

Poster I

01 | Pia Fenske, University Hildesheim | Vestibular and Stimulus Location Influences on the Simon Effect

Clinical researchers have found that if the vestibular system malfunctions, cognitive functions such as visuospatial abilities and attention and even executive functions can also be in disorder (Bigelow & Agrawal, 2014). But - although, not many studies with healthy participants exist - it seems that stimulation of the vestibular system can also enhance the performance in cognitive tasks.

The present study functions as a baseline study to investigate how the vestibular system influences cognition. Participants are asked to perform a Simon Task with colored circles two times: sitting and standing up. The well-known Simon Paradigm investigates how an irrelevant stimulus position influences the reaction times in a spatial stimulus-response task (Simon & Rudell, 1967). In trials where stimulus and response key position are compatible, reaction times are usually faster than on incompatible trials. While being one of the most reliable effects, not many studies have examined if the Simon Effect also appears when the stimuli are presented in the most outer eccentricities of a computer screen. Hommel (1993) results showed a Simon Effect only in the low eccentricity condition.

We conducted an experiment with a 2 (compatibility: compatible vs. incompatible) x 2 (body position: sitting vs. standing) x 3 (eccentricity: low, medium, high) experimental design. We expect to find a Simon Effect with faster reaction times in compatible trials. Besides, we expect the Simon Effect to be modulated by the eccentricity – a larger Simon Effect in the low eccentricity and by body position.

02 | Devu Mahesan, University of Greifswald | Interference in dual tasks: The impact of Task 2 response inhibition on processing affective Task 1 stimuli | Devu Mahesan & Rico Fischer

Backward crosstalk effects (BCE) are observed in dual-task studies when the characteristics of Task 2 (T2) influences Task 1(T1) performance. A particularly interesting type of BCE, known as the nogo BCE, is reported when T2 is a go/no-go task. The usual observation is that when T2 is a nogo (withholding the response), T1 processing takes longer than when T2 is a go. Nogo BCE is due to the response inhibition needed to inhibit an already prepared R2 spilling over to T1 motor execution. Growing evidence shows that response inhibition causes affective devaluation of the associated stimuli, possibly due to the negative affect immediately elicited by inhibition. It is unclear how nogo BCE based on response inhibition would impact affective processing in T1? In two experiments, participants categorized S1 as positive or negative, followed by a T2 which required a go/no-go response depending on the color. Results showed a large nogo BCE when S1 was positive. That is, withholding R2 considerably slowed R1 execution when reacting to positive T1. Surprisingly, the nogo BCE was absent when S1 was negative. Results are discussed in the context of an affective mismatch between S1 valence and R2 response-type (go vs. no-go).

03 | Hannah Dames, University of Freiburg & University of Zurich | Directed Forgetting of Stimulus-Action and Stimulus-Classification Associations | Hannah Dames¹, Marco Ragni^{1,2}, Andrea Kiesel¹ & Christina U. Pfeuffer¹

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Directed forgetting (DF) experiments demonstrate that humans can intentionally forget previously-learned information. Whereas many studies have demonstrated DF for item memory, it is still unclear if (and how) DF affects item-based associations. In the present study, we investigated whether the instruction to remember or forget a stimulus affected the formation or retrieval of corresponding stimulus-action (S-A; stimulus - motor output) and stimulus-classification (S-C; stimulus – task-specific semantic classification) associations. To do so, we combined the DF item-method and item-specific priming. In a prime phase, participants formed associations between presented stimuli and actions/classifications. After stimulus offset, a memory cue indicated whether participants should remember or forget the stimulus for a memory test at the end of the experiment. In the following probe phase, participants responded to the same stimuli and S-C or S-A mappings item-specifically repeated or switched. Unexpectedly, in our first experiments, probe performance did not differ between to-be-remembered and to-be-forgotten stimuli regarding S-A priming effects. However, we found indications that the memory instructions themselves affected learning. Currently, we are conducting follow-up experiments to further investigate DF of S-C associations. We discuss how the voluntary control of item and associative memory can be investigated in the future and whether/how associations between items and actions/classification can be intentionally forgotten or not.

04 | Sebastian Hellmann, University of Eichstätt-Ingolstadt | Sequential sampling models for confidence in perceptual decision-making

Many decisions must be made with incomplete information. The ability to evaluate the resulting uncertainty is a key aspect of metacognition. As both confidence judgments and reaction times are expected to be closely related to sensory uncertainty, a mathematical model of human perceptual decision-making should be able to explain them both. We propose the new two-stage dynamical evidence and visibility model, an extension of the popular drift diffusion model of decision making, to account for choices, reaction times and confidence at the same time. The decision process in a binary perceptual task is described as a Wiener process accumulating sensory evidence about the choice options bounded by two constant thresholds. To account for confidence judgments, we assume parallel accumulation of information about the reliability of the present stimulus. In addition, there is a period of post-decisional accumulation of sensory evidence to allow for changes of mind. We examined model fits in a post-masked orientation discrimination task with varying stimulus-onset-asynchrony and subsequent confidence judgments. A comparison between the two-stage evidence and visibility, two-stage dynamical signal detection theory and several versions of the race models of decision making showed that only the new two-stage evidence and visibility model produced an acceptable fit to choices, confidence, and reaction time. This finding suggests that confidence judgments may depend on parallel estimates of sensory uncertainty. Further work will focus on the application of the idea of an additional visibility accumulation to race models.

05 | Vanessa Mitschke, University of Würzburg | Validating a new paradigm for the measurement of aggressive tendencies in competition / cooperation

Aversive Image TAP - Developing a version of the Taylor Aggression Paradigm using aversive images as punishment. We collected data about punishment decisions based on prior provocation, indicators of current state (valence, arousal, dominance) and overall attitudes towards the opponent (fairness and liking ratings) and modulations due to trait aggressiveness. We gathered data from a first pilot study and now want to discuss how to proceed with validating the paradigm and add a cooperation variant (featuring positive images).

06 | Marlene Wessels, University of Mainz | Improving time-to-collision estimation for accelerating vehicles

Previous studies have shown that people make significant errors in judging the time-to-collision (TTC) of visually presented accelerating objects, as acceleration information is largely unconsidered. However, there may be cues that can help assess acceleration information and thus improve TTC estimation. In an initial study, we presented a vehicle in an urban traffic scenario either audiovisually or only visually to investigate the potentially supporting role of auditory information. Participants estimated the TTC of vehicles approaching either at constant speed or under acceleration. At constant speed, TTC estimates for audiovisually presented vehicles were similar to those in the visual-only condition. For accelerating vehicles, however, TTC was significantly overestimated in the visual-only condition. In comparison, the extent of TTC overestimation was significantly reduced for audiovisually presented accelerating vehicles. Thus, complementary auditory information provides a significant advantage for estimating TTC for accelerating vehicles in traffic scenarios. In an ongoing second study, we address the question whether visual cues can be similarly helpful in TTC estimation. Here, participants estimate TTC of visually presented vehicles in a traffic scenario similar to the first study. In the acceleration condition, a visual marker on the vehicle indicating a present acceleration is either displayed or not. We expect the visual marker to improve the TTC estimation for accelerating vehicles.

Online 1 | Solveig Tonn, University of Würzburg | Agency for prevention behavior | Solveig Tonn, Lisa Weller, Katharina Schwarz, Wilfried Kunde & Roland Pfister

When acting, we affect our environment. In doing so, we generally feel in control of our actions and their consequences, a phenomenon termed sense of agency. Agency is well documented for actions that aim at causing perceivable effects in the environment, but not all actions aim at causing an effect – rather, actions may also aim at preventing a certain event from occurring. Such prevention behavior poses a critical challenge to the cognitive system, because successful prevention inherently revolves around the absence of a perceivable change. Based on a series of experiments, we will show that this state of affairs leads to a profound dissociation of explicit and implicit measurements of agency: Whereas participants reported high levels of agency in explicit judgements, there was no sign of agency in corresponding implicit proxies, i.e., temporal binding. These results attest to an altered action representation for prevention behavior and support recent proposals to model related processes such as avoidance learning in terms of propositional rather than associative terms.

Online 2 | Sarah Koch, University of Halle-Wittenberg | The influence of magnitude expectation on the processing of loudness and pitch

Previous research suggests the existence of a generalized magnitude representation system (e.g. A Theory of Magnitude, Walsh, 2003) for various magnitude dimensions like numbers, time, or space. A few studies indicate possible interaction effects between magnitude dimensions and auditory dimensions like pitch and loudness (e.g. Campbell & Scheepers, 2015; Hartmann & Mast, 2017). However, whether these auditory dimensions are also represented by a generalized magnitude representation system is still an open question. I will investigate this assumption in an online experiment by testing the effect of magnitude expectation on reaction times in a loudness discrimination task and a pitch discrimination task. In each trial, participants will see a number sequence in ascending, descending, or random order to induce an expectation about the next item's magnitude. After the last number, a tone varying in either loudness or pitch will be presented, and participants will have to decide whether the tone was loud/gentle or high/low. If loudness, pitch, and numbers are represented on the same generalized magnitude representation system, the tone's characteristic will either confirm the magnitude expectation (a loud/high tone after ascending order and a gentle/low tone after descending order) or violate the magnitude expectation. Reaction times should be shorter when the magnitude expectation is confirmed in comparison to the random order. Likewise, reaction times should be longer when the tone's characteristic violates the magnitude expectation. Preliminary data will be presented and the implications for a generalized magnitude representation system for loudness and pitch will be discussed.