Understanding Others

Integration of Social, Cognitive and Affective Processes
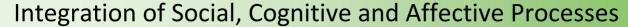
4th Understanding Others Workshop
Program and abstracts

Technical issues related to real-time social interaction phenomena: Focus on study design and data analysis
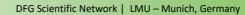
March 28-29th, 2019
Faculty of Psychology and Educational Sciences
Ludwig-Maximilians-University Munich
Leopoldstr. 13
80802 Munich
(Room 1213, "Lesehalle")

LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

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At the workshop we review and discuss novel design and analysis approaches to study Theory of Mind, empathy, and related social behaviors in actual social interaction. The discussion will range from design and procedural set ups, over employed study equipment to stimulus presentation. Recent philosophical considerations on what it is that we actually intend to measure complement the program. The topics will range from –but will not be limited to– recent developments in measures and analysis methods such as hyper-scanning, item-wise MRI analysis, implicit (behavioral) measures or experience sampling methods. We aim to reveal potential avenues to address the technical challenges associated with studying social interactions in real time.

THURSDAY, MARCH 28th, 2019

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09.30 – 10.00   Registration and welcome coffee

10.00 – 10.15   Welcome and introduction by organizers

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1st Session: **Psychology**

10.15 - 11.00   Keynote: Stephan de la Rosa (MPI for Biological Cybernetics, Tübingen)
From the lab to real life: Using virtual reality to examine social cognitive processes in realistic conditions
Chair: Olga Klimecki

11.00 - 11.30   Coffee & tea break

11.30 – 12.30   Discussion within and across disciplines
Discussion leaders: Dana Schneider (psychology and philosophy), Matthias Schurz (neuroscience)

12.30 - 13.30   Lunch (included in the conference price)

13.30 – 14.30   Contributory Talks

Contributory talk I: Roser Cañigueral (University College London)
Using fNIRS hyperscanning to study dyadic interactions: the case of reputation management

Contributory talk II: Virginia Salo (Vanderbilt University)
Measuring proximity as a window into caregiver-child interaction patterns

Contributory talk III: Matthieu Vétois (University of Geneva)
Political opinions matter when it comes to changing social emotions in conflicts over immigration

14.30 - 15.00   Coffee & tea break

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THURSDAY, MARCH 28th, 2019

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2nd Session:	**Psychiatry/Clinical Psychology**

15.00 – 15.45   Keynote Leonhard Schilbach (MPI for Psychiatry, München)
From gaze-contingent faces to full body tracking: Quantifying dyadic interaction to understand social impairments in psychiatric disorders
Chair: Stefan R. Schweinberger

15.45 – 16.15   Coffee & tea break

16.15 – 17.15   Discussion within and across disciplines
Discussion leaders: Olga Klimecki (psychology and philosophy),
Matthias Schurz (neuroscience)

17.15 – 18.15   Contributory Talks

      Contributory talk I: Tobias Schuwerk (LMU München)
Enter the Wild: Autistic Traits and Their Relationship to Mentalizing and Social Interaction in Everyday Life

      Contributory talk II: Deborah Riby (Durham University)
How can we capture real-life and real-time social interaction abilities for individuals with neurodevelopmental disorders? Evidence from research on Williams Syndrome and Autism

      Contributory talk III: Bernadette von Dawans (Trier University)
Empathy buffers social deficits after stress in social anxiety disorder

18.15 – 19.30   Poster session (with drinks)

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20.00   Dinner: Restaurant Goldene Rakete, Ursulastraße 3, 80802 München
Not included in conference price but everyone is welcome to join

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FRIDAY, MARCH 29th, 2019

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08.30 -09.00   Coffee

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3nd Session: _Philosophy_

09.00 - 09.45   Keynote: Sebo Uithol (Radboud University Nijmegen)
                          Social Cognition: What is there to understand?
                          Chair: Anika Fiebich

09.45 - 10.15   Coffee & tea Break

10.15 - 11.15   Discussion within and across disciplines

                          Discussion leaders: Anika Fiebich (psychology & philosophy),
                          Pascal Vrticka (neuroscience)

11.15 – 11.45   Break and group photo

11.45 – 12.30   Contributory Talks

                          Contributory talk I: Artur Czeszumski (Osnabrück University)
                          The social situation affects how we process feedback about our actions

                          Contributory talk II: Christopher Frauenberger (Vienna University of
                          Technology)
                          Diversity Computing

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12.30 – 13.45   Poster session and lunch (included in the conference price)

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4th Session: Neuroscience

13.45 – 14.30   Keynote: Simone Shamay-Tsoory (University of Haifa)
                          _A two-brain approach for understanding how empathy contributes to
                          distress regulation_
                          Chair: Daniela Mier

14.30 – 15.00   Coffee & tea break

15.00 – 16.00   Discussion within and across disciplines

                          Discussion leaders: Pascal Burgmer (psychology & philosophy),
                          Philipp Kanske (neuroscience)

16.00 – 16.30   Coffee & tea break

FRIDAY, MARCH 29th, 2019

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16.30 – 17.45   Contributory Talks

Contributory talk I: Tobias Schlicht (Ruhr-University Bochum)
Predictive Processing and Social Understanding

Contributory talk II: Takahiko Koike (National Institute for Physiological Sciences, Okazaki, Japan)
*The role of the right anterior insular cortex in joint attention-related identification with the partner – A hyperscanning fMRI st*udy

Contributory talk III: Pascal Vrticka (MPI for Human Cognitive and Brain Sciences, Leipzig)
Brain-to-Brain Synchrony during Cooperation: A new Measure for Relationship Quality?

Contributory talk IV: Sam Wass (University of East London)
Inter-personal neural synchrony and neural responsivity: how mature brains scaffold immature brains during shared parent-child play.

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17.45 - 18.15   Poster awards, farewell and closing remarks

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Stephan de la Rosa
Max Planck Institute for Biological Cybernetics
Tübingen, Germany

ABSTRACT

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From the lab to real life: Using virtual reality to examine social cognitive processes in realistic conditions

The ultimate goal of almost all psychological research is to understand human behavior in real life. Yet, experiments require highly controlled experimental conditions for scientific reasoning that have often little resemblance with real life. One way to overcome this impasse is by means of virtual reality (VR). VR allows the creation of experimental setups in which participants can behave more naturally. While these additional degrees of freedom for the participants' behavior lead to a more ecologically valid experiment, they give rise to new challenges. I will report about our experiences of using VR to examine social cognitive processes, which include the advantages and disadvantages of this technology. I will highlight that the use VR technologies in psychological research needs to be accompanied by appropriate psychophysical methods (e.g. adaptation) and analysis that allow firm scientific reasoning. The presented studies will focus on examining cognitive representations supporting social interactions.

Leonhard Schilbach
Max Planck Institute of Psychiatry
Munich, Germany

ABSTRACT

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From gaze-contingent faces to full body tracking: Quantifying dyadic interaction to understand social impairments in psychiatric disorders

Social neuroscience focuses on the neurobiology that underlies social encounters, but has found it difficult to study social interactions in those contexts, where they really matter, i.e. everyday life. By developing and using novel tools which allow for the study of reciprocity in social interactions, such as gaze-contingent tasks, and which allow for quantitative phenotyping of freely forming, dyadic social interactions, such as non-invasive fully body motion tracking, we provide new insights into the behavioral mechanisms of social exchange and demonstrate how this may be relevant in order to understand social impairments in various psychiatric disorders.

Sebo Uithol
Donders Institute for Brain, Cognition and Behaviour
Radboud University Nijmegen, the Netherlands

ABSTRACT

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Social Cognition: What is there to understand?

 What do we do or have when we understand others? And how should we investigate this process of understanding? In this talk I will argue that understanding others is not what it is commonly taken to be. I will argue that the notion of intention is important to social cognition, but in a way that is quite different from what is commonly assumed. Intentions are not brain states that cause overt behavior. Rather, intentions are social constructs, and denote a collective way of explaining behavior. This has important consequences for social cognition. First, in social interaction intentions need not be inferred in order to explain behavior, as they were not a cause of the observed behavior to begin with. Theory theory and simulation theory are both mistaken when they are interpreted as a mechanism that allows us to infer the intention that caused the behavior we observed. But that does not mean that the notion of intention has no role in social cognition. In a social community we learn what an accepted explanation of behavior is—commonly in terms of intentions—which makes the notion of intention a social construct. This opens up new research lines: How do we acquire these explanatory skills? When do we need such explanations? Will these explanations have an impact on other action-observation processes? In the final part of my talk I will explore ways to address these questions.

Simone Shamay-Tsoory
Department of Psychology
University of Haifa, Israel

ABSTRACT

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A two-brain approach for understanding how empathy contributes to distress regulation

Empathy allows us to understand and share one another's emotional experiences. Despite the developments in the study of empathy, the vast majority of empathy paradigms focus only on passive observers, carrying out artificial empathy tasks in socially deprived environments. This approach significantly limits our understanding of interactive aspects of empathy and how empathic responses affect the distress of the sufferer. We recently proposed a brain model that characterizes how empathic reactions alleviate the distress of a target. Specifically, in a dual-EEG study we show that hand-holding during pain administration increases brain-to-brain coupling in the alpha-mu band in a network that mainly involves the central regions of the pain target and the right hemisphere of the empathizer. Moreover, brain-to-brain coupling in this network was found to correlate with analgesia magnitude, indicating that brain-to-brain coupling may contribute to touch-related analgesia. Similarly, using a serial dual-fMRI approach we show a shared activity between the target and the empathizer during hand-holding. Employing this dual-brain approach may provide a highly controlled setting in which to study the neuroanatomical bases of real-life empathy and its contribution to distress regulation.

Roser Cañigueral
Institute of Cognitive Neuroscience
University College London, United Kingdom

ABSTRACT

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Using fNIRS hyperscanning to study dyadic interactions: the case of reputation management

Reputation is a social construct that emerges from the desire to promote good self-impressions when we are in front of others, that is, when an observer can potentially judge us. Previous studies on reputation management are limited because participants do not interact with the observer and happen in restricted neuroimaging environments (e.g. fMRI). This means that these studies are missing the continuous exchange and integration of social signals that shape real face-to-face interactions. Moreover, functional near-infrared spectroscopy (fNIRS) and wavelet coherence analysis are novel powerful tools to investigate interpersonal neural processes in social interactions. Here, we combine a dyadic experimental paradigm with dual eye-tracking and fNIRS hyperscanning to assess individual and interpersonal neural correlates of reputation management. Pairs of participants sat across a table and completed a simple task where they had to privately choose if a statement was true or false about themselves. Crucially, after each trial choices of both partners was either disclosed or not to the dyad. Results show that, when choices are disclosed and the potential for social judgement increases, the amount of gaze directed at the face of the partner increases, as well as activity in brain regions involved in social cognition, face processing and strategic decision-making. Wavelet coherence analysis confirmed that some of these areas were synchronised across individuals in a dyad, suggesting that coherent neural mechanisms associated with face and social processing are engaged during the dyadic experience of social judgement. These findings advance current knowledge about brain systems involved in reputation management.

Virginia Salo
Department of Psychology and Human Development
Vanderbilt University, Nashville, United States of America

ABSTRACT

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Measuring proximity as a window into caregiver-child interaction patterns

Close contact with a caregiver is essential for promoting healthy socio-emotional development. Critically, the types of interactions that we believe to be most supportive of positive development (e.g., joint attention, gaze-sharing, observing facial expressions) can only take place in moments of closer contact. From research with children raised in profoundly deprived environments, we know that extreme neglect can have striking and lasting negative effects on children's social development. However, we know little about normative patterns of interactions in more typical settings. To address this gap, we are developing a simple wearable device that can be used to dynamically and unobtrusively capture information about physical proximity between young children and caregivers throughout the day in their natural environments. The portable nature of these devices allows for proximity to be measured both inside and outside of the home throughout the day and in any context. We postulate that measurements corresponding to close proximity between child and caregiver indicate periods in which increased opportunity for developmentally critical interactions occur. Whereas, measurements corresponding to greater distance between child and caregiver indicate periods with limited to no interaction. To test this, we pair these devices with the LENA, a widely used portable language monitoring device, which quantifies linguistic interaction patterns and which can be linked to the proximity information. We will present data collected using these devices from one parent–child dyad, including information about their patterns of interaction as well as a detailed look at the interactions that occurred during periods of close proximity.

Matthieu Vétois
Department of Psychology and Educational Sciences
University of Geneva, Switzerland

ABSTRACT

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Political opinions matter when it comes to changing social emotions in conflicts over immigration

Authorship: Klimecki, O., Vétois, M., & Sander, D.

In many societies, immigration is a conflictual topic, leading to heated exchanges between proponents of restrictive versus more liberal immigration policies. Such dialogues might be facilitated by empathy and perspective taking. In the current study we tested whether political opinion is a boundary condition when it comes to implementing instructions for empathy and perspective taking in conflicts between people with liberal versus restrictive views on immigration. The results reveal that participants with a liberal view on immigration were motivated to follow both, the perspective taking and empathy instructions, and showed related decreases in their emotions under the perspective taking instructions. Although participants with restrictive immigration views were not motivated to follow the instructions and showed no changes in their emotions, the perspective taking condition increased their perception of the other's competitiveness. These findings underline the importance to take political opinions into account when it comes to implementing interventions for conflict resolution.

Tobias Schuwerk
Department of Psychology and Educational Sciences
Ludwig-Maximilians-University Munich, Germany

ABSTRACT

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Enter the Wild: Autistic Traits and Their Relationship to Mentalizing and Social Interaction in Everyday Life

Theories derived from lab-based research emphasize the importance of mentalizing for social interaction and propose a link between mentalizing, autistic traits, and social behavior. We took social cognitive research outside the lab to test these assumptions in everyday life. Via smartphone-based experience sampling and logging of smartphone usage behavior we quantified mentalizing and social interaction in our participants' natural environment. Both measures were compared with autistic traits, controlling for Big Five personality dimensions, social anxiety, and verbal intelligence. Mentalizing occurred less frequently than reasoning about actions and participants preferred to mentalize when alone. Autistic traits were negatively correlated with communication via smartphone. Yet, they were not associated with social media usage, a more indirect way of getting in touch with others. We further found no relation between autistic traits and social network size. These findings critically inform recent theories on social cognition and behavior in individuals with and without autism.

Deborah Riby
Department of Psychology
Durham University, United Kingdom

ABSTRACT

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How can we capture real-life and real-time social interaction abilities for individuals with neurodevelopmental disorders? Evidence from research on Williams Syndrome and Autism

Social atypicalities are transdiagnostic and impact individuals with a broad range of neurodevelopmental disorders; including but not restricted to Autism, Williams Syndrome, Fragile X Syndrome, and ADHD. The vast majority of the research in our lab has focused on convergent and divergent components of the social phenotypes of Williams Syndrome (WS) and Autism (ASD). In this presentation I will focus on the range of methodological approaches we have taken to capture aspects of typical and atypical social functioning in these groups; I will present data ranging from parental questionnaire measures, interviews, rating scales, eye tracking, and face-to-face real life social approach tasks. Finally, I will describe our current studies that will harness the opportunities of virtual reality. Across tasks individuals with both WS and ASD show subtle but important social atypicalities, however the nature of these atypicalities and the nature of social motivation, vary by diagnosis (as well as individual differences). Aspects of social functioning are atypical in both these groups, but what are the best measures for capturing and understanding these social atypicalities and the potential underlying mechanisms? I will discuss this ongoing challenge. WS and ASD are particularly important groups for emphasising the heightened social vulnerability that can occur when social behaviour develops atypically and therefore this is a crucial future area of research for understanding both typical and atypical real-life and real-time social interaction phenomena.

Bernadette von Dawans
Department of Biological and Clinical Psychology
University of Trier, Germany

ABSTRACT

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Empathy buffers social deficits after stress in social anxiety disorder

Acute stress can increase prosocial behavior in healthy humans. This is called the tend-and-befriend response and has been described as adaptive stress coping mechanism. However, it is yet unknown whether people suffering from social anxiety disorder (SAD), exhibit such an affiliative stress response mechanism. Since empathy is one prerequisite for successful social interactions, it may serve as an important modulator of affiliation under stress. In a randomized controlled trial sixty patients with SAD and fifty-three healthy controls were exposed to either a stress or non-stressful control condition (TSST-G) and participated in an everyday conversation paradigm. Patients did not differ from controls in their physiological stress reactions but showed higher levels of subjective stress responses. While healthy controls showed improved social behavior with higher increases in cortisol, patients with SAD performed worse with increases in cortisol. This effect was buffered by cognitive empathy.

The results shed light on the divergence of subjective and physiological stress reactions in social anxiety and may encourage a Research Domain Criteria (RDoC) approach to SAD. Future studies need to test whether empathy training may lead to increased tend-and-befriend responses under stress in SAD.

Artur Czeszumski
Institute of Cognitive Science
Osnabrück University, Germany

ABSTRACT

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The social situation affects how we process feedback about our actions.

Humans achieve their goals in joint action tasks either by cooperation or competition. In the present study, we investigated the neural processes underpinning error and monetary rewards processing in such cooperative and competitive situations. We used electroencephalography (EEG) and analyzed event-related potentials (ERPs) triggered by feedback in both social situations. 26 dyads performed a joint four-alternative forced choice visual task either cooperatively or competitively. At the end of each trial, participants received performance feedback about their individual and joint errors and accompanying monetary rewards. Furthermore, the outcome, i.e. resulting positive, negative or neutral rewards, was dependent on the pay-off matrix, defining the social situation either as cooperative or competitive. We used linear mixed effects models to analyze the feedback-related-negativity (FRN) and used the Threshold-free cluster enhancement(TFCE) method to explore activations of all electrodes and times. We found main effects of the outcome and social situation, but no interaction at mid-line frontal electrodes. The FRN was more negative for losses than wins in both social situations. However, the FRN amplitudes differed between social situations. Moreover, we compared monetary with neutral outcomes in both social situations. Our exploratory TFCE analysis revealed that processing of feedback differs between cooperative and competitive situations at right temporo-parietal electrodes where the cooperative situation elicited more positive amplitudes. Further, the differences induced by the social situations were stronger in participants with higher scores on a perspective taking test. In sum, our results replicate previous studies about the FRN and extend them by comparing neurophysiological responses to positive and negative outcomes in a task that simultaneously engages two participants in competitive and cooperative situations.

Christopher Frauenberger
Human Computer Interaction Group
Vienna University of Technology, Austria

ABSTRACT

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Diversity Computing

The role of technology in human-human interaction has become increasingly ambiguous. While historically, technology was seen as merely a communication channel (telephone, hearing aids), the opportunities of near limitless computing power, miniaturisation, sophisticated sensing capabilities and multimodal output have created ubiquitous and smart technology that mediates our interactions more profoundly. The Emotional Hearing Aids by Rana el Kaliouby or the Autism Glass Project are examples for how social signal processing is applied to social interaction in real time. However, there are significant challenges in the design of such technologies: first, it is not trivial to sense and process relevant features of social interaction, ranging from individual biometric data to dynamic, multi-person relational data, possibly to natural language providing context. Secondly, it is not clear how to interpret the data and what it means exactly in the complexity of real-world interactions. Further, it is an open question what to do with the information that is being extracted. The Emotional Hearing Aid was framed as an assistive technology that provides additional information to the wearer that would otherwise be missed. However, this immediately points to the normative expectations that any such processing and presentation implies. There is a very delicate ethical and moral dimension to consider when developing roles of technology in this space. I would like to contribute to this workshop by talking about Diversity Computing - a computing paradigm that aims to develop a new kind of technology that supports humans who are meaningfully different in collaborative and relational sense-making (see reference below).

Fletcher-Watson, S., De Jaegher, H., van Dijk, J., Frauenberger, C., Magnée, M., & Ye, J. (2018). Diversity Computing. Interactions, 25(5), 28–33. https://doi.org/10.1145/3243461

Tobias Schlicht
Institute for Philosophy II
Ruhr-University Bochum, Germany

ABSTRACT

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Predictive Processing and Social Understanding

Predictive Processing (PP) is a theoretical framework promising a unified account of perception, action, and cognition (Clark 2016). What can PP contribute to debates about social cognition? Does it constitute a unique proposal that competes with familiar approaches like theory-theory, simulation-theory and interaction-theory? Or is it rather compatible with all of them? Researchers from different disciplines disagree about the explanatory level on which predictive processing is supposed to have an impact on debates in cognitive science. According to Spratling (2017), it is an account on what Marr (1982) calls the computational level, leaving room for variation both on the algorithmic and implementation levels. Clark (2016) instead presents it as an account on the algorithmic level, telling us not something about the computational function but proposing an algorithm for what actually happens on the level of neurons in the case of perception and cognition in biological systems. Finally, Friston (Friston, Fortier & Friedman 2018) declares that his version of predictive processing in terms of free energy minimization "ticks all David Marr's boxes" (2018, p23). Depending on which of these claims can be maintained, it will have different effects on the possible impact of the predictive processing framework for debates on social cognition. These debates have centered on various proposals about how to interpret the algorithmic level underlying the cognitive process responsible for our mindreading abilities. Do we employ a theoretical body of knowledge and engage in rich inferences (Gopnik & Wellman 2012), or do we put ourselves in other people's proverbial mental shoes by simulating their cognitive decision-making processes (Goldman 2006)? Or can we simply perceive what others feel and intend (Gallagher 2001)? Some authors have argued we should be pluralists about social cognition (Fiebich 2015). Others have started to investigate what predictive processing can contribute to these debates (deBruin 2018, deBruin & Michael 2018), some have claimed that it can teach us about what is impaired in autism (Schilbach et al. 2017). However, if PP accounts are formulated on the computational level, they are not competing with any of the traditional

accounts, but seem to be compatible with all of them. If they are interpreted as being formulated on the algorithmic level, they could significantly disrupt the shape of current debates, as it is possible to reformulate every contender in terms of prediction error minimization. This could mean that PP accounts either ignore the substantial differences between the competing cognitive strategies or that present alternatives between inference, simulation, and perception are not as well defined as their proponents have cast them to be. In this talk, I will present this in form of a dilemma for PP accounts, intending to initiate a debate about this issue.

Takahiko Koike
Department of System Neuroscience
National Institute for Physiological Science, Okazaki, Japan

ABSTRACT

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The role of the right anterior insular cortex in joint attention-related identification with the partner – A hyperscanning fMRI study.

Understanding others as an intentional agent is critical in social interaction, including the joint attention (JA). During JA, an initiator selects a shared object through gaze (IJA), and an opponent responder follows the direction of the initiator's gaze (RJA), thus sharing the intention of the selection of the object. Then, where is the neural basis of identification or sharing the intention? The previous study shows that the inter-brain correlation could be a measure of sharing information through an interaction (Hasson and Frith, 2016). Here, we combined two analysis technique to fully reveal the neural basis of sharing intention during JA: a conventional single-brain activation analysis, and inter-brain correlation analysis. As an inter-brain correlation analysis, we introduced a new method based on single-brain functional connectivity analysis (Rissman et al., 2006). The conventional single-brain activation analysis showed that the different subregions of anterior insular cortex (aIC) are responsible for distinct behaviors in JA: Rostral part is for RJA, caudal part is IJA, and dorsal is for volitional selection of target during IJA. In addition, the inter-brain correlation analysis revealed that the activation of dorsal right aIC is correlated to that of partner. As the dorsal aIC is responsible for the volitional selection of the target during JA, identification with others by JA is likely accomplished by the shared intention of selection of the target, that is represented by the inter-brain correlation of right dorsal aIC.

Pascal Vrticka
Family Health & Social Stress Research Group
Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

ABSTRACT

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Brain-to-Brain Synchrony during Cooperation: A new Measure for Relationship Quality?

Humans are social beings from the cradle to the grave. Throughout the life span, we depend on social connection, protection, and care. A fundamental means for establishing social relationships is interpersonal synchrony, which can occur at different behavioral, physiological, endocrine, and neural levels. Related to social closeness, interpersonal synchrony is proposed to be strongest during parent-child interactions and to successively decline the more distant the interaction partners are to each other, i.e. interactions between romantic partners > friends > strangers. Extending such proposition, we suggest that interpersonal synchrony not only varies as a function of social closeness across the above categories, but also within categories themselves depending on inter-individual differences affecting relationship quality. To test our proposition, we set up a series of functional near-infrared spectroscopy (fNIRS) hyperscanning studies in dyads of collaborating adults or parents (mothers and fathers) with their children, and focus on brain-to-brain and thus neural synchrony as primary interpersonal synchrony variable. To assess inter-individual differences pertaining to relationship quality, we rely upon the developmental psychological framework of attachment theory. Additionally, we also consider interaction partner sex as variable of interest. Our findings show that brain-to-brain synchrony increases during collaboration. Furthermore, we demonstrate that interaction partner sex modulates brain-to-brain synchrony. Finally, we find that inter-individual differences in attachment-derived measures associate with brain-to-brain synchrony. All the above holds true for parent-child interactions as well as interactions between adult strangers. Brain-to-brain synchrony may thus constitute a new measure for relationship quality across several interaction settings and the life span.

Sam Wass
University of East London
London, United Kingdom

ABSTRACT

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Inter-personal neural synchrony and neural responsivity: how mature brains scaffold immature brains during shared parent-child play.

Much early attention and learning – in particular, most early cognitive learning - takes place during shared attention with a social partner. But little previous research has investigated the neural mechanisms by which attention is dynamically shared between adults and infants during social interaction. We present findings from two papers that examine this question. In the first, typical 8-month-old infants interacted with an adult reciting nursery rhymes in two conditions: direct gaze and indirect gaze, while dual EEG was recorded. Bidirectional Granger-causal influences between the brains of infants and adults engaged in social indirection were observed in the Theta and Alpha bands, that were stronger during direct relative to indirect gaze. Infants vocalised more frequently during direct gaze, and individual infants who vocalised longer elicited stronger synchronisation from the adult (Leong, […] & Wass, 2017 - PNAS). In the second study, we examined the neural mechanisms by which interpersonal and social influences act on attention. We recorded dual EEG from typical 12-month-old infants and parents during solo play and joint play. Granger-causal analyses suggested that parents' brains dynamically responded in the Theta band to their infants' attentional shifts and that, where the parent is more neurally responsive, the infant is more attentive (Wass […] & Leong, 2018 - PLoS Biology).

References:

Leong, V., [...]. & Wass, S.V. (2017). Speaker gaze increases information coupling between infant and adult brains. Proceedings of the National Academy of the Sciences. 114 (50), 13290–13295

Wass, S.V., Noreika, V., Georgieva, S., Clackson, K., Brightman, L., Nutbrown, R., Santamaria, L., Leong, V. (2018) Parental neural responsivity to infants' visual attention: how mature brains scaffold immature brains during social interaction. PLoS Biology. https://doi.org/10.1371/journal.pbio.2006328

Theme: Psychology, poster **#1**

Friederike Behrens

Department of Cognitive Psychology

Leiden University, Belgium

A Statistical Approach to Quantifying Physiological Synchrony

Humans use a variety of signals to convey their emotions and intentions to one another, ranging from facial expressions to subtle changes in pupil size. Besides these, other signals, such as heart rate and skin conductance, are not directly visible, yet contribute to the expression and perception of emotions and intentions. These signals tend to be synchronized which has been suggested to foster mutual understanding and trust. However, little research has focused on how to quantify synchronization in indistinguishable dyads consisting of two individuals to whom no specific roles are assigned.

We provide an advanced approach, lagged windowed cross-correlation analysis, that considers the dynamics of an interaction, where the strength of synchronization changes over time and where people react at different delays to events and to each other (sometimes Person A follows Person B, sometimes vice versa). The method allows to quantify these different aspects of synchronization. We illustrate the method based on a study where two naïve participants played a social dilemma game sometimes playing face-to-face, sometimes without face contact. During the experiment, their physiological responses were measured. Performing the lagged windowed cross-correlation analysis, we showed that synchrony increases with face contact, but it is the stability in synchrony that predicts cooperative success.

Given the growing interest in physiological synchrony in different disciplines, standard methods are necessary to increase understanding between various research fields and make studies comparable. The current study presents a strong statistical method that can be applied to different types of continuous data and different contexts.

Theme: Psychology, poster **#2**

Martina De Lillo

School of Psychology

University of Kent, Canterbury, United Kingdom

Comparing real-time social interactions in young and old adults

Research exploring social interaction has typically employed tightly controlled, lab-based experimental methods. Additionally, the majority of this work has focused on early childhood and young adulthood, with much less research examining real-time social interaction in older adulthood. We address these gaps by employing more ecologically valid methods (eye-tracking glasses) to compare social interaction in young (20-40 years old) and older adults (60-80 years old). In Experiment 1, participants engaged in a short interview-style conversation with the experimenter (e.g. plans for the weekend). In the first speaking part they answered four questions, In the second listening part they switched roles with the experimenter and now asked four questions and listened to the experimenter's answers. Eye-tracking monitored looks to the experimenter's face, body, and background. In Experiment 2, participants completed a task that required a short indoor walk through a busy University building. They were provided with a map that indicated the route to follow, and eye-tracking monitored looks to people, objects, path, and map. Results from Experiment 1 showed that participants spent more time looking at the background while speaking, but longer looking at the experimenter's face features while listening; age did not significantly modulate these patterns. While navigating the real-world in Experiment 2, participants spent surprisingly little time fixating people (~5%), and this was significantly reduced among older adults compared to young adults (3% vs. 7%). We will discuss the degree to which the results can be generalized to behaviours and processes that are activated in real life.

Keywords: Social interaction, eye-tracking, old age

Theme: Psychology, poster **#3**

Marina Kammermeier

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The Relationship between Emotional Availability and Motionese in Mother–Infant Interaction

Previous research has shown that parents' Emotional Availability (EA, Biringen, 2008) is positively related to infants' development in various domains. However, to date research has not investigated whether EA has concrete behavioral correlates on the parent's side. In our study, we focused on the concept of motionese (Brand, Baldwin, & Ashburn, 2002), i.e. the performance of motoric actions in a way that is appropriate for infants. Based on theoretical considerations we hypothesized specific links between dimensions of EA and aspects of motionese. We examined these links in a sample of 41 mother-infant dyads, with infants aged 7 months. Maternal EA was assessed in a 10 minute free play interaction between mothers and infants. To assess the level of motionese mothers were asked to demonstrate five novel objects (i.e. toys) to their infants. Mothers' actions were coded on six broad dimensions: proximity to the infant, interactiveness, enthusiasm, range of motion, repetitiveness, and punctuation of motion. Results showed that mothers showing higher sensitivity as well as higher non-hostility used a broader range of motion when demonstrating toys to their infants. Additionally higher structuring behaviors were associated with a broader range of motion, more repetition and higher punctuation of actions. We also found that less intrusive mothers showed less enthusiasm, as well as less repetition and punctuation of actions. Our findings provide first evidence that an emotionally available interaction style is connected to concrete infant-directed adjustments in mothers' actions and motions.

Theme: Psychology, poster **#4**

Jürgen M. Kaufmann

Department of Psychology

Friedrich Schiller University, Jena, Germany

The big nose bias, or when distinctiveness hinders face learning: Evoking an other-phenotype effect with selectively manipulated same-phenotype faces

Faces from other ethnic groups than one's own are more difficult to remember. This robust phenomenon is known as "other-race effect" (ORE). Because the term "race" is problematic for several reasons, we suggest to label it "other-phenotype effect" (OPE) here. The present study is based on seemingly paradoxical previous findings: Other-phenotype faces and caricatures of same-phenotype faces evoke comparable patterns of event-related potentials, but opposite behavioural effects. This suggests qualitatively similar processes for both types of faces at learning, but with different consequences for recognition: When learning unfamiliar faces, deviations from the norm are used for forming basic representations. Distinctive information is useful in the case of caricatures, because norm deviations differ for each individual face, but misleading for other-phenotype faces, because the most salient norm deviation is always in the same direction. We tested this idea by using distinctive same-phenotype (Caucasian) faces with all noses manipulated in a uniform direction. In a learning/recognition task, we compared performance for these faces to veridical same- and other-phenotype (Asian) faces. Our main aim was to simulate an OPE with distinctive "big-nose" same-phenotype faces. In accuracies and RTs, we found significant costs both for "big-nose" and other-phenotype faces. In ERPs, we observed a similar pattern for "big-nose" and other-phenotype faces (smaller P200, and larger N250 and LPC compared to veridical same-phenotype faces). Our results suggest that qualitatively similar processes mediate the learning of unfamiliar same- and other-phenotype faces, but with different consequences due to differences in the usefulness of the respective distinctive information.

Theme: Psychology, poster **#5**

Mitsuhiko Ishikawa

Department of Psychology

Kyoto University, Japan

How machine learning can be used in social cognitive science? A challenge to predict infant social behaviour

Machine learning with an artificial neural network (ANN) has been getting attention from engineering, information science and also neuroscience. An ANN includes non-linear transformation of input information to predict output, therefore machine learning of the ANN approach may make it possible to predict complex phenomenon such as social behaviour. Here, we used infant state data in the experimental setting including physiological arousal and fixation time toward the monitor to predict infant gaze following which is one of the fundamental social behaviour. We used 80% of all data collected in the previous study for training, and created predictive models with ANNs. Then the other 20% of all data was used to evaluate prediction accuracy of each model. As a result, the model including baseline heart rate levels, heart rate levels during watching actor's action, presentation of communicative cues and fixation times toward actor's face predicted infant gaze following approximately 75%, and it was the most predictive. This study tried to predict infant gaze following by physiological and attentional states using machine learning with ANNs. Results highlighted that machine learning can predict infant social behaviour with relatively high accuracy. It can be suggested that machine learning may be helpful to consider mechanisms of social behaviour.

Theme: Psychology, poster **#6**

Bozana Meinhardt-Injac

Department of Psychology

Johannes Gutenberg University Mainz, Germany

The Two-Systems Account of Theory of Mind: Testing the Links to Social-Perceptual and Cognitive Abilities

Authorship: Bozana Meinhardt-Injac, Moritz M. Daum, Günter Meinhardt and Malte Persike

According to the two-systems account of theory of mind (ToM), understanding mental states of others involves both fast social-perceptual processes, as well as slower, reflexive cognitive operations (Tager-Flusberg & Sullivan, 2000; Apperly & Butterfill, 2009). To test the respective roles of specific abilities in either of these processes we administered 15 experimental procedures to a large sample of 343 participants, testing ability in face recognition and holistic perception, language, and reasoning. ToM was measured by a set of tasks requiring ability to track and to infer complex emotional and mental states of others from faces, eyes, spoken language, and prosody. We used structural equation modeling to test the relative strengths of a social-perceptual (face processing related) and reflexive-cognitive (language and reasoning related) path in predicting ToM ability. The two paths accounted for 58% of ToM variance, thus validating a general two-systems framework. Testing specific predictor paths revealed language and face recognition as strong and significant predictors of ToM. For reasoning, there were neither direct nor mediated effects, albeit reasoning was strongly associated with language. Holistic face perception also failed to show a direct link with ToM ability, while there was a mediated effect via face recognition. These results highlight the respective roles of face recognition and language for the social brain, and contribute closer empirical specification of the general two-systems account.

Theme: Psychology, poster **#7**

Emma Morgan

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University of Sheffield, United Kingdom

Explicit and Implicit Mentalising and the Effect of a Social Presence

Previous research has shown that participants perform significantly better on explicit mentalising tasks when a real person is present (Chevallier et al., 2014), and there is a current focus within the literature on the need for more ecologically valid paradigms (Risko et al., 2012; Reader & Holmes, 2016). However, it is not yet known what effect the presence of real people has on implicit mentalising behaviour. We therefore used a non-verbal theory of mind task to study explicit and implicit mentalising in neurotypical adults. The task was completed in two conditions: A 'live' condition where the task was acted out in real time in front of the participant, and a 'recorded' condition where the participant was shown pre-recorded videos of the same task. We found that participants were equally as accurate at the explicit task in both the live and recorded conditions. By comparison, participants were significantly more accurate at the implicit task when it was completed in the live condition, demonstrating that implicit mentalising was highly sensitive to a social presence. This suggests that individuals may implicitly mentalise within real life environments when faced with powerful social cues, but that this is less apparent when in environments without a real social presence. Therefore, this finding has implications for the generalisability of theory of mind tasks conducted in lab based, socially limited paradigms.

Theme: Psychology, poster **#8**

Łukasz Okruszek

Institute of Psychology

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Social Perception and Interaction Database (SoPID) – a novel database of dyadic actions presented with point-light displays.

Biological motion processing is among the most basic of the human social cognitive abilities. Healthy individuals have been shown to be able to process a wide range of social signals from point-light displays (PLD), including affective state and intentions of the observed agent. The ability to process higher-order social information from PLD has also been shown to differentiate patients with schizophrenia or individuals with autism spectrum disorders from healthy controls. Here, we present a novel PLD dataset (Social Perception and Interaction Database) which may be used for studying multiple levels of social information processing. Methods: Two pairs of professional actors were asked to perform a wide range of dyadic actions during two motion-capture session, including (1) communicative interactions (e.g. A asks B to sit down; B sits down); (2) emotional exchanges (e.g. A shouts at B; B apologizes); (3) independent actions of agents (e.g. A squats down; B jumps) and (4) displays of 100% scrambled motion of two agents. Preprocessed stimuli has been visually degraded to PLD. Then, recognizability of the SoPID vignettes has been tested in a series of behavioral and neuroimaging studies.

Results: Initial behavioral studies have found high level of recognizability of the type of the action (88±16%) and emotional state (76±21%) of the agents in healthy individuals (n=21). High sensitivity (d'=2,2±0,5) for recognition of original vs. scrambled versions of SoPID vignettes has been found in an independent set of healthy individuals (n=20). Finally, in a follow-up neuroimaging study, differential activations across social perception, theory of mind and action observation brain networks were found for specific types SoPID actions in a well-powered sample of healthy individuals (n=47). Discussion: These results suggest that SoPID may be effectively used for behavioral and neuroimaging studies on a wide range of social cognitive processes.

Theme: Psychology, poster **#9**

Pauline Petereit

Clinic for Neurology

University of Lübeck, Germany

Can neural reactions to social rejection predict aggressive and avoidant behavior?

Authorship: Petereit, P. & Krämer, U.M.

Social rejection often leads to aggression, yet not always. It is assumed that certain personality traits, such as rejection sensitivity (RS), predispose to more aggressive reactions to rejection. Here, we investigate the hypothesis that differences in the neural reactions to social rejection and acceptance can predict the following aggressive or avoidant behavior. We used a social feedback paradigm to induce social rejection and acceptance. Participants were shown feedback of putative other participants that rated them in a get-acquainted-game. One group received mainly negative feedback (indicating that most people did not want to meet them), whereas the other group received mainly positive feedback. After feedback presentation, participants played the Fight-or-Escape-Paradigm (FoE), a competitive reaction time task in which participants can either aggress or avoid the confrontation. In behavioral pilot studies, participants high in RS were more aggressive and more avoidant than participants low in RS. Over time, participants adjusted their feedback expectations to the type of feedback they received, but more so in the positive group and with considerable interindividual variation. We are now conducting an EEG study with the same paradigm to examine relationships between neural activity and aggressive behavior. We hypothesize that differential changes in feedback expectation and emotional reactions to feedback are reflected in neural activity related to social feedback. In turn, these neural changes are expected to predict aggressive behavior. This study will help to understand how social rejection leads to aggression in certain individuals.

Theme: Psychology, poster **#10**

Aleksandra Piejka

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The influence of a second agent on detecting communicative intentions

Understanding communicative intentions (COM) is crucial for effective interpersonal functioning. Evidence suggests that stimuli presenting COM is preferentially processed in healthy individuals and human motion is recognized more accurately when it responds to a communicative gesture. However, it is unclear whether these effects are linked to the preferential processing of single agent's intentions or detection of the contingencies between actions of two agents. In the presented study, 127 participants were asked to complete two different tasks presenting point-light presentations of agents. During the first task (CID-5), participants watched dyads of agents, who were either interacting or acting independently of each other. During the second task (Gestures), participants were presented with a single agent performing a communicative gesture or an individual, object-related action. During both tasks participants were asked to indicate whether presented agents were signaling COM. A significant interaction between the type of display and the type of situation was observed: communicative gestures were detected more accurately in CID-5 task than in Gestures task while the opposite was true for individual actions. Thus, despite higher complexity of the visual stimuli, communicative intentions expressed between two agents are recognized more accurately than communicative gestures of a single agent. It corroborates the chunk-storage hypothesis claiming that third-person encounters are perceived as a single visual unit. However, without additional cue provided by another agent, COM of a single person can be harder to recognize than individual gestures, which implies that another agent provides salient contextual information for classifying observed gesture as communicative.

Theme: Psychology, poster **#11**

Irene Sophia Plank

Einstein Center for Neurosciences

Berlin School of Mind and Brain, Germany

Adults understanding children: empathy, compassion and affect recognition

Understanding others is a challenging task that humans face every day. This task becomes even more difficult if they deal with people who are different from themselves. Nonetheless, there is one group of humans which to understand is especially crucial and whose brains, motives and behaviour differ significantly from the average adult: children. Therefore, we ask if it is more difficult for adults to understand children than other adults and if this effect is moderated by parenthood. We hypothesise that parents understand children regardless of their dissimilarity better than non-parents due to familiarity. Additionally, we predict that although cognitive understanding is more difficult, children elicit more compassion and empathy in adults and that this difference is even more pronounced for parents. We are testing 32 parents and 32 non-parents matched for IQ, age and socioeconomic status. All participants will complete tasks to measure empathy, compassion and affect recognition as well as questionnaires measuring emotion regulation, alexithymia and social desirability. Preliminary results on half of the desired sample indicate a difference in empathy but not compassion or affect recognition. In conclusion, this data indicates that parents have no better understanding of children's affects than non-parents. Children do, however, elicit stronger affective reactions in them. This could be the reason why even adults without daily contact with children are familiar enough to understand them as well as other adults.

Theme: Psychology, poster **#12**

Sandra Schiemann

Department of Psychology

University of Salzburg, Austria

I don't like you – I don't empathize with you! The influence of disliking a client can even influence a coach's empathy

Authorship: Sandra J. Schiemann, Irina T. Eberhard, Christina Mühlberger, Stefan Reiss & Eva Jonas

Coaching is an effective human resource development approach, in which the coach's empathy plays a central role. However, previous research on empathy indicates that empathy can be influenced by situational or motivational factors, such as the likeability and interference of the counterpart. To investigate how these factors influence the empathy of the coach, we conducted four studies, in which we manipulated the coaching client's behavior and proposed that interfering and unlikeable clients can have a negative impact on coaches' empathy in terms of empathic feelings, thoughts, intentions, and behavior. In the first two studies (N1 = 88; N2 = 110), the participants were asked to coach a client, who was either interfering (IG), neutral (control group = CG), or likable (LG); the empathic behavior was measured with an email to the client. In the third study (N3 = 155), psychology students were asked to coach a client who was described as either interfering (IG), neutral (CG), or dislikeable (disliking group =DG) in written form; in this study, the empathic behavior was qualitatively deductively analyzed from the recorded chat conversation. These first three studies showed that both IG and DG lead to less affiliation and less empathy towards the client. In a fourth study (N3 = approx. 60) with real-life coaches, we are now examining whether an either neutral (CG) or disliking (DG) client leads to less affiliation, less empathy, worse video-rated interaction, and less client-rated coaching success. The results of all four studies promise theoretical and practical implications.

Theme: Psychology, poster **#13**

Dana Schneider

Department of Social Psychology

Friedrich Schiller University, Jena, Germany

Studying interaction attitudes from a 2nd person perspective using non-interrupting video-based cause-and-effect facial behaviour analysis and offline self-report experience sampling

Authorship: Dana Schneider (1,5), Lea Müller (3) , Nicole Methner (2), Martin Thümmel (3), Maha Shadaydeh (3), Larissa Abigall Nägler (1), Joachim Denzler (3, 4) & Thomas Kessler (1)

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Studying real-time 2nd person perspective social interaction phenomena (Schilbach et al., 2013) is a technical challenge regarding study design and data analysis. Here we utilized a non-intrusive video-set up for recording facial mimicry data and an offline self-report experience sampling design. We manipulated respectful, neutral and disrespectful attitudes in three interactions. For the experience sampling we extended Renger et al. (2017) in that we found for both interaction partners a preference for the respectful versus the disrespectful interaction. Based on facial action units (FACS; Ekman and Friesen, 1987; Ekman, 2002) using OpenFace (Baltrušaitis et al., 2015) facial mimicry expressions were computed. After detecting scenes where sender and receiver showed similar facial mimicry expressions, we used Granger causality to investigate their cause-effect relation. Results indicated for example that the sender caused the strongest facial happiness expressions in the receiver in the respectful condition. Interestingly, in the disrespectful condition this causation pattern flipped: The

receiver caused instead the happiness facial expressions in the sender, indicating that the receiver aims to repair this interaction situation of rejection and social exclusion. In sum, these techniques of non-intrusive video-based cause-and-effect facial behaviour analysis and self-report experience sampling might be a great way forward to study various cognitive and affective phenomena in real-time 2nd person perspective social interactions.

Theme: Psychology, poster **#14**

Paul Winkler

Department of General Psychology and Cognitive Neuroscience

Friedrich Schiller University, Jena, Germany

Anxiety and Immersion in Human-Robot Interaction: Initial data from VR Experiments with Service Robots and Industrial Robots

In this project, we investigate influences of various factors regarding human (e.g., age, personality traits, autism quotient - AQ), robot (e.g., visual appearance, movement), and immersion of display (e.g., 2D vs. head-mounted virtual reality -VR) aspects on subjective experiences of robots, sense of presence, anxiety and physiological responses (SCR). In Experiment 1, participants stated their sense of presence and anxiety while evaluating four service robots with different degrees of human-likeness, presented in different degrees of immersion. Initial results (N = 24) show that immersion of display and movement elicited an increased sense of presence, but did not elicit increased levels of anxiety. Moreover, we found evidence for the uncanny valley hypothesis, in terms of a decrease of anxiety ratings with increasing human-likeness that reversed for the most human-like robot. There was a moderate positive correlation of experienced presence with extraversion, but not with AQ. In Experiment 2, participants reported anxiety when facing an industrial robot performing one of several different movements in a VR environment. Initial results of this experiment (N = 35) suggest that different trajectories of movement (in particular, motion trajectories towards versus away from the participant) elicit enhanced anxiety reports and elevated SCRs. Moreover, anxiety reports (but not SCRs) also increased as a function of movement speed. Together, the final results from these experiments should promote deeper insight into the proposed relationships between immersion, presence, and emotions in human-robot interaction, and their modulation by personality traits.

Theme: Psychiatry/Clinical Psychology, poster **#15**

Katja Bertsch

Department of General Psychiatry

Heidelberg University, Germany

The challenge of measuring behavioral and neural correlates of reactive aggression in healthy volunteers and psychiatric patients

Aggression is a highly prevalent behavior in healthy individuals and particularly amongst patients with certain psychiatric disorders, such as borderline personality disorder (BPD). Since the personal and social costs of aggression are high and psychological as well as pharmacological treatment options are still limited, a better understanding of the underlying neural and psychological mechanisms is of high relevance. In a fMRI study, we have aimed to investigate the neural correlates of reactive Aggression in patients with BPD and healthy volunteers using a modified Taylor Aggression Paradigm that includes brief video clips of an opponent's facial expressions. In several behavioral Tasks, we have additionally measured behavioral correlates of threat hypersensitivity and approach, emotional contagion and dysregulation in all participants. First results indicate that patients with BPD do not adapt their aggressive Response to their opponent's facial expressions, but rather use an inflexible, predefined strategy. The MRI data suggest alterations in subcortical (amygdala, hypothalamus) and prefrontal (medial and orbitofrontal) activations in patients during high provocation. Although these results are of high interest and may help to improve our understanding of reactive Aggression in BPD, the question arises how to optimize data analysis and to set up new aggression experiments with greater ecological validity.

Theme: Psychiatry/Clinical Psychology, poster **#16**

Francois Bogacz

Swiss Center for Affective Sciences

University of Geneva, Switzerland

The causal effects of mediation: mediation improves conflict resolution in romantic couples

In spite of the adverse effects of conflict, there is still a scarcity of studies on interventions that could promote conflict resolution in disputes, for example in romantic couples. A particularly promising intervention technique is mediation, which is a negotiation facilitated by a neutral third party. To test the impact of a mediator on couple conflict, we conducted a randomized controlled study in 38 romantic couples who discussed a topic of recurrent disagreement either in the presence of a mediator or in the presence of a silent third party. The results of our study show that compared to the control group, couples in the mediation condition reported more agreements, higher levels of positive affect and higher satisfaction regarding the contents and process of their discussions. Our results also show that the self-assessed tendency of couple members to use active constructive behaviors such as perspective-taking during their discussion also had a positive effect on the outcome variables listed above, but that dispositional mindfulness and emotional intelligence did not have any significant impact. We furthermore found a positive relation between couple's synchronicity of skin conductance, a measure of arousal, and their closeness and quality of relationship. In summary, the present data suggest that mediation can have a beneficial impact on conflict resolution and thus offers a viable intervention strategy for promoting conflict resolution in romantic couples.

PS: this is co-authored with Dr Olga M. Klimecki

Theme: Psychiatry/Clinical Psychology, poster **#17**

Patricia Cernadas

Swiss Center for Affective Sciences

University of Geneva, Switzerland

Changing negative attitudes with compassion training and reappraisal training in order to promote conflict resolution

In tense situations, emotions emerge and impact conflict-related issues. Previous studies have suggested that cognitive reappraisal, an emotion regulation strategy, has beneficial impact on conflict resolution. Here we aimed to test if training the feeling of compassion also promotes conflict resolution. More precisely, our goal was to investigate whether a compassion training and a cognitive reappraisal training can decrease negative attitudes and emotions (e.g., schadenfreude) felt towards a difficult person. We expected that compassion training would increase prosocial behaviors and would reduce negative behaviors such as punishment. To test these hypotheses, we recruited 108 participants that were randomly assigned to one of the three conditions: compassion training, reappraisal training or a control training. The three interventions were parallel in structure, starting with an information session of 30 min-1h and two courses of 2h30 given by a teacher, followed by 20 min guided audio trainings for a daily practice at home. We measured negative attitudes and emotions to misfortune scenarios involving a difficult person at pre- and post-training tests and punishment behavior towards a third party at post-training. The data will be analyzed and the results will be presented at the meeting.

Theme: Psychiatry/Clinical Psychology, poster **#18**

Silvia Fuertes Marraco

Swiss Center for Affective Sciences

University of Geneva, Switzerland

The impact of mediation on affect exchange in a conflict dialogue between romantic partners

Emotions drive and regulate inter-personal relationships. As such, emotions are at the core of conflict settlement and key to conflict resolution. Yet, there is limited qualitative or quantitative evidence on the impact of methods of conflict resolution such as mediation on interpersonal affect exchange.

Here, we present a project that is aimed at testing how mediation impacts the affective exchange between romantic partners in a conflictual discussion. We recruited romantic couples and invited them to talk on a conflicted topic of their choice: n=19 couples discussed in the presence of a silent third party, and n=19 couples had a mediation (with 7 different mediators in the study). The dialogues were video-recorded capturing each partner, and when applicable also the mediator. We are currently applying the Specific Affect coding system (SPAFF). The SPAFF chronologically segments exchanges to assign and weigh affects based on an 18 code scheme that evaluates non-verbal and verbal content including the effect on the receiver.

This study will allow us to assess the effect of mediation on the quality, intensity and dynamics of affects exchanged in conflict dialogues between romantic partners. The aim is also to assess whether there are different qualities of mediator intervention and whether these correlate with particular outcomes in the dialogue.

Theme: Psychiatry/Clinical Psychology, poster **#19**

Kerstin Ganglmayer

Department of Psychology and Educational Sciences

Ludwig-Maximilians-University Munich, Germany

Do children, adolescents and adults with autism-spectrum-condition visually anticipate other's actions as goal-directed after frequent observation?

Authors: Kerstin Ganglmayer, Tobias Schuwerk, Beate Sodian, & Markus Paulus.

Theories suggest that individuals with autism spectrum condition (ASC) have difficulties in anticipating others' goal-directed actions. This might be caused by an impairment of using prior information. Yet, it is not clear whether individuals with ASC can process the actual goal of an action or just rely on movement trajectories when anticipating actions. To this end, the current study investigated whether children, adolescents and adults with ASC anticipate another's action based on the action goal and not just on the movement trajectory after frequent observation of the action. Children (n = 59), adolescents (n = 38) and adults (n = 46) with and without ASC were presented with an animated agent that repeatedly takes different paths to reach the same of two targets. Participants' eye-gazes were assessed to analyze anticipations. Results show that the ASC group exhibited fewer goal-directed anticipations than the control group over the three age groups (p = .013). Especially in the first trials individuals with ASC did not anticipate goal-directed, but increased their goal-anticipations in later trials. These findings indicate that individuals with ASC are able to anticipate the actual goal of an action and not just movement patterns. However, they are impaired in their ability to use prior information, as they needed more repetitions to encode the goal. Our findings thus inform theories on social cognitive problems within ASC.

Theme: Psychiatry/Clinical Psychology, poster **#20**

Ellen Greimel

Department of Child and Adolescent Psychiatry and Psychotherapy

Ludwig-Maximilians-University Munich, Germany

The role of attentional deployment during cognitive reappraisal in adolescents with major depression

Greimel, E., Piechaczek, S., Feldmann, L. & Schulte-Körne, G.

Adolescents and adults with major depression (MD) report deficits in adaptive emotion regulation, including difficulties in reinterpreting the meaning of emotional events (i.e., cognitive reappraisal). Surprisingly, several experimental studies on cognitive reappraisal have found unimpaired cognitive reappraisal abilities in MD samples. It is yet unexplored whether in these groups, aspects related to attention deployment – i.e., the act of directing visual attention away from or towards emotional aspects of a scene – might have obscured previous findings. The aim of this study was to examine the causal role of attentional deployment during cognitive reappraisal in adolescent MD.

37 adolescents with MD and 36 healthy controls (12-18 y.) were included in the study. Participants performed a well-established cognitive reappraisal task during which they a) down-regulated negative affective responses to negative IAPS by means of cognitive reappraisal, or b) simply attended to the pictures and responded naturally to them. During the task, attentional focus was systematically manipulated. This was achieved by directing participants´ gaze on a circumscribed area within the pictures comprising particularly emotional vs. non-emotional aspects. Following each picture, participants indicated their affective response on a rating scale. The validity of the experimental manipulation was ensured by continuously tracking participants´ eye gaze during the task. Across groups and attentional focus conditions, reappraisal resulted in diminished negative affective responses to the pictures (as compared to the attend condition). Regulation success differed significantly between the groups dependent on gaze focus: MD adolescents exhibited relatively less regulation success compared to controls when gaze was focused on emotional aspects, while the reverse was true when gaze was focused on

non-emotional aspects. In controls, reduced regulation success in the non-emotional gaze focus condition was related to lower habitual use of maladaptive emotion regulation strategies as assessed by a questionnaire. Our findings are in line with research showing that MD is associated with difficulties in disengaging from negative material. The results suggest that in adolescents with MD, an emotional context might interfere with the aim to form a new appraisal of a negative scene.

Theme: Psychiatry/Clinical Psychology, poster **#21**

Haemy Lee Masson

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KU Leuven, Belgium

Social touch observation in adults with autism: an MVPA study

Humans can easily grasp the socio-affective meaning of touch during the mere observation. This social cognitive ability is supported by several neural systems, including the theory of mind (ToM) and somatosensory resonance. In the current study, we investigate which of these two systems underlies changes in observed touch processing in adults with ASD, as compared to well-matched neurotypical (NT) adults. Using advanced fMRI-based MVPA methods, we examined the neural representations of affective touch in predefined regions that are relevant to social cognition and somatosensory processing, e.g., the temporoparietal junction (TPJ) and somatosensory areas, respectively. Behavioral results suggest that individuals with ASD and NT adults similarly perceive the valence and arousal of social touch scenes. At the neural level, the affective meaning of touch is equally well represented in TPJ in both groups. In contrast, unlike the NT group, the ASD group does not show affective representations in the somatosensory cortex. In addition, this absence of affective representations in the somatosensory cortex was associated with individual differences in the degree of social touch avoidance and the number of autistic traits. In sum, our findings imply that individuals with ASD are able to cognitively reason about the affective meaning of socio-affective touch, but they do not show the spontaneous embodied somatosensory resonance while observing social touch scenes. Our study highlights that depth of understanding of a state of others is shallower in adults with ASD.

Theme: Psychiatry/Clinical Psychology, poster **#22**

Mariya Malygina

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Helping behavior in adolescence toward peers in emotional distress

The aim of the study is to investigate the relations between distinct components of social cognition and the ability to recognise the symptoms of depression (comparing to non-clinical symptoms of emotional distress). Additionally, help-giving responses toward hypothetical peers in depression were assessed. Peer support may contribute to maintenance of mental health and psychological well-being.

Help-giving behavior is considered as a social competence. Adolescents' ability to recognise the symptoms of depression and help-giving responses toward hypothetical peers were investigated using adapted version of "The Friend in Need Questionnaire" (Byrne, Swords, Nixon). Two tests were applied to asses the components of social cognition: Reading the Mind in the Eyes (Baron-Cohen), Social intelligence test Guilford-O'Sullivan; and two questionnaires: Self Report Emotional Intelligence Test Schutte, Emotional Empathic Tendency Scale Mehrabian, Epstein. The network of "significant others" differs for distress vignettes, and depression vignettes (the most significant difference was found for necessity of psychologist, psychiatrist). Adolescents express greater concern for peers showing signs of depression than for peers showing signs of distress. High scores for theory of mind and social intelligence (components of social cognition) are related to more accurate recognition of symptoms of depression. Empathy level predicts the extent of worrying about psychological state of hypothetical peer. Adolescents recommend friends as primary sources of help for depression and distress. Types of help-giving responses offered to a peer were revealed. The strategies of helping meet two tendencies: a) reducing the contact with the problem area; b) gaining positive life experiences.

Theme: Psychiatry/Clinical Psychology, poster **#23**

Sophie Ruth Poppenhäger

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The role of empathic sensitivity in freezing response after social threat cues

Empathy is generally known as a resilience factor for mental health (Shiner & Masten, 2012). However, high empathic sensitivity to others' distress combined with inadequate coping skills to deal with others' distress has been shown to increase an individual's risk for internalizing symptoms (Zahn-Waxler & Van Hulle, 2012). One basic defensive stress reaction to cope with threat is the freezing response, characterized by bodily immobility and decreased heart rate. While freezing in response to acute threat is adaptive, prolonged freezing has been associated with internalizing symptoms (Niermann et al., 2017). It remains, however, unknown whether empathic sensitivity and freezing behavior are associated. To close this knowledge gap, we will use behavioral and self-report measurements to investigate the role of high empathic sensitivity to social threat cues. Therefore 60 participants, aged 18-50 without any mental disorder diagnosed during the past 12 months will be included in the study. Empathy will be investigated with the behavioral EmpaToM task (Kanske et al., 2015) and the Interpersonal Reactivity Index (Davis, 1983). Furthermore state anxiety will be assessed by means of the Spielberger State-Trait Anxiety Inventory (Spielberger et al., 1983) preceding and following the EmpaToM task. Freezing behavior in response to social threat will be objectively quantified with electrocardiographic and posturographic measures during passive-picture viewing of happy, angry, and neutral faces. We expect that individuals with higher empathic sensitivity show prolonged freezing after angry faces.
Based on these research further studies can investigate a better predictive tool for who is at risk for internalizing symptoms.

Theme: Psychiatry/Clinical Psychology, poster **#24**

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Autistic traits, personality, and evaluations of humanoid robots by young and older adults

While research activities with individuals on the autistic spectrum have increased strongly in the past decades, there is a remarkable lack of research on autism and autistic traits in older adults. It has been proposed that children on the autistic spectrum may benefit from interactions with social robots; in a separate research field, the role of technology and robotics for older adults is currently being discussed. The present study combined these topics by assessing both young and older (Mean age = 22 vs. 69 years) neurotypical adults´ evaluations on multiple dimensions (likeability, companionship, dominance, threat, human-likeness) of various humanoid robots presented in video clips. We assessed autistic traits (known to co-vary with autism spectrum characteristics, using the Autism Spectrum Questionnaire – AQ) as well as Big-Five personality traits. Somewhat unexpectedly, older adults evaluated robots as more likeable than young adults overall. Compared to young adults, older adults also showed significantly higher levels of autistic traits (particularly in the social interaction subscale of the AQ), higher levels of conscientiousness, and lower levels of openness. Across groups, and particularly so in participants with high levels of autistic traits, we found strong positive correlations between ratings of likeability and human-likeness of robots. Overall, we found remarkably favourable evaluations of robots by older adults, suggesting potential for older adults on the autistic spectrum to benefit from social robots. In addition, age-related differences in relationships between personality dimensions and autistic traits deserve special attention.

Theme: Psychiatry/Clinical Psychology, poster **#25**

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Empathic accuracy and interpersonal motives in couples – A messenger-based approach

Research underlines the importance of close relationships for psychological well-being and mental health. However, a frequent issue in studies on the interaction of couples is the artificial or intrusive character of the measurement. The present research project aims at the ecologically valid evaluation of couples' everyday interaction. Specifically, the association between the accuracy of the emotional understanding of the partner (empathic accuracy), interpersonal Motives, and indicators of relationship quality will be evaluated in couples. Based on findings on the role of interpersonal motives for couples, the present study introduces the accuracy of ratings of partner's situational interpersonal motives as a novel conceptualization of social functioning in couples. Also, in an explorative evaluation, it will be assessed whether frequent ratings of emotions and interpersonal motives with feedback increase accuracy of ratings. As evaluation method a smartphone messenger application is used, which combines features of ecological momentary assessment and communication tools. The app enables users to communicate but also share affective states and interpersonal motives and is therefore a non-intrusive method to assess individual and interpersonal states in a naturalistic way. Main goal of the research project is the cross-sectional investigation between couples, whether more accurate ratings of emotions (higher empathic accuracy) and interpersonal motives (higher accuracy of motive ratings) are related to higher quality of relationship in both partners.

Theme: Psychiatry/Clinical Psychology, poster **#26**

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Implicit measures reveal reduced neural sensitivity for social information in boys with autism spectrum disorder

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Fluently recognizing faces and facial expressions is highly important for our social interactions. Impaired and atypical face processing have often been postulated as a key deficit in autism spectrum disorders (ASD). Despite the great amount of research on face identity and facial expression recognition in ASD, results are mixed. This may be due to an overreliance on explicit face processing paradigms, which may not reflect daily-life functioning and spontaneous face processing abilities in ASD. To address this limitation, we applied an innovative scalp electroencephalography approach combined with fast periodic visual stimulation (FPVS) in typically developing (TD) boys (N=23) and boys with ASD (N=23). With FPVS, we rapidly and periodically
present series of images as well as periodic oddball images, eliciting steady-state brain responses at the frequency of visual stimulation. This frequency-tagging approach allows to quantify the neural saliency of social (faces) versus non-social stimuli (houses), and allows to quantify the implicit sensitivity for detecting subtle socio-communicative cues, such as

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differences in facial identity or expressions. Results reveal a reduced neural saliency for social information in ASD. In addition, while general neural synchronization to the visual stimulation and neural responses indexing generic face categorization were intact in boys with and without ASD, implicit neural responses indexing individual face discrimination and expression discrimination were substantially reduced in individuals with ASD. With FPVS, we observed a reduced neural saliency for social information, and selective high-level impairments in individual face and expression discrimination in ASD, measured implicitly, within a few minutes of time.

Theme: Neuroscience, poster **#27**

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Witnessing others' suffering is related to changes in subsequent brain activity and connectivity in old age

While empathy is well studied in younger adults, empathy-related brain functions in elderly are poorly understood. In order to assess (1) neural representations of empathy in elderly and (2) whether empathy-related situations produce carryover effects on brain activity and connectivity, we acquired functional resonance imaging data while 122 participants over 65 years watched emotional video-clips from the Socio-affective Video Task followed by resting periods of 90s. Participants also provided self-report on their feelings in response to each video as well as measures of dispositional empathy (Interpersonal Reactivity Index; IRI). While confirming previous findings from younger adults (Klimecki et al., 2013) on higher empathy and negative feelings, as well as lower positive feelings in response to others' suffering compared to everyday life situations, we additionally observe higher emotional responses in elderly compared to young participants. Furthermore, the confrontation with others' suffering induced greater brain activity in areas related to empathy and social cognition, including anterior insula, middle cingulate gyrus, and medial prefrontal cortex. Moreover, activations were increased in brain regions related to the default mode network following emotional videos in contrast to neutral videos. Correlations between IRI subscores and brain activity showed that empathy-related personality traits differently modulate brain responses during and after emotional movies. Additional functional connectivity analyses will be presented.Our study shows that when faced with others' suffering, older adults experience emotional states that persist over time inducing carryover effects into the resting state. Interestingly, preliminary results suggest that such carryover effects can be modulated by personality traits.

Theme: Neuroscience, poster **#28**

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Investigating empathy for pain toward racial in- and outgroup targets with ERPs, EEG oscillations

Coauthor: Hartmut Leuthold

Even though empathy for pain is quite well investigated, it remains unclear which underlying processing stages are automatic and controlled and whether they are identical for in- and outgroup targets. To identify empathic influences on information processing we presented white participants pictures of fair-colored body parts in painful and neutral situations and asked them to judge the painfulness or count the number of body parts, while recording EEG and response force. In order to identify racial bias influences, we performed a second, almost identical study except that dark-colored pictorial stimuli were introduced. Event-related brain potentials indicated an automatic empathic influence on stimulus encoding and later controlled influences on the categorization stages, as reflected by the early posterior negativity (EPN) and the late posterior positivity (P3), respectively. N240 amplitudes over central electrodes were differentially influenced by painful compared to neutral stimuli, but only for ingroup targets. Furthermore, we found a positive correlation between the implicit racial ingroup preference of participants and P3 amplitude differences between fair- and dark-colored hands to painful stimuli only. Results of response force and EEG oscillations (mu and beta band) revealed facilitated motor processing in preparation of the motor response, independent of skin color. In sum, the present work advances our understanding of empathic processing towards in- and outgroup targets by demonstrating that the early encoding stage and, depending on participants' implicit ingroup preferences, the late categorization stage are influenced by racial bias, whereas the motor facilitation seems to be independent of the target's racial background.

Theme: Neuroscience, poster **#29**

Martin Imhof

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Strong health prevention messages increase collectively shared neural engagement

Mass media health messages are a key strategy to combat risky drinking. However, messages often vary in their ability to engage and influence recipients. The inter-subject correlation (ISC) offers an audience-centered neural measure of viewer engagement during reception of naturalistic messages (Hasson et al., 2004). While previous work mainly used fMRI - which has low temporal resolution - the approach has recently been adapted to EEG (Parra et al., 2018). Here, we expand on own fMRI work (Imhof et al., 2017) and test whether strong compared to weak messages against risky drinking prompt higher EEG-ISC. Thirty-two participants viewed strong and weak audio-visual PSAs, which were comprehensively characterized in terms of perceived message effectiveness (PME) previously and confirmed in the current sample ($p < 0.001$, $t(18) = 7.89$). Brain responses were recorded using 256-channel EEG (0.5 Hz HPF, 1000 Hz sampling rate) and submitted to EEG-ISC analysis to obtain maximally correlated components. EEG-ISC was extracted per subject and video, and statistically compared. The main finding is that stronger messages, as defined by PME, evoke stronger correlated brain responses. Moreover, the results are replicated within a second presentation of the messages. Our findings align with previous work and support the hypothesis that strong PSAs engage the brains of audience members more consistently. In sum, EEG-ISC offers an unobtrusive, low-cost method to assess "neural engagement" within an audience during naturalistic stimulation. Moreover, EEG-ISC offers a temporally sensitive neural marker to assess health media and track the grip of a message over time.

Theme: Neuroscience, poster **#30**

Annalina Mayer

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The role of egocentric and allocentric perspectives in vicarious embarrassment – an fMRI study

Humans experience vicarious embarrassment when they observe other's mishaps or misbehavior in public settings, even when the observed person does not recognize their own transgression of social norms. Vicarious embarrassment results from spontaneous processes of mirroring and perspective-taking that are anchored in the observer's appraisal of the situations. Humans can however overcome this egocentric bias in their judgment by deliberately adopting the other person's perspective. This study examined the effects of allocentric ("How does the person feel?") and egocentric evaluations ("How do I feel as an observer?") of social scenarios that, in previous studies, have been proven to elicit vicarious embarrassment. The shown scenarios included a protagonist who was either aware or not aware of their mishap, allowing observers to feel embarrassed either with or for the person. Using functional resonance imaging, we demonstrated that vicarious embarrassment resulting from an egocentric perspective was reflected within networks associated with mirroring and perspective taking, namely the anterior cingulate cortex, anterior insula and the medial prefrontal cortex, with the right posterior temporal sulcus being specifically involved in embarrassment with, instead of for, the protagonist. Evaluating the situation from the protagonist's perspective particularly involved the right middle temporal gyrus. The strength of the subjectively experienced embarrassment was associated with activations within bilateral parietal areas covering parts of the somatosensory cortex. These findings illustrate how the allocentric and egocentric anchoring of the bystander's perspective in otherwise identical situations modulate the experience of third-person embarrassment and its neural correlates.

Theme: Neuroscience, poster **#31**

Christine Michel

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Leipzig, Germany

Inter-brain and behavioral synchrony during Joint Attention

In our daily life, we often synchronize our behavior (e.g. our body posture) with others. Recent research has shown that behavioral and inter-brain synchrony are related: When people synchronously perform hand movements, their oscillatory phases in their brains measured via the phase-locking value (PLV) align (Dumas, Nadel, Soussignan, Martinerie, & Garnero, 2010). Additionally, experimentally manipulated inter-brain synchrony facilitates behavioral synchrony (Novembre, Knoblich, Dunne, & Keller, 2017). These studies assessed behavioral synchrony with regard to simple hand or finger movements. However, natural interactions are more complex. One pivotal form of behavioral adjustment is during moments of Joint Attention when two people attend to the same object and are both mutually aware of it. In the current study, we examined inter-brain synchrony in 34 same-sex adult dyads (17 males, average age 24 years). We simultaneously measured EEG in two participants. In the NOJoint Attention condition, participants were asked to explore a novel object on their own thinking about its function and features. In the Joint Attention condition, participants were asked to nonverbally show and explain their object to their partner.

In preliminary analyses we found less mu power (9-12Hz, central electrodes) in the NOJoint Attention (M=.18 , SD=.09) as compared to the Joint Attention condition (M=.24, SD=.15), t(67)=-4.46, p<.001. Presumably participants moved more during the NOJoint Attention condition which may be one factor explaining this result. This highlights methodological difficulties designing research on real social interactions. A more detailed analysis of behavioral synchrony as well as the PLV is under way.

Theme: Neuroscience, poster **#32**

Halima Rafi

Swiss Center for Affective Sciences

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Neural and Behavioral Correlates of Conflict in Romantic Couples

Previous neuroimaging studies have shown that when seeing the face of one's romantic partner, as opposed to the face of a same-sex acquaintance or unknown person, activity increases in brain areas related to positive affect and reward. To test whether this activation is subject to modulation by current relations between couples, the present study investigated the impact of a conflictual discussion on the neural representation of one's romantic partner. In addition, we tested whether third-party mediation during conflict discussion, as compared to a control condition without mediation, was associated with increased brain activation in the ventral striatum, ventral tegmental area and the medial orbitofrontal cortex. Lastly, we assessed the impact of incidental emotions induced by interpersonal conflict on economic decision-making by having participants play the Dictator's Game and Ultimatum Game before and after interpersonal conflict. The present study found that the mediation during conflict decreases activation in the amygdala after conflict, as compared to no mediation. In addition, questionnaire results indicated that the mediated condition was significantly more satisfied post-conflict compared to the non-mediated condition. Finally, both the mediated and non-mediated group made significantly lower offers in the Ultimatum Game post-conflict compared to pre-conflict.

Theme: Neuroscience, poster **#33**

Elisa Roberti

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You smile, I smile with you. The observation of a happy facial expression activates sensorimotor areas in 7-month-old infants.

In everyday life, emotional facial expressions offer fundamental social cues to empathizing and understanding other minds. In adults, the observation of emotional facial expressions activates sensorimotor areas involved in the execution of the same expressions (Van der Gaag, Minderaa & Keysers, 2007). Similarly, mu rhythm desynchronization, indexing sensorimotor activation, was detected in 30-month-old infants during the observation of dynamic happy, sad and neutral facial expressions (Rayson et al., 2016). According to some authors, this depends from the activation of the mirror neuron system (MNS; Iacoboni, 2009) via a motor resonance mechanism, which allows individuals to understand others' emotions as if they were personally experienced. The present EEG study investigates whether sensorimotor activation in response to emotional facial expressions is present in infants as young as 7 months of age. To this purpose, infants were presented with female faces expressing either happiness or anger. Dynamic stimuli were used, as they share temporal and structural properties with live facial expressions. Furthermore, they are more reliably processed by the emotion processing neural network (Trautmann, Fehr & Herrmann, 2009), enabling at the same time a good experimental control on the stimuli. The sensorimotor activation over central left (C3) and right (C4) clusters of electrodes was analyzed. Results revealed a right-lateralized mu rhythm desynchronization in response to happy but not to angry faces. The implications of the current findings for our understanding of emotion processing development are further discussed.

Theme: Neuroscience, poster **#34**

Anne Saulin

Translational Neuroscience Unit

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How different social motives interact in the human brain

The motivational states that drive human social behaviour are complex. In most cases, they derive from different motives that interact with each other, yet the behavioural and neural mechanisms of social motive interactions are poorly understood. Here, we use hierarchical drift-diffusion modelling (HDM) and functional magnetic resonance imaging (fMRI) to assess how different social motives interact during the decision process and on the neural level. Participants chose between prosocial and egoistic allocations of points after an empathy induction (empathy condition), a reciprocity induction (reciprocity), the simultaneous induction of those two motives (combined condition) and without prior motive induction (baseline condition). Our behavioural results demonstrated a significant interaction between the two motives, reflected by an increase in prosocial decisions in the combined compared to the reciprocity condition. Drift diffusion modelling results revealed that the interaction between the motives increased participants' pre-existing tendency to make a prosocial decision (z parameter). On the neural level, the motive-interaction-related increase in prosocial decision tendency correlated with bilateral activation in the dorsal striatum. The individual strength of activation in this region correlated with activation in the anterior cingulate/dorsomedial prefrontal cortex, a region that tracked increased other-regarding preferences in the combined motive condition. The functional connectivity between dorsal striatum and ACC/DMPFC was mediated by the strength of the empathy motive that was simultaneously induced with the reciprocity motive. Together, these findings provide novel mechanistic insights into the interaction between different social motives, and their impact on human decision processes and neural decision circuitries.

Theme: Neuroscience, poster **#35**

Stephanie Schmidt

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University of Konstanz, Germany

EEG and EEG-fMRI measurements of empathy and theory of mind – methodological challenges

The measurement of neural processes underlying social cognition usually relies on methods such as fMRI, which has a good spatial resolution, or EEG, which has a good temporal resolution. A combined measurement provides data that has both, good temporal and spatial resolution, but also artefacts that might lead to unusable data or even worse: false results. In this analysis, we compare EEG results from a simultaneous EEG-fMRI measurement with those from a standard EEG, using the same social-cognitive paradigm. With this work, we hope to raise awareness for the challenges associated with the analysis of EEG and especially EEG-fMRI data, and discuss implications on the interpretation of obtained results in a social-cognitive context. In the present analysis, we compare the EEG data from two studies which used the same experimental paradigms. In the first study 65 participants completed a simultaneous EEG-fMRI measurement using a 64-electrode cap. In the second study, 10 participants completed a standard EEG measurement using a 128-electrode cap in a lab setting. In both studies, participants completed the same two tasks: 1. An empathy task, in which emotional faces are presented and participants have to indicate their cognitive and affective empathy, as well as distress. 2. A theory of mind task, in which participants decide on the emotion or intention of a person based on the emotional facial expression. We present the results from the two studies in a comparative manner, focusing on the so called mu-suppression that was shown to characterize social-cognitive processing, and which has been linked to activation in the mirror neuron system. We highlight the challenges in data processing, and discuss consequences for the interpretation of EEG data on social cognition acquired in different settings.

Theme: Neuroscience, poster **#36**

Christian Valt

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Feedback Processing in the Context of Social Comparison

In many situations, social comparison calls for the evaluation of one's own performance in relative terms, by taking into account the performance of other people. We investigated effects of social comparison on performance monitoring with the help of event-related brain potentials (ERPs). To this end, we recorded the electroencephalograms (EEGs) of two participants performing a response-choice task at the same time and in the same room. After each response, participants received two feedback signals presented in sequence: one feedback described the personal performance (personal) and one reflected the other participant's performance (non-personal). Social comparison should lead to changes in the processing of the second feedback determined by the quality of the preceding feedback, resulting in relative interpretations like "I performed better", "I performed equally well", or "I performed worse". ERP results showed that the first non-personal feedback affected the P3 evoked by the second personal feedback, but did not modulate the feedback-related negativity (FRN). The fronto-central P3 evoked by personal feedback was larger when the comparison signalled that the personal performance was worse than the other participant's performance. Interestingly, the effect was most prominent over bilateral fronto-central electrodes (FC3 and FC4), suggesting the involvement of additional brain areas for feedback processing in relative terms. We take the observed ERP effect as indications that, in the present experiment, social comparison did not change the perceived valence of the personal feedback but increased the relevance of feedback processing in case the personal performance was not as good as the performance of others.

Theme: Neuroscience, poster **#37**

Ayumi Yoshioka

Cognitive and Psychological Science

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Neural basis of subjective preference congruity: a hyperscanning functional MRI

The impression and feelings to others change depending on agreement or disagreement of preferences. Although previous studies have examined the difference between agreement and disagreement of their preferences, no functional MRI research has been conducted in real live communicative situation. Here, we examined neural substrates of sharing preferences dividing preference agreement and utterance order with a hyperscanning functional MRI. Nineteen pairs were participated in this study. Experiment was $2 \times 2 \times 2$ within-subject factorial design manipulating attending item and judging (preference/familiarity or object feature), utterance order (initiator or responder), and agreement of opinions (agreement or disagreement). The utterance order was assigned by visual stimulus surrounding a partner's face. In the preference/familiarity task, the word regarding everyday things were displayed with the direction (preference or familiarity). The initiator gave direction for the responder verbally. After that, initiator and responder told the opinion about the word each other. As a control task, they performed object feature task (they answered the shape or color of the picture). The results demonstrated that, in initiator-agreement condition, left temporal region, angular gyrus, prefrontal to anterior cingulate cortex, posterior cingulate cortex, caudate, and cerebellum were more activated in preference/familiarity than feature task, whereas in initiator-disagreement condition, inferior frontal gyrus to anterior insula and amygdala were more activated in addition to the above region. Furthermore, residual brain activities in the temporo-parietal junction and mid-to-posterior superior temporal sulcus were more synchronized between the real pairs than between the pseudo-pairs.

Theme: Neuroscience, poster **#38**

Sam Wass

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Stress contagion: examining how physiological stress in adults and infants cofluctuates in naturalistic settings

Previous research has suggested that affective states are not simply concepts that live privately in the mind, but rather that they emanate from the individual and may influence others. Understanding this is particularly important the causation of clinical disorders, for example the inter-generational transmission of stress and anxiety. However, no previous work has studied how levels of physiological stress in adults and infants co-fluctuate in naturalistic settings. We designed miniaturised microphones and autonomic monitors that could be worn concurrently by infants and their parents in naturalistic settings. This allowed us to record, for the first time, spontaneously occurring autonomic arousal fluctuations, and vocalisations, in infant-parent dyads. We studied a sample of mixed socio-economic status, high-risk infants, growing up in East London, UK. Using multiple analytical techniques we show that increased physiological stress associates with phasic decreases in inter-dyadic sensitivity. Thus, parents were most sensitive to changes in their infant at times when their own physiological stress was low; and infants were more sensitive to changes in their parent at times when their physiological stress was low. We also show that the 'high points' of infants' physiological arousal lead to reactive increases in the parent's physiological arousal, and that increases of greater reactive physiological change from the parent are associated with faster soothing from the child. Our findings have implications for understanding empathy and affect-matching in typical parent-child interactions, and for understanding early pathways in the inter-generational transmission of stress, and anxiety.

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NOTES

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