the common effect of physical distance on gap selection, however also indicate that participants' TTC assessments might be partially responsible for that effect.

Of chickens, eggs, and yolk: The electrophysiology of breaking a rule

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Human agents follow rules by default, and violating even simple rules yields cognitive conflict for the rule breaker. Previous experiments showed this conflict in various behavioural measures including response times and movement trajectories. Based on these experiments, we investigated the electrophysiological signature of rule violations. Most notably, rule violations are characterized by an attenuated P300 component when evaluating the stimulus prompting the behaviour, most likely reflecting increased response complexity. In addition to documenting this electrophysiological signature, our results reinforce theories that assume the P300 component to reflect the retrieval of learned stimulus-response associations, a process that clearly needs to be inhibited to allow for successful rule violation.

Lexical selection is not the end! The role of ‘late’ processes in bilingual language switching

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In the process of language production, a number of different processes are necessary. Roughly, one might distinguish between the levels of conceptualization, lexicalization, phonological encoding and articulation. Most studies on bilingual language production, and more specifically on bilingual language switching, have focused on the level of lexicalization. Yet, although the selection of the correct lemma in the correct language and interference between lemmas certainly play a crucial role in bilingual language production, it is also important to look at the influence of later processes like phonological encoding and articulation. In this presentation, we will provide an overview of studies that strongly suggest the importance of these later processes in bilingual language switching. The studies demonstrate both the influence of phonological manipulations (for example phonological overlap) as well as after-effects of articulation (by comparing trials with and without overt speech production). Taken together, we suggest that theories and models of bilingual language control should emphasize the influence and the role of phonological encoding and articulation.

Crosstalk within and between response modalities

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The execution of multiple responses in close temporal proximity is known to result in performance costs. Several theoretical frameworks have been proposed to explain such costs, including multiple resource theory. When applied to output domains, this theory would predict that processing two responses within the same modality should lead to greater costs compared to cross-modal response demands. In the present experiment, we studied the performance of manual responses either in the context of other manual responses (intra-modal condition), or in the context of saccade responses (cross-modal condition). Surprisingly, performance costs were greater in the cross-modal condition than in the (otherwise comparable) intra-modal condition. These results appear to challenge the assumption that cross-modal response demands draw on fewer common resources than intra-modal response demands. We suggest that resource scheduling within and across response domains is much more flexible than previously assumed.

When what you hear does not match what you see: Nonstrategic validation of audio-visual information

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In research on language comprehension, there are different views regarding the validation of incoming information while reading a text. Richter, Schroeder, and Wöhrmann (2009) showed that people validate incoming text information in a fast, efficient, and nonstrategic manner when they have strong background knowledge regarding this information (epistemic monitoring). Richter et al. found a Stroop-like interference effect of task-irrelevant truth when participants were required to judge the orthographical correctness of the last word of true or false assertions (epistemic Stroop-effect). In the present study, the hypothesis was tested that individuals validate audio-visual information in the same fast, efficient, and nonstrategic way. For this purpose, participants had to respond to the target words “true” or “false” after hearing true or false assertions about simultaneously presented pictures. An ANOVA of the response latencies showed that responses were delayed if a person had to respond to the target word “true” after hearing a false assertion and vice versa. However, this interference effect decreased over the course of the experiment, which could be an indication that participants were able to generate strategies against the interference of task-irrelevant truth. Overall, the results support the assumption of a routine and nonstrategic validation of audio-visual information.

Motor Imagery - Reconstructing the content of imagery from brain activity within the premotor and the posterior parietal cortex

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The organization of motor maps during the imagination of actions is an intensely debated issue. The present study sought to test whether the content of motor imagery can be decoded from spatial patterns of BOLD signals in motor and motor-related cortices. During fMRI-scanning 20 right-handed volunteers (12 female, mean age = 26.3 years, SD = 4.4) underwent three experimental conditions and one baseline condition. In the experimental conditions participants had to imagine three different right-hand movements: a precision movement, an extension-flexion movement, and a squeezing movement. We then used multivoxel pattern analysis to decode the identity of imagined movements based on spatial patterns of BOLD signals they evoked in premotor and posterior parietal cortices. We found that the content of motor imagination could be decoded significantly above chance level from spatial patterns of BOLD signals in both, the premotor and posterior parietal cortex. Our data provide evidence that patterns of activity within premotor and posterior parietal cortex systematically vary with the contents of action imagination.

The effects of a visual prospective memory task on distinct components of attention

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Event-based prospective memory (EPM) tasks require that the intention to respond to an external event is retained, often concurrently to performing other ongoing tasks. This is thought to involve monitoring the environment for events, thereby producing attentional costs. To specify these costs for the visual domain, we asked whether the attentional components specified by Bundesen (1990, Psych.Rev.) are affected in the retention interval of an EPM task. The ongoing task allowed the estimation of the attentional components threshold of conscious perception, capacity of visual short-term memory, processing speed, top-down controlled selectivity, and laterality of attentional weighting. Events were embedded in the ongoing task, but only trials without events or responses were analyzed, to capture only intention retention effects. Processing speed was lower when participants performed the EPM task compared to a control condition without EPM requirements. This effect was smaller when the events were of higher rather than lower salience. This was replicated in another experiment, while there were no stable effects on other attentional components. Taken together, visual processing speed for an ongoing task's stimuli is reduced during the retention interval of a visual EPM task, but to a lesser extent when EPM events are more salient.

Hemodynamic Influences on Automatic and Controlled Processes – Effects of Body position on Distractor-Response Binding and Negative Priming

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The present study investigated whether nearly automatic versus controlled distractor-processing is differently affected by the activation of arterial baroreceptors. Baroreceptors are mechanoreceptors sensitive to changes in blood pressure. Research on circulation-brain interaction demonstrated that their stimulation leads to significant changes in cortical activity (Rau et al., 1993; Vaitl & Gruppe, 1992) and inhibitory effects on several extra-cardiac functions of the organism (cf. Rau & Elbert, 2001). In an experiment (N = 28) we varied participant's body position; thereby blood pressure and in turn baroreceptor activity was manipulated. Our results indicate divergent effects of baroreceptor stimulation on two tasks involving nearly automatic versus controlled distractor-processing. In particular, in a sequential distractor priming task we analyzed effects of automatic retrieval due to distractor repetition (a phenomenon dubbed distractor-response binding; cf. Frings, Rothermund, & Wentura, 2007) as well as after-effects of actively ignoring distractors (i.e. Negative priming; cf. Tipper, 1985). The results showed that the size of Negative priming was modulated by baroreceptor activity while distractor-response binding was not. Implications for models of distractor-processing are presented.

Zwei Arten von Interferenzen bei räumlichen Perspektivenwechseln

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In der Vorstellung in andere räumliche Perspektiven zu wechseln, ist eine anspruchsvolle kognitive Aufgabe, zum einen weil es räumliche Neuberechnungen erfordert, zum anderen weil hierbei Interferenzen zwischen vorzustellender und realer Perspektive auftreten können. Es werden zwei Experimente berichtet, deren Ziel die weitere Aufklärung der beteiligten Interferenzmechanismen war. Probanden lernten eine Konstellation von 18 Gegenständen bei freier Bewegung aus multiplen Perspektiven (Exp. 1) oder aus einer festgelegten Perspektive (Exp. 2). Anschließend wurden sie in den gleichen Raum in eine festgelegte Perspektive (in Exp. 2 mit dem Lernen übereinstimmend) geführt. Probanden mussten dann aus verschiedenen vorgestellten Perspektiven Zielobjekte so schnell und genau wie möglich mit einem Joystick anzeigen. Es handelte sich um einen 3x4x4 within-subjects-Versuchsplan mit Messwiederholungen. Das Zeitintervall zwischen Darbietung von Perspektiveninformation und Zielobjekt (SOA) wurde dreistufig, die zwei räumlichen Interferenzquellen (Ausrichtungs- und Objektrichtungsdisparität) jeweils vierstufig variiert. Unabhängig vom Lernmodus, zeigte sich, dass Ausrichtungsdisparität und Objektrichtungsdisparität wirken und die Anzeigezeiten und -fehler mit steigender Disparität zur körperlich eingenommenen Perspektive linear ansteigen. Das SOA-Intervall ermöglicht eine Vorverarbeitung der Perspektiveninformation, zeigte jedoch keine Anzeichen für Wechselwirkungseffekte mit den beiden Interferenzquellen. Das Ergebnismuster weist auf die zentrale Rolle von Interferenzwirkungen bei räumlichen Perspektivenwechseln hin und hilft die beteiligten Interferenzmechanismen aufzuklären.

Spatial attention is unaffected by the emotionality of irrelevant facial expressions

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An often cited finding, frequently serving as a precondition for further research, is the automatic attention grabbing effect of emotional faces. In a series of dot-probe experiments we tried to replicate this finding by presenting always an emotional and a neutral face at once with a target stimulus appearing behind one of them. Even with many different settings, very standardized procedures and lots of trials and participants we did not get consistent cueing effects of emotional compared to neutral photographic faces. This suggests that at least when emotion is irrelevant there is no reliable effect of emotional facial expression on spatial attention.

Social Learning in Categorization

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In many tasks people rely heavily on social information, where good social information has been shown to promote learning and help achieve better results. However, relying on other people could also have negative consequences. In the current experiment we investigated if other people's behavior would influence how people learn in a probabilistic categorization task that provided the opportunity for individual and social learning. In half of the trials participants received social information, in the other half of trials participants had to decide on their own. To assess social and individual learning, we compared the performance of three groups: The first group received no social information, the second group received information about the decisions of one previous participant that had performed well and the third group received information about the aggregated response of a group of participants.. When social information was provided, participants followed the observed behavior, leading to better performance, when the social information was correct. When no social information was provided however, participants performed worse compared to the individual learners. This suggests that even though trustworthy social information can lead to good performance, it may harm performance in the long run, by impairing individual learning.

Maintainers and Dropouts of an Internet-based Questionnaire

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(1) Do maintainers and dropouts of an internet-based questionnaire belong to the same sample? (2) Sample = 99 filled out a questionnaire on sport biography. n1 = 34: Dropouts are participants who fill out at least the first part of the questionnaire. n2 = 65: Maintainers are participants who finished all three parts of questionnaire. The questionnaire was presented in three parts. Control variables before the questionnaire itself, were accessing data. Sport biography was assed by years and age ranges. Only maintainers received a compensation for participation. (3) The peek of participants is in the beginning. 6 of 99 finished faster or later than at the order of registration. Most of them prefered to answer in the afternoon, on Mondays, in January, in winter, in 2009. Most of them were between 19 and 39 years-old, named two sport disciplines and have been continously sport active in the past five years.

Time course of spatial attentional shifts within and across visual hemifields

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Evidence indicates separate visual processing resources that split the workload across visual hemifields. It is not yet clear, however, how independent these resources are, and how they coordinate when the focus of attention shifts. We investigated this issue by measuring the behavioral time-course of top-down spatial attentional allocation when shifting attention between stimuli located in the same vs. different visual hemifields. Four random dot patterns were presented in each trial, and auditory cues indicated the task-relevant stimulus, with two cues occurring successively. The stimulus cued second was either in the same or the other visual field from the first, thus necessitating a shift in spatial attention within or across hemifields. Speed changes were embedded in ongoing motion in a go/no-go paradigm. Responses were required only to changes at the most recently cued stimulus location. By varying target and distractor speed-change timing with respect to cue onset, we behaviorally probed the time-course of attention. Overall, performance was better for within-hemifield trials. The time-course of performance after the second cue suggests that within-hemifield shifts of spatial attention confer behavioral benefits earlier than between-hemifield shifts. The results will be discussed with respect to resource theories of visual attention.

A Meta Analysis of Syllogistic Reasoning using Multinomial Processing Tree Models

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Reasoning about quantified assertions, so-called syllogisms, have been discussed since Aristotle. A syllogism consists of two premises each containing one of four quantifiers (All, Some, Some not, None), and participants are usually asked to draw or evaluate a conclusion. Recently, Khemlani and Johnson-Laird (2012) have analyzed seven theories that predict, for all 64 possible syllogisms, which conclusions individuals may draw. In a meta-analysis of six studies they compared dichotomized response proportions (i.e., above a threshold or not) with the binary predictions of the theories. We present a reanalysis of this data using the raw response frequencies of all studies employing multinomial processing tree (MPT) models to incorporate more fine grained (i.e., weakly ordered) predictions of the theories and allow the possibility that responses may have been guessed by participants. We obtained estimations of the overall model fit for each theory and estimated, for each syllogism individually, with which probability a response was guessed or generated according to the theoretical predictions. To compare the performance of the different theories on the data, we used the Fisher information approximation (FIA) measure of model complexity derived from the minimum description length principle.

Primacy Effects in Sequential Diagnostic Reasoning About Ambiguous Evidence Generalize Across Learning Procedures

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In diagnostic reasoning about the cause of sequentially presented pieces of evidence the order of presentation can influence the final diagnosis. Primacy and recency order effects have been reported and have been explained by different memory dynamics. Past studies have differed in learning procedures and in the relative support for competing diagnoses in reasoning items. While primacy effects regularly occur when participants directly study described cause-effect relationships and then select diagnoses for sequences of evidence that equally support two competing diagnoses, in studies using exemplar-based learning and less ambiguous items often recency effects are observed. Thus, in a novel experiment we contrasted those learning procedures and presented the same ambiguous items to two groups of participants, who had to diagnose which out of four chemicals had caused a fictitious patients symptoms. Presented sequences of symptoms finally supported two concurring diagnoses equally but one stronger early in the sequence. Both groups favored the initially supported diagnosis. Hence, this primacy effect was independent of differences in representations that may have ensued from the differing learning procedures. In both learning conditions, the initial diagnostic hypothesis framed the processing of subsequent ambiguous pieces of evidence resulting in a bias toward the initial hypothesis.

Electrophysiological and behavioral evidence for shared multiple resources of visuo-spatial attention and response selection

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The present study investigated interference between capacity limited visuo-spatial attention and response selection. We conducted an event-related potential (ERP) and behavioral dual-task study of the Psychological Refractory Period (PRP) type. Capacity limitations in visuo-spatial attention were realized in a conjunction search task that requires serial focused attention for target detection. This conjunction search Task 2 followed an auditory Task 1 after a variable temporal interval (Stimulus Onset Asynchrony, SOA). In Task 2's ERP data, the N2pc amplitude specifically indexes the allocated amount of visuo-spatial attention to the detected target and its latency indexes the efficiency of the attention shift. Interference between visuo-spatial attention and response selection would be indicated, if the N2pc parameters were a function of SOA. Non-interference would be indicated, if the N2pc parameters were not a function of SOA. In addition, conjunction search time was analyzed according to the locus-of-slack method. Overall, data analysis revealed evidence for non-interference. We discuss the findings with respect to the resources visuo-spatial attention and response selection share – a single resource in case of interference or multiple resources in case of non-interference.

Demonstrating the adaptation of representations of crabs and lobsters

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In order to recognize familiar objects, it is commonly assumed that incoming perceptual object information must be matched against representations of these objects stored in memory. While earlier memory theories implicitly claimed that these memory 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). However, so far, the demonstration of flexible representations is largely limited to representations of faces and evidence of adaptation effects in alternative categories is lacking. The present study tests adaptation effects on representations of animal categories, i.e. crabs and lobsters. We present data that demonstrate these effects of these categories following the exposure to new information. These data illustrate the adaptation of representations of crabs and lobsters and extend the phenomenon of flexible object representations beyond faces.

Dual-Tasking is more than task-switching: Looking for performance benefits instead of costs

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Multitasking research by means of task-switching and psychological refractory period paradigms has mainly focused on interference costs. E.g., task-switching experiments have revealed robust findings of mixing and switch costs, using mostly simple choice-reaction tasks. To advance dual-tasking theory, we performed two experiments contrasting the effects of a task-switching paradigm with those of a concurrent dual-task paradigm using two working memory tasks of different complexity. Experiment 1: n=15 participants switched between a memory-search and a 2-step-calculation task in alternating runs. Similar to previous studies using univalent stimuli, no mixing costs emerged. However, high switch costs were found - in line with findings of interruption studies using complex tasks. Providing a preview of the upcoming stimulus of the other task, resembling real-world situations, did not make a difference to the results. Experiment 2: Another picture emerged in the concurrent dual-task paradigm. N=60 participants worked on the same two tasks with preview, but completely self-organized. Switch costs not only vanished, but even indicated significant switch gains. This led to a huge performance-benefit compared to pure single-task performance. The phenomenon of switch costs seems not to be generally generalizable to situations beyond standard task-switching. Preview and self-organization even result in benefits instead of costs.

Individual aspects of distance perception in stereoscopic virtual environments

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In virtual environments, perceived distances are frequently reported to be shorter than intended. This might hinder realistic behavioral investigations. One of many possible causes is the use of a generic standard stereo base, instead of adjusting the presentation to the users' interpupillary distance (IPD). To test this, we conducted experiments in a five-sided CAVE. We manipulated the stereo base in relation to the subjects' IPD and used different tasks to assess subjects' distance perception. As expected, deviations of the stereo base from the individual IPD influenced distance estimates. However, even with the stereo base corresponding to the IPD, we found individual deviations from the modeled distances. Only part of this variance can be explained through stereo vision ability. Thus, it seems that setting the stereo base to the IPD might not be sufficient for correct distance perception. Therefore, we tested two methods for an individual perceptual calibration. Subjects were instructed to adjust either the stereo base or the position of virtual objects. Both methods led to similar results. In summary, our experiments show that for correct distance perception in stereoscopic projection-based virtual environments a number of aspects, including the individual IPD and individual depth perception, need to be considered.

Effects of target direction on eye-hand coordination patterns during visuomotor adaptation

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It is known that movement control with two joints (shoulder and elbow) is more difficult than that with single joint (elbow) in executing aiming movements, and that the involvement of the two joints depends on movement directions. The purpose of our study is to examine whether target directions for aiming movements affect learning-related changes of eye-hand coordination during a visuo-motor rotation task. Twenty healthy participants performed aiming movements to targets with their right hand on a horizontal digitizer, while looking at a feedback (cursor) that was rotated for 75° on a computer monitor. We recorded eye and hand movements simultaneously. The results showed that hand movements became faster and shorter as the practice progressed. Regarding effects of target directions on these changes, the laterality of target locations relative to the hand used had a more prominent effect than joint involvement. Hand movements made to the ipsilateral targets were learned faster than those to the contralateral targets. Inter-trial variability of hand trajectory length was also smaller for the ipsilateral targets. Our analyses on eye-hand coordination seek to determine whether learning-related changes of gaze fixation patterns during hand movements are altered depending on these behavioral changes associated with different target directions.

How visible arrow cues enable masked arrow cues to orient attention

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It has been found that masked arrow cues are able to orient attention when they are intermixed with visible arrow cues. This effect is contingent on high (above chance) overall cue validity and is absent when the cues are non-predictive of the target location. It remains unclear, however, whether the overall validity of the masked cues themselves or the overall validity of the visible cues is critical for the emergence of this effect. To deconfound these factors, we disentangled the overall validity of masked and visible cues. In Experiment 1, 80% of the visible cues validly predicted the target location, while the overall masked cue validity was only 50%. In Experiment 2, these overall cue validities were reversed. In Experiment 1, responses were faster after valid than after invalid masked cues, suggesting that masked cues were able to impact on attention. In Experiment 2, however, masked cues remained ineffective despite their high overall validity. These results show that masked arrow cues impact on attention as long as an accordant top-down setting (i.e., intention to use the cues) is induced by visible cues. If that is not the case, this intention cannot be induced by the masked cues themselves.

More conflict does not trigger more adjustment of cognitive control for subsequent performance: A study of the bivalency effect

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Encountering a conflict triggers an adjustment of cognitive control. This adjustment of cognitive control can even affect subsequent performance. In two experiments, we tested whether more conflict triggers more adjustment of cognitive control for subsequent performance. To this end, we focussed on the bivalency effect, that is, the adjustment of cognitive control following the conflict induced by bivalent stimuli (i.e., stimuli with relevant features for two tasks). Bivalent stimuli were either compatible (i.e., affording one response) or incompatible (i.e., affording two different responses). Thus, compatible bivalent stimuli involved a task conflict, whereas incompatible bivalent stimuli involved a task and a response conflict. The results showed a similar bivalency effect after compatible and incompatible bivalent stimuli. This indicates that more conflict does not trigger more adjustment of cognitive control for subsequent performance. Therefore, only the occurrence of conflict – not its amount – is determinant for cognitive control.

What car should I buy? Working memory and the deliberation-without-attention effect

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Everyday we make a host of decisions (e.g., what should I have for lunch?, what mobile phone should I buy?). The deliberation-without-attention effect suggests that for complex decisions to be made unconscious thinking leads to better decisions compared to conscious deliberations which are heavily based on a capacity limited working memory (WM) system. The aim of the present study was to investigate the specific role of WM in the deliberation-without-attention effect. Specifically, we related the WM functions of memory updating (MU) and relational integration (RI) to performance in a complex car selection task varying three decision conditions - immediate decision (n = 31), decision after four minutes of deliberate thinking (n = 32), and decision after performing a distractor task for four minutes (n = 32). Our results can show that immediate and deliberate thinking decisions are significantly better compared to decisions after a distraction. In addition, individuals high in RI outperform low-RI individuals in the deliberate thinking condition. No relations were found between MU and decision quality in all three conditions. These findings are discussed in line with recent investigations into the deliberation-without-attention effect and the role of WM in decision making.

Symbolic distance effect for actions

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The time necessary to discriminate between stimuli on a certain dimension increases as the similarity of the stimuli on that dimension increases (symbolic distance effect, SD). In the present study we investigated whether the SD occurs for actions. First, a group of participants rated the bodily effort of different actions (presented as words). In Experiment 1, two actions were presented simultaneously, similarity of bodily effort was manipulated (distances: close, intermediate, and far). Participants were asked to indicate which action requires less/more bodily effort. Participants had longer decision times the more similar the actions were in terms of bodily effort (SD effect). In Experiment 2, in addition to distances we also manipulated whether both actions were performed with the same or different effectors. A SD effect occurred and decision times were longer when the two words required the use of the same effectors. It seems that in order to make the judgment, actions are automatically simulated in the motor system, when the actions require the same effectors interference occurs. Together, the results are in line with the embodied approach to language comprehension, according to which action words partially reactivate the motor state that produces the denoted action.

Risk sensitivity in passive risk situations

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According to Damasio, somatic markers play an important role in decision making under uncertainty. This hypothesis, however, requires that somatic markers are sensitive towards the value and risk associated with different stimuli. The motivation of the following study is to get a better understanding of the psychophysiological mechanisms underlying risk sensitivity by measuring skin conductance responses (SCRs) in passive risk situations. Eight participants played a card game. Two cards are drawn from a deck consisting of ten cards numbered from 1 to 10. Before seeing the first card, participants make a bet whether the second card will be higher or lower. Consequently, the first card is turned over followed by the second card 7s later. Winning a bet has no consequences, losing a bet leads in 50% of the cases to an electric shock. Showing the first card implicitly reveals the risk of receiving an electric shock. By recording SCRs after the first card, we can analyze risk sensitivity without contamination by active decision making. Our results suggest that SCRs are able to code the risk associated with different stimuli and hence might serve as feedback loops in the decision process as required by Damasio's somatic marker theory.

Individual differences in sentence reading and parafoveal priming tasks: Examining letter crowding effects on eye movements and lexical decisions

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Visual acuity rapidly decreases in parafoveal vision. At the same time, adjacent letters in words tend to crowd more strongly when presented at larger distances from the fovea. Hence, the susceptibility to letter crowding should indicate individual differences in parafoveal processing and the rate at which words are read after they have been previewed in parafoveal vision. Two experiments tested the functional relationship between letter crowding, parafoveal processing, and word-recognition during reading. The first experiment used a gaze-contingent parafoveal preview manipulation while recording eye movements. Contrary to expectations, there was no significant correlation between the readers' letter-identification performance (LIP) and their preview benefit (PB). However, both LIP and PB correlated with the individual reading rates showing that faster readers perceived less central crowding and revealed less PB. The second experiment tested whether crowding was predictive for lexical decisions in a priming task. Again, there was no simple relation between letter-identification performance at and repetition priming for primes presented at the different spatial locations. If preview benefit and repetition priming both tap similar processes, the results suggest that letter crowding affects parafoveal processing not directly but possibly moderated by other factors. More research seems necessary to disentangle this complex relationship.

Neural activations during explicit processing of pain-related words in chronic low back pain patients

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Pain-specific processing can be activated not only by noxious stimuli but also by pain-relevant cues like pictures, facial expressions, or words. Although chronic pain patients are frequently exposed to pain-related words, neural activations during this processing only started to be investigated. The aim of the present study was to compare neural activations induced by pain-related adjectives in a sample of chronic back pain patients (CBP) with activations in healthy controls (HC). 13 CBP patients and 13 HC matched for age and gender volunteered in the study. Subjects attentively viewed pain-related, negative, positive, and neutral adjectives and were asked to generate mental images associated with the words during fMRI scanning. Brain activation was compared between word categories and between CBP and HC. As pain and depression were correlated, the pain-specificity of the fMRI results was established by statistically eliminating the variance of this influence. Comparing the neural activation of pain-related adjectives with other adjective categories, CBP patients significantly differ from HC. For example, comparing pain-related adjectives with negative adjectives, CBP showed an enhanced activation in dorsal cingulate cortex. This might be due to an enhanced processing of pain related adjectives that are primed by current pain.

Looking at degrees of separation: Early brain responses to binocular orientation differences

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Having two eyes allows us to perceive stereoptic depth, when the images between the two eyes differ just a little, but also to experience the fascinating phenomenon of binocular rivalry, when the images between the two eyes differ a lot. Then our perception alternates back and forth between those images. To explore the neural mechanisms underlying visual processing of stimuli that differ to different degrees between the eyes I measured event-related potentials (ERPs) to 200-ms sine-wave gratings differing in orientation between the eyes from 0° to 90°. They elicited typical ERPs, with a first major component (P100) 100 ms after stimulus onset and a second major component (N170) 170 ms after stimulus onset. P100 amplitude was larger when the orientations were the same in the two eyes, intermediate when the orientations were maximally different (leading to binocular rivalry), and smallest for in-between orientation differences. N170 amplitude followed a linear function: It was smallest when the orientations were the same and increased with orientation difference between the eyes. These results suggest that the P100 reflects processes in which the binocular input are offset against each other, and that the N170 reflects binocular rivalry.

Intense Blue Light Improves Sleep Quality and Well-Being within Daily Life Settings

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Purpose: Can intelligent lighting within homes and offices prevent us from fatigue and sleepiness throughout the autumn period? Deficits of current lighting research regarding direct and indirect the effects on the human system are so far restricted by laboratory findings of activating light of daily life conditions. **Methodology:** The randomized controlled trial, single blind study took place in the context of a hotel stay. A between-subject design (84 healthy individuals with no ophthalmic diseases, color blindness or extreme chronotype) was conducted, The participants were randomly assigned to an experimental group (n=44; 27 female) and a control group (n=40; 28 female). Latest LED technology in the reconstructed areas of the hotel was used to match intensity and spectrum of the light installation to the specific times of the day in order to have an activating impact during the day and a de-activating impact in the evening. **Results:** The results show reduced level of stress, fatigue and discomfort in the experimental light condition. The quality of sleep is increased as measured by reduced restlessness and fewer disturbances during the night. Moreover, melatonin is increased before bed-time and decreased in the wake up time.

Ignoring sound: Repeated exposure reduces disruption of serial recall

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Examining whether disruption of serial recall by task-irrelevant sound is attenuated after repeated exposure to the auditory distractors helps to solve the question to which extent attentional processes are involved in the changing state irrelevant sound effect. In a series of four experiments, the disruptive effects of to-be-ignored speech and music relative to a quiet control condition were markedly reduced after eight repetitions, regardless of whether trials were presented in blocks (Experiment 1) or in a random order (Experiment 2). Further, the auditory distractor's playback direction (forward, backward) had no effect (Exp. 3). The very same results were obtained when the auditory distractors were only presented in a retention interval after the presentation of the to-be-remembered items (Experiment 4). This pattern is only consistent with theoretical accounts that allow for attentional processes to interfere with the maintenance of information in short-term memory.

Backward crosstalk in the PRP-paradigm: Effects of instructed vs. intentional nonactions in T2 on reaction times in T1

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In dual-task performance several findings suggest that the compatibility between S1/S2 and/or R1/R2 affects primary-task performance. According to Hommel (1998) and contrary to the assumed bottleneck of response selection, this backward crosstalk implies that response selection in overlapping tasks runs partly in parallel. More recently, Miller (2006) found such backward crosstalk even without stimulus or response compatibility when T2 was a Go/NoGo task. Whenever a NoGo response was required, response times of T1 were significantly slower. One reasonable explanation for this backward crosstalk is that S2 automatically triggers a response which then affects R1 (Hommel & Eglau, 2002). We conducted two experiments that compared the effects of instructed vs. intentional Go/NoGo tasks on response times of T1. We expected to find backward crosstalk in the former but not in the latter condition, as in the case of an intentional Go/NoGo task the stimulus does not signal a certain response. Experiment 1 confirmed this hypothesis. In Experiment 2, intentional Go/NoGo responses led consistently to different visual effects. The findings revealed backward crosstalk with short SOAs. Thus, it seems that the anticipation of a (non)action-effect might act similarly to a stimulus signaling an instructed (non)action, at least with short SOAs.

Overt production of emotional words: an ERP study

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The ultimate goal of language production is to convey meaning. Accordingly, semantic aspects of message generation and access to the mental lexicon are well-investigated. However, communicating thoughts and intentions is not only characterized by semantic contents but may also involve strong emotional aspects, for instance, during arguments or discussions of emotional topics. To date, little is known about how emotion interacts with different planning stages of language production. In the present study we investigate the influence of emotional contents on speaking during single word production. Reaction times and event related potentials (ERPs) were recorded while participants produced words of positive, neutral and negative valence in a translation task or read these words silently (control condition). Reading emotional words was associated with a late positive component at central sites, starting at about 450 ms, that is assumed to reflect processing of the intrinsic value of emotional stimuli. A similar positivity was found in the word production task starting at about 600 ms, that may reflect the processing of the intrinsic value of emotional messages during speaking.

Location dependent spatial recall of familiar places

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As we walk through an environment, we stay aware of our surroundings by integrating sensory inputs into an egocentric spatial working memory (WM), or "spatial image" (Mallot & Basten 2009; Tatler & Land 2011; Loomis et al. 2013). Here, the interaction of spatial long-term memory (LTM) and WM in an outdoor urban environment was studied. Pedestrians in Tübingen were asked to draw sketch maps of a well-known downtown square. Interviews were performed at eight locations in walking distance to the target square and at three distant locations (>2km). Sketch maps were rated for orientation. Orientation frequencies depended significantly on interview site for the downtown locations. At distant sites, orientation frequencies did not differ from each other, nor from the average of the downtown frequencies. Normalized directional vectors were found to point from the nearby interview sites towards the target square. We conclude that representations of a target square are automatically recalled from LTM and used to continuously update the subjects' spatial image as they walk in the vicinity of this square. This involves position-specific transformations from allocentric LTM to egocentric WM of the reported type.

Die Zeit und die Flanker: Eine Geschichte zum Verweilen

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Die Möglichkeit, das zeitliche Erscheinen eines Reizes zu antizipieren, erlaubt schnellere Reaktionen auf einen Zielreiz. Was jedoch passiert mit Störreizen (Flankierreize), welche zeitgleich mit einem Zielreiz dargeboten werden? Werden diese besser mit den Zielreizen mitverarbeitet oder können sie besser unterdrückt werden? Wir untersuchten diese Frage mittels eines Bahnungsparadigmas, indem wir nacheinander zwei Zielreize (Prime und Probe) darboten, die jeweils eine Wahlreaktion erforderten. Sowohl Prime als auch Probe waren dabei jeweils von Flankierreizen umgeben, die entweder neutral (keiner Antwort zugeordnet) oder inkompatibel (erforderten eine andere Reaktion als der Zielreiz) waren. Die zeitliche Antizipationsmöglichkeit auf den Prime manipulierten wir mittels einer geblockten Vorperiode (VP), wobei eine kurze VP eine gute zeitliche Vorbereitung erlaubt. Neben einem generellen Reaktionszeitvorteil zeigte sich bei kurzer VP zusätzlich eine Interferenzwirkung der Flankierreize, welche bei langer VP nicht auftrat. Weiterhin drückte sich eine Inhibition der Prime-Flankierreizein einem negativen Primingeffekt für den Probe aus: Die Reaktionen waren verlangsamt, wenn die Primeflankierreize zum Probezielreiz wurden. Dieser Inhibitionseffekt wurde jedoch nicht durch die VP beeinflusst. Zusammenfassend sprechen die Ergebnisse dafür, dass gute zeitliche Vorbereitung eine verstärkte Störreizverarbeitung bedingt, welche sich jedoch nicht in einer stärkeren Unterdrückung äußert.

Referential Primacy Effects In Subjective Judgments of Truth

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When people encounter a statement repeatedly, they are more likely to believe it. Previous research has offered two accounts why this truth effect occurs: Convergent validity and processing fluency. Convergent validity occurs because people remember they have encountered the statement before, but misremember its source. Processing fluency occurs because repeated statements can be processed more easily. Both accounts increase the subjective impression that a statement is true. Alternatively, we propose a referential primacy effect for repeated statements. Experiment 1 confirmed that participants believe a repeated statement more than a new statement, but a contradicting version of a repeated statement less than a new statement. We propose that the mechanism for this effect is referential availability: When people encounter a statement for the first time, statement supporting references (i.e. sources, experiences, knowledge) in memory are activated. When the statement is repeated, these references become available and serve as cues that validate the statement's truth. By manipulating participants' level of elaboration (Experiment 2 + 5) and participants' availability of statement supporting references (Experiment 3 + 4) we confirmed our assumption that the truth effect is mediated by the increased availability of statement supporting references for repeated statements.

Emotional prosody processing in Behavior and Brain Function: Insights from Autism Spectrum Disorder

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Social decision-making crucially depends on efficient processing of subtle nonverbal cues such as the emotional tone of voice, i.e., prosody. Individuals with Autism Spectrum Disorder (ASD) are characterized by severe social deficits, yet specific impairments in emotional prosody processing remain an under-researched topic. In this study, we investigated emotional prosody processing in individuals with ASD (N=27) and healthy controls (N=22) with new ecologically valid behavioral and functional magnetic resonance imaging tasks. Compared to controls, individuals with ASD were slower and less accurate on the behavioral prosody recognition task. On the brain level, individuals with ASD recruited the amygdala and the superior temporal sulcus (STS) less than controls when processing social emotions and activity of prosody processing regions including the STS predicted accurate emotion recognition on the behavioral task to a lesser extent in individuals with ASD compared to controls. Furthermore, the functional connectivity between prosody processing regions was significantly reduced in the ASD group relative to controls during emotional prosody processing. In sum, these results provide evidence for dysfunctional emotional prosody processing in individuals with ASD on the behavioral and neural level and highlight the crucial role of the relationship between behavior and brain function and for unimpaired social functioning.

How spatial is the Corsi block tapping task? Comparison of pictorial and navigational versions

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The Corsi block tapping task is widely used to assess working memory abilities in humans. Does performance in the Corsi block tapping task depend on the modality of task presentation (encoding) and reproduction (recall)? The same configuration of 15 squares was presented either on a computer screen or as a set of tiles on the floor in a 5x5 m arena. Sequences were presented by highlighting the squares, using computer-controlled flashlights in the floor condition. Subjects reproduced the sequence with a computer mouse (screen-recall), or by stepping on the remembered boards (floor-recall). Production time was balanced by appropriate delays in the screen condition. Both conditions were tested for encoding and recall in a 2x2 factorial design. Results showed a decrease in performance with increasing sequence length. Furthermore, performance decreased from Screen-Screen via Floor-Screen and Floor-Floor to Screen-Floor. We conclude that the Screen-Floor condition requires additional working memory resources not recruited in the Screen-Screen task. Such resources might be required for spatial updating, mental rotation of the memorized pattern during walking, transfer from the screen monitor on the floor, or the control of walking itself. These include important spatial competences which are not tested in standard Corsi setups.

Route descriptions: Influence of semantic and structural salience

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Landmarks, objects that stand out from the environment, are often used for route descriptions. They can vary in many aspects, e.g., the semantic richness (are they meaningful or not?), and their structural salience (the position of an object at an intersection). We conducted an experiment in which participants (N=32; ♀=20; \bar{M} 25.7 years, SD=5.3; between-subject factors) had to learn a route through a virtual maze from an allocentric or egocentric perspective. As landmarks we used pictograms with high semantic richness and geometrical shapes with low semantic richness. The pictograms and shapes were placed at each of the four possible corners of the intersections. After route learning, participants had to write down route instructions and landmarks from memory. Results reveal a significant main effect for structural salience, and significant interactions between the position at the intersection and the semantic richness of the landmarks, as well as the ego- vs. allocentric perspective of the route learner. The results highlight the importance of the structural and semantic salience in the landmark-based description of routes. The findings are discussed within current theories of human wayfinding.

The adaptive regulation of mind-wandering behavior

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The term mind-wandering describes the mental phenomenon of experiencing one's own thoughts drifting away from a task towards unrelated inner thoughts, fantasies, or feelings. Engaging in mind-wandering can be pleasant and sometimes even beneficial for the fulfillment of personal goals. However, mind-wandering will often come at a cost to the performance in current tasks. Previous research has shown that mind-wandering tendencies in attention-demanding tasks are negatively correlated with working-memory capacity (WMC) and these findings have been interpreted as evidence that high-WMC individuals are better able to block out task-irrelevant thoughts than low-WMC individuals. This ability might be one reason why high-WMC individuals outperform low-WMC individuals in cognitive tasks. To further investigate the WMC/mind-wandering relationship, we assessed WMC and we experimentally manipulated the demands of an ongoing task. Mind-wandering was measured during both demanding and non-demanding task situations. Results of a latent-change model showed that high-WMC individuals were more flexible in the adjustment of mind-wandering to current task demands than low-WMC individuals and that the better cognitive-regulation abilities mediated the relationship between WMC and task performance. This finding suggests that not only better inhibitory-control abilities but also a more flexible adjustment to situational demands underlies the often observed WMC/mind-wandering relationship.

Retrieval-induced forgetting is recall specific

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Retrieval-induced forgetting (RIF) refers to the finding that retrieval of a subset of studied items can cause forgetting of related non-retrieved items. RIF has often been attributed to inhibitory action during retrieval practice, which assumes that the forgetting is recall specific. Alternatively, RIF has been attributed to increased competition arising from the retrieved items during test, indicating that the forgetting may not be recall specific. Comparing the effects of retrieval practice trials with the effects of standard restudy trials, previous work typically reported forgetting after retrieval but not after restudy trials. Employing some newer restudy formats (e.g., pleasantness rating, imagination), however, more recent work did find restudy to induce RIF-like forgetting, at least when using recall testing. Here we compared the effects of retrieval practice with the effects of the newer restudy formats using item recognition testing. Item recognition testing is less susceptible to interference effects than recall testing and thus more appropriate to examine the inhibition account of RIF. We found both retrieval practice and restudy to enhance recognition of the practiced items, but only retrieval to induce forgetting of the other items. These findings challenge the competition account of RIF and favor inhibitory explanations.

Facial contrast varies with health and is a cue for health perception

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“Facial contrast”—the contrast between the facial features and the surrounding skin—is known to be involved in the perception of the sex and age of a face. Here we show that several aspects of facial contrast, including all the aspects that decrease with age, are greater in faces that are perceived to be healthier. However, only one of those aspects of facial contrast—luminance contrast around the eyes—was associated with a global health evaluation performed by a physician. Manipulating eye luminance contrast alone affected perceived health in a forced-choice task, as did manipulating all of the aspects of facial contrast that are related to perceived health. Collectively, these results support the idea that facial contrast is related to health and plays a role in the perception of health from the face.

Stability of crosstalk upon variation of visual and proprioceptive action effects

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Usage of input-output devices indicates crosstalk between visual (distal e.g., monitor) and proprioceptive (proximal: e.g., pen on a tablet) modalities. The reason for this is the representation of visual and proprioceptive information in combined feature codes (Hommel et al., 2001). Following up on research by Ladwig et al. (2012, 2013) we investigated the stability of crosstalk across different context conditions with variations in set size and gains to influence predictability of sensorimotor transformations. In the experiments participants used a pen on a covered tablet to perform an aiming task on the display (phase 1). Different gains randomly perturbed display or hand amplitudes. In phase 2 participants reproduced the formerly performed hand amplitude without visual feedback. Aftereffects, arising from visual information in phase 1, were more pronounced for proximal action effect variations than for distal action effect variations (= asymmetric crosstalk). Subsequent experiments enriched or reduced degree of predictability of stimuli, as well. On the one hand in situations of distal perturbations aftereffects seemed to be independent of predictability as we gained a solid bias of crosstalk. On the other hand when the context allowed for less predictability aftereffects from proximal perturbations decreased and asymmetry of crosstalk resolved.

Dual- vs. single-task working memory training: an fMRI study

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The present study investigated the possibilities to improve cognitive functions by working memory (WM) training, as well as the neuronal changes following training using MRI. To investigate the specific effects of combining two WM tasks, two different groups were recruited for training: Group 1 trained on an auditory and a visuospatial n-back task simultaneously (dual training), while group 2 trained on the two tasks separately (single training). Additionally, group 3 was recruited as a no-contact control group, i.e. these participants did not attend any training but they completed the pre- and post-test sessions. Training took place daily over the course of 16 days, before and after which the participants attended MRI scanning and completed tests on untrained tasks tapping executive functioning. Compared with the performance of the single training group and of the no-contact control group, dual training demonstrated positive effects on the abilities to coordinate two simultaneous tasks, and this effect transferred to an untrained WM dual task. These results are discussed in reference to training-related modulations in neural functions.

Prosody perception in the laryngeal premotor cortex: fMRI and TMS evidence

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Prosody conveys meaning as part of a parallel communicative channel that is independent from the linguistic message, but socially highly relevant. We investigated the neural mechanisms behind the understanding of meaning in prosody in a functional magnetic resonance imaging (fMRI) and a transcranial magnetic stimulation (TMS) study. In both experiments, participants categorized the prosodic meaning (statement or question; experimental task) or the word-initial consonant (/bear/ or /pear/; control task) of single word utterances that varied along a pitch contour (falling to rising) or phoneme continuum (/b/ to /p/). In the fMRI study, the prosody task was associated with stronger activation in the right laryngeal premotor cortex (PMC) than the control task. In the TMS study, 15 minutes of 1 Hz inhibitory TMS over the right laryngeal PMC reduced performance in prosodic categorization but not in the control task. These findings converge on a motor simulation mechanism – i.e. the conversion of the perceived falling or rising pitch contour into simulated laryngeal gestures – that tune-up prosodic comprehension. The data illustrate the role of (pre)motor areas in speech perception and will be discussed to complement traditional left hemispheric language models (Hickok et al., 2011; Pulvermüller & Fadiga, 2010).

Pluralism about Introspection: Combining Reasoning with Perception

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In the debate about the nature of introspection, dual-process theories offer one type of framework for thinking about the relevant issues, which has been thoroughly disputed and equally thoroughly supported in the recent literature. However, it is far from clear whether the debate about the correct formulation and the success of dual-process theories gets to the heart of the philosophical issues about the nature of introspection. To illustrate this point, I present a different framework, pluralism about introspection, which is compatible with the most charitable reading of dual-process theories while nonetheless leaving room for their incompleteness.

Güte sequentieller Entscheidungen nach negativer Stimmungsinduktion

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Ziel der Untersuchung war es, den Einfluss einer negativen Stimmung auf die Güte sequentieller Entscheidungen zu untersuchen. Die Versuchspersonen wurden zunächst über eine Imaginationstechnik in eine negative oder eine neutrale Stimmung versetzt. Danach bearbeiteten sie eine Variante des Sekretärinnen-Problems (SP). Dabei werden nacheinander Bewerber für eine Stelle dargeboten. Zu jedem Bewerber wird gesagt, wie gut er im Vergleich zu den bisherigen Bewerbern war und die Versuchsperson muss bei jedem Bewerber entscheiden, ob dieser eingestellt werden soll oder nicht. Die Ergebnisse zeigen, dass die Stimmungsinduktion erfolgreich war. Im Hinblick auf die Leistungen im SP zeigen sich keine signifikanten Unterschiede zwischen den beiden Stimmungsbedingungen; tendenziell war die Leistung im SP in der negativen Stimmungsbedingung aber schlechter. Für die individuell bestimmten Entscheidungsschwellen (ab welcher Bewerberanzahl ein Bewerber gewählt wird) zeigen sich ebenfalls keine Unterschiede zwischen den beiden Bedingungen. Weitere Analysen zeigten, dass die von den Personen erlebte Angst signifikant negativ mit der Leistung im SP und mit den individuellen Entscheidungsschwellen zusammenhing (je mehr Angst, desto schlechter die Leistung und desto kleiner die Schwellen). Die Befunde werden mit den Ergebnissen anderer Untersuchungen verglichen und kritisch diskutiert.

„Weil ich gerne Fußball spiele“: Wie Erstklässler die Auswahl von Nachrichtenthemen begründen und wie reliabel ihre Wahl dabei ist

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Den Umgang mit Medien zu lernen, zählt in einer von Medien geprägten Gesellschaft zu einer wichtigen Aufgabe. Eine Längsschnittstudie zum Thema Nachrichten in Tageszeitungen liefert Hinweise darauf, dass Grundschüler zunächst eine Nachrichtenauswahl ich-bezogen begründen und erst mit zunehmendem Alter die Perspektive anderer einbeziehen. Davon ausgehend, haben wir in einer Querschnittstudie mit Erstklässlern untersucht, wie reliabel die Wahl und die Begründungen der Themen sind. Die Kinder haben zu zwei Messzeitpunkten, die eine Woche auseinander lagen, jeweils 5 aus 16 Themen für die Titelseite einer Tageszeitung wählen sollen. Die Themen der beiden Aufgabenversionen waren laut Expertenranking inhaltlich vergleichbar. Erhoben wird, ob die Mädchen und Jungen in beiden Versionen die jeweils parallelen Themen wählen und ob sich die Begründungen in ihrer Ich-Bezogenheit unterscheiden. Die Ergebnisse werden mit den Ergebnissen der Längsschnittstudie verglichen.

Help or hurt, I just want to matter - desire for impact guides post-ostracism behavior

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Previous research has found inconsistent effects of ostracism on behavior: increases in aggressive as well as prosocial behavior. We try to reconcile these seemingly contradictory behaviors by presenting them as different means to serve the same end: to have an effect on others. If this is the case, the impact a certain behavior yields should guide behavior more than its prosocial or aggressive character. In the present studies, participants were ostracized or included in a Cyberball game and then had to choose between a prosocial and an aggressive behavioral option, with one of the options yielding a clearly higher impact. Specifically, participants got a chance to influence the amount of aversive noise blasts another person, which they had not and would not meet, would have to listen to: they could choose between removing one (low impact, prosocial) or adding five (high impact, aggressive) noise blasts in one condition and vice versa (removing five vs. adding one) in the other. As hypothesized, ostracized participants chose the high-impact option significantly more often than included ones; the aggressive or prosocial character of a behavior was no significant predictor of its choice.

The role of input and output modality in language processing

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Language processing can require the combination of compatible (auditory-vocal and visual-manual) or incompatible (auditory-manual and visual-vocal) input and output modalities. Input-output modality compatibility is defined as the similarity of stimulus modality and the modality of response-related sensory consequences (cf. Stephan & Koch, 2010). The aim of the present study was to examine the influence of modality compatibility while performing language-related cognitive operations. We used a task-switching paradigm, in which participants had to switch between compatible or incompatible input-output modality combinations while performing verbal semantic categorizations or word-form decisions. The results demonstrate higher switch costs (i.e. higher RT and an increased percentage of errors in switch trials compared to repetition trials) for incompatible modality combinations than for compatible combinations. Taken together, we could show that input-output modality compatibility plays an important role in language processing.

Me or Merkel? Exploring different levels of face familiarity

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Recent research suggests facial stimuli containing only horizontally aligned features constitute a “bar-code-like” structure which may convey the key information for face recognition. While this bar-code model holds true for robust effects like face inversion or preferential processing of faces compared to objects overall lower performance of older adults compared to younger adults are being reported. This study sought to further investigate applicability of the model on different levels of face familiarity. 22 young and 18 older subjects (M=68.9 years) participated in a repeated measures design assessing performance regarding unfamiliar, famous and self-face (factor familiarity) using individually tailored morph sequences. Stimuli were either presented containing all or only horizontal information (factor features). Results indicate age differences concerning accuracy and reaction times. While for young adults higher familiarity is accompanied by higher accuracy scores irrespective of displayed features, old adults’ performance for horizontal information is independent from level of familiarity suggesting age-differential processing. Additionally, young adults displayed faster recognition on higher levels of familiarity including previously reported preferential processing of participants’ own face (“self-face advantage”) while older subjects’ reaction times showed to be independent of familiarity level.

Exploring commission errors after finished delayed intentions

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In sociotechnical workplaces such as aviation and healthcare, the ability to remember to execute intentions at the appropriate moment in the future – prospective memory (PM) – can be safety critical. In these settings, an intention is frequently retrieved, but the execution of the task needs to be delayed due to ongoing task demands (delayed-execute PM task). Even though forgetting of tasks is an obvious safety-critical problem, the opposite can also be cause of concern. Repeating already finished PM tasks – errors of commission – such as administering the same medication twice can jeopardize patient safety. We address this issue in the delayed-execute paradigm in ongoing experiments. After the PM task instructions, participants in the finished condition got to do a brief PM experiment including two PM events. Participants in the cancelled condition were told that the PM task was cancelled and should not be performed immediately after the PM instruction. In a final experiment including several PM events, we observed that participants in the cancelled condition showed more commission errors compared to the finished condition. Replicating results from event-based PM tasks, the risk to erroneously execute cancelled intentions apparently extends to delayed-execute PM tasks.

When Flanker meets the n-back task: pupil dilation and EEG correlates for load on executive working memory functions

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Often named executive working memory functions are updating, shifting and inhibition. In the n-back task updating and shifting are loaded differently depending on n-back level. Thus 1-back loads mainly on updating, 2-back loads additionally on shifting. We were interested in how adding load on inhibition within an n-back task would alter the load-related measures pupil dilation, EEG frequency band power (alpha, theta) and P300 amplitude. In general increasing load should lead to increasing pupil dilation and theta frequency band power and decreasing P300 amplitude and alpha frequency band power. In a 3x2 design we manipulated load on updating and shifting by using the n-back levels zero to two and inhibition by using congruent and incongruent Flanker items (i.e., letters flanked by same or different letters) as stimuli. All measures were sensitive for the load manipulations however to different degrees. Load on inhibition lead to an additionally decreased P300 amplitude on all n-back levels. However there was only a significant effect on the lower n-back levels for pupil dilation and alpha frequency band power. Theta frequency band power showed the strongest effect for load on updating. We will discuss these results with respect to differentiation of executive working memory functions.

Adaptive Consumer Judgments – Comparing Exemplar Against Rule-based Strategies

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According to standard economic models, consumer judgments are best described and predicted by rule-based strategies that rely on weighted additive rules. In contrast to this, cognitive theories suggest that decision makers have a repertoire of qualitatively different strategies available and thus may sometimes be better described by different models. Here, one prominent alternative are exemplar-based strategies that rely on the similarity to previously encountered options. Following this idea, we hypothesize that customers adaptively shift between different strategies depending on the task they face. To test, we conducted an experiment in which we incentivized participants (N=64) to accurately estimate the market price of actual wine bottles. In an initial training phase, participants received feedback about the true prices. In one condition these prices were best accounted for by an exemplar strategy while in the other condition a rule-based strategy worked best. Results from a subsequent test phase indicated that participants indeed adjusted their judgment strategies depending on which training set they faced. In a second test phase, these different judgment strategies also led to qualitatively different choices. Together the results highlight the need to consider qualitatively different cognitive strategies to accurately predict judgments and choices in a consumer context.

Change and error: Incorrect predictions reduce switch costs

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In a modified task switching paradigm, participants were asked to predict the upcoming task based on guessing. While incorrect guesses led to an overall increase of reaction times and error rates, they reduced task switch costs compared to conditions in which participants predicted the correct task. This effect was more pronounced when participants switched among four rather than only two tasks. We interpret these findings in terms of an enhanced level of controlled processing induced by a prediction error.

Separating Semantic and Pragmatic Information in Eye-Movements for Image-Processing Tasks

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Eye-movements recorded during image-processing tasks are influenced by the image content (semantic information) and the image-processing task (pragmatic information). To analyze the image-processing task it is necessary to separate these two kinds of information. We present a method to transform an original image into variants which contain less semantic information, but preserves task relevant features, such as color impression, spatial color correlation and luminance. Analysis of eye-movements for a global contrast adjustment task demonstrates the applicability of this method. Images from different semantic categories were transformed, using this method, into three variants containing different amounts of semantic information. Subjects performed global contrast adjustment on these images, blocked such that each subject saw all images but each image was presented only in one of the three semantic information variants. Subjects chose a similar global contrast for images independent of the variant they saw, but fixation distribution and frequency were significantly different between the variants. The interpretation is that our method does not remove pragmatic information, shown by similar performances in the global contrast adjustment task for all image variants. The benefit of our method is that eye-movements are not confounded by influences of semantic information present in the original images.

Can eye-movements explain why patients with optic ataxia are better with memory-guided actions?

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The perception-action model suggests that the dorsal stream processes visual information in real-time and that only the ventral stream has the capacity to store visual information. Consequently it is assumed that during memory-guided actions control switches from the dorsal to the ventral stream leading to paradoxical improvement in the case of patients with dorsal-stream damage. This prediction was repeatedly confirmed in patients with optic ataxia. In this talk I will present findings from a patient with optic ataxia (CB). CB showed the typical pattern of substantial pointing errors when pointing to targets in his visual periphery. We also tested him in a memory condition and found that his ability to keep fixation was substantially reduced during the memory condition. When we excluded trials where fixation was broken, performance in the immediate and memory condition were comparable. In one condition CB was explicitly asked to make an eye-movement towards the remembered target position before he initiated his pointing response. CB's performance in this condition was significantly improved. Our findings suggest that patients with optic ataxia may have a problem in decoupling eye- and hand-movements and that in memory conditions eye- and hand movements may be better correlated and thus improved.

A dynamical systems perspective on delay discounting: choice movements, sequential effects and modelling

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When choosing between temporally delayed goods, individuals often prefer smaller values delivered sooner over larger values delivered later. This delay discounting has been found to a higher extent than suggested by normative economic theories. A wide range of research aims for an understanding of this phenomenon focusing on the decision outcome. Here, we argue that an empirical and modeling approach based on Dynamic Systems Theory could inspire and advance the investigation of delay discounting processes by turning the focus on temporal patterns in theorizing, empirical investigation, and modeling. We will illustrate how choice movement tracing and the analysis of sequential choice patterns could be used to study delay discounting. Furthermore, we exemplify how dynamic modeling supports the understanding of the observed decision-making behavior. We will discuss benefits and pitfalls of the proposed approach in advancing our understanding of the processes of delay discounting.

Developmental changes in decision making under risk from childhood to young adulthood: Contributions of cognitive functions and personality

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Previous studies have shown that children and adolescents often tend toward highly risky decisions frequently leading to negative consequences. Theoretically, this phenomenon may be associated with the age-related maturation of brain areas involved in cognitive control. Particularly, executive functions and working memory have been reported to mature until adulthood and to be involved in decision making under risk conditions. Beyond that, age related changes in risky decision making may be grounded in the development of personality and impulsivity. Thus, we investigated, developmental changes of executive functions, working memory, personality, and impulsivity as potential moderators of age related changes in risky decision making. Therefore, 112 participants in three age groups (8-11, 12-15, 16-19 years) performed the Game of Dice Task (GDT), measuring decision making under risk, and a test battery assessing the potential moderators. The number of high risk decisions in the GDT was significantly lower in higher age groups, $F=10.90$, $p<.001$. This age-effect was moderated by executive functions, but not by working memory, personality, or impulsivity. Thus, individual differences in the maturation of executive functions, associated with areas in the prefrontal cortex, seem to be an important factor in young persons' behaviors in risky decision-making situations

Perception of saturation when viewing natural scenes

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For most of the color spaces there is at least one formula that allows us to determine the saturation of a color. It is hitherto unknown, however, whether these formulas are perceptually adequate. We conducted two experiments in an attempt to fill this gap. In the first experiment, we presented 80 color images of natural scenes to 8 participants. Participants were asked to choose the pixel in the image that appeared to be the most saturated. The judgments of the participants were then compared to the judgments of six popular saturation measures. This revealed that the measures capture human perception well: the pixels chosen by the participants came out as highly saturated on all of the measures, while differences between the measures were small. In the second experiment, we presented the images from the first experiment in grayscale to further 8 participants. Participants were asked to choose the pixel that would be the most saturated if the image was in color. Surprisingly, the participants' choices came out as very saturated on the six measures as well. This suggests that participants can determine the saturation of a pixel in a natural scene even if it does not contain color information.

Parietal Representations of Egocentric Space include unseen Locations

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Our subjective experience links covert visual and egocentric spatial attention seamlessly. However, the latter can extend beyond the visual field, covering all directions relative to our body. Even with closed eyes we can rotate from the computer screen to face the window with little loss of accuracy, and once rotated we are aware of the computer's updated egocentric position. It appears thus that our egocentric model includes seen and unseen locations. In contrast to visual representations, little is known about unseen egocentric representations in the healthy brain. Parietal cortex appears to be involved in both, because its lesions can lead to deficits in visual attention, but also to a disorder of egocentric spatial awareness, known as hemispatial neglect. In this study, our participants performed a novel egocentric orientation task inside an octagonal room. Once they were familiar with this setup, we exposed our participants to a virtual version of the same paradigm during fMRI recordings. We found egocentric unseen space represented by patterns of voxel activity in parietal cortex, independent of visual information. Intriguingly, the best decoding performances corresponded to brain areas associated with visual covert attention and reaching, as well as to lesion sites associated with spatial neglect.

It's all in your head – effects of social context on emotional word processing

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Language has an intrinsically evaluative and communicative function. Here, we investigate how the processing of trait adjectives is modulated by their perceived communicative source in anticipation and presentation of evaluative feedback. 16 student volunteers underwent a social evaluative situation, consisting of videotaping the participants while they gave a short speech describing themselves. Based on this recording a stranger or a random computer program supposedly evaluated their personality, providing feedback by highlighting positive, negative or neutral trait adjectives. Actually, in both conditions words were presented and selected randomly. Participant's cortical responses were recorded via EEG. Results showed stronger responses towards presented words and particularly towards the feedback presentation in the supposedly human-generated condition. These main effects started at about 100ms. Moreover, at feedback anticipation, the supposedly human-generated negative and positive trait adjectives were differentially processed. At feedback presentation, putative human-generated affirmative positive decisions were processed more intensely. This self-positivity preference started at about 428ms right frontal, later shifting towards central regions. These results confirm the impact of ascribed context on the processing of emotional trait adjectives and specify the corresponding electrophysiological processes. Seemingly realistic interactive designs are introduced as a useful tool to study context effects in word processing.

Drivers' left turn decisions in front of electric bikes and bicycles

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In recent years, electric bicycles (e-bikes) have proven popular with cyclists. They allow people of limited physical ability to be mobile without the need to use a car, just as they help regular cyclists reach their destinations faster and with less effort. However, some safety concerns have also been raised. One potential problem is that at first sight, they are hardly distinguishable from regular bicycles. This could lead other road users to misjudge the speed of an approaching e-bike, since they can reach a higher maximum speed than regular bicycles. We investigated differences in drivers' decisions to turn left in front of bicycles and e-bikes approaching at different speeds. In addition, the effect of drivers' age on their decisions was assessed. For this purpose we conducted an experiment on a test track with 43 participants in two age groups. They were required to observe a bicycle/e-bike approach, and to indicate the smallest gap for a left turn in front of the cyclist they were willing to accept. The results show that participants accepted smaller gaps for e-bikes than for bicycles. This effect was mainly driven by the older participants, whereas there were no differences for the younger age group.

Effect of rise time and amplitude modulation on auditory simple reaction time

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It is a well-known phenomenon that simple reaction time (RT) to the onset of a sound depends on its loudness. The louder a sound, the shorter the RT. However, it is not clear what triggers the reaction. In order to avoid a click noise, sounds are usually switched on gradually, i.e. with a rise time. Though the loudness level eventually attained is its main determinant, the steepness of the rise might also contribute to RT. In Experiment 1, the duration and the shape of the attack are varied for a 1-kHz pure tone while the sound pressure level finally reached is kept constant. The results clearly show faster reactions to shorter rise times. In Experiment 2, a constant rise time is used, while the signal is shaped by sinusoidal amplitude modulation, the frequency and starting phase of which are varied. The results of both experiments suggest that RT is determined by the level within the first 50 milliseconds with a higher weighting being placed on the beginning.

Is the survival-processing advantage due to enhanced short-term memory involvement?

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The survival-processing effect describes the recall advantage for words in a surprise memory test, which have been rated according to their relevance for a survival scenario. Although this advantage has been demonstrated relative to a number of control conditions that are usually associated with good memory (e.g., rating the words according to their pleasantness), the underlying cognitive mechanisms are still at debate. In three experiments we tested a short-term memory account of the survival-processing advantage. For this purpose, participants had to perform the rating tasks during irrelevant speech, which has been verified to impair short-term memory significantly. Consonant with this irrelevant sound effect, the survival-processing advantage disappeared during irrelevant narration (Exp. 1). Yet, the recall advantage persisted during artificial speech conditions with a monotonic temporal-structure (Exp. 2) or when irrelevant narration was restricted to the rating task while the surprise memory test was performed during silence (Exp. 3). Against the backdrop of the typical short-term memory impairment in the latter two sound conditions—and the lack thereof on the survival-processing effect in Experiments 2 and 3—our data speaks not in favor of enhanced short-term memory involvement evoking the surviving-processing advantage. Alternative explanations will be discussed.

Spatio-temporal perceptive fields estimated by means of metacontrast masking

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Metacontrast masking refers to the suppression of visibility of a target stimulus by the successive presentation of a surrounding, non-overlapping mask stimulus. The suppression is measured as a function of the time interval between target and mask (stimulus onset asynchrony; SOA). The aim of this study was to measure spatio-temporal perceptive fields, i.e. the masking effectiveness and time point of maximal masking (SOA_{max}) at different spatial configurations of a Gabor target and a sinusoidal collinear mask. Thus, we varied the SOA as well as the diameter of the surrounding mask, the phase contrast between target and mask and the spatial frequency. By means of the later manipulation we wanted to gain knowledge about different types of inhibition, namely intra- and inter-channel inhibition. The obtained visibility ratings of three observers show some interindividual variability but converge on three main findings: masking effectiveness decreases with spatial distance, phase contrast only matters at short distances and low spatial frequency and masking is less effective in mixed spatial frequency configurations compared to equal ones. Our results support the assumption that intra-channel inhibition is stronger than inter-channel inhibition.

Background distortion does not contribute to the perceived material properties of thick transparent objects

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Fleming, Jäkel, and Maloney (2011) instructed subjects to match perceived material properties of thick, clear transparent objects in simulated photo-realistic scenes by adjusting the refractive index. Despite systematic deviations from the predicted refraction setting, the authors conclude that estimated refraction is used as an indicator for material properties and emphasize the role played in this process by background distortions caused by the object. However, this appears implausible, because information necessary for inferring the refractive index from distortions, namely the object's exact shape and thickness, its distance to the background, and the undistorted background, were not available in their situation. This suggests that the subject's settings were not based on distortion but reflect the influence of other criteria. We tested this hypothesis in a similar matching experiment. The main difference was that distortion was gradually isolated from other image properties (strength of specular reflection and image artifacts) that may alternatively be used as matching criterion. As expected, the matching acuity strongly diminished in trials with isolated distortion. Furthermore, the specular reflection dominated when specular reflection and distortion provided inconsistent information. This indicates that distortion information is not used to estimate the material properties of transparent objects.

Neural underpinnings of nocebo effects: an fMRI study in healthy volunteers

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While placebo effects have already received much attention over the last few years, nocebo effects remain less-well studied. Therefore, we implemented a nocebo paradigm to induce visceral hyperalgesia triggered by negative expectations in order to assess the neural mechanisms mediating nocebo effects. Healthy volunteers were assigned either to an experimental-(nocebo) or a control-group. All underwent three consecutive fMRI sessions during which painful rectal distensions were delivered. The nocebo group was instructed to expect pain sensitization. Expected pain intensity, state anxiety and tension were assessed prior to each session, perceived pain using online ratings. The nocebo group revealed increased expectation of pain as well as higher perceived pain during session three, and higher pain expectation correlated with pain ratings (all $p < .05$). While tension ratings were reduced in the control group, this was not the case in the nocebo group ($p < .05$). Nocebo responder also demonstrated an up-regulation of neural activity in DLPFC during pain-anticipation and in pain-associated-areas like thalamus and insula during pain. Negative expectation concerning pain processes led to altered neural responses. These findings have implications not only for chronic abdominal pain conditions, but also for clinical settings involving painful experiences in general.

Curve tracing: too slow for response priming

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In pathfinder studies, participants are presented with two curved lines and are asked to judge whether two dots are placed on the same line or not. This process is thought to be mediated by time-consuming attentional tracking. We investigated curve tracing by presenting circular configurations of eight alternating red and green dots. In corresponding configurations, a first line linked a green to a green dot and a second linked a red to a red dot. In non-corresponding configurations, the first and second line each linked a green dot to a red dot. Participants indicated as quickly as possible whether a target configuration was corresponding or non-corresponding. The target was preceded by a prime configuration that was either consistent or inconsistent with respect to this response requirement (in consistent trials, e.g., a corresponding prime preceded a corresponding target configuration). The stimulus-onset asynchrony (SOA) between prime and target was varied in seven steps (24-672 ms). Response times were faster to corresponding compared to non-corresponding targets but we obtained no response priming effects for any SOA. Our findings are in accordance with the notion of a slow attentional tracking process in curve tracing and rule out a feedforward system of information transmission.

The interruptive function of pain in the trigeminal and peripheral system

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Facial pain is transmitted by the trigeminal nerve. Activation of the trigeminal nerve signals potential danger to essential organs (i.e., brain) and functions such as senses, food intake and communication. It therefore appears conceivable that the face and its surrounding area play a unique role in pain perception and processing. This notion is supported by a high prevalence of head and facial pain disorders and experimental data. The so called interruptive function of pain might therefore be higher for trigeminal than for peripheral pain. In two experiments with healthy volunteers we compared the interruptive function of trigeminal and peripheral electrical pain on different cognitive functions (attention, learning, memory). Within the first experiment we found higher impairment on target detection in a visual attention task for trigeminal than for hand pain. Results in the second experiment showed worse performance (i.e., more omissions and slower reaction times) in a visual categorization task for trigeminal stimulation. These results suggest a higher impairment of cognitive functions by trigeminal compared to peripheral pain. Therefore, these findings hold important clinical implications regarding the functional impairment observed in patients suffering from chronic headache syndromes. We plan to study this phenomenon on the neural level using fMRI.

Modelling the role of prime and target strength in response priming

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In response priming, a prime and a target stimulus are presented in quick succession and are coupled to identical (consistent) or alternative (inconsistent) motor responses. Typically, in consistent trials, responses are faster compared to inconsistent trials. This response priming effect received some attention because it represents an early phase of motor activation that is potentially independent of the visual awareness of the primes. However, not all characteristics of the effect are well understood. For example, it is not clear how prime and target signal, respectively, contribute to response speed and priming effect. We independently varied the signal strength of prime and target, either in the isoluminant plane (red and green stimuli with different levels of saturation, 3 sessions) or in the luminant plane (rectangular and diamond-shaped stimuli with different levels of lightness, 3 sessions). The results are comparable for isoluminant and luminant stimuli: Response times are faster with increasing target strength, and priming effects increase with prime strength and decrease with target strength. We present a model, based on Vorberg et al.'s (2003, PNAS 100, 6275-80) accumulator model, that quantifies and correctly predicts our results by estimating different rates of response activation for primes and targets.

A temporally sustained implicit theory of mind deficit in Autism Spectrum Disorders

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Eye movements during false-belief tasks can reveal an individual's capacity to implicitly monitor others' mental states (theory of mind - ToM). It has been suggested, based on the results of a single-trial-experiment, that this ability is impaired in those with a less severe autism spectrum disorder (ASD), despite neurotypical-like performance on explicit ToM measures. However, given there are known attention differences and visual hypersensitivities in ASD it is important to establish whether such impairments are evident over time. Further, investigating implicit ToM using a repeated trial approach allows an assessment of whether learning processes can reduce the ASD impairment in this ability, as is the case with explicit ToM. In this study we investigated the temporal profile of implicit ToM in individuals with ASD and a control group. Despite similar performance on explicit ToM measures, ASD-diagnosed individuals showed no evidence of implicit false-belief tracking even over a one-hour period and many trials, whereas control participants did. These findings demonstrate that the systems involved in implicit and explicit ToM are distinct and hint that impaired implicit false-belief tracking may play an important role in ASD. Further, they indicate that spontaneous learning processes do not alleviate this impairment across multiple trials.

Why You Should Maybe Start Smoking: The Effect of a CHRNA Variant on Response Speed

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Nicotine is a natural stimulant of the cholinergic neurotransmitter system. It binds to the $\alpha 4$ subunit of the nicotinic acetylcholine receptor and thereby increases the rate of cholinergic transmission (e.g. Flores, Rogers, Pabreza, Wolfe & Kellar, 1992). Through the administration of this drug, it is possible to study the effects of acetylcholine on measures of cognition. Nicotine was found to elevate the response speed in a visual cuing task, both for humans and macaques (Witte, Davidson & Marrocco, 1997). It was our aim to extend this finding and replicate it on a genetic level. CHRNA4 rs1044396 is a variant on the CHRNA4 gene, which codes for the $\alpha 4$ subunit of the nicotinic acetylcholine receptor. In our study, this variant modulated the response-speed in the Stroop task, Negative Priming task and Posner Cueing task, while exhibiting no effect on measures of selective attention.

Quantify yourself! Smartphone-basierte Erfassung von Nutzerverhalten und -stimmung in einem Alltagssetting

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Mehr als jeder sechste Mensch weltweit besitzt ein Smartphone. Als mobiles und umfangreich mit Sensoren ausgestattetes Endgerät kann es als „digitales Schweizer Taschenmesser“ dazu beitragen, die Bedürfnisse, Stimmungen und das Erleben des Nutzers zu erfassen. Nutzer können "sich selbst quantifizieren“, wie es auch die Quantified-Self-Bewegung vorlebt. Eine große Anzahl sensorischer Daten können bereits heute ausgewertet werden: Sprachinformationen (Stimme, Umgebungsgeräusche über das eingebaute Mikrofon), Kommunikationsverhalten (SMS, E-Mail), Bewegungsmuster (Beschleunigungssensoren) können z. B. die Stimmung detektieren. Außerdem ermöglichen Kontextinformationen wie Datum, Uhrzeit, Umgebungslärm, Standort (GPS-, WLAN-basiert), lokomotorische Aktivität (GPSbasiert, Beschleunigungssensoren) sowie Lichtstärke (Kamera) eine Analyse der Rahmenbedingungen des Nutzerverhaltens. Um die Fähigkeit des Smartphones zur psychologischen Messung von Verhalten zu überprüfen wurde eine Pilotstudie mit einer Multi-Sensor-Smartphone-App in einem alltäglichen Setting durchgeführt. Die Ergebnisse unterstreichen die Leistungsfähigkeit der mobilen Erfassung durch Smartphones. Die so ermöglichten Einblicke in das individuelle Erleben werden abschließend kritisch bezogen auf aktuelle Bedenken zur Privatsphäre und Nutzersicherheit diskutiert.

The likes of others: Brain correlates of socially influenced affective judgment

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Humans rarely make decisions in isolation, even when it comes to highly subjective affective judgments. We are constantly confronted with social affective cues, such as others' "likes" or average user ratings. Previous research has shown that our judgment can indeed be shaped by social and affective stimulation preceding our decisions. However, it is subject to debate which neural mechanisms mediate such adjustments of judgment. To address this issue, we investigated socially primed affective judgment while event-related brain potentials (ERPs) were recorded. Thirty participants rated abstract symbols after having seen the ostensible average rating of a mock group of previous participants. Real participants rated randomly drawn ideographs as significantly more favorable after high group ratings than after low ones. ERPs during the processing of the ideographs revealed that an early lateralized frontal as well as a later mediofrontal component were modulated by group rating. Previous research suggests that these effects might reflect affective responses and value-based decision making, respectively. Our results thus indicate that social affective cues, such as others' judgment, can modulate emotional and valuation-related selection processes. This corroborates recent neuroimaging findings suggesting that social influence directly affects the value we assign to an object.

Tracking memory processes during rule versus similarity-based decision making

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When making decisions such as accepting or rejecting a job candidate, it is frequently assumed that people either rely on a rule-based or on a similarity-based process. Studying differences between rule- and similarity-based decision processes, however, is difficult, because they differ in processes — such as information search in memory — that are notoriously difficult to access. Recently it was suggested that when retrieving information from memory people tend to fixate the blank location where this information appeared during encoding. We used this phenomenon to investigate the difference between rule and similarity-based decision processes in two experiments via eye-tracking. In both experiments, participants first learned cue information about job candidates (exemplars) and their suitability. In a subsequent test phase they decided about the suitability of new candidates that varied in their similarity to the previously learned exemplars. Results showed that when using similarity, but not when using a rule, participants fixated the previous location of exemplars that were similar to the new candidates longer than the location of dissimilar exemplars. This suggests that people using similarity retrieve previously learned exemplars whereas people using a rule do not.

Fahrer- und Blickverhalten bei fehlerhaften Richtungsanzeigen frühzeitiger Fahrerinformatoren über bevorstehende Verkehrskonflikte an Kreuzungen

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In Entwicklung befindliche, fortschrittliche Kollisionsschutzsysteme unterstützen den Fahrer in drohenden Verkehrskonflikten durch Ausgaben von Fahrerinformatoren oder -warnungen und, falls notwendig, Eingriffen in die Fahrzeugführung. Es konnte wiederholt ein positiver Effekt richtungsspezifischer Warn- und Informationssignale gegenüber unspezifischen Warnsignalen gezeigt werden (z.B. Naujoks, Grattenthaler & Neukum, 2013; Weller et al., 2013). Es ist jedoch denkbar, dass diese Richtungsanzeigen aufgrund funktionaler Unzulänglichkeiten in Einzelfällen fehlerbehaftet sind, und dem Fahrer die Richtung des drohenden Konflikts fehlerhaft angezeigt wird. In einer Fahrsimulatorstudie innerhalb des Forschungsprojekts Ko-PER mit $n = 81$ Probanden wurden die Effekte solcher fehlerhaften Richtungsanzeigen in verschiedenen Kreuzungskonfliktszenarien untersucht. Hierbei absolvierten die Probanden die Konfliktsituationen entweder (1) ohne Fahrerunterstützung, (2) mit unspezifischen Fahrerinformatoren über bevorstehende Konflikte oder (3) mit richtungsspezifischen Fahrerinformatoren. Im letzteren Fall wurde die Richtung des jeweiligen Konflikts in der Hälfte der Szenarien falsch angezeigt. Die Untersuchungsergebnisse zeigen, dass falsche Richtungsanzeigen keinen bedeutsamen negativen Einfluss auf das Fahrverhalten und die Kritikalität der Situationen haben, wohin gegen sich deutliche Einbußen in der Akzeptanz der Fahrerunterstützung durch das Auftreten falscher Richtungsanzeigen finden. Diese Studie wurde im Rahmen des vom Bundesministerium für Wirtschaft und Technologie geförderten Forschungsprojekts Ko-PER durchgeführt (Förderkennzeichen I9S9022B).

Does search determine choice? The impact of subtle information costs on cognitive processes.

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Investigations into the cognitive processes underlying decision making often assume a close link between properties of information acquisition and the resulting choices. Sometimes it is claimed that differences in information acquisition correspond with differences in the cognitive process. In a risky choice experiment using the process-tracing methodology MouselabWeb, we investigate to what extent subtle differences in acquisition mode impact patterns of information acquisition—and whether this impact is accompanied by changes in choice. Specifically, we manipulated whether people acquired a piece of information simply by moving a mouse over it (“mouse-over mode”) or whether they had to click on it (“click mode”). While the difference between these two modes seems minimal, we find considerable discrepancies in number, length and sequence of people’s acquisitions. Importantly, however, people’s risky choices, as characterized by cumulative prospect theory parameters, hardly differed between the two conditions. These results highlight a) that even minimal costs during information acquisition can lead to dramatic differences in search behavior; and b) that differences in measures of search are not necessarily indicative of differences in cognitive process.

Look at where I look - Perspective adoption in the noninformative gaze-cueing paradigm is not present for overt orienting

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"Gaze-cueing" describes the attention allocation in gaze-direction due to a depicted social cue. Recently, we showed that covert attention is not only drawn to the gazed side, but additionally to gazed-at objects, revealing that participants adopted the cue's perspective [Schulz, J., Velichkovsky, B. M., & Helmert, J. R. (in press). doi: 10.1080/13506285.2013.864739]. In the two experiments presented here, we looked for similar perspective-related cueing-effects for instructed versus voluntary overt orienting. A head was presented centrally in a 3D-scene, with two objects to its left and right, respectively, of which one changed its color during each trial. Before color-change, head gazed left or right randomly. Depending on head position gaze referred or referred not to single objects. Participants were instructed to initiate a saccade to the changed object (Experiment 1) or to press the appropriate button to indicate its location while inspecting the display freely (Experiment 2). In both experiments, we found reaction time advantages to the gazed side, but not to gazed-at objects. This is at odds with our previous results for covert orienting at the same task. Results are discussed with regards to the dissociation between gaze locus and attentional locus in covert orienting.

The assessment of hemispheric dominance for visuospatial attention: How robust are fMRI results in single subjects?

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Functional differences between the left and right hemisphere have been observed for most cognitive functions, the mechanisms underlying hemispheric specialization however are not fully understood. In the last decade, functional imaging techniques, in particular functional magnetic resonance imaging (fMRI) and functional transcranial Doppler ultrasonography (fTCD), have been intensively used to investigate the lateralization of brain function. In the present study, we aimed to implement a spatial memory paradigm to assess the lateralization of a typically right-lateralized brain function with fMRI not only at the group level, but also robustly in single subjects. We adapted a paradigm that has recently been reported to yield stable and reliable results using fTCD. 15 healthy right-handed subjects were investigated with fMRI. At the group level we found right-lateralized activation in frontal and lateral parietal areas, typical for visuospatial processing. However, regarding the individual results, the activation patterns vary greatly, including subjects with predominantly frontal or parietal activation also in the left hemisphere. Our study suggests that fTCD results must be interpreted with more caution if the activated network underlying the Doppler sonography results is highly variable between subjects with regard to the functional neuroanatomy.

Uncertainty effects in visual psychophysics

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Uncertainty effects refer to decreased sensitivity in detection experiments when the subject is uncertain about the physical properties of the stimulus (such as its size, position or spatial frequency). In particular, uncertainty about the spatial frequency of a sinusoidal grating is thought to cause a large drop in detectability (Davis & Graham, 1980). The uncertainty model of Pelli (1985) and a recent model by Goris, Putzeys, Wagemans, and Wichmann (2013) both account for this effect. However, the models make different predictions on the slope of the psychometric function. Pelli's model predicts a rise of the slope when the threshold rises, while the model of Goris et al. predicts a pure shift without any slope change. We measured psychometric functions for detection of sinusoidal gratings with spatial frequencies of 3, .75 and 12 cyc/deg, alone and intermixed under uncertainty. Surprisingly, we do not find a sizeable uncertainty effect in our data. We measured at least 13800 trials per subject. With the statistical power due to this large number of trials we can exclude effect sizes of the magnitude found in the literature. We discuss different explanations for this lack of effect in our data compared to previous studies.

Saccadic adaptation induced by a perceptual task

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The human motor system and muscles are subject to fluctuations in the short and long-term. Motor adaptation is classically thought of as a low-level process that compensates for the error between predicted and executed movements in order to maintain movement accuracy. Contrary to a low-level account, accurate movements might be only a means to support high-level behavioural and perceptual goals. To isolate the influence of high-level goals in adaptation of saccadic eye movements we manipulated perceptual task requirements in the absence of low-level errors. Observers had to discriminate one character within a peripheral array of characters. Between trials, the location of this character within the array was changed. This manipulation led to an immediate, strategic change and a slower, gradual adaptation of saccade amplitude and direction. These changes had a similar magnitude as classical saccade adaptation and transferred completely to reactive saccades without perceptual task. These results suggest that a perceptual task can modify oculomotor commands by generating a top-down error signal in saccade maps just like a bottom-up visual position error. Hence saccade adaptation not only maintains saccadic targeting accuracy, but also optimizes gaze behaviour for the behavioural goal, showing that perception shapes even low-level oculomotor mechanisms.

Sequential effects of posture selection in pointing and grasping

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In a sequential motor task, we tend to reuse previous movement plans and, thus, stick to previous postures. This sequential effect of posture selection has been demonstrated in a number of grasping studies. We asked whether similar sequential effects would occur for pointing movements, where hand orientation was less constrained. To this end, participants ($N = 30$, 11 male, 23.7 ± 3.3 years) had to (A) open and close a column of drawers in a sequential order, grasping each drawer on a cylindrical knob or (B) touch a target ball at the centre of each drawer knob with their index finger. The pro/supination of the hand was measured with an optical motion capture system. For pointing, participants used a more pronated posture than for grasping, $F(1,28) = 58.613$, $p < .001$. Posture also was more pronated in the descending sequences of trials than in the ascending sequences, indicating a sequential effect, $F(1,28) = 43.622$, $p < .001$. This sequential effect did not differ between pointing and grasping, $F(1,28) = 0.229$, $p = .636$. These findings imply that a sequential effect and, thus, the reuse of previous movement plans, is also present for pointing movements in a vertical pointing task.

Counter-regulation depends on Emotional Intensity - Illuminating the Determinants of Implicit Emotion Regulation

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Counter-regulation reflects an attention allocation to stimuli of opposite valence to current emotions and is assumed to be a dynamic process which does not occur per se but only if there is a need for regulation, that is, if one has not yet psychologically adapted to the emotional experience (Rothermund, Voss, & Wentura, 2008). To test this assumption valence biases in attention allocation were assessed after remembering positive or negative events that were either still emotionally hot or to which the person had already adapted psychologically. Differences regarding the current state of psychological adjustment were manipulated experimentally by instructing participants to recall distant vs. recent events (Exp. 1) or affectively hot events vs. events to which the person had accommodated already (Exp. 2). Valence biases in affective processing were measured with a valence search task. In line with the hypothesis emotional counter-regulation (i.e. affective incongruency effects) was elicited by remembering affectively hot events, whereas congruency effects (i.e. attention allocation to stimuli of the same valence as the emotional event) were obtained for events for which a final appraisal had already been established. Taken together, these results support the flexibility and adaptivity of attentional counter-regulation and implicit emotion regulatory processes.

The influence of target-distracter similarity on visual working-memory performance and the ability to filter out irrelevant information

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The capacity of visual working memory (WM) is limited and varies strongly across individuals. There is evidence that filtering efficiency, i.e., the ability to prevent irrelevant information from being stored in WM is a major factor behind this variation. Here, we examined the influence of target-distracter similarity on filtering efficiency. In a change-detection task, participants were asked to maintain squares and ignore rectangles. Side length of the rectangles was varied systematically, resulting in three different types of distracters. The results indicate that filtering is more demanding when targets and distracters are similar and therefore difficult to discriminate. Importantly, this effect was modulated by capacity – individuals with low WM capacity were more susceptible to distraction by items similar to the target than individuals with high WM capacity. These results support the relationship between filtering efficiency and working-memory capacity.

Pupillary responses to perceived facial attractiveness

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There is evidence that the perception of facial attractiveness interacts with the perception of eye contact (Kampe, Frith, Dolan, & Frith, 2001; Ewing, Rhodes, & Pellicano, 2010; Kloth, Altmann, & Schweinberger, 2011). Moreover, pupil size was reported to increase with perceived eye contact of a conversational partner (Honma, Tanaka, Osada, & Kuriyama, 2012). Here we investigated whether perceived attractiveness and eye contact elicit additive or interactive effects on pupil responses, which are generally assumed to be independent of conscious awareness (Laeng, Sirois, & Gredebäck, 2012). We selected 36 pre-rated attractive and unattractive faces (18 each, 9 female of each type, all equated for luminance) and manipulated the eye region to achieve an impression of eye contact or averted gaze. Faces were shown for 3000 ms in randomized order while 20 observers (10 female) judged attractiveness on a 4-point scale. Intriguingly, following an initial pupil constriction which depended on attractiveness overall, subsequent pupil dilations (1000–2000 ms) exhibited a significant interaction between observer gender, face gender and attractiveness. In particular, male observers showed greater dilations for attractive than unattractive female faces. Our results are a first demonstration that facial attractiveness affects the physiological response in the eye of the beholder.

What Don't You Think? An Examination of Mental Models in Causal Reasoning

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Few studies thus far have investigated causal relational reasoning with three-term series problems. Some reasoning conclusions, despite being true, are not drawn by participants. Building on the Mental Model Theory (MMT), we derived predictions from initial models (IMs) for each pair of relations from the set: causes, prevents, have a common cause, and are independent. An additional hypothesis about why specific conclusions that hold only in an alternative model are not drawn is that the generation of the alternative model requires too many transformation steps from the IM. These theoretical considerations were investigated in an online experiment in which participants had to assess the consistency of 64 three-term series problems for the four relations described above. Answer-frequency results confirmed 11 of the 15 testable, hypothesized IMs. The proposed difficulty measure correlated highly with the empirically found results.

Effects of action goal perturbation on bimanual grasp posture planning

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This study examined the effects of perturbations in action goal on bimanual grasp posture planning. Sixteen participants simultaneously grasped two horizontally oriented cylinders and placed either the left or the right end of the cylinders into corresponding targets. As soon as participants initiated their reach-to-grasp movements, a secondary stimulus was triggered, which indicated whether there was a perturbation in action goal for the left or the right object. In general, the tendency for a single hand to select end-state comfort compliant grasp postures was higher during nonperturbed compared to both perturbed left and perturbed right trials. In addition, participants were more likely to plan their movements to ensure end-state comfort for both hands during nonperturbed trials than perturbed trials, especially during object end-orientation conditions that required the adoption of at least one underhand grasp to satisfy bimanual end-state comfort. The Results indicate that participants attempt to reduce the cognitive cost associated with grasp posture replanning by maintaining the original motor plan, and tolerating less controllable final postures.

Why does temporal preparation increase response conflict? Evidence from an event-related potential (ERP) study

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It is well-known that temporal preparation for an impending target allows for faster responding. Recent studies, however, show that this response benefit is paralleled by increased response conflict if the target is surrounded by response-incompatible flankers. Based on the framework of dual-route models, this increase in conflict has been attributed to a facilitation of automatic response activation. To further examine this idea, we conducted an ERP flanker experiment in which we measured the effect of temporal preparation on the positive dip of the LRP, indexing automatic response activation, and the N200, indexing cognitive control. In each trial, participants had to respond to an arrowhead target pointing either to the left or right. This target was preceded by flankers that were response-compatible, incompatible, or neutral. Temporal preparation was manipulated via constant foreperiods. In line with an influence on automatic response activation, temporal preparation led to an earlier and slightly more pronounced positive LRP dip. Interestingly, temporal preparation also led to a more pronounced N200. We suggest that temporal preparation effects on response conflict involve two mechanisms: facilitation of automatic response activation and a compensatory increase in cognitive control to overcome activation of the false response hand.

Reaching while in motion: trajectories depend on the spatial reference frame of the target

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We frequently reach for objects while our body is in motion. However, little is known about the involved control mechanisms and how they differ in relation to the reference frame of the target. We studied reaching movements during whole-body accelerations, to either body-stationary or world-stationary targets, but imposing the same initial and final configuration of the arm. Based on energetic criteria, reach movements should converge to the same trajectories for targets presented in either reference frame. Our results indicate that reaches to a body-stationary target are more curved than to a world-stationary target. We conclude that the solution to the control problem depends on the reference frame in which reach targets are presented, indicating that minimization of energy alone is insufficient to explain the results. Our results suggest that the coordination mechanism takes into account the time varying location of the target and not its final location.

The Impact of Happy and Sad Emotions on the Status Quo Bias

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Incidental emotions can change the way how people respond to the nudge of default option. We conducted an experiment to disentangle two leading theories that can explain influence of mood: The “affect-as-information” theory and the “mood-maintenance” theory. If choice of the default option maintains the status quo, both theories give the same predictions that positive mood would lead to higher likelihood of choosing default option. However, if choosing the default results in a change of the status quo, “affect-as-information” predicts that decision makers in a positive mood will rely more on the default, whereas “mood-maintenance” predicts that decision makers in a positive mood will rely less on the default. To test these predictions, we investigated in an online study how happiness and sadness influenced reliance on both types of defaults. The results suggest that the effect of participants’ mood depended on the type of default. In line with mood-maintenance theory, when defaults introduced a change, participants were more likely to follow it when in a sad mood than when in a happy mood. The implications for the design of default policies in marketing are discussed.

The Detection of the Objects in Patients with Schizophrenia treated with the Atypical and Typical Drugs

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1. It is known that disorder of the perceptual and integrative processes in patients with schizophrenia are connected with the change of perception of the space-time characteristics of visual stimulus. Parvocellular and magnocellular visual channels provide primary filtration of visual information. The incentive of this research are contradictory facts concerning contrast sensitivity in schizophrenia. The goal of the research is to determine contrast-frequency sensitivity of the visual system in schizophrenic patients with different durations of disease and the treatment of atypical and typical antipsychotics. 2. Contrast sensitivity was recorded using Gabor elements which were looked like gratings with sinusoidal distribution of brightness, spatial frequency: 0.4 cycles/degree, 3.6 and 17.9 cycles/degree. 3. Results: in general patients with schizophrenia compared to the norm showed a decline of contrast sensitivity at low and medium spatial frequencies. Patients with schizophrenia less than 10 years showed a decrease of contrast sensitivity only at low spatial frequencies, while patients with schizophrenia more than 10 years – at low, medium and high spatial frequencies. Patients with schizophrenia less than 10 years receiving treatment of atypical antipsychotics showed a decrease in contrast sensitivity at low spatial frequencies and treated by typical antipsychotics – in low and high spatial frequencies.

Comparing Models of Probabilistic Conditional Reasoning: Evidence for an Influence of Logical Form

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According to probabilistic or Bayesian models, responses in reasoning problems should reflect the probability of the conclusion given the information in the premises based on participants' content-specific background knowledge. Oaksford, Chater, and Larkin (2000) proposed a model of conditional reasoning according to which responses correspond to the conditional probabilities of the conclusions given minor premise. In contrast, Klauer, Beller and Hütter's (2010) dual-source model proposed that, in addition to their content-specific background knowledge, participants utilize information based on the form of the argument, conceptualized as the subjective probability with which a certain reasoning form is valid. We fitted four models to six data sets: the dual-source model, the original model by Oaksford et al. (2000), an extension of that model, and a fourth model that conceptualizes reasoning as purely based on background knowledge, but in a different way (by minimizing the Kullback-Leibler difference between prior and posterior probability distribution; Hartmann & Rafiee-Rad, 2012). Relative to its competitors, the dual-source model had fewer or at most the same number of free parameters, yet it provided the best fits to the data. This finding supports the idea that humans integrate different types of information when reasoning.

Situated Decision-Making in a Virtual Reality Environment: Affective, Social, and Moral Aspects of Dilemmas

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The role of cognition has been emphasized in traditional theories of moral decision-making. A recent trend is to focus on the interplay of automatic and controlled processes using dual-process theories. In this study, we investigate the cognitive and affective underpinnings of decisions in dilemma situations and evaluate whether dual-process theories can account for our findings. We employ a virtual reality version of the classical trolley dilemma in which decisions regarding the sacrificing of virtual persons have to be made. Participants were seated in the cockpit of a controllable virtual trolley. Their task was to steer the trolley either to the left or right track at junctions. However, virtual persons that differed in specific properties such as gender or number stood on the tracks. Our study confirmed that decisions can be explained within the framework of dual-process theories. We found a tendency towards sacrificing male individuals. This tendency was particularly strong for male participants and was associated with socially desirable responding. Pupillometric measurements during the experiment revealed a time-locked peak in pupil dilation occurring at the moment of decision. In the gender condition, the tendency towards looking at the victim before the decision was highest among all conditions.

Das Steady-state visuell evozierte Potenzial (SSVEP) im human Elektroenzephalogramm: Aktivität aus weit verteilten kortikalen Objektrepräsentationen

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Untersuchungsgegenstand der vorliegenden Elektroenzephalogramm-Studie war die Genese des Steady-state visuell evozierten Potenzials (SSVEP). Beim SSVEP handelt es sich um die oszillatorische Antwort des Cortex auf einen flickernden Stimulus, die dieselbe zeitliche Frequenz wie der initiiierende Stimulus aufweist und somit ein kontinuierliches Maß der Aktivierungsmuster darstellt, die mit diesem Stimulus assoziiert sind. Ziel der Studie war es, weitere Evidenz für die These zu finden, dass das SSVEP durch die Aktivität des gesamten Netzwerkes generiert wird, das einen Stimulus kortikal repräsentiert. Dazu wurden den 25 Versuchspersonen unter Verwendung eines Repetition Priming-Designs Bilder von realen Objekten je nach Versuchsbedingung wiederholt mit konstant bleibender Frequenz oder mit einem Frequenzwechsel von der ersten zur zweiten Präsentation präsentiert. Sowohl nach konstant bleibender Frequenz als auch nach Frequenzwechsel zeigten sich signifikant geringere SSVEP-Amplituden für die Wiederholung der Stimuli relativ zu ihrer ersten Präsentation (Repetition Suppression), wobei sich die Stärke des Repetition Suppression-Effektes nach Frequenzwechsel nicht signifikant von der nach gleichbleibender Frequenz unterschied. Da eine Schärfung des Netzwerkes, das einen Stimulus repräsentiert, als Grundlage des Repetition Suppression-Effektes vermutet wird, liefern diese Befunde weitere Evidenz für die These, dass weit verteilte Netzwerke für die Genese des SSVEP verantwortlich sind.

Development and evaluation of an experimental cue-reactivity paradigm for pathological Internetsex use

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Background: Until now, there is no consensus regarding phenomenology, classification and diagnostic criteria of Internet addiction (IA). Some approaches argue to model IA in analogy to substance dependence, for which associative learning and cue-reactivity are basic pathomechanisms of development and maintenance. Additionally, some researchers distinguish between general and specific IA, whereas pathological Internetsex use is referred to as a specific IA. Methods: In two studies (n=56, n=17) a Standard Pavlovian Instrumental Transfer Task (S-PIT) was modified to investigate associative learning processes regarding pornographic stimuli. Due to consistent pairing of neutral stimuli with either pornographic or neutral pictures (within factor), the observation of cue-reactivity was assessed during an evaluation phase. Results: The results show that the pornographic-associated stimulus was rated significantly more pleasant and sexual arousing than the neutral-associated stimulus. Further, this finding was supported by observed skin-conductance responses in the second study. Discussion: The results suggest an instrumental transfer of arousal for the pornographic, but not for the neutral stimuli. These findings indicate that associative learning and cue-reactivity might be crucial for the development and maintenance of pathological Internetsex use. Moreover, the results need to be discussed with their relevance for analogies between IA and substance dependencies.

Toolbox versus adjustable spanner: Which metaphor describes information search behavior best?

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When decision makers are confronted with different problems and situations, they adapt their behavior to these changes. Multi-Strategy-Models (MSMs) assume that decision makers choose adaptively from a set of different strategies (toolbox metaphor), whereas Evidence-Accumulation-Models (EAMs) hold that the same uniform mechanism is employed, but adapted to the environmental change (adjustable spanner metaphor). Both metaphors for multi-attribute inference tasks make distinct predictions concerning the information search (and stop) behavior - namely, that it either confirms to the selected strategy (MSMs) or that information is searched until an evidence threshold is passed (EAMs). In two experiments, we contrasted these predictions by providing participants with different degrees of evidence in a half-open-half-closed information board. For the majority of participants we find that their information search behavior is well captured by the notion of an evidence threshold that is either undercut or passed by the given evidence.

Gaining voluntary control of smooth pursuit eye movements

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Smooth pursuit eye movements depend strongly on the presence of a moving target or its anticipation when the trajectory and timing is known beforehand. Attempts to investigate the voluntary execution of smooth pursuit eye movements have either involved exceptional subjects or symbolic cues predictive of target movement onset and direction. I will present data indicating that we can elicit voluntarily slow eye movements in a population of un-screened, naïve observers, by using a gaze-contingent learning paradigm, in which left or right target motion is contingent upon the detection of a slow eye movement in the corresponding direction. This new paradigm can be used to understand the interplay of bottom-up and top-down signals in triggering slow eye movements, in a way that is reminiscent of the antisaccade task.

The Capacity and Precision of Emotional Representations

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Research has demonstrated that emotional stimuli are prioritized in attention and memory. However, it is unknown whether this advantage is accompanied by a decrease in the precision with which emotional stimuli are stored. In particular, if this would be the case, usual capacity limits may be exceedable when processing emotional stimuli because research has shown that precision reductions increases capacity. To examine these issues, we performed two experiments. In Experiment 1, subjects were presented with mixed arrays of emotional and neutral stimuli and both the number and precision of stored representations was measured. We found that emotional stimuli were stored with higher probability but lower precision than neutral stimuli. In Experiment 2, subjects performed the same task with purely emotional or neutral stimulus arrays. We found that emotional significance did not further increase the number of stored representations beyond the capacity limit of visual working memory. Our results replicate that emotional items receive prioritized processing. However, this prioritizing is accompanied by a decrease in precision, an effect possibly mediated by subcortical amygdala pathways. Intriguingly, even when stimuli are processed with high priority and low precision via subcortical pathways, the capacity limits of visual working memory seem not be exceedable.

Abstandsverhalten und Time-on-Task Effekt. Was passiert beim manuellen Folgefahren? Eine Simulatorstudie

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Die vorliegende Studie untersucht monotonen manuelles Folgefahren und erfasst dabei Veränderungen in der Fahrperformanz des Folgefahrenden. Nutzen der Studie ist vor allem, einen Vergleichswert für langfristige Technologie-Strategien in der Automobilindustrie wie etwa dem automatisierten Fahren zu schaffen. Bisherige Forschungsergebnisse zum automatisierten Fahren zeigen bereits signifikant negative Auswirkungen auf beispielsweise das Abstandsverhalten (vgl. z.B. Skottke et al., 2006; Rudin-Brown et al., 2004). Aus den vorliegenden Ergebnissen wird eine Kontrollgruppe zu den negativen Befunden aus diesen Studien generiert. Im Fahrsimulator wurden die Zeitlücke (THW) und SDLP systematisch über eine Strecke von 70 km beobachtet. Beim manuellen Folgefahren zeigten sich signifikante systematische Vergrößerungen der Zeitlücke und der SDLP über die Zeit. Dies sollte bei der Implementierung von autonomem Fahren berücksichtigt werden, um den Übergang von einer Assistenz zum selbstständigen Fahren so sicher wie möglich zu gestalten.

Visual perception of shape from a generative model perspective

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We can usually tell if a tin can has been crushed or if the material of a statue eroded. In other words, we readily make judgments about generative processes or transformations applied to objects. At the same time, we can identify objects across different transformations. This suggests that the visual system is able to decompose the representation of an object into its original shape and a transformation subsequently applied to it. However, very little is known about the extent the visual system extracts information about transformations applied to shapes. Experiment 1 investigated whether subjects can detect ‘bending’ transformations across parametrically generated random 3D shapes. Subjects adjusted the degree of bend of one shape until it appeared as bent as a standard object. In Experiment 2 subjects had to identify objects across different transformation. They saw a bent shape and had to pick the corresponding ‘untransformed’ version from a bigger set of ‘untransformed’ objects. The results show that subjects can extract information about transformations applied to shapes. This provides some of the first evidence for scission of a shape’s representation into its underlying causes – an original shape and the transformation applied to it.

Evaluative conditioning requires clearly supraliminal presentation of CSs

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Theories of evaluative learning hold that we acquire preferences via different learning mechanisms, one of them being evaluative conditioning (EC). EC occurs when an initially neutral stimulus (CS) is evaluated more positively (negatively) after being paired with positive (negative) stimuli (USs). EC is of theoretical importance because it is often considered to be distinct from other learning mechanisms in dual-process models of learning or attitude formation. Specifically, it is predicted that EC can occur without awareness of the stimuli and/or their pairing. To investigate this hypothesis, we studied EC under conditions of focused attention but reduced awareness (i.e., very brief CS presentations). This approach of controlling attention and manipulating stimulus strength aligns with theories of consciousness that hold attention and stimulus strength as determinants of consciousness (Dehaene, Changeux, Naccache, Sackur, & Sergent, 2006, Koch & Tsuchiya, 2007). We present a series of studies in which we varied presentation conditions, orienting tasks, and CS stimuli (pseudowords, faces, pictures of products). Despite above-chance visibility, an EC effect was absent for briefly presented CSs, suggesting that EC is not, in general, independent from awareness of CSs.

Sequential Diagnostic Reasoning with Numerical Frequencies

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In many everyday situations people seek to determine the most likely cause for a number of observed effects. If the possible causes are known, such reasoning leads to the selection of one among several diagnostic hypotheses. In the reported experiment we used quasi-medical problems consisting of four sequentially presented symptoms with four candidate diagnostic hypotheses. The symptoms were described as caused by chemicals that affected workers in a fictional chemical plant. In the learning phase participants studied the four chemicals and the symptoms that each could cause with specific probabilities. Differing from other studies, we used visualized numerical instead of verbal frequencies. Thirty-eight participants were tested in a within-subjects design with nine symptom sequences. We used ambiguous sequences that could be equally caused by two chemicals to investigate possible order effects and explicitly highlighted alternative hypotheses by using a stepwise rating procedure that also enabled us to compare participants' ratings with belief updating in a Bayes net. Even though explicit highlighting should reduce framing by early symptoms, participants were biased towards the initial hypothesis although an alternative hypothesis was equally supported. Despite this primacy order effect, participants' average belief ratings were remarkably similar to the normative Bayesian probabilities.

Magnitude of motivation can be influenced by subliminal priming

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Word primes have been successfully used in the past to facilitate the processing of other words, but also to modify mental states such as emotion, cognition and motivation. Such studies documented that the direction of the motivational drive can be successfully changed. However, until now it has not been documented whether the motivation magnitude can be influenced as well. To find out, we asked 26 subjects to point at subliminally presented (30ms) words that were either associated with low motivation (13 subjects) or high motivation (13 subjects). Afterwards, subjects completed a questionnaire that asked for the actual motivation for solving a riddle task. No effect of priming was observed for typical pointing parameters such as reaction time, which indicated that the motor task was not influenced by motivation. However, an effect emerged for the subsequent self-assessed motivation level. The subject group primed with high-motivation words rated their motivation higher than the group primed with low-motivation words. The results indicate that not only the direction, but also the level of motivation can be manipulated subliminally.

Fit Performance and Simulation Performance of Reinforcement-Learning Models for the Iowa Gambling Task

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Decision-making deficits in clinical populations are often studied using the Iowa gambling task (IGT). Performance on the IGT can be decomposed in its constituent psychological processes by means of cognitive modeling analyses. However, conclusions about the hypothesized psychological processes are valid only if the model provides an adequate account of the data. In this presentation I compare absolute model performance of the Expectancy Valence (EV) model, the Prospect Valence Learning (PVL) model, and a hybrid version of both models –the PVL-Delta model– using two different methods. These methods assess (1) whether a model provides an acceptable fit to an observed choice pattern, and (2) whether the parameters obtained from model fitting can be used to generate the observed choice pattern. Our results show that all models provided an acceptable fit to two data sets; however, when the model parameters were used to generate choices, only the PVL-Delta model captured the qualitative patterns in the data. Our results highlight that a model's ability to fit a particular choice pattern does not guarantee that the model can also generate that same choice pattern.

Perceptually-Inspired User Interfaces for Natural Interaction in Virtual Environment

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Virtual reality provides computer simulations, where people can interact without having to consider limitations of the real world. Applications for these technologies are traditionally found in the areas of simulation, training, rehabilitation and research. Since the commercial distribution of stereoscopic 3D movies and the latest interactive devices such as the Nintendo Wii, the EyeToy from Logitech or Microsoft Kinect virtual worlds gained enormous significance in the field of entertainment and edutainment. However, in order to handle the complexity of novel technology a new paradigm shift in human-computer interaction is required: from graphical user interfaces to natural user interfaces. We will present some perceptually-inspired user interface concepts, which make use of the perceptual limitations of humans in order to improve the naturalness of interaction in virtual environments. In particular, we will consider the most natural way of moving through the world, i.e., real walking. Since the physical lab space is usually small, a straightforward implementation is often not possible. In a series of psychophysical experiments we have identified detection thresholds, which provide information about how much humans can be guided on physical paths, which may vary from the paths they actually perceive in the virtual environment.

Syllogistic Reasoning with Generalized and Non-Monotonic Quantifiers: A Theory of Minimal Models

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Only few psychological theories of syllogistic reasoning provide predictions for generalized quantifiers (e.g., most) and theories for reasoning with non-monotonic quantifiers such as normally are non-existent. We propose a theory of minimal mental models for such quantifiers which we compared to predictions derived from matching theory in two online experiments. In the first experiment participants performed a production task to generate responses to syllogisms with the quantifiers all, some, most, and normally. In the second experiment we additionally asked participants to assess the relationship between quantifiers. The results indicated that with few exceptions minimal models could predict participants' modal responses. A moderate correlation between the number of steps necessary to obtain the initial model and the frequency of the respective models was found. The results of the second experiment indicated, as expected, that the quantifiers normally and most are interpreted differently.

Schlau durch Blau, ruhig durch Pink? Haben Farben einen Einfluss auf die kognitive Leistungsfähigkeit und Emotionen?

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Der Farbe Pink werden starke und spezifische Effekte auf die Emotion zugeschrieben. In den letzten Jahren wurden etwa vermehrt Gefängniszellen in Pink gestrichen, da diese angeblich die Zelleninsassen beruhigen. In unserer Studie haben wir den Einfluss der Umgebungsfarbe Pink auf emotionale Parameter im Vergleich zu den Farben Blau, Rot und Weiß untersucht. Zusätzlich wurde der Effekt der Umgebungsfarbe auf die Leistung in kognitiven Tests gemessen, da aktuelle Studien zum Beispiel negative Effekte der Farbe Rot auf die Testleistung berichteten. Während des Experiments saßen die Probanden (N = 173) in Farbkabinen, die in den Farben Pink, Rot, Blau sowie Weiß als Kontrollbedingung gestrichen wurden, und bearbeiteten kognitive Leistungstests (Zahlenreihen fortsetzen, mentale Rotation, verbale und visuelle Gedächtnistests). Bevor die Versuchspersonen in der Farbkabine Platz nahmen sowie nach der Bearbeitung der Tests wurde der aktuelle emotionale Zustand mittels der SAM-Ratingskalen für Valenz, Arousal und Dominanz erfasst. Die Umgebungsfarbe hatte keinen signifikanten Einfluss auf die Emotionsratings. Multivariat zeigte sich ein marginal signifikanter Effekt auf die kognitiven Tests. Die Effektstärke war jedoch sehr gering ($\eta^2 p = .041$). Deskriptiv zeigte sich je nach Test ein unterschiedlicher Zusammenhang zur Umgebungsfarbe.

Modality matters: Evidence for modality-specific crosstalk in task switching

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In a series of experiments we examined modality-specific influences in task switching. To this end, participants switched either between two modality compatible tasks (auditory-vocal and visual-manual) or two incompatible tasks (auditory-manual and visual-vocal). Switch costs were increased when switching between modality incompatible tasks compared to when switching between modality compatible tasks. To account for this influence, we suggest an explanation in terms of ideomotor “backward” linkages between anticipated response effects and the stimuli that called for this response in the first place. According to this generalized ideomotor idea, the modality match between response effects and stimuli would prime selection of a response in the compatible modality. Therefore performance would be facilitated when switching between modality compatible tasks, whereas between task crosstalk would hinder performance when switching between modality incompatible tasks. This modality-specific crosstalk in task switching is also discussed with regard to other modalities.

Fronto-temporal dissociations in verbal fluency in aphasic patients and healthy controls

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In verbal fluency, a widely used test of executive functions mediated by left frontal brain areas, participants are asked to generate as many words as possible from a letter (letter fluency) or a category (semantic fluency). Responses are analyzed with respect to the number of responses, the number of switches from one subcategory to another and the size of the clusters produced within subcategories. While some researchers have argued that there is a frontal-temporal dissociation between switching (frontal) and clustering (temporal) across fluency tasks, others have argued that the frontal-temporal dissociation pertains to phonological (frontal) vs. semantic (temporal) fluency. We tested 9 patients with aphasia following CVA and 9 healthy controls in fluency tasks, naming tasks, and tasks tapping executive functions. Correlation analyses demonstrated that phonological fluency was more strongly correlated with executive functions than semantic fluency in controls and that switching was more reliant on executive functions than clustering in aphasic patients, indicating that both views discussed in the literature are partly correct. We discuss these findings in light of the role of linguistic planning processes involved in generating and encoding a response in fluency tasks.

Cognitive Functions and Strategy Use in Decisions under Risk assessed by a Dice Task

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In decisions under objective risk conditions, explicit information about potential positive and negative outcomes and their probabilities is available. In paradigms measuring these decisions—as the Game of Dice Task, GDT—healthy participants often apply calculative or intuitive strategies leading to different outcomes (Brand et al., 2008). Furthermore, participant's strategy use was reported to moderate the benefit of outcome feedback in the GDT (Brand et al., 2009). However, little is known about the details of applied strategies and the role of cognitive functions for strategy choice. We investigated 142 healthy participants and analyzed their strategy use in more detail. Three strategies could be identified, which are well-known from literature (West & Stanovich, 2003). The strategies come close to “intuition”, “probability-matching”, and “utility-maximization”. Results confirm past studies' conclusions that persons with calculative strategies (i.e. probability-matching and utility-maximization) perform better in the GDT, $F(2,139)=45.22$; $p<.001$, also if feedback is removed, $F(2,68)=35.28$; $p<.001$. In terms of cognitive functions, we found that less optimal strategies (i.e. intuition and probability-matching) were accompanied by weaker logical thinking, working memory, and executive functions, $F(2,139)\geq 3.04$; $p\leq .04$. Hence, under explicit risk conditions, more calculative strategies are superior to less calculative strategies and accompanied by better cognitive skills.

Superior temporal sulcus connectivity and the integration of speech and gesture

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The left superior temporal sulcus (STS) plays an important role in integrating audiovisual information and is functionally connected to disparate regions of the brain. With this study we tested the hypothesis that the functional connectivity of the left STS is dependent on modality (speech vs. gesture) and abstractness of speech-gesture utterances (IC vs. MP). During fMRI-data acquisition, 16 participants were shown videos of an actor performing gestures in a concrete (iconic gestures, IC) and abstract (metaphoric gestures, MP) sentence context. Additionally unimodal speech (S) and gesture (G) conditions were presented. A psycho-physiological interaction (PPI) analysis based on the seed region from a previous analysis in the left STS was performed (see Straube, et al., 2013; Human Brain Mapping). Modality specific STS connectivity were found for speech processing ($S>G$) in language related areas and gesture processing ($G>S$) in occipital areas. For $MP>IC$ we obtained increased connectivity in predominantly lateral and medial frontal brain regions. Finally reduced connectivity for iconic coverbal gestures in contrast to both unimodal conditions ($IC<S \cap IC<G$) were found in bilateral and medial frontal brain regions. These data support the assumption that the STS is especially relevant for the semantic processing of speech and gesture information.

Tell me where to go – The influence of structural salience on route descriptions

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Even though research about semantically or visually salient landmarks exists, structural salience and its effect on the verbalization of a route is still a fairly unexplored topic in spatial cognition. In our study participants (N=6) learned a path visualized by screenshots of intersections with landmarks (differently colored objects) on every corner. Subsequently, they had to write a route description, either following a strict (specify one landmark per intersection) or a loose (free of limitation) instruction. Do people have a preference for a specific object location being used for route directions? The descriptive data revealed that participants try to specify single landmarks on every intersection even when the instruction does not require it. The specified landmarks were located in direction of turn (before or after the turn) in 96% of all cases. We assume that the overall structure of an intersection, in particular the position of a landmark relative to the direction of turn, affects the formation of a spatial representation and later on the implementation within the route description. Further data will be provided to discuss our findings with theoretical assumptions on the importance of mental transformation and language (Hamburger et al., 2013).

Working-memory training in younger and older adults: Training and transfer effects on executive control

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Numerous studies illustrated the decline of executive control with cognitive aging. However, open issues in the aging literature are whether (1) aging cognitive systems are plastic and training can compensate such decline, (2) training of an executive control aspect transfers to other aspects. Therefore, the present study investigates whether it is possible to improve working-memory (WM) updating skills with training in form of a complex visual-auditory WM task in older adults (mean age = 66.5 years) in contrast to younger adults (mean age = 24.4 years). Further, it tests whether this potential improvement transfers to untrained WM tasks, as well as situations of the task switching, dual-task, and attentional-blink type. Our results demonstrated that WM updating training improved performance in the trained task in older as well as younger adults (however, with an increased training benefit in younger adults). In addition, there were transfer effects to a visual version of an untrained WM task in both age groups, while transfers to aspects of task maintenance in the task switching as well as attention switch in the attentional blink situations were exclusive for the latter age group. We discuss these findings in the context of aging and executive control literature.

I Feel so Blue - A framework for Smart Phone based Depression Monitoring Applying only In-Built Smart Phone Sensors

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Monitoring depression unobtrusively within daily life activity still remains an unsolved task. The proposed framework aims at designing and developing an advanced system for analysis, detection and estimation of users' cognitive, affective, motivational, energetic, and behavioral states associated with depression by processing information extracted from Smartphones equipped with multiple sensor modalities. The ultimate goal of the framework is to detect and capture the most important symptoms of the Major Depressive Disorder (MDD) without interrupting or influencing any of the user's daily activities. Such symptoms include negative mood, sadness, loss of self esteem, hopelessness, pessimism, fatigue, loss of energy, loss of interest and joy in (social) activities, gaining or losing weight, psychomotor unrest or slowing, and reduced sleep quality. Using innovative pattern recognition techniques to be implemented on a Smartphone, the Smartphone system will be able to automatically provide an initial behavioral assessment directly on the device. Preliminary data is presented to provide proof-of-concept evidence.

Do I need to have my hands free to understand hand-related language?

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Over the past years, several studies have provided evidence that participants mentally simulate the described situations or events during language comprehension. However, it is still unclear whether these simulations are functionally relevant for comprehension. In this study, we investigated whether a secondary task occupying the manual system, and thereby impeding hand-related simulations, would have differential effects on the processing of hand- and foot-related nouns. Participants were responding to the colour of the presented nouns by pressing a key or pedal with the left hand or foot, respectively. Responses were withheld to pronounceable pseudo words. In one half of the experiment, participants simultaneously performed a tapping task with their right hand. As expected, foot responses were faster to foot- than to hand-related words and hand responses were faster to hand- than to foot-related words. More importantly, although the manual tapping task slowed down response times to both types of words, its influence was stronger on hand- than foot-related words. These results indicate that simulations are not just a by-product of language processing but rather seem to play a functional role in the comprehension process.

In Vino Veritas? - Alcohol, Response Inhibition and Lying

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Although highly relevant from an applied perspective, very little is known about the relation between alcohol and deception. Given that alcohol intoxication impairs response inhibition, and that response inhibition is reasoned to be critically involved in deception, we hypothesized that acute alcohol intoxication would hamper lying. In order to test this idea, 104 volunteers performed a Stop-Signal Task and a Sheffield Lie Test during a science festival, where participants also had the opportunity to drink alcoholic beverages. Stop-Signal Reaction Times (SSRTs) were taken as response inhibition indicators from the Stop-Signal Task. Differences in error rates and RTs between lying and truth (lie-effect) telling were taken as indicators of the cognitive costs of lying from the Sheffield Lie Test. Breath analysis revealed that participants blood alcohol concentration (BAC) varied between 0.0 and 1.52 ‰. Results indicated a correlation between BAC and SSRTs, with higher intoxication levels being related to impairments in response inhibition performance. BAC was not related to the lie-effect. Implications of the findings with regard to the relation of alcohol intoxication and deception as well as the general role of response inhibition in deception are discussed, with simultaneous consideration of our specific design and sample characteristics.

Grasping does not obey Weber's law – even if perceptual processes are involved

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The Perception-Action Model (PAM) postulates qualitatively different visual processing for perception versus action. According to Weber's law, the just-noticeable difference between two stimuli increases linearly with stimulus magnitude. Therefore, one might expect that the standard deviation (SD) of a response might also scale linearly with stimulus magnitude. Manual size estimation (a perceptual task in the PAM) indeed shows this relationship. However, the SD of natural grasping (a motor task in the PAM) is unaffected by stimulus size. This surprising finding that a motor task does not obey Weber's law was taken as strong evidence for qualitatively different visual processing for perception versus action and for the PAM (Ganel, Chajut, & Algom, 2008). We tested this interpretation by creating grasp targets that force an involvement of perceptual processes. Parts of the stimuli were covered such that participants (N=20) had to perceptually complete the stimuli. Nevertheless, we still did not find Weber's law in grasping, suggesting that it is not a dichotomy between perception and action, but other processes that are responsible for the apparent absence of Weber's law in grasping.

Personality and decision-making: temperament and character personality profile in relation to the discounting process

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Brief overview of three types of discounting, including temporal discounting, social discounting and effort discounting, will be presented. Generally speaking, discounting refers to a decrease in the subjective value of a reward (or loss) as its delay increases, size of a group the reward is shared with increases, and an effort required to obtain the reward increases. The aim of the present research was to investigate the relationship between Cloninger's personality dimensions of temperament and character (harm avoidance, novelty seeking, reward dependence, persistence, and cooperativeness) with the rates of discounting. In order to evaluate temporal, social and effort discounting rates participants were required to make a series of choices regarding hypothetical amounts of money. Cloninger's personality dimensions were assessed with the Temperament and Character Inventory (Cloninger et al., 1993). The analysis showed differences in effort discounting rate in reference to harm avoidance, reward dependence and persistence dimensions. Quite unexpectedly, the rate at which delayed losses were discounted was related to cooperativeness. The rate of discounting of delayed rewards and social discounting did not differ between individuals with different personality profiles.

How to trust a perfect stranger: Predicting initial trust behavior from resting-state brain-electrical connectivity

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Reciprocal exchanges can be understood as the updating of an initial belief about a partner. This initial level of trust is essential when it comes to establishing cooperation with an unknown partner as cooperation cannot arise without a minimum of trust, which is not justified by previous successful exchanges with this partner. Against this background, we demonstrate the existence of a representation of the initial trust level independent of the exchange and the partner. Specifically, we are able to predict the Investor's initial investment – i.e. his initial level of trust toward the unknown trustee in round 1 of a standard ten-round Trust Game – from resting-state functional connectivity acquired several minutes before the start of the Trust Game. In contrast, resting-state functional connectivity is not significantly associated with the level of trust in later rounds mirroring the updating of the initial belief about the partner in accordance with his behaviour. Our results shed light on the question of how the initial level of trust is formed and represented. In particular, we show that a person's initial level of trust can, at least in part, be determined from brain electrical activity acquired well before the beginning of an exchange.

Retrieval-induced forgetting in procedural memory

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Repeating the same sequence of body movements by and by makes its execution smooth and quick. Yet, relatively little is known about the representation of body movements in memory. Whereas it is assumed that the procedural memory system contains motor programs representing body movements, the processes operating within this system have not been investigated much. We examined the organized storage of motor sequences in procedural memory by assuming that processes related to interference at retrieval are indicative of memory organization (cf. Tempel & Frings, 2013). Effects resulting from these processes, thus, would allow inferences on how motor sequences are represented and organized. Participants learned sequences that were categorized by the direction of their initial movement. The subsequent selective retrieval of a subset of items of one category resulted in retrieval-induced forgetting (RIF) for the non-retrieved rest of items of the same category. RIF occurred in an explicit recall test (Experiment 1), as well in an implicit test assessing memory with novel cues (Experiment 2). Thus, in accord with an inhibitory account, RIF was cue-independent. The results suggest that inhibition affected motor programs. Basic retrieval dynamics apparently operate within the declarative and procedural systems in a similar way.

Visible persistence of transient shapes suggests amodal filling-in

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Visible persistence (VP) is defined as the prolonged percept of a visual stimulation after the termination of the stimulus itself. We created so-called transient shapes that only consist of one single transient second-order luminance signal. Previous experiments suggested that VP is at least partly determined by a filling-in mechanism in which filling-in distance and amount of contour information are crucial variables. The filling-in hypothesis was tested in two experiments. In Experiment 1 we presented flickering annuli for different duration before the transient shapes to weaken contour processing. We showed that contour adaptation shortens VP duration of transient discs, suggesting that contours are crucial for VP. In Experiment 2 we applied a masking paradigm known from brightness filling-in experiments to transient shapes. The mask was a thin black ring smaller than the disk, presented at various delays after the transient shape. The results show that up to some critical SOA masks degrade the percept of transient disks to that of annuli, suggesting that an amodal figure property is filled-in. Moreover, VP of disks perceived as annuli was as short as VP of physical annuli, suggesting that the percept of a stimulus rather than its physical shape affected its VP.

The role of the cerebellum in saccade and smooth pursuit adaptation as a window into neuronal mechanisms of motor learning

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In order to exploit the advantages of foveal vision, we make saccades to shift the image of an object onto the fovea and smooth-pursuit eye movements to stabilise it there despite continuing object movement relative to the observer. On-going smooth-pursuit is a reflection of a feedback system minimising retinal image slip. However, pursuit initiation is still open loop, requiring a direct conversion of visual information into the motor response in the absence of visual feedback. Hence, in order to generate an appropriate initial smooth pursuit eye movement, the parameters linking input and output must be chosen optimally. The same need for parametric optimisation pertains to saccades, which are too fast to rely on visual feedback. Considering lesion data I will argue that this parametric optimization is an accomplishment of a specific part of the midline cerebellum, the oculomotor vermis, able to contribute adjustments fast enough to cope with the consequences of fatigue. I will discuss electrophysiological results suggesting how these adjustments may emerge from information processing in the OV, among others arguing for a dual role of the climbing fibre system in initiating as well as maintaining the parametric adjustments needed.

The influence of instructions on attentional processing

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According to the common dichotomy, attention is controlled by either top-down processes (i.e., I voluntarily direct my attention towards stimuli that I intend to process) or bottom-up processes (i.e., my attention is "grabbed" by stimuli that have intrinsic salient properties that makes them stand out). Recently, Ahw, Belopolsky and Theeuwes (2012) proposed another type of attentional control that is based on an individual's selection history. We examined whether participants' attention can be controlled by instructions alone (i.e., under circumstances in which participants do not have any prior (selection) experience with the stimuli). In our studies, participants were instructed that specific stimuli would become relevant in a later stage of the experiment, because they would have to perform a specific task based on identifying these stimuli (Experiment 1) or because these stimuli would later be associated with an aversive stimulus (Experiment 2). We subsequently examined whether attention was biased towards these "instructed" stimuli compared to control stimuli. Importantly, attentional bias was assessed before participants ever performed the identification task or experienced the aversive stimuli.

The influence of observed distal action effects on object recognition

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The classic view of a strict structural as well as functional segregation of the ventral and dorsal pathways in visual perception has been repeatedly challenged in the last decade. Hence there is an increasing body of evidence from different fields that suggests at least a certain degree of interaction between these two systems, which is in line with theoretical accounts proposing links between action and object representations or even an integrated representation of both. Moreover, recent research supports a facilitative influence of observed action effects on object recognition. However, it is still unclear if this facilitation genuinely stems from actual distal action effects in the form of observed object motion or from proximal action effects and associated motor affordances as represented by grasp. The current study employed a priming paradigm to address this question by presenting abstract distal action effects of common and well-known everyday objects as either compatible or incompatible prime stimuli to actual pictures of these objects. Results are generally in favor of the notion that distal action effects do indeed play a role in object recognition as incompatible primes lead to higher error rates and longer reaction times in an object naming task than compatible primes.

Predicting lightness judgments from image statistics of matte and glossy virtual objects

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Humans are able to estimate the reflective properties of a surface (albedo) of an object despite the large variability in the reflected light due to shading. We investigated which statistics of the luminance distribution of matte and glossy three-dimensional virtual objects are used to estimate albedo. Naive observers were asked to sort twelve objects in an achromatic virtual scene in terms of their albedo. The objects were uniformly spaced on a horizontal plane under a directional diffuse illuminant. Twelve different reflectances have been chosen for the objects to allow better than chance, but not perfect discrimination performance. Observers were significantly better in ranking matte objects than glossy ones. The physical ranking of matte objects was best predicted by the maximum of the luminance distribution whereas the best predictor for the glossy objects was the mean of the distribution. Observers seemed to exploit these optimal cues: their rankings were mainly based on the maximum and the mean of the luminance distributions for the matte objects and dominated by the mean for the glossy ones.

Alfred - A library for rapid experiment development

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Software used for the development of psychological computer experiments in most cases differs significantly depending on whether one wants to create an online experiment or a local laboratory experiment. Currently, experimenters who wish to conduct similar experiments both in an online and a laboratory setting will therefore have to implement these experiments separately using different programs which is time consuming and redundant. Additionally, different programs have different assets and drawbacks which experimenters will also have to take into account separately. We created Alfred, a framework which allows experimenters to create both online and laboratory experiments in a single development environment. Since Alfred is based on Python - a powerful but beginner friendly programming language - users can easily add custom components and functionality to the framework which allows them to develop computer experiments that exactly meet their unique requirements. Furthermore, combining the power and versatility of script based development with the possibility of central online data storage, Alfred allows users to benefit from specific advantages of both experiment types and also their respective development platforms. All in all, using Alfred can considerably facilitate the development and conducting of experiments in both online and laboratory settings.

Disorder of choice: decision-making deficits of patients with pathological buying

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Pathological buying (PB) implies frequent buying episodes of non-required products. Shopping behavior continues even if individuals repeatedly experience negative consequences. It is discussed whether deficient decision-making abilities are related to PB, in terms of preferring the alternative of buying, which is rewarding in the short-term but unfavorable in the long run. We investigated decision-making in 30 patients with PB and 30 gender, age and education matched control participants with the Iowa Gambling Task (IGT), the Game of Dice Task (GDT) and tests of executive functioning. The IGT is a decision-making task with implicit rules and is associated with emotional feedback processing, whereas the GDT has explicit and stable rules and is associated with emotional feedback processing, and also with executive functioning. In comparison to controls, the patients showed a lower netscore in the IGT, $t(58)=2.19$, $p<.05$, $d=0.57$, but not in the GDT. Additionally, executive functioning of patients were in the normal range. The results indicate that patients with PB have no impairment in executive functioning and decision making under explicit conditions. In contrast, they appear to have more problems in a decision situation with implicit rules which must be learned from experiencing emotional feedback.

Using spatial statistics to investigate allocation of attention within single trials

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Due to visual acuity limitations of the retina, we need to move our eyes when exploring a visual scene. As a result, we usually observe clusters of fixations in some parts of the image. Both bottom-up (e.g., salience) and top-down factors (e.g., gist of a scene) have been put forward to explain the generation of fixation clusters. Here, we show that target selection is not only a consequence of image properties but also depends on the size of the attentional window – a stimulus-independent mechanism. We demonstrate that the inhomogeneous pair correlation function (PCF) can be used to investigate distributions of fixation locations during single trials, independent of the inhomogeneity generated by images. Our results show that fixations cluster at short length scales ($<3^\circ$) during single trials. The effect cannot be explained by the overall inhomogeneity of fixations locations generated across subjects. Presenting the same image twice augmented the effect. The PCF can be interpreted as an indicator of the size of the attentional window that decreases during reinspection of images. In general, the limited attentional window reinforces inspection of close fixation locations. We conclude that the PCF is a promising tool to investigate target selection during individual trials.

Modulation of subliminal semantic priming by task sets and subliminal task cues

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Previous studies showed that task sets can be activated unconsciously. Based on the attentional sensitization model of unconscious cognition, the present study investigated whether such unconsciously activated semantic or perceptual task sets modulate subsequent masked semantic priming. To this end, we combined the induction task paradigm, in which participants attended either to semantic or perceptual stimulus information prior to the masked priming procedure, with masked task cue presentation. Participants were presented in half of the trials with a visible task cue (“B”/“A”) indicating the type of the subsequent induction task (Is the shown object living or non-living/round or elongated?) followed by masked semantic priming within a lexical decision task (word/pseudoword decision). In the other half of the trials, participants performed the subliminally primed lexical decision task preceded only by a masked task cue. In the reaction time data both the induction tasks with visible task cues as well as subliminal presentation of task cues specifically modulated subliminal semantic priming effects. This pattern was also reflected in the electrophysiological data. The present results show for the first time that unconsciously activated task sets have the ability to specifically modulate subsequent unconscious processes.

Developmental changes in monitoring-control processes across childhood and adolescence

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The spacing effect describes the finding of better memory for material that is learned spaced across time as compared to material learned in a massed manner, that is material learned repeatedly over a short period of time. Few studies have investigated on what basis children and adults make their spacing decisions. In the current paradigm we tested participants spacing decisions in relation to their metacognitive monitoring. Three age groups (7-year olds, 10 year olds and adults) were tested on a spacing paradigm in which participants were presented with two learning blocks with picture pairs of different degrees of difficulty (easy, medium, hard). Participants had to make judgments of learning (JoL) and furthermore had to decide whether to restudy items now, later or not at all. The findings suggest that there was a relation between strategy decisions and JoL for all three age groups and that adults and 10 year olds decisions were more related to their JoL than the strategy decisions of 7-year olds. The findings will be discussed within a framework of developmental changes in metacognitive monitoring-control processes.

Decoding grasping and pointing actions from brain oscillations: investigating the temporal dynamics of the Action Observation Network

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Numerous studies have shown that temporal, parietal and frontal areas are involved during action observation. This group of areas has been called the Action Observation Network (AON). However, little is known about the temporal dynamics of the AON. Our goal here is to provide a detailed investigation of the spatiotemporal unfolding of neuronal activity during action observation. We used magnetoencephalography (MEG) to measure brain oscillations while participants were watching short videos of pointing or grasping movements. We used an implementation of the multivariate searchlight to find which frequencies could better discriminate between the two actions in the different time points while the action unfolds. We observed good classifications in the theta band over parieto-occipital sensors in an early stage of the processing, and in the beta band over sensorimotor sensors but only later in time. Our results confirm previous functional magnetic resonance imaging (fMRI) studies which showed that the observation of pointing and grasping movements elicit differential activity. However, our data shed some light on the question of when neuronal activity begins to differentiate between the two movements and provide new insight into the dynamics of the AON.

Don't be sad, but distrust? The influence of distrust and sadness on deductive reasoning

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Deductive reasoning in a Wason Selection Task (WST) affords systematic processing and the ability not only to verify rules, but to falsify them and to avoid the mistake of matching bias. Research has shown that people who themselves may be potentially betrayed are more often trying to falsify the rule. This may be seen as a mindset of distrust. Furthermore, manipulating the mood of participants has shown to impair logically correct reasoning. In three experiments, using the full negations paradigm of the WST, we expected that a mindset of distrust reveals more falsification and less matching than does a mindset of sad mood. Manipulating with a Velten-Mood Induction Procedure (V-MIP) in a web experiment (Experiment 1) and a lab experiment (Experiment 2) and controlling for the mediators uncertainty and arousal, in the sad condition participants falsified less and matched more than in the distrust group. Manipulating subliminally (Experiment 3) reveals a different picture: Sad participants falsify more and match less than participants under distrust. The different influences of supra- and subliminal manipulation are discussed to explain these discrepant results.

Processing Fluency Contributes to the Relatedness Effect on Judgments of Learning

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Cued recall performance is usually much higher for related word pairs (e.g., lamp – light) than for unrelated word pairs (e.g., apple – car). People seem to be well aware of this effect: Judgments of learning (JOLs)—that is, predictions of the likelihood that recently studied information will be retrieved in future—are substantially higher for related word pairs than for unrelated word pairs. However, the mechanisms underlying this effect remain unclear. We report two experiments that address the contributions of two processes (i.e., beliefs about one's memory and ease of processing during the study phase) to the relatedness effect on JOLs. Results showed that controlling statistically for processing disfluency—operationalized as self-paced study time in Experiment 1 and number of trials to acquisition in Experiment 2—significantly reduces the effect of relatedness on JOLs for lists of word pairs representing a wide and a narrow range of associative strength. Controlling for processing fluency did not, however, eliminate the relatedness effect. This pattern of results suggests that the relatedness effect on JOLs is mediated by both processing fluency and beliefs.

Analyse von Tastaturanschlägen und Mausbewegungsmustern zur Detektion von Schläfrigkeit in der PC-Arbeit

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Fragestellung: Müdigkeit kann in der Mensch-Maschine-Interaktion ein erhebliches Sicherheits- oder Komfortrisiko darstellen. Der vorgestellte Messansatz nutzt die direkte Interaktion von Computer- Eingabegeräten um den Benutzerzustand der Übermüdung zu erkennen. Methode: In vier ähnlichen Sitzungen wurden 30 Probanden nachts in einer simulierten Computeraktivität beobachtet. Jede Sitzung bestand aus einer Reihe von verschiedenen Experimenten. Als Referenz wurde Müdigkeit durch Selbst- und Fremdeinschätzung durch die Karolinska Sleepiness Scale (KSS, KSS-O) gemessen. Ergebnisse: Die Auswirkungen der Schläfrigkeit auf das motorische Verhalten der Benutzer wurde unter Verwendung einer Vielzahl typischer Computeraufgaben erfasst. So wurden neben künstlichen Trackingaufgaben und Standardaufgaben der PC-Nutzung, wie z. B. Text-Editor und Internetsuchaufgaben, durchgeführt. Änderungen in der Tastatur- und Maus-Interaktion sind nach Analyse der Daten erkennbar, vor allem in einer reduzierten Gesamtaktivität, einer erhöhten Korrekturrate, Verweildauer und eine erhöhte Klickdauer – sowohl bei Maus- als auch bei Tastatureingaben.

Feedback and reference matter: Findings on antipointing and delayed propointing do not need to be explained by the perception-action model

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Rossit et al. (2009, 2011) showed that neglect patients were impaired in antipointing and delayed propointing, but unimpaired in immediate propointing. They argue that, according to the action-perception model, ventral areas are lesioned in neglect and thus patients fail in the first tasks, which are ventrally driven, but succeed in the latter task which is dorsally controlled. However, the results could be explained differently. Therefore, we investigated healthy individuals in antipointing, immediate and delayed propointing by varying the availability of visual feedback and the presence of a reference line in antipointing. The withdrawal of feedback increased the unsigned errors in pro-and antipointing. When a reference line was present in antipointing, unsigned errors decreased. The facilitating effect of feedback was stronger for antipointing with, compared to antipointing without reference. Accuracy in propointing decreased with the introduction of a delay, and with decreasing availability of feedback. Our results imply that the availability and usefulness of sensory feedback are crucial factors in visuomotor control which could also account for Rossit et al.'s observations in neglect patients without being in the need of the perception-action model. Moreover, the results show that thoroughly designed tasks are warranted to draw unequivocal conclusions for visuomotor control.

The role of microsaccades in high-precision control of binocular gaze

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We investigated binocular gaze control while observers performed a high-precision manual task. They tried to hit a target hole (1 mm diameter) in a plate with a needle (0.5 mm diameter) at 200 mm viewing distance. Binocular eye movements and the 3D position of the needle tip were tracked. Observers consistently set their point of gaze at the target height first while the horizontal and depth adjustments took place more slowly as the needle approached the target. The rate and amplitude of microsaccades decreased as the distance between needle and target dropped under 3 mm. Microsaccades contributed to displace gaze between the needle tip and the target horizontally, but this was not the case in depth. Moreover, changes in version and vergence were not coordinated during microsaccades. In a control experiment observers moved their gaze between targets located along a slanted plane. Even for saccades as small as the microsaccades in the needle experiment, we observed a coordinated displacement of gaze on the horizontal and depth axis, although the vergence gain was only 47.1%. We conclude that microsaccades can displace gaze between relevant objects, but version and vergence are only coordinated in small saccades if this is specifically instructed.

Constancy of visually perceived fluid viscosity

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In everyday life, we can readily distinguish liquids with different viscosities, like water, honey and tar by sight. However, the visual cues the brain uses to estimate viscosity remain poorly understood. We investigated the constancy of perceived viscosity over time as liquids poured into a container. We simulated seven liquids with viscosities ranging from thick gels to runny water-like materials. The fluid poured at constant velocity through a source, splashed against a fixed sphere and filled up a reservoir over time. Seven timeframes featuring significant interactions between the fluid and its surroundings were selected from the animations. On each trial, observers viewed one such static frame from a given time point of one of the seven viscosities, and had to indicate which of seven frames from a standard time point had the corresponding viscosity, in a 7AFC matching paradigm. Thus, subjects had to identify viscosity based on static shape cues, across differences in time. The results reveal systematic errors, although accuracy increases over time. The pattern of errors suggests subjects rely on a number of simple shape-based heuristics to perform the matching task, which leads to performance that is substantially below ‘viscosity constancy’.

Perceptual anticipation of others' movements: A motor or a visual origin?

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In order to process others' movements in real-time despite the informational lag imposed by neural transmission, our perceptual system typically anticipates the outcome of their movements by shifting forward the perceived position of the effectors along their plausible trajectories. According to motor theories of perception, this perceptual anticipation (PA) of others' movements depends on "forward models" initially dedicated to predictions about the outcome of one's own actions. If true, PA should be specific to the observed movements that belong to the motor repertoire of the observer. To test this prediction, we asked an individual born without arms (D.C.) and control participants to watch series of three sequentially presented pictures involving an actor's arm rotating out of, or arriving at, an awkward position, and to decide whether the last picture matched a subsequent probe picture. Foils showed the arm shifted slightly backward or forward along its initial trajectory. Like control participants, D.C. showed the typical bias toward forward rather than backward foils only when the hand moved out of (not into) the awkward position. The finding that PA in D.C. is shaped by implicit knowledge of biomechanics suggests that the computations underlying this effect may be intrinsic to the visual system.

Effects of anxiety on decision making and visual search behavior in complex sport situations

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Based on the Attentional Control Theory (ACT; Eysenck et al., 2007), performance efficiency is decreased in high-anxiety situations. A repeated-measures design (high/low state anxiety and high/low perceptual task demands) was used to test ACT explanations. Complex football situations were displayed to expert and non-expert football players in a decision making task in a controlled laboratory setting. Ratings of state anxiety and pupil diameter measures were used to check anxiety manipulations. Dependent variables were verbal response time and accuracy, mental effort ratings and visual search behavior (e.g., visual search rate). Results confirmed that an anxiety increase, indicated by higher state-anxiety ratings and larger pupil diameters, reduced processing efficiency for both groups (higher response times and mental effort ratings). Moreover, high task demands reduced the ability to shift attention between different locations for the expert group in the high anxiety condition only. Since particularly experts, who were expected to use more top-down strategies to guide visual attention under high perceptual task demands, showed less attentional shifts in the high compared to the low anxiety condition, as predicted by ACT, anxiety seems to impair the shifting function by interrupting the balance between top-down and bottom-up processes.

Weight sensations affect performance in different task domains

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In current literature on embodied cognition, the influence of an incidental sensation of weight on higher cognitive processes such as decision making and judgment formation is investigated in various ways. The present study broadens this scope to the effects of weight on performance. In study 1 participants had to solve an anagram task to measure cognitive flexibility while holding a heavy or a light clipboard. Results show a weaker performance in the heavy clipboard condition. Moreover the task was perceived to require more effort but not to be physically more demanding in the heavy condition. Study 2 focused on decision-making in a two-alternative forced-choice task in which participants had to decide between objects on the left and on the right side. In the heavy condition objects on the right side were preferred, in the light one objects on the left. Moreover, women showed a general side preference for the left while men favored the right side. Results indicate that not just the unconscious feeling of weight afflicts our performance and decision making but also that the nature of impact varies between different types of tasks.

Action prediction without perceptual cues: Evidence from motor imagery of joint action

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Observing other people's actions often allows us to generate predictions about how these actions will unfold in the near future. In many cases, however, we perform actions together with other people instead of merely observing them. In such joint actions, predictions about own and other's actions need to be integrated in real time to make appropriate behavioral adaptations and thereby bring about a desired shared goal. The present study investigated online integration of action predictions using a novel motor imagery paradigm. Individual participants imagined performing a simple action (i.e. making a forward jump) both alone and in coordination with an imagined second person. An analysis of the timing of participants' jump imagery indicated that, first, participants planned their imagined actions with respect to the predicted durations of their own and their partner's actions even in the absence of perceptual information about the partner and that, second, participants took common principles of motor control into account when imagining coordinating with another person. Besides demonstrating motor imagery of joint action for the first time, these findings provide compelling evidence for an online integration of action predictions to achieve close temporal coordination with others.

Eye movements enhance sequence learning

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There is an ongoing debate about the role of eye movements during sequence learning. To determine the impact of eye movements in sequence learning an experiment utilizing a 16-element complex movement sequence was designed. Participants were randomly assigned to one of two experimental groups: a group that was permitted to use eye movements (FREE) and another group that was instructed to fixate a marker during acquisition (FIX). To evaluate how eye movements affect sequence learning, participants were administered to a retention test and the eye movement condition that was not practiced during acquisition. To assess if the oculomotor system can store the information about the position of the targets gained during previous practice to support sequence production we tested both groups under a condition where the visual target information was removed. Results demonstrated that participants of the FREE group outperformed those of the FIX group during acquisition and the retention and transfer tests. This indicated that eye movements were advantageous for sequence learning.

Seek and remember: Scene semantics interact with visual search to build better memories

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It would seem that intentionally memorizing objects in scenes should produce stronger memory representations than incidentally encoding them, e.g. during visual search. However, when observers were asked to recall scenes they had previously either searched through or memorized, their memory performance was better for searched objects than for objects they had explicitly tried to memorize. Even though participants in the search condition were not explicitly asked to memorize objects, they reproduced significantly more objects compared to the memory condition despite equal gaze durations. Is this search benefit on recall due to the mere act of searching, or does this effect rely on higher-level scene semantics that guide search in scenes? The recall benefit for searched over memorized objects in scenes was eliminated when target objects were presented on uniform, non-scene backgrounds. The recall benefit remained absent when objects were placed on such a background in locations consistent with their placement in scenes (e.g. mirror above sink). Thus, search enhanced recall only when objects were presented in a full scene context. Scene semantics help us to search for objects in real scenes and, then, appear to help us to remember what we have searched for.

Age- and expertise-related changes of bimanual coordination

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Bimanual coordination requires coupling of both hands. In-phase coordination, where both hands tense and release in synchrony, was shown to be stable with increasing age, whereas performance of the less stable antiphase pattern (one hands' tension is synchronized with the other hands' relaxation) declines with age. Little is known about how expertise, gained through continuous use of the hands, influences these patterns of bimanual coordination. To test for age- and expertise-related differences in bimanual coordination and respective electrophysiological correlates, three groups of participants (young non-experts: 21-28 years, late middle-aged non-experts: 37-49 years, and late middle-aged experts: 57-67 years) performed in-phase and antiphase bimanual isometric force modulation tasks under online visual feedback. Electrophysiological correlates were measured with EEG, and posterior α -power as neuromarker of bimanual coordination related to visuo-attentional processes was analyzed. We confirmed that age-related differences were only prominent in the antiphase task; late middle-aged non-experts required a longer time to return into the required antiphase pattern. Late middle-aged experts, however, performed on a level in between non-experts and young adults. Further, experts performed faster movement corrections. α -power changes differ between groups, pointing towards different attentional control processes underlying bimanual coordination. Age-related decline might be postponed by deliberate practice.

Der Einfluss von Exposition auf das Nutzererleben in der Mensch-Technik-Interaktion und die Bedeutung von expliziter Evaluation

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Das Nutzererleben in der Mensch-Maschine-Interaktion unterliegt vielfältigsten Einflüssen (Roto, Law, Vermeeren & Hoonhout, 2011; Pohlmeier, 2011), u.a. zeitlich bedingten Faktoren. Der Einfluss der Expositionshäufigkeit auf das Nutzererleben wurde bereits für die Wahrnehmung von visueller Attraktivität und Usability untersucht (Vogel, 2013; Vogel, Hallier & Thüring, 2013; Vogel & Silvennoinen, 2013). Es zeigt sich, dass die Art der Evaluation in der Expositionsphase einen maßgeblichen Anteil an der Ausprägung eines „mere-exposure effects“ (Zajonc, 1969; Bornstein, 1989) hat. Explizite Evaluation nach dem Vorbild der „Repeated Evaluation Technique“ (RET, Carbon & Leder, 2005) führt eher zu einer Veränderung der Bewertung von Nutzerschnittstellen mit zunehmender Exposition, als die reine Darbietung ohne weitergehende Elaboration (Vgl. Vogel, 2013 und Vogel & Silvennoinen, 2013). Im Beitrag sollen zwei methodische Ansätze zur Untersuchung eines „exposure effects“ in der Mensch-Maschine-Interaktion vorgestellt und diskutiert werden.

Neurocognitive perspectives on exercise in virtual environments

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Virtual environments are suggested to encourage regular exercise. Neurophysiological research recommends exercise to benefit mental health, including cognitive processing, based on interpreting event-related brain potentials (N2). However, little is known about neuroelectric responses to exercise in virtual environments. In the present study 22 healthy participants performed separate exercise (bicycle ergometer) and no-exercise sessions in three virtual environment conditions. Each virtual environment generated a different sense of presence and included a choice reaction-time task to assess cognitive performance. Conditions lasted 5 minutes each and were randomly assigned within sessions. EEG recordings of 64 Ag/AgCl electrodes referred to the international 10:20-system. Stimulus onset was real-time triggered and negative peaks of N2 components (amplitude, latency) were exported for analysis. Heart rate was monitored and sense of presence assessed prior to and following each session and condition. N2 amplitude increased relative to sense of presence ($p < 0.001$), intensified during exercise compared to no-exercise ($p < 0.05$). N2 latency increased relative to increased sense of presence ($p < 0.001$), however, obtained no exercise effect. Cognitive performance changes failed significance and, thus, mirroring cognitive processing. The present findings indicate a neuronal resource compensation of neuroelectric responses that balance conflicting cognitive processing to avoid inefficiency.

The phase of pre-stimulus 7 Hz oscillations gates cortical information flow and predicts perception performance

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Contrary to the subjective impression that visual information flows continuously from our sensory channels, recent evidence suggests that the sensitivity for visual stimuli fluctuates periodically. The neural mechanisms underlying this perceptual sampling are yet unknown. We tested the hypothesis that the perceptual sampling rhythm is mediated by on-going brain oscillations which gate the transfer and integration of information between higher and lower level visual processing regions. Human participants performed a contour detection task while brain activity was recorded simultaneously with EEG and fMRI. The results obtained from EEG-informed fMRI analysis and dynamic causal modelling demonstrate that the phase of an on-going 7 Hz oscillation prior to stimulus onset modulates perceptual performance and the bidirectional flow of information between the medial occipital cortex (putative V4) and right intraparietal sulcus. These findings suggest that brain oscillations gate visual perception by providing transient time windows for long-distance cortical information transfer.

Empirical evidence in favor of a default-disruptive model.

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This presentation has two purposes: First, it will introduce the prevalent theoretical model of human decision making that describes reasoning in terms of a dualistic distinction. The focus will be put on the so-called default-interventionist model assuming that an automatic or intuitive system (System 1) yields default responses unless intervention by higher order reasoning processes (System 2) is necessary (e.g., Evans & Stanovich, 2013; Kahneman, 2011; Stanovich & West, 2000). Second, by presenting empirical evidence from a series of studies on intuitive and deliberative decision making from our lab it will be claimed that these results challenge the prevalent theoretical model and rather suggest a default-disruptive model, wherein analytical introspection does not come to the rescue of intuitive, holistic recognition but rather disrupts these processes. Finally, by taking up results from research on meta-consciousness and introspection, it will be put up for discussion why and when meta-consciousness may (or may) not misrepresent experience.

Does working memory training have to be adaptive?

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This study tested the common assumption that, in order to be most effective, working memory (WM) training should be adaptive (i.e., task difficulty is adjusted automatically to individual performance). Indirect evidence for this assumption stems from studies comparing adaptive training to a condition in which tasks are practiced on the easiest level of difficulty only (cf. Klingberg, 2010), thereby, however, confounding adaptivity and exposure to varying task difficulty. For a more direct test of this hypothesis, we therefore randomly assigned 132 participants to one of three training procedures (adaptive, randomized, or self-chosen task difficulty) or to an active control group. In comparison to the control, all three experimental groups showed increased performance in the trained tasks which, to some degree, transferred to non-trained, structurally different WM tasks. However, there was no transfer to reasoning in any of the groups. Surprisingly, neither training nor transfer effects were modulated by training procedure, indicating that the role of adaptivity might have been overestimated in previous training research.

Was war höher? Ein 2AFC-Paradigma zur Erfassung der wahrgenommenen Deckenhöhe von Innenräumen

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Beschäftigt man sich mit der Wahrnehmung der Ausdehnung von Innenraumdimensionen, so stellt sich die Frage nach einer möglichst verzerrungsfreien Erfassung der wahrgenommenen Breite, Tiefe oder Höhe. Die in bisherigen Studien verwendeten verbalen metrischen Urteile in Zentimetern unterliegen potenziellen kognitiven Einflüssen. Im vorgestellten Experiment untersuchten wir daher erstmals die Erfassung der wahrgenommenen Raumhöhe mittels direkter Größenvergleiche und ohne die Notwendigkeit expliziter Größenschätzungen etwa auf einer Zentimeterskala. In einem 2AFC- (two-alternative forced-choice) Paradigma präsentierten wir in jedem Trial stereoskopisch eine dreidimensionale Simulation eines virtuellen Innenraums mit konstanter Grundfläche und variierender Deckenhöhe sowie eine senkrechte Säule, die auf der Bodenfläche des Innenraums ohne die sonstigen raumbegrenzenden Elemente – Wände und Decke – dargeboten wurde. Die physikalische Höhe der Säule wurde um die dargebotenen Deckenhöhen variiert. Die Versuchspersonen schätzten ein, ob die Säule oder die Decke höher war. Die Reihenfolge von Innenraum und Säule wurde variiert. Aus den psychometrischen Funktionen wurde diejenige Säulenhöhe geschätzt, die subjektiv der Raumhöhe entsprach (Punkt subjektiver Gleichheit, PSE). Außerdem wurde die Differenzschwelle (DL) als Maß für die Sensitivität der Versuchsperson geschätzt. Unsere Ergebnisse zeigen, dass sich mit dieser Methode auch Änderungen in der wahrgenommenen Höhe im Zentimeterbereich reliabel erfassen lassen.

Information transmission in unconscious semantic priming

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Unconscious semantic priming relates to the notion that semantic categorization (e.g., whether digits are larger or smaller than 5) can be performed on stimuli that are not consciously accessible. Conscious awareness is typically tested in a direct task, where participants judge the visibility of a masked digit (prime). If this task is at chance-level, it is concluded that the prime was not conscious. Dehaene et al. (Nature, 1998) suggested that primes nevertheless are categorized unconsciously because responses in another task (indirect task) were still affected by the congruency of the prime. Evidence for this was based on reaction times, but also on EEG and fMRI. We replicated (N=19) the behavioral part of this study but improved on the design by quantifying and comparing the transmitted information in the direct and indirect tasks. Surprisingly, we found similar amounts of transmitted information in the direct and indirect tasks. This casts doubt on the notion that semantic categorization can be performed on unconscious stimuli, although a full evaluation would need to include the measurement of EEG and fMRI data.

Risky Decision Making under Stress

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Many decisions under risk and uncertainty are made under physical or emotional stress. How stress influences financial risk taking, however, is still under debate. Past research suggests that people are more prone to take risks under stress, but the effect depends on the characteristics of the decision and the decision maker. For instance, stress increases risk taking for loss gambles, but decreases risk taking for gain gambles. In the current project we suggest that stress enhances preexisting risk tendencies, possibly by increasing how strongly people rely on their emotions when making a decision. In an experiment we investigate if the riskiness (i.e. the variance) of gambles influences the direction of the stress effect and if the current mood state can predict participants decisions. Our results show that stress does not influence the overall level of risky choices. However, stressed participants became more risk seeking when considering gambles with relatively low risk, but less risk seeking for gambles with relatively high risk. Furthermore, mood valence predicted the change in risk taking. This suggests that the influence of stress depends on the characteristics of the decision task and is consistent with the idea that stress enhances existing behavioral tendencies.

Probability judgments about logical relations – Bayes replacing Biases?

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Standard logic and standard probability theory are venerable normative standards used to distinguish correct from incorrect judgments. However, psychological research has found that people in many respects deviate from these norms. These findings fueled the bias and heuristics approach. Other researchers like Gerd Gigerenzer have argued that these norms are “narrow” and that their applicability particularly in situations where they have elicited biases can often be called into question. The debate on conjunction fallacies actually involves both norms, norms of logic and norms of probability. An alternative non-standard approach at the intersection of logics and probability is ‘Bayesian pattern logic’, claiming to resolve several involved problems. In two experiments we investigate how people judge which hypothesis is most probable given a larger number of observed patterns of frequencies. One experiment shows the influence of noise priors, modelling the tolerance towards exceptions. A second experiment shows that dyadic Bayesian logic only applies if people correctly link logical statements (e.g. “AND”-sentences) to logical propositions (e.g. logical conjunctions). Even if this is not the case the resulting judgments follow a reasonable pattern.

Reduced Sensitivity for Uncontrollable Dangers: Self-Regulatory Processes in the Perception of Risk Signals

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Previous studies frequently found increased or equal sensitivity for negative signals in comparison to neutral cues. Supporters of a negativity bias argue that an enhanced sensitivity for negative stimuli might have brought an evolutionary advantage because this mechanism helps individuals to avoid harm and death. However, such an argument holds only as long as potential dangers can be avoided by detecting them quickly and accurately. A perceptual bias in favor of uncontrollable dangers, however, might even be maladaptive because sensitivity would be bound to a stimulus which is irrelevant to the planning of future action. Therefore, cognitive resources would be wasted and the psychological well-being might be impaired. Consequently, we expect a decreased attention for cues signaling uncontrollable dangers. This hypothesis was tested using a visual search task with different types of targets that signal the presence vs. absence of risk of losing money. Confirming our expectation, sensitivity for danger cues was reduced in comparison to neutral cues when participants had no possibility to avoid the loss.

Aesthetic terms used for the description and evaluation of literature

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We investigated the conceptual structure of the aesthetics of literature following the lead of Jacobsen and colleagues (2004, *Psychological Reports* 94, pp. 1253-1260). 1544 students were asked to write down the adjectives they use to describe or evaluate the aesthetics of literature in general or of one of five literary genres (novels, short stories, poems, plays, or comedies). Analyses of the frequencies, mean list-ranks and the Cognitive Salience Index revealed that beautiful and suspenseful were the most important terms. Furthermore, there were interesting differences between the genres reflecting specific aspects like the importance of emotions for plays and comedies (sad, amusing) and of cognitive-affective states for novels and short stories (suspenseful, interesting), or the affinity of poetry to music (rhythmic, melodious). A multidimensional scaling yielded a two-dimensional solution with the first dimension differentiating between narrativity/ conceptuality and poeticity/ musicality and the second between intellectual and emotional states.

Intention Retrieval and Deactivation Following an Acute Psychosocial Stressor

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We often form intentions but have to postpone them until the appropriate situation for retrieval and execution has come, an ability also referred to as event-based prospective memory (PM). After intention completion, our cognitive system has to deactivate no-more-relevant intention representations from memory to avoid interference with subsequent tasks. In everyday life, we frequently rely on these abilities also in stressful situations. Surprisingly, little is known about potential stress effects on these functions. Therefore, the present study aimed to examine the reliability of event-based PM and of intention deactivation in conditions of acute psychosocial stress. To this aim, eighty-two participants underwent the Trier Social Stress Test, a standardized stress protocol, or a standardized control situation. Following this treatment, participants performed a computerized event-based PM task to assess PM performance and deactivation of completed intentions. Although the stress group showed elevated levels of salivary cortisol as marker of a stress-related increase in hypothalamus-pituitary-adrenal axis activity throughout the cognitive testing period compared to the no-stress group, PM performance and deactivation of completed intentions did not differ between groups. Findings indicate that cognitive control processes subserving intention retrieval and deactivation after completion may be mostly preserved even under conditions of acute stress.

Neuronal correlates of practice in a dart throwing training study

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In this study, we examined the effects of physical training and mental visualization on the performance of dart throwing and the accompanying changes in the EEG. For this purpose, subjects without prior dart experience underwent 15 trainings with EEG recording during the first and last training session. Training consisted either of pure physical training, a combined training of physical throwing and visualizations and a control group with physical training and an irrelevant tapping task. As a result, throwing performance improved in all three groups with the control group showing less improvement by trend. Concerning EEG parameters, changes in the EEG frontal midline theta (4-7 Hz) during the preshot phase (-500ms to -250ms) were observed particularly in the physical training group. Furthermore, a left-hemispheric temporal upper alpha (10-12 Hz) power increase could be found in the last training session. In sum, these changes might reflect the process of optimizing cortical activation strategies during the dart throwing training. The performance increase in the control group indicates on the one hand that even half as much throws were sufficient for motor learning and on the other hand, the mental visualization training should be advanced by using a more goal oriented mental strategy.

Influence of spatial workspace characteristics on sensorimotor learning

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This study analyzes the influence of workspace symmetry on sensorimotor learning in the form of adaptation transfer following a visuomotor rotation in a sliding task. Motor learning, adaptation, and generalization are usually investigated and explained in terms of internal representational and motor models that drive motor control and planning. While these models acknowledge the influence of context, the contribution of the perceptual characteristics and structure of the workspace as such on generalization in sensorimotor learning has not yet been sufficiently addressed. Consequently, the present experiments investigate the workspace's perceived symmetry with reference to the observer's egocentric and allocentric frames of reference. The task required participants to slide a cursor presented on a monitor from a starting position towards a target using a stylus on a digitizer tablet. The workspace consisted of two starting positions and one target depicting an equilateral triangle. The workspace's characteristics were varied by altering either the triangle's (distal), or the observer's (proximal) orientation. The directions of the angular deviations made during generalization were used to analyze the influence. Results generally suggest that a symmetric workspace favors symmetric transfer and a breakup of the egocentric perceived symmetry results in unsystematic transfer.

Unfallursachen bei Landstraßenunfällen

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Obwohl die Gesamtzahl der Verkehrstoten über die Jahre hinweg kontinuierlich absinkt, stellen Landstraßenunfälle in dieser Hinsicht eine beständige Problematik dar. Im Jahr 2012 kamen beispielsweise knapp zwei Drittel aller Verkehrstoten auf den Bayerischen Straßen auf Landstraßen ums Leben. Gemäß den amtlichen Unfallursachen war dabei überhöhte und nicht angepasste Geschwindigkeit die häufigste Unfallursache. Auf welchem Ursachenmechanismus diese Unfälle jedoch genau basieren, lässt sich mit den Angaben aus der amtlichen Statistik nicht näher bestimmen. Eine detailliertere Sichtweise auf den tatsächlichen Unfallhergang ermöglicht daher die Arbeit der AARU Verkehrsunfallforschung. Im Rahmen des interdisziplinären Forschungsprojekts werden Verunfallte interviewt und es können auf Grundlage dieser subjektiven Informationen sowie den objektiven Informationen aus der technischen Rekonstruktion der Unfälle fundierte Schlüsse hinsichtlich des tatsächlichen Unfallhergangs und der entsprechenden Unfallursachen gezogen werden. Auf der Datenbasis von über 850 psychologisch umfassend analysierten Unfällen aus der AARU Datenbank, in der für Unfälle seit 2002 Unfallursachen gemäß der 5-Step Methode vergeben werden, werden die Unterschiede hinsichtlich der Unfallursachen je Straßenart detailliert betrachtet. Ein Ergebnis dabei ist, dass sich auch in der detaillierten Unfallursachenanalyse zeigt, dass bei Landstraßenunfällen eine bewusst überhöhte Geschwindigkeit tatsächlich eine Rolle spielt. Allerdings stellt auch eine Fehleinschätzung der eigenen Geschwindigkeit bzw. des Fahrzeugverhaltens einen großen Einfluss dar.

Valence-specific attention allocation enhances processing of emotional words in language-related brain areas.

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Emotional words can elicit strong responses and receive preferential processing in distributed brain areas. Since emotional words may be seen as endogenous attention elicitors, we investigate how top-down instructions modulate their processing. A key question is, whether responses in language-specific areas are increased when attention is allocated to words in a valence-specific way and how these effects compare to passive listening. To address these issues, we carried out an auditory event-related fMRI study manipulating both word valence as well as attention-allocation instructions. Participants were presented with negative, positive and neutral words, and asked to either pay attention to the negative or positive words, or to engage in passive listening. Regions of interest were defined in the middle temporal gyrus, superior temporal gyrus and inferior frontal gyrus. The ROI analyses revealed a significant attention by word-type interaction in the inferior frontal gyrus, with post-hoc analyses revealing a valence-congruent modulation effect. An exploratory whole-brain analysis revealed significant and valence-congruent attention by word-type interactions in inferior frontal gyrus and prefrontal cortex ($p < 0.05$; corrected). Our results underscore the importance of language-related areas in processing emotional word content and show that attention allocation can substantially alter these processes in a valence-specific direction.

Illuminant chromaticity influences color constancy

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Past research on color constancy has mainly focused on surfaces illuminated by a restricted set of illuminants. We wanted to investigate whether there are systematic differences in the degree of color constancy between illuminants of varying hues. We varied chromaticity and saturation of the illuminant on color constancy in rendered two- and three-dimensional scenes. Ten naïve observers performed achromatic matches on scenes illuminated by illuminants of 20 different chromaticities and two saturation levels. The scenes depicted different versions of an illusion introduced by Lotto & Purves (2004). The surface reflectances were chosen from the axes of DKL-Color-space, rotated in steps of 18° azimuth in accordance with the illuminants. Each Illuminant was chosen so that it exactly canceled the chromaticity of one surface color. We found that constancy was similar for 2D- and 3D-scenes and independent of illuminant saturation. There were notable differences for illuminants varying in chromaticity. We conclude that not only color discrimination, but also constancy shows a dependence on hue.

Spatial continuity is more important than temporal continuity in learning of transsaccadic associations

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Spatial processing resolution of a particular object in the visual field can differ considerably due to eye movements. The same object will be represented with high acuity in the fovea but only coarsely in periphery. Herwig and Schneider (submitted) proposed that the visual system counteracts such transsaccadic resolution differences by predicting, based on previous experience, how foveal objects will look like in the periphery and vice versa. They demonstrated that previously learned transsaccadic associations between peripheral and foveal object information facilitate performance in visual search, irrespective of the correctness of these associations. False associations were learned by replacing the presaccadic object by a slightly different object during the saccade. Importantly, participants usually did not notice this object change. This raises the question whether perception of object continuity is a critical factor in building of transsaccadic associations. We disturbed object continuity during transsaccadic learning by a postsaccadic blank or a task-irrelevant shape change. Interestingly, visual search performance revealed that disruption of temporal object continuity (blank) did not impair learning of transsaccadic associations but that disruption of spatial object continuity (shape change) prevented it. Thus, continuity of spatial object properties seems more important than continuity of temporal properties in transsaccadic learning.

Jüngere und ältere Autofahrer beim Abbiegen an Kreuzungen: sicherheitskritische Unterschiede in der Aufmerksamkeit?

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Für ältere Autofahrer ist besonders das Linksabbiegen an Kreuzungen problematisch und schlägt sich entsprechend in Unfallzahlen nieder (Gerlach et al., 2007; Chandraratna et al, 2002). Häufig werden dabei die Entfernung und die Geschwindigkeit entgegenkommender Fahrzeuge falsch eingeschätzt (Braitman et al., 2007). Erklärt wird dies mit nachlassender physiologischer Leistungsfähigkeit. Neben dieser Verringerung der physiologischen Leistungsfähigkeit, sind jedoch möglicherweise auch Aufmerksamkeitsdefizite für die das zunehmende Risiko beim Linksabbiegen verantwortlich. In der vorliegenden Studie wurde in einer Simulatorfahrt eine Linksabbiegesituation untersucht. Neben der Wahl einer genügend großen Zeitlücke bestand die Schwierigkeit in der Berücksichtigung von ebenfalls kreuzenden, jedoch weniger auffallenden, Radfahrern. Zur Untersuchung der visuellen Aufmerksamkeit werden im Beitrag neben den Ergebnissen zu Verhaltensdaten insbesondere die Ergebnisse zu den Blickdaten vorgestellt. Bei der Auswertung liegt der Schwerpunkt in Unterschieden zwischen Fahren verschiedener Altersgruppen.

Attentional adjustment to response conflict under conditions of controlled low- and high-level feature priming and distractor-response contingencies

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Interference evoked by distractor stimuli is reduced after trials in which target and distractors are associated with different responses. This sequential modulation (a.k.a. as Gratton effect) has been ascribed to attentional focusing triggered by response conflict. This account has been challenged on the grounds of confounds of the sequence of conflict/no-conflict trials with the sequences of (a) specific distractor-response conjunctions, (b) distractor-response contingency levels, and (c) high-level perceptual features. In addition, conflict at the level of stimulus rather than response codes has been suggested to underlie attentional adjustment. We conducted two experiments using a (four-choice) “temporal flanker task”, in which target and distractor are defined by their relative onset (i.e., advance distractor presentation). In Experiment 1, we confined the analysis to trials with unbiased distractor-response contingency, devoid of repetitions of stimuli or responses from the preceding trial. In Experiment 2, we additionally controlled perceptual target-flanker configurations. A Gratton effect was found in both experiments. While the results of both experiments rule out feature integration and contingency-level switch-cost accounts, the results of Experiment 2 further dismiss stimulus conflict and perceptual priming accounts. These findings constitute the hitherto purest evidence for trial-to-trial attentional adjustment to response conflict.

The influence of prime visibility in motor and semantic priming depends on masking method

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One approach to determine the role of consciousness consists in outlining the effects of unconscious stimuli. Various studies reported that motor priming effects do not necessarily depend on conscious awareness of the effective stimuli. In contrast, semantic priming effects have often been found to increase with increasing stimulus awareness. From this pattern of results it has been speculated whether semantic processing requires consciousness whereas simple responding does not. Here we provide evidence for the view that this difference between motor priming and semantic priming might result from differences in the masking procedures. We found priming effects independent of prime visibility when metacontrast masking was used with both motor and semantic priming; priming effects depended on prime visibility, however, when pattern masking was used. This data challenges the fundamental distinction between semantic and motor processing regarding the role of consciousness.

Visually Perceived Target-Distractor Separation Modulates Tactile Distractor Processing

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When two tactile events simultaneously impact on the skin surface the perceived separation between these stimuli determines performance in a tactile selection task. In a sequence of three experiments, we investigated the effects of the visually perceived separation between target and distractor locations in a tactile variant of the flanker task. More specifically, delivering a target and distractor to the right and left hand, respectively, we examined whether the impact of a barrier placed between the hands is moderated by its translucency (opaque vs. transparent) and its permeability (impermeable vs. permeable). When the hands were separated by means of an opaque or transparent occluder, only the perceptual flanker effect was significant, whereas the flanker effect at the response level was not. Thus, irrespective of vision, separating both hands by a barrier prevented tactile distractors from being processed up to the level of response selection. Yet, when a permeable barrier (i.e., a frame) was placed between the target and the distractor hand, perceptual as well as response flanker effects were obtained. Taken together, these results suggest that higher visual cognition – and not the availability of vision – impacts on the processing of tactile distractors.

Neural mechanisms for overt habitual and non-habitual manual actions

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This study explored the neurophysiological mechanisms underlying the planning and execution of an overt goal-related handle rotation task. The aim of the present study was to differentiate cerebral activity between grips executed in a habitual and a non-habitual mode. Our results indicate that the planning and execution of goal-related actions are controlled by different neural mechanisms which depend on the control requirements of the action. In a handle rotation task, participants had to use thumb-toward or thumb-away grips to rotate a handle to a given target position. Neural processes for action execution (measured by event-related potentials (ERPs)) differed between habitual and non-habitual conditions. We found differential activity between habitual and non-habitual conditions in left and right frontal areas from -600 to 200 ms time-locked to reaching the target position. These results indicate that the homing in phase of habitual and non-habitual actions are controlled by different neural mechanisms and that actions in the habitual mode require less cognitive effort for control demanding parts of an action sequence compared to the non-habitual mode.

Visual information as a cue for turn-taking in conversation

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Turn-taking in conversation is almost perfectly timed, with only a small amount of pauses and overlaps. To achieve this level of accuracy, listeners need to be able to anticipate the end of the speaker's turn. Some authors assume that visual cues are used as an information source for the prediction of turn endings. The goal of this study was to investigate if visual cues have an impact on the accuracy of end-of-turn anticipation. We conducted a reaction time experiment where we presented video and sound sequences taken from a corpus of natural conversations. Participants were asked to press a button to mark the end of a turn. The stimuli were presented in three conditions. 'Audio-visual': Video including sound, 'audio-only': Audio track without the video and 'visual-only': Video track without sound. The results showed that removing visual information in the 'audio-only' condition did not influence the participants' accuracy in end-of-turn anticipation compared to the anticipation performance in the audiovisual condition. In contrast the subjects showed a decrease in anticipation accuracy when only visual information was available. These findings suggest that visual cues are neither a mandatory nor a sufficient information source for end-of-turn anticipation.

Emotionale Wirkung von Farbe

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Emotionale Wirkungen von Farbe werden häufig diskutiert bzw. im angewandten Kontext als gegeben angenommen. Bisherige Untersuchungen wiesen jedoch meist keine befriedigende Kontrolle aller drei Dimensionen von Farbe (Farbton, Helligkeit und Sättigung) auf. In unserem Experiment wurden diese Dimensionen unabhängig voneinander variiert und subjektive Einschätzungen von Valenz und Arousal im resultierenden dreidimensionalen Farbraum erhoben (SAM-Ratingskalen). Die Probanden (N = 65) betrachteten jeweils 30 unterschiedliche Farbreize, die für je 30 Sekunden präsentiert wurden (Sehwinkel 18°). Die subjektiven Emotionseinschätzungen zeigten, dass gesättigtere und hellere Farben erregtere emotionale Zustände bewirkten. Das Arousal variierte zudem mit dem Farbton und stieg von Grau über Blau und Grün bis hin zu Rot an. Erwartungsgemäß hatte die Sättigung der Farbe einen stärkeren Effekt auf das Arousal als der Farbton. Die Valenzratings waren bei gesättigten und helleren Farben am höchsten. Zusätzlich interagierten die drei Farbdimensionen in ihrer Wirkung auf Arousal sowie auf Valenz miteinander. Beispielsweise zeigte sich nur bei der höchsten Sättigung ein klarer Effekt des Farbtons auf die Valenz, erwartungsgemäß führte dann Blau zum angenehmsten emotionalen Zustand. Die Daten zeigen, dass die häufig verwendeten nur auf den Farbton bezogenen Auswahlregeln bezüglich der emotionalen Wirkung von Farbe zu kurz greifen. Insbesondere sollte der Effekt der Sättigung berücksichtigt werden.

Nutzerzentrierte, situationsgerechte Warnkonzepte - Wie warnt man in der Stadt am besten?

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Im urbanen Raum trifft der Fahrer auf besondere Herausforderungen, komplexe Fahr- und Verkehrssituationen, viele ablenkende Reize, hohe Informationsdichte und zeitliche Dynamik bei geringen Entscheidungszeiten und Handlungsspielräumen. Nutzerzentrierte, situationsgerechte Warnkonzepte werden benötigt. Unklar ist noch, wie diese den Fahrer warnen sollen, generisch oder spezifisch, handlungs- oder aufmerksamkeitsorientiert. Aufbauend auf einer Vorstudie zur Unfallentstehung im urbanen Raum wurden vier Warnkonzepte (+ Kontrollgruppe, Between-subject Design) in das Head-up-display des statischen Fahrsimulators der TU Braunschweig implementiert. Das Fahr- und Blickverhalten sowie die subjektive Bewertung der einzelnen Warnkonzepte wurden von 60 Probanden in acht unterschiedlich kritischen Szenarien erfasst. Bei ersten Analysen der laut Unfallstatistiken und subjektiven Probandenbewertungen am kritischsten und häufigsten Szenarien (Linksabbiege-Szenarien mit querendem Fußgänger oder Radfahrer) kam es mit generisch handlungsorientierter Warnung zu signifikant weniger kritischen Situationen als ohne Warnung. Bei spezifisch aufmerksamkeitsorientierter Warnung zeigte sich nur im Fußgängerszenario eine signifikant geringere Anzahl kritischer Situationen verglichen mit der Kontrollgruppe. In den anderen Testgruppen waren dagegen keine signifikanten Unterschiede hinsichtlich der Anzahl kritischer Situationen zu verzeichnen. Diese Konzeptevaluationen sind ein erster Schritt auf dem Weg zu einem integrierten, handlungsorientierten MMI-Konzept für den städtischen Bereich. Weitere Iterationen folgen. Besonders sollten dabei das Fahreralter sowie die gemeinsame Wirkung unterschiedlicher Warnungen (Multimodalität) beachtet werden.

The Good, the Bad and the Leaders – Who makes it to the Top and Why

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In recent years, research has provided evidence that men with a higher facial width-to-height ratio (fWHR) are more aggressive, more willing to cheat, exploit the trust of others and deceive their counterparts in negotiations. Assuming a positive relationship between fWHR and social dominance as may be required for leadership, we investigate top-level business leaders – namely the CEOs of companies listed in the Dow Jones stock market index and its German analogue (DAX) – and show that they have a higher fWHR compared to a control sample from the general population. Suggesting this effect transcends organizational boundaries and value-systems, we find the same for the popes of the roman-catholic church since 1878. In contrast to recent laboratory findings indicating increased willingness to exploit and deceive in high-fWHR individuals, we additionally show that fWHR of the Dow Jones companies' CEOs is positively associated with prosocial and cooperative acts as indicated by the company's ecological performance and charitable donations. Results suggest a complex relationship between fWHR and leadership performance, presumably mediated by testosterone exposure during puberty.

Rules and Rebels

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Most of our daily life is organized around rules and regularities. But what if one were to break a given rule? To investigate the behavioural parameters of violation responses, we conducted a series of experiments on an iPad, which allowed us to track the participants' finger-movements on the touchscreen. Our experiments show that rule-violating behaviour is distinctly different from rule-based actions in both, response times and movement trajectories. Data not only shows differences between the two types of responses (rule-based vs. rule-breaking), but also a sequential modulation by the previous response. We further address the question how far the inherently included negation in any violation (breaking a rule is equivalent to not following a rule) drives our results.

A mass-density model can explain the normal and the inverted size-weight illusion

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When judging the heaviness of two objects with equal mass, people perceive the smaller and denser of the two as being heavier. Our model describes this size-weight illusion as weighted average of two heaviness estimates, derived from mass and density, with weights that follow the estimates' reliabilities. We varied the reliability of the density estimates by manipulating the quality of haptic volume information: Blindfolded participants lifted objects via a string, with a precision grip or with a power grip enclosing the object. Objects varied in mass and density. Participants judged the heaviness of objects using magnitude estimation. In addition, we assessed the estimates' reliabilities by measuring discrimination thresholds for mass and volume. The role of density in perceived heaviness increased with the quality of volume information and also the pattern of the estimates' reliabilities confirmed model predictions. Further, we were able to explain the inverted size-weight illusion by assuming a negative prior for the correlation between mass and volume. This illusion has been observed after intensive training on objects that are negatively correlated in mass and volume (Flanagan et al., 2008). Overall, the results corroborate our model, which is promising as unifying framework for the size-weight illusion.

Resisting temptation in behavioral addiction – a neuropsychological assessment of patients with Gambling Disorder and Internet Addiction

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Background: Behavioral addictions such as Gambling Disorder (GD) and Internet Addiction (IA) have been introduced in the new chapter of “Addiction and related Disorders” in the DSM-5 (APA, 2013). Recent research has emphasized the common underlying neurobiological and personality-related risk factors involved in the pathogenesis and maintenance of behavioral addictions and substance dependencies. However, on the personality factor impulsivity both groups seem to differ, with IA-patients presenting less impulsivity and rather low conscientiousness, while impulsivity is very distinct in GD. Moreover, IA-patients perform also poorly in putting long-term beneficial goals before short-term goals that might not be as beneficial, which is similar to IGD-patients. Methods: The aim of this study was to compare the ability to resist temptations between patients with GD and IA with a delay discounting task and an Iowa Gambling task. Results: The results showed that not only GD-patients show differences from healthy controls but that IA-patients also showed this effect on the dimension of resisting temptation. Discussion: The results will be discussed and set into the context of the new classifications of behavioral addiction.

“Soprano” versus “Bass”: Compatibility effects between linguistically implied pitch and space rely on contextual information provided by sentences, not single words.

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Based on the finding that physical pitch height is associated with vertical space, with high pitch being located higher in space than low pitch, this study investigated whether this association also holds true for language processing. In two experiments, participants read sentences (Experiment 1) or words (Experiment 2) implying either a high or low auditory event (e.g., The soprano sings vs. The bass sings and Soprano vs. Bass). Finding evidence for an association between pitch height and vertical space during language processing would fit nicely in the framework of grounded cognition, postulating that language comprehension is accompanied by multimodal simulations of the described events. A sensibility judgment task (Experiment 1) and a lexical decision task (Experiment 2) was performed requiring either an upward or downward arm movement. It was assumed that stimuli implying high pitch are responded to faster with an up-response and stimuli implying low pitch with a down-response. This is exactly what we observed for sentences in Experiment 1. In Experiment 2, participants were presented with words instead of sentences, no differences in response location were found. This suggests that a certain amount of contextual information is needed to elicit a space-pitch association during language processing.

Placebo analgesia reviewed: brain mechanisms of endogenous pain modulation and its changes across the lifespan

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Placebo analgesia is a prime example of the impact that psychological factors have on pain perception. The administration of a pharmacological inert substance produces a pain-relieving effect if the subject is convinced that a potent analgesic is being delivered. As a powerful clinical example of the cognitive modulation of pain it has become a popular experimental model to examine central mechanisms of endogenous pain modulation. Converging evidence from experimental placebo research of the past three decades has revealed placebo analgesia as a complex phenomenon involving psychoneurobiological interactions. Furthermore, several factors are discussed as having a potential effect on placebo analgesia like personality, age or gender. In this part of the symposium we will present an overview of these psychoneurobiological interactions involving a brief introduction of the neurobiology of placebo analgesia. We will look into different factors influencing the placebo effect and present actual data on differences in placebo analgesia in young and old healthy subjects.

Offside judgments in laypersons with different types of static displays

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We investigated offside judgments in laypersons in four experiments with different types of static displays. Previous research neglected offside judgments in this group although the majority of assistant referees in football games at the amateur level are laypersons. The aims of the present research were (a) to investigate the spatial resolution in laypersons perception of offside situations, (b) to search for biases in their offside judgments, and (c) to develop useful displays for future research. The displays showed the moment when a midfielder passes the ball to a forward that moves in the vicinity of a defender. We systematically varied the spatial location of the forward around the defender in eleven steps, and participants made their offside decision by pressing a key. Across experiments, displays varied in abstractness (shapes, cliparts, photographs). There were three major results. First, both the accuracy and speed of offside judgments deteriorated when the spatial distance between forward and defender decreased, approaching guessing rate at the smallest distances. Second, participants showed a consistent bias in favor of the non-offside response, in contrast to most studies on professional assistant referees. Third, displays involving clipart characters appear well suited for being used in subsequent research.

Is memory one representation or many? Evidence for the dynamic use of multiple representations

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The analogy of space to human cognition has a long-standing tradition. Our study aims to elaborate on the validity of this analogy for search in memory. We show that people are able to dynamically recruit independent memory representations in the recall of country names. By instructing participants to use specific recall cues we also show that despite a strong effect on the retrieval sequence, total recall from memory remains unaffected. Whereas these findings strongly support a higher dimensionality to memory than previously thought, the simultaneous finding of severe retrieval time costs for non-default representations suggests that the use of particular retrieval structures may be adaptive. In sum, our results support local-to-global memory search strategies similar to foraging strategies in space, but further suggest that memory is not constrained to one local representation, but may indeed support many.

Is there a relationship between the development of motor planning skills and executive functions in early childhood?

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The present study investigated the development of anticipatory planning skills in children and its interdependencies with the development of executive functions. Two hundred and seventeen participants in 9 age groups (3-, 4-, 5-, 6-, 7-, 8-, 9-, 10-year-olds, and adults) were tested in three different end-state comfort tasks and three tasks to assess executive functioning (Tower of Hanoi, Mosaic, and the D2 attention endurance task). Regression analysis revealed a developmental trend for each individual end-state comfort task across all age groups (all $p < .01$). However, there was no indication of generalization across these tasks, as correlations between the three motor tasks failed to reach significance for all age groups ($p > .05$). Multiple regressions trying to verify a prediction of performance in the end-state comfort tasks by the level of executive functioning also failed to reach significance. Accordingly, anticipatory planning develops with age, but the impact of executive functions on this development remains unknown. Moreover, motor planning does not seem to be a holistic construct, as the developmental tempo of the three different tasks was not correlated.

Decoding action concepts at different levels of abstraction – an fMRI MVPA study

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Action concepts are generalizations from concrete action. It is debated, however, how action concepts are represented in the brain. Motor versions of embodied theories claim that action concepts are instantiations of the motor system whereas classical cognitive theories positions propose that action concepts are represented as amodal representations in networks distinct from the motor system. Here we used cross-conditional multivoxel pattern analysis to decode observed actions on three levels of abstraction: a concrete level (open vs. close a specific bottle), an intermediate level (open vs. close across different bottle exemplars), and an abstract level (open vs. close across object classes, i.e., bottles and boxes). A ROI analysis revealed significant decoding accuracies for the concrete level in left ventral premotor, and bilateral inferior parietal and occipitotemporal cortex (OTC). Intermediate and abstract concept levels, however, could be decoded bilaterally in the anterior intraparietal sulcus (aIPS) and in the posterior middle temporal gyrus (pMTG) only, an area that has also been implicated to play a role in conceptual processing of verbs. These results were corroborated by a surface-based searchlight analysis. In contrast to embodied theories, our findings suggest that action concepts are represented outside premotor and motor regions.

Pupil size response to an emotionally conditioned neutral stimulus.

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Evaluative Conditioning (EC) refers to the change in the liking of a previously neutral stimulus when it has been paired with an emotionally loaded one. Pupil size response (PSR) to emotionally loaded stimuli has been well documented for different kinds of stimuli. In this work we measured the PSR to the presentation of Landolt rings before and after being conditioned with negative stimuli coming either from the International Affective Picture System (unimodal conditioning) or from the International Affective Digitalized Sounds (cross modal conditioning). In the experiment the subjects observed / heard stimuli that included Landolt rings. They rated the audio-visual material in both valence and arousal. Using the personal ratings one side-opening ring was paired with the most negative stimuli and the other opening side was paired with the most neutral stimuli. Participant's mood before and after the experiment was evaluated via STAI questionnaires. Results show a before-after conditioning difference in the participant's mood and Landolt ring valence-arousal rating. Most important, the efficiency of the EC was also seen in the PSR. After the conditioning the PSR to a Landolt ring was changed in both intensity and time duration compared to the one of a non-conditioned ring.

The manipulation of prior encoding depth affects intuitive judgments

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Please answer quickly: Do the following words SALT, DEEP, FOAM have something in common? The semantic coherence of word triads can be assessed either explicitly, when people know the solution word, or intuitively, when people “know” that a triad is coherent, without knowing the solution word. Here, we asked whether coherence judgments (either explicit or intuitive) can be influenced by previous processing of the word triads. To test this question, we conducted two experiments using distinct manipulations of the memory traces, namely semantic vs. non-semantic encoding. In both experiments participants first encoded the triads, either by learning the material up to a criterion (semantic encoding, Exp. 1) or by categorizing triads according to non-semantic criteria (non-semantic encoding, Exp. 2), and then judged these triad's coherence. Results revealed that for triads that had to be learned prior to the coherence judgment (semantic encoding), participants significantly knew more correct solution words compared to new triads. For triads that had been processed via a categorisation task beforehand (non-semantic encoding), participants showed better intuitive judgements, yet they did not explicitly solve more triads. Thus, our results indicate that the manipulation of previous processing of word triads influences subsequent explicit and intuitive coherence judgments.

Learning to recognize voices: electrophysiological correlates

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Listeners recognize familiar speakers from various utterances, suggesting the existence of relatively speech-invariant voice representations. Using EEG we investigated the acquisition of these representations during voice learning. In each of two blocks, participants studied 6 unfamiliar voices uttering short sentences in 12 study phases. After each study phase they classified test voices as “old” or “new”. In the “same sentence” block, speakers repeated the study sentences at test; in the “different sentence” block, they uttered different sentences. Above-chance recognition (d') increased across study-test-cycles, indicating significant voice learning. Importantly, voices were recognized more accurately from the same than from different test sentences. During study, voices subsequently remembered elicited larger mean amplitudes at parietal sites than voices subsequently forgotten, in the P3 (250-400 ms) and the late positive complex (400-800 ms). This difference due to memory (dm) effect was unaffected by test sentence condition, possibly reflecting the establishment of relatively speech-invariant voice representations. During test, voices correctly classified as “old” elicited a more positive LPC (300-700 ms) at Pz than test voices correctly classified as “new”. This OLD/NEW effect was only observed in the same sentence condition, suggesting that it reflects processes related to speech-dependent retrieval of voices from episodic memory.

Does body-rotation facilitate mental rotation?

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The relationship between motor processing and mental-rotation performance has been a topic in many disciplines, including psychology, neuro- and sports science and has regained attention within the embodied-cognition framework. In this study, we investigated the acute effects of being physically rotated 360 degrees in a gymwheel on mental-rotation performance. In a pre-post design, 62 gymwheel novices completed chronometric mental rotation PC tests containing different stimuli (human figures, 2D; letters, 2D; cubes, 3D). Participants were divided into three groups: One group (R) completed 18 full rotations around the sagittal axis, two control groups either cycled on an ergometer (CG) or solved crosswords (OG), lasting 20 minutes each. A 3 x 5 x 3 (group x disparity x stimulus category) repeated-measures ANOVA on the response-time changes revealed main effects of stimulus category and disparity. Most relevantly, the interaction between stimulus category, disparity and group was significant ($F(16,472)=2.26$; $p=.004$; $\eta^2=.07$), based on higher benefits of group R in the letter stimulus with larger disparities. This finding demonstrates acute effects of specific motor experience and training on mental-rotation performance. The specificity of the effect with respect to stimuli and interventions needs to be further explored.

The time course of the covert processing of facial identity and expression: effects on attention

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Emotion and identity are probably the most important information of faces. Many studies have found the recognition of identity and expression to show different patterns of cerebral activation. Many studies found attention is directly driven by the emotional features of the stimuli. Fearful faces are very important emotional stimuli which signal potential threat and elicit attention from observers. Here, we investigate the spatio-temporal dynamics of the differential influence of emotion-laden stimuli on attention in a covert expression/identity based odd-quadrant task. Each trial consisted of a set of four faces. In the “expression” condition, a set of four faces were mixed fearful and neutral expressions of the same person; in the “identity” condition, the faces were all fearful or all neutral expressions coming from two different persons. Participants had to point the odd face that differed from the rest. In the identity condition, both fearful and neutral faces revealed a spatial effect (left vs. right) oppositely affecting the P300 of the brain hemispheres; facial expression (fearful vs. neutral) affected P2 and N2. In the expression condition, the effect of facial expression showed on P1, N1, P2 and N2. There were no significant effects of spatial position for any ERP component.

Sound of car engine influences subjective rating of collision likelihood

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Cardrivers can estimate collision likelihood between them and a possible collision partner based on visual input (Coull et al., 2008). However, the question arises if the engine sound has any influence on drivers' temporal collision estimation. In an fMRI-study, participants watched videos from drivers' perspective and decided if they would have crashed or not into a suddenly appearing tractor. Physically, videos were designed to reveal a collision into the middle of the car, or sharply pass at the back or front. Two-thirds of the videos were accompanied by either a fast or slow sound of engine. Behavioral data indicated an interaction of sound by video-type: fast versus slow engine sounds lead to decreased collision rating for physically rear-end collisions and vice versa to increased collision rating for front-end collisions. Thus, driving was perceived faster with faster than slower sounds. Neuronal data indicated higher involvement of brain areas known for decision making (medial frontal cortex) for no-collision versus collision perception overall sounds. Neuronal interactions of sound by video-type were revealed in mainly visual and auditory sensory areas, indicating basic multisensory processes. Thus, faster sounds enhance visual temporal estimation due to increased multisensory integration and enhanced decision making.

Visuospatial effects of saccadic adaptation

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To see the objects around us structured spatially we need a neural map representing visual space. Information about external space is coded metrically in oculomotor maps which represent targets for saccade eye movements. If saccade motor maps structure visual space, modifications in these maps should be accompanied by changes in visual space perception. We used saccade adaptation to induce modifications in saccade maps. After adaptation subjects mislocalized visual stimuli. Two different kinds of saccade adaptation have been reported in the literature: A fast adapting process associated with changes in saccade dynamics and a slower process which might involve plasticity in the saccade target representation. We found that mislocalization was induced only by the latter mechanism. The magnitude of the mislocalization depended on the size and persistence of errors between intended and actual saccade amplitudes. Modulations of saccade adaptation by changes in initial eye position were followed by comparable modulation in visual mislocalization. The tight agreement between the change of eye movement control and the change of localization shows that perceptual space is shaped by motor knowledge rather than simply constructed from visual input.

Analysis of speech characteristics during an interview may provide direct access to emotional state in the domain of disgust sensitivity

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Based on the component process model of emotion (Scherer, 1986) emotional states inflect vocal parameters of speech. In line with the MODE model (Fazio, 1990) for the application of emotion regulation strategies cognitive control resources are needed. In our study (N =104; 2386 speech samples) we investigated whether disgust relevant parameters of a computer based acoustic speech analysis (Praat speech analysis software, Boersma, 2001) predict self-rated disgust state after the presentation of disgusting stimuli. In the analysis we considered acoustic features related to the process of respiration, phonation and articulation. We expected a higher correlation for subjects low in availability of control resources than for subjects with available control resources. The availability of control resources was manipulated by deprivation of sleep vs. no deprivation. Preliminary results show the several significant acoustic correlates of disgust, i.e. features related to changed intonation, pressed speech, and nasality.

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