



Tag der Kognitionswissenschaften 2023

June 12, 2023 / 14:15 – 18:00 / Campus Golm

Programm

Location: Building 06, Room 1.01

14:15 – 14:25 **Introduction**

UFSKW PhD-Candidates Talks

14:25 – 14:45 **The P600 & phasic norepinephrine release during sentence comprehension**

Friederike Contier

Supervisors: Milena Rabovsky, Mathias Weymar and Isabell Wartenburger

14:45 – 15:05 **Effects of Meaning-Based Scene-Object Relations on Visual Attention**

Pelin Celikkol

Supervisors: Jochen Laubrock & David Schlangen

15:05 – 15:25 **Effects of Maternal Gaze on Infant Brain Activity and Word Segmentation**

Monica Vanoncini

Supervisors: Ezgi Kayhan-Wagner, Natalie Boll-Avetisyan, Birgit Elsner

15:25 – 15:45 **Fast planning - fast production? The link between high-level planning and acoustic duration in single word production**

Marie Hansen

Supervisor: Audrey Bürki

Location: Building 14, Room 0.47

16:00 – 17:45 **Business Meeting (Mitgliederversammlung)**

18:00 **Potluck**

Abstracts

(UFSKW PhD-Candidates Talks)

The P600 & phasic norepinephrine release during sentence comprehension

Friederike Contier

The P600 event-related component is elicited by a wide range of anomalies in the linguistic input, such as structural violations, ambiguities, and semantically deviant words. Traditionally, the component has been interpreted as a signal of specific linguistic combinatorial operations and continues to inform neurocognitive models of language comprehension (e.g., Kuperberg, 2021, *Top. Cogn. Sci.*). However, the P600 – just like the earlier domain-general P3 component – has alternatively been proposed to signal phasic norepinephrine (NE) release from the locus coeruleus (LC) to salient and motivationally significant stimuli more generally (e.g., Bornkessel-Schlesewsky & Schlewsky, 2019, *Front. Psychol.*). At the UFSKW meeting, I will present results of three EEG studies testing different hypotheses following this proposal: 1) The amplitude of the P600 and P3 should correlate with NE biomarkers, such as the task-evoked pupillary response, 2) The P600 and P3 should be modulated if NE is manipulated, for example via transcutaneous vagus nerve stimulation, and 3) Since NE concurrently projects to limbic structures, enhanced NE release (and thus, larger P600 amplitudes) should lead to more pronounced explicit memory effects. The pattern of results will contribute to our understanding of the neurobiological basis of the P600 ERP component, and specifically inform the debate on whether it shares a neural generator with the domain-general P3.

Effects of Meaning-Based Scene-Object Relations on Visual Attention

Pelin Celikkol

The relative contribution of bottom-up and top-down attentional guidance is a central topic in vision research. While the bottom-up modulation of attention refers to a process where low-level scene features guide attention, top-down modulation refers to guidance by the viewer's knowledge and expectations accumulated throughout a lifetime. In our project, we aim to explore the influence of scene-object relations on viewing behavior in an attempt to address the relationship between scene-relevant expectations and visual attention. To assess top-down guidance in real-world scenes, we score the relevance of linguistic object labels using methods from document analysis, specifically, the term frequency-inverse document frequency (TF-IDF), a statistic intended to reflect how important a word is to a document. We use TF-IDF as a proxy for how important a specific object is to a scene category and use these scores to predict eye movement distributions over scenes. Our results show that scene-specific objects are more likely to be fixated, suggesting that an object's meaning in relation to a scene affects attention during scene perception. Building upon our current results, we aim to investigate meaning-based influences on the sequential nature of attention and the role of top-down guidance in multimodal processing.

Effects of Maternal Gaze on Infant Brain Activity and Word Segmentation

Monica Vanoncini

The social brain, consisting of those areas sensitive to social information, has been argued to “gate” the mechanisms involved in human language learning. Early preverbal interactions are guided by ostensive signals, such as gaze patterns. However, little is known about how the infant brain processes social gaze in naturalistic interactions and how this relates to infant language development. During free play of 9-month-olds with their mothers, we recorded fNIRS hemodynamic cortical activity and micro-coded different gaze behaviors (i.e., mutual gaze, infant’s or mother’s social gaze) offline. Infants’ speech processing abilities were assessed with a word segmentation task. Using multidimensional joint recurrence quantification analysis (MdJRQA), we examined which gaze type was related to the highest infant’s hemodynamic cortical activity, in terms of Recurrence Rate. Regression modeling revealed that maternal social gaze co-occurred more often with high infant’s cortical activity compared to the other gaze types. Moreover, using recurrence quantification analysis (RQA) we found that maternal social gaze also was the gaze behavior that best predicted infant’s word segmentation, in terms of Entropy. The findings further support the importance of social interaction in language development, particularly highlighting a specific aspect, i.e., maternal social gaze.

Fast planning - fast production? The link between high-level planning and acoustic duration in single word production

Marie Hansen

Decades of experimental research on language production have shown that planning processes are reflected in response latencies (i.e., the time interval between the presentation of a stimulus and the onset of the vocal response) and that some words can be planned faster than others. For instance, more frequent words can be accessed faster. The acoustic duration of the produced word has also been used as a marker of planning. Yet, there is no clear evidence to date that acoustic durations indeed reflect high-level planning processes. The presented work is part of a registered report that is designed to clarify this issue. To test whether experimental manipulations known to reliably impact response latencies also impact acoustic durations, we analyze several datasets collected with the picture-word interference paradigm. In this paradigm, participants name pictures presented along with phonologically or semantically related or unrelated distractor words. The relationship between target and distractor impacts response latencies. With this data we examine both semantic and phonological processing stages. To additionally test the claim that acoustic durations mostly reflect high-level planning when participants are forced to plan their speech more incrementally, we also analyze data from a setup with responses produced under time pressure. The results are discussed in the light of psycholinguistic theories of language production and different accounts postulating a direct link between response latencies and acoustic durations.