INSTITUTE OF PSYCHOLOGY

UNI GRAZ

19th Doctoral Congress

November 20th, 2020

Program & Abstracts

Organiser:

Doctoral School

Head: I. Papoušek

Hosted by:

Educational Psychology

Head: M. Paechter

Organising Team:

D. Skliris, D. Macher, M. Eglmaier, S. Roßkogler, M. Paechter

PROGRAM

Overall time schedule for presentations

9:00 - 9:10	Opening
9:10 - 10:50	Presentations on *Health and therapy*
10:50 - 11:15	Coffee & tea break
11:15 - 12:30	Presentations on *Visual experience, neural activation, cue reactivity*
12:30 - 13:30	Lunch break
13:30 - 14:45	Presentations on *Emotion and cognition in applied contexts*
14:45	Closing, end of doctoral congress

PROGRAM – SESSIONS AND PRESENTATIONS

09:00 – 9:10 Opening

Ao. Univ.-Prof. Dr. Ilona Papoušek
Head of Doctoral School

Univ.-Prof. Dr. Manuela Paechter
Educational Psychology

09:10 –10:50 1st Session: Health and therapy
Chair: Manuela Paechter

9:10 Electronic health record use and its impact on health professionals in hospitals (Planning)
Cordula Kupfer (Work and Organizational Psychology / Kubicek)

9:35 Neurological and cognitive functions in multiple sclerosis (Planning)
Stefanie Hechenberger (Biological Psychology / Pinter, Fink)

10:00 A meta-analytic evaluation of internet-based cognitive-behavioral therapy and virtual reality exposure therapy (Final)
Martin Polak (Health Psychology / Tanzer)

10:25 You eat with your eyes first: An investigation of different approaches to reduce visual food cue reactivity (Final)
Jonas Potthoff (Clinical Psychology / Schienle)

10:50 – 11:15	**Coffee & tea break**

11:15 – 12:30	**2ⁿᵈ Session: Visual experience, neural activation, cue reactivity** Chair: Stephan Vogel

11:15 Fine-scale neural activation patterns of missing visual input (Planning)
Ana Arsenović (Cognitive Psychology and Neuroscience/ Zaretskaya, Ischebeck)

11:40 The effects of imaginary eating on visual food cue reactivity: An event-related potential study (Planning and first results)
Saša Zorjan (Clinical Psychology / Schienle)

12:05 Prestimulus activity and functional connectivity predicting subjective visual experience (Planning)
Marilena Wilding (Cognitive Psychology and Neuroscience / Zaretskaya, Körner)

12:30 – 13:30	**Lunch break**

13:30 – 14:45	**3ʳᵈ Session: Emotion and cognition in applied contexts** Chair: Katja Corcoran

13:30 Trusting a humanoid robot in the work context (Planning)
Agnes Altmanninger (Work and Organizational Psychology / Kubicek)

13:55 Cognition, emotion, and functional brain changes to improve prediction of outcome in young stroke patients (Planning)
Viktoria Fruhwirth (Biological Psychology / Pinter, Weiss)

14:20 Enhancing collaboration in complex problem-solving through computer-supported knowledge (Planning)
Nicole Hynek (Cognitive Psychology and Neuroscience / Albert)

14:45	**Closing, end of doctoral congress**

Note

The link to the video conference, posters, and further information can be found in the Moodle environment for the doctoral congress (20W 602.908 Dissertant*innenseminar Psychologie).

POSTERS IN THE MOODLE ENVIRONMENT, FROM NOVEMBER 20TH TO 27TH

Posters
Sabrina Finke   Early cross-format integration of number words and digits in adults, but not in children   (Developmental Psychology / Landerl, Kemény)
Doris Grössinger   Arterial spin labeling neurofeedback of the anterior insula - a proof of principle   (Neuropsychology / Wood)
Gabriela Hofer   Ability perception in speed dating and beyond: Self-other knowledge asymmetries at different levels of acquaintance   (Differential Psychology / Neubauer)
Nina Jurinec   Placebos vs. SMS reminders as additional treatment components in cognitive-behavioral therapy for depression   (Clinical Psychology / Schienle)
Michaela Meier   A systematic investigation of cognitive abilities and personality traits of mathematicians   (Educational Neuroscience / Grabner, Vogel)
Norah Neuhuber   Calibrated trust in the automotive context   (Work and Organizational Psychology / Kubicek)
Isabella Unger   Comparison of women with high vs. low food addiction tendency: A pilot study with voxel-based morphometry   (Clinical Psychology / Schienle)

Note

Posters and a discussion forum for each poster can be found in the Moodle environment for the doctoral congress (20W 602.908 Dissertant*innenseminar Psychologie). Please use the opportunity to discuss the posters with the doctoral students in the forum for each poster!

ABSTRACTS FOR PRESENTATIONS

Trusting a humanoid robot in the work context

Agnes Altmanninger

Supervisor: Bettina Kubicek

Cooperation partner: Reinhold Esterbauer (Institute of Philosophy/Faculty of Catholic Theology)

Work and Organizational Psychology

Robots independently support humans in their work tasks. Even though robots are clearly recognized as artificial machines, humans do react socially toward them and (believe to) perceive intentionality in their behaviour and develop a sort of trust toward them. Interpersonal trust implies that the trustor is vulnerable [1], but has positive expectations toward the trustee [2] in uncertain situations [3].

Regarding human-robot-interaction, a multitude of definitions and measurements of trust have been developed. Therefore, the first step of the dissertation project is to define a concept of trust regarding human-robot-interactions in the work context based on a systematic analysis of existing literature. In the following, we will conduct empirical studies to measure trust in situations where humans work together with humanoid robot Pepper (Softbank Robotics). Additionally, factors which influence the level of trust that humans place in a robot will be explored. This research aims to gain a deeper understanding of human collaboration with artificial agents.

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Fine-scale neural activation patterns of missing visual input

Ana Arsenović

Supervisors: Natalia Zaretskaya, Anja Ischebeck

Cognitive Psychology and Neuroscience

Visual context is one of the crucial factors in generating subjective visual experience. A popular approach for studying contextual effects in the brain is omitting a part of a visual scene and investigating brain activity patterns within the topographic representations of the omitted part in early visual areas [1]. This approach revealed that fine-scale activity patterns of non-stimulated cortex carry information about the surrounding context. These findings are typically interpreted within the framework of the predictive coding theory [2,3], which suggests that feedback connections from higher- to lower-level areas play a central role in generating context-dependent effects. However, the exact perceptual process that generates these effects is not clear. They could be produced by a prediction based on the global scene layout, local filling-in of the missing information, or a simple activity "spillover" via the horizontal connections. In this study, we will examine which of these factors contribute to the neural representation of the missing part of a scene. We use Kanizsa shape - an illusion in which the right orientation of the surrounding inducers produces perception of an illusory shape [4]. Leaving out one of the inducers allows us to independently manipulate the global scene layout, shape information and inducer proximity, thereby assessing the role of these factors in representation of missing information. We will measure brain activity with functional magnetic resonance imaging (fMRI) and perform multivariate pattern analysis (MVPA) to determine under which conditions the activation patterns in the areas representing the missing inducer contain contextual information.

References

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Cognition, emotion, and functional brain changes to improve prediction of outcome in young stroke patients

Viktoria Fruhwirth

Supervisors: Daniela Pinter, Elisabeth Weiss

Biological Psychology

Stroke is the leading cause of long-term disability in adults. 10-15% of stroke patients are so-called "young stroke patients", aged 18-55 years. Impairment in young stroke patients is common and affects multiple domains such as cognition and emotion (e.g. depression and anxiety). Young stroke patients are particularly affected by post-stroke disability due to major life responsibilities (e.g. work, family). Therefore, predicting stroke-outcome and optimizing rehabilitation (e.g. enhancing psychological resilience) within this specific stroke population is of high importance. Growing evidence shows that prediction of stroke-outcome improves by knowledge about cognitive and emotional state, in addition to baseline clinical scores. However, even in patients with similar neurological impairment, outcome and rehabilitation success varies widely, most likely due to different capacities for brain reorganisation. Especially in acute patients, functional brain changes have great potential to more precisely predict short-term stroke outcome. Consequently, this study aims to assess the additional value of cognition, emotion, and functional brain connectivity in acute young stroke patients for outcome prediction. Within two years, we intend to include at least 141 acute, imaging-proven ischemic stroke patients aged 18-55 years. The behavioural test battery including clinical scores, cognitive assessment and questionnaires will be obtained at acute stage and after three months post-stroke. MRI will be conducted at the acute stage. In the first year, we will focus on outcome prediction three months post-stroke. In the second year, we will conduct a resilience intervention. This project could extend our knowledge in predicting stroke-outcome and optimizing rehabilitation in young stroke patients.

Neurological and cognitive functions in multiple sclerosis

Stefanie Hechenberger

Supervisors: Daniela Pinter, Andreas Fink

Biological Psychology

Cognitive impairment is present in 40-70% of patients with multiple sclerosis (pwMS). It occurs already at the disease onset and is now viewed as one of the most disabling symptoms. However, standard clinical care in MS does not include neuropsychological assessment or monitoring. This dissertation project comprises three studies:

The aim of the first study is to evaluate the feasibility of a self-administered iPad based cognitive screening tool (processing speed test, PST) to assess cognitive function in MS as well as its effectiveness compared to a standard battery of neuropsychological tests.

Secondly, associations between cognitive function assessed by self-administration or neuropsychological testing with MRI parameters (structural damage of grey and white matter) will be explored.

Besides cognitive deficits, fatigue, depression and anxiety are also part of the "so-called" hidden symptoms in pwMS. Therefore, in the third study we will investigate the relationship between these hidden symptoms, cognitive function and physical impairment. For this dissertation project, 150 pwMS and 50 age-, sex- and education-matched healthy controls will undergo clinical (e.g. physical impairment and disability), neuropsychological (e.g. cognition, depression, fatigue) and MRI assessment (e.g. volume of inflammatory lesions, atrophy). Patients undergo all assessments at the same day, lasting about 2.5 hours. Results will give further information about 1) clinical feasibility and relevance of a self-administered cognitive screening tool, 2) the relationship between MS-related structural brain changes and cognitive function and 3) the effect of possibly existing hidden symptoms regarding the extent of physical impairment.

Enhancing collaboration in complex problem-solving through computer-supported knowledge visualizations

Nicole Hynek

Supervisor: Dietrich Albert

Cognitive Psychology & Neuroscience

Group research examining situations of successful problem-solving shows that group members must succeed in combining and integrating their different knowledge to develop more comprehensive, solution-relevant knowledge [1-2]. In group discussion, however, individuals favor processing information that is familiar to them and corresponds to prior knowledge and preferences [1-3]. Psychological research on computer-supported collaboration indicates that the integration of unshared or controversial information can be enhanced through *knowledge awareness* by making group members' task-relevant knowledge visually accessible, e.g. through cognitive maps [4-5]. Yet, it is not clear which processes are triggered through visualization-supported knowledge awareness and under which conditions these processes are initiated. A first study will examine the assumption that the provision of visual information (IV) facilitating comparisons of the knowledge distribution within a group, shifts the discussion towards unshared knowledge elements (DV-1), and promotes collaborative inferences (DV-2). The experiment will be a 2 × 2 factorial design providing salient vs. non-salient visual differentiation of one's knowledge from partners' knowledge (IV-1) and structural vs. non-structural information on partners' knowledge (IV-2). Within an agent-simulated group chat, the effects of these visual manipulations will be measured by the frequency of unshared knowledge elements addressed during the exchange and patterns of collaborative inferences [2]. The experimental setting will consist of different software components: An information space with the group members' knowledge visualizations, and the simulated group chat environment. The experimental task is to solve a complex problem requiring the participant to exchange unshared information and draw inferences by addressing agents' unique knowledge elements.

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Electronic health record use and its impact on health professionals in hospitals

Cordula Kupfer

Supervisor: Bettina Kubicek

Work and Organizational Psychology

Workers in hospitals are more and more dependent on information about patients stored in computer systems, so-called electronic health records (EHRs). It has been shown that implementing EHRs in hospitals is associated not only with improved quality of documentation and care, but also with changes to workflow and work interruptions [1] or information overload [2]. Based on action regulation theory, the doctoral thesis aims to identify the effects of EHR application on the work organization and working conditions of occupational and physio therapists in Austrian hospitals. A systematic literature review will provide an overview of previous studies on EHR use and its impact on health professionals in hospitals. A mixed methods approach including telephone interviews, observations, focus groups, cognitive interviews and an online survey is applied to identify effects on and possible risks specific to occupational- and physiotherapists when working with EHRs. Based on the results, a vignette study will be designed to test, in a quasi-experimental setting, different scenarios with regard to the integration of EHR into work processes and their effects on work-related outcomes. The findings may support future developments and implementations of EHRs in hospitals.

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A meta-analytic evaluation of internet-based cognitive-behavioral therapy and virtual reality exposure therapy in psychiatric disorders

Martin Polak

Supervisor: Norbert Tanzer

Health Psychology

Compared to conventional psychological treatments, internet-based cognitive-behavioral therapy (iCBT) and virtual reality exposure therapy (VRET) present both innovative and efficient alternatives in the treatment of anxiety disorders. The aim of this dissertation was to perform several meta-analyses investigating the efficacy of transdiagnostic and disorder-specific self-help and/or guided self-help iCBT for adults with panic disorder with or without agoraphobia (PD/A) and VRET for adults with social anxiety disorder (SAD). The efficacy of these novel treatments was investigated in selected randomized controlled trials (RCTs), published in peer-reviewed journals. Changes in symptoms were assessed on primary (disorder-specific symptoms), secondary (comorbid general anxiety and depression symptoms) and tertiary (quality of life improvements) levels. In all meta-analyses, iCBT and VRET were compared to both inactive and active control groups. In each study, wait-lists and information controls served as inactive controls and face-to-face cognitive-behavioral therapy (fCBT) as active controls. When calculating effect sizes, we used between-group design and Hedges´s g for post-test and follow-up estimations. Heterogeneity analysis, as well as publication bias and risk of bias analysis were performed and interpreted. In search for potential moderators of treatment effect, subgroup-analyses of variables such as adherence to the treatment, treatment uptake, study context and/or sample size were performed. There was no statistically significant difference found between iCBT and fCBT in PD/A but a statistically significant difference between VRET and fCBT in SAD. Our findings support the growing evidence base for internet-delivered psychological interventions as effective, and in many aspects advantageous approach to mental health care.

You eat with your eyes first: An investigation of different approaches to reduce visual food cue reactivity

Jonas Potthoff

Supervisor: Anne Schienle

Clinical Psychology

Background: Attentional biases to visual food cues have been associated with overeating and weight gain (obesity). The modification of visual food cue reactivity (FCR), particularly to high-calorie cues, may support healthy food consumption behavior.

Method: In three eye-tracking studies, my dissertation has focused on gaze behavior during visual food cue perception. I have examined the effectiveness of different treatment methods (providing a placebo, nutritional information) to reduce FCR. Furthermore, the relationship between FCR, weight-concerns, weight-status, and visual context was investigated.

Results: In study I, a placebo labeled as appetite suppressant effectively reduced appetite and dwell-time spent on food cues. In study II, the suggestion of a high sugar content via 'traffic light' nutrition information delayed the gaze relocation away from sweet food images. In study III, high-calorie food cues attracted early automatic attention. Later, visual attention was shifted towards simultaneously presented low-calorie cues. This approach-avoidance behavior was independent from the weight-status and weight-concerns of participants.

Conclusion: The findings of study I & II suggest that visual FCR can be effectively modified via verbal or pictorial suggestions, which could be promising tools in eating disorder therapy. Results of study III suggest to consider the time-course of visual approach-avoidance behavior during food cue exposure. Study III also indicates that high-calorie food cues are more likely to be avoided when low-calorie food stimuli can be approached as an alternative.

Prestimulus activity and functional connectivity predicting subjective visual experience

Marilena Wilding

Supervisors: Natalia Zaretskaya, Christof Körner

Cognitive Psychology and Neuroscience

The neural mechanisms that underlie our subjective perception of the environment are currently thought to be a complex interaction between the processing of our bottom-up sensory input and top-down accurate predictions of the external world [1]. The exact neural mechanisms underlying this interaction have not been sufficiently revealed. Specifically, it is not clear whether top-down predictive effects are formed prior to sensory input, and whether those are related to and can be detected in slow fluctuations of resting-state fMRI activity. Prior studies demonstrated functional measures before the stimulation to be predictive of the participants' subjective percept, but these studies explicitly induced expectations about the upcoming stimulus, or focused on only a subset of brain areas, never examining network-level interactions [2-3]. In this study, we will present a bistable motion stimulus [4], which can be perceived either as illusory squares ("illusion"-condition) or local movement of elements ("non-illusion"-condition), without any change in sensory information. It thus allows the isolation of specific neural mechanisms underlying top-down influences on sensory areas in an unbiased manner. To measure these influences, we will use whole-brain fMRI in a combination of resting-state and event-related experimental design. Participants will be asked to fixate their gaze on a white dot for most of the time. At random intervals they will be presented with the stimulus and asked to report their subjective perception. By comparing resting-state data preceding "illusion" and "non-illusion" trials, we will determine whether spontaneous signal fluctuations and inter-regional communication *before* stimulus onset can predict their subsequent percept.

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The effects of imaginary eating on visual food cue reactivity: An event-related potential study

Saša Zorjan

Supervisor: Anne Schienle

Clinical Psychology

Previous research has demonstrated that imagining consumption of a specific type of food helps individuals to consume less of that food. The present event-related potential study aimed at investigating the underlying neural correlates of this appetite-reducing strategy. A total of 86 women (mean age = 23.65 years) were randomly assigned to one of three imagination conditions. In each condition, they listened to a guided imagery script that either described the eating of 30 colorful button-shaped chocolates (M&Ms), the sorting of 30 M&Ms by color, or the sorting of 30 marbles by color. Subsequently to the imagery task, the participants were presented with images of M&Ms and marbles while their electroencephalogram and craving ratings were recorded. The results showed that imaginary eating did not reduce the appetitive value of M&M pictures. The M&M sorting group reported enhanced craving and showed increased late positivity toward M&M pictures (300–600 ms after picture onset) compared to the two other groups. The present findings indicate that the imagined handling of food increases food cue reactivity and that imaginary eating is not a reliable method to reduce appetite.

ABSTRACTS FOR POSTERS

Early cross-format integration of number words and digits in adults, but not in children

Sabrina Finke

Supervisors: Karin Landerl, Ferenc Kemény

Developmental Psychology

Converting digits to number words and vice versa seems to be an effortless process in adults. It is as yet unclear whether the integration of the two formats takes place automatically, and how it develops during childhood. We investigated whether the representation of an Arabic digit is automatically and involuntarily activated upon hearing the corresponding number word in adults and nine-year-olds. In an ERP experiment, we presented participants (20 adults and 20 nine-year-olds) with unimodal (two digits) or cross-modal (one number word and one digit) number pairs, which were either identical (e.g., "one" and 1) or non-identical ("one" and 9). We designed a passive task in which participants did not respond to numerical stimuli. Adult ERPs showed strong effects of congruency, both uni- and cross-modally: The P2p component was more positive for incongruent than congruent number pairs. As the P2p emerges in an early time window before conscious processing, this indicates an automatic integration of number words and digits. In the later P300 window, we found more positive amplitudes for incongruent number pairs in the unimodal condition, indicating semantic processing. Conversely, we did not find a P2p effect of numerical congruity in 9-year-olds. In this age group, we could only replicate the later unimodal P300 effect. Thus, both age groups seem to process unimodal number pairs semantically, even though access to the number semantic was not required. We could show that adults integrate number words and digits automatically, while 9-year-olds do not, suggesting that this integration process develops over an extended period and is still ongoing in 9-year-olds.

Arterial spin labeling neurofeedback of the anterior insula – a proof of principle

Doris Grössinger

Supervisor: Guilherme Maia de Oliveira Wood

Cooperation partners: Rudolf Stollberger, Stefan Spann (TU Graz)

Neuropsychology

Real-time fMRI (functional magnetic resonance imaging) neurofeedback allows high-resolution feedback for the whole brain, but it does not allow a direct statement on blood perfusion. Arterial Spin Labeling (ASL) is a gold standard for perfusion measurements, but has never been used for neurofeedback [1]. Our aim was to investigate if participants can control their blood perfusion in the anterior insula by using emotion imagery. Other studies [e.g. 2] already demonstrated that modulating the insula activation using BOLD neurofeedback is possible. Therefore, we expected participants to successfully control their insula perfusion.

Participants receiving genuine neurofeedback with or without explicit instructions showed a relative increase in cerebral blood flow in the insula over multiple runs. Participants who received sham feedback, based on the brain signal of another participant, did not show increased insula activation. Time-course analysis of the insula also showed an activation peak at the beginning of the emotion condition, which is more pronounced in participants receiving real feedback. However, despite these results, in a whole brain analysis none of the participants showed activation in the insula. Therefore, further analyses of the data are necessary to evaluate successful regulation.

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Ability perception in speed dating and beyond:
Self-other knowledge asymmetries at different levels of acquaintance

Gabriela Hofer

Supervisor: Aljoscha C. Neubauer

Differential Psychology

Vazire's [1] self-other knowledge asymmetry model focuses on differences in self- and other-knowledge of traits and explains them through differences in trait observability and evaluativeness. The model predicts accuracy-benefits of other-estimates of observable traits and accuracy-benefits of self-estimates for non-evaluative (i.e., neither socially desirable nor undesirable) traits. Recent work [2] has shown asymmetries in the accuracy of ability self-estimates by adolescents and peer-estimates by their classmates. The present study compared the accuracy of ability estimates by individuals themselves and knowledgeable informants to estimates by strangers made after 3-min speed-dating encounters. Additionally, the suitability of observability and evaluativeness as predictors of self-other asymmetries in the ability realm was put to a first test. 175 adults (87 women) completed measures for verbal, numerical and spatial intelligence, creativity, and intra- and interpersonal emotional competence, provided self- and a contact for informant-estimates, and participated in a speed dating event. Measures of individual importance and judgment certainty about the estimates provided at speed dating were collected for each domain to approximate evaluativeness and observability, respectively. While the self had an accuracy advantage for judgments of numerical intelligence, creativity, and intra- and interpersonal competence, only informant-estimates of verbal intelligence and only stranger-estimates of spatial intelligence showed relevant accuracy. However, these differences in accuracy were not accompanied by related differences in the individual importance or judgment certainty of the respective domains. Overall, results support the existence of self-other knowledge asymmetries in the ability realm but their determination by evaluativeness and observability is yet to be confirmed.

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Placebos vs. SMS reminders as additional treatment components in cognitive-behavioral therapy for depression

Nina Jurinec

Supervisor: Anne Schienle

Clinical Psychology

Patients with depression often experience difficulties with completing homework assignments during cognitive-behavioral therapy (CBT). The present study investigated the effects of two additional CBT components: a specific placebo and short message service (SMS) reminders to improve the practicing of a daily relaxation exercise during a four-week outpatient program. A total of 86 patients diagnosed with major depressive disorder (moderate to severe symptoms) were randomly assigned to one of three groups: 'Coping with Depression' course (standard group), 'Coping with Depression' course with daily placebo treatment (placebo group), or 'Coping with Depression' course with daily SMS reminders (SMS group). The placebo (sunflower oil) was introduced as a natural medicine to mobilize the bodies' natural healing powers. SMS messages were sent out once a day to remind the patients of their homework. The placebo group showed better homework compliance than the two other groups with improved quantity and quality of relaxation exercises. Each group reported a significant reduction in depression symptoms with a marginally greater decrease in the placebo group compared to the SMS group. The results suggest that placebo treatment is more effective than SMS reminders to support specific behaviors in patients with depression

Going beyond intelligence: A systematic investigation of cognitive abilities and personality traits of mathematicians

Michaela Meier

Supervisors: Roland Grabner, Stephan Vogel

Educational Neuroscience

While the cognitive foundations for mathematical abilities have been investigated thoroughly in children and adults with and without mathematical difficulties, our current knowledge about the cognitive abilities and personality traits associated with mathematical expertise is still scarce. In this study we systematically investigated which domain-general (working memory (WM), patterning, visual statistical learning (VSL)) and domain-specific cognitive abilities (approximate number system (ANS), symbolic magnitude comparison, ordinality, arithmetic) as well as personality traits (Big Five, need for cognition (NFC), attitudes towards mathematics) are related specifically to mathematical expertise. To this end, we compared 41 mathematicians with 41 non-mathematicians from fields with no to minimal mathematical expertise. The two groups were matched for age, sex and educational level as well as for general intelligence. All analyses were done with Bayesian statistics to investigate differences and similarities across groups. After controlling for intelligence, the data showed that mathematicians and non-mathematicians had very similar profiles. They were comparable in WM capacity, VSL and general patterning abilities, only in the patterning domain time mathematicians solved more items. Both groups performed equally in ANS and the ordinality task, however, the mathematicians had a more accurate mental representation of symbolic numbers and a better arithmetic fact knowledge but similar procedural knowledge. No differences were visible in NFC and the Big Five, except for openness where mathematicians were less open to experiences. Additionally, mathematicians had a more positive attitude towards mathematics than non-mathematicians. Overall this study significantly contributed to a deeper and more differentiated understanding of mathematical expertise.

Calibrated trust in the automotive context

Norah Neuhuber

Supervisor: Bettina Kubicek

Cooperation partners: Peter Mörtl, Paolo Pretto (Virtual Vehicle Research Center)

Work and Organizational Psychology

Advanced driver assistance systems play an increasingly important role within the automotive sector, but significant challenges are associated with the introduction of these systems. One being to reach a level of calibrated trust – meaning, the driver knows when it is safe to trust the system and when it is not to do so.

Objective: We conducted a simulator study with the aim of investigating the topic of "calibrated trust" in the interaction with driver assistance systems. The research questions were: "How can calibrated trust be measured?" and "Are people able to calibrate their level of trust in regard to the specific driving context they are in?"

Background: The discussion of trust in advanced driver assistance systems (ADAS) often fails to include a baseline scenario against which the observed data can be compared to and to include subjective and objective data. Only then, an interpretation of the observed data allows to conclude whether the driver was able to calibrate her level of trust to the new driving context.

Method: 40 participants drove in two experimental conditions – in the first condition, the ADAS functioned reliably and in the second condition, the systems displayed system failures four times during the drive. Subjective trust ratings during and after the drive, monitoring behaviour (by means of eye-tracking) and number of manual take-overs were recorded and analysed.

Results: The selected metrics showed to be sensitive enough to measure an adaptation of self-reported trust and reliance action (monitoring behaviour and number of manual take-overs). A cluster analysis showed a first indication of different groups of drivers in regard to trust calibration – some drivers were able to calibrate their level of trust within the experimental drive where the systems were not functioning reliably and some drivers did not show trust calibration. The analysis also confirmed the importance of combining several metrics (subjective and objective).

Comparison of women with high vs. low food addiction tendency: A pilot study with voxel-based morphometry

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Background: The concept of 'food addiction' (FA) posits that highly processed food with added fat and/or refined carbohydrates is capable of triggering addictive-like eating behavior. FA may be one possible phenotype in obesity. Methods: The present voxel-based morphometry (VBM) study compared data from three groups of women. One group scored high on the Yale Food Addiction Scale (YFAS) and was overweight (n = 21), whereas the two other groups had low YFAS scores and were either overweight (n = 21) or normal-weight (n = 21). Results: Overweight women with high YFAS scores had less grey matter volume (GMV) in the inferior frontal gyrus (IFG) than overweight women with low FA tendency, who in turn had less GMV in the IFG than the normal-weight group. The IFG is involved in response inhibition, which is relevant for the control of appetite and food intake. In the group with high FA tendency, the frequency of binge episodes was substantially correlated with the YFAS scores, and 11 women of this group were diagnosed with binge-eating disorder (BED). The association between IFG volume and YFAS scores was not statistically significant anymore when controlling for the effect of binge frequency as revealed by partial correlation analysis. Conclusion: This VBM study revealed an association between reported FA tendency and a neural correlate of disinhibited eating. Future studies with bigger sample sizes are needed in order to demonstrate that FA is sufficiently different from existing conditions (e.g., BED) to warrant classification as a distinct disease phenotype.