From self-knowledge to knowing others:
New advances in characterizing socio-cognitive dysfunctions in the general and clinical populations

Location: Université catholique de Louvain (UCLouvain) - "Auditoires centraux" building - auditorium Maisin

Address: Avenue Emmanuel Mounier, 51 - 1200 Bruxelles

Website: https://www.self-knowing-others.org

Time	Event	Topic	Duration
Thursday, August 31st 2023			
Time	Event	Topic	Duration
9:30		Registration & coffee	30 min
10:00		Organizers: *Introduction to the workshop by* Claus Lamm & Henryk Bukowski	30 min
10:30-12:00	Talk	Dr. Francois Quesque: *Consensus about social cognition terminology and knowledge of social cognition among clinicians.*	45 min
	Talk	Dr. Celine De Meulemeester and Dr. Patrick Luyten: *Understanding Self-Other Distinction Impairments in Personality Disorders through the Lens of Mentalization-Based Theory and Treatment (MBT)*	45 min
12:00-13:00		**Lunch break**	1h
13:00-15:00	Blitz	5 short talks: 1. *Unraveling the Complexity of Self-Other Distinction* by Ekaterina Pronizius 2. *COSIMO: Paving the Way for Social Cognition in Screening Diagnostics* by Rebecca Johannessen 3. *Poorer representation of minds underpins less accurate mental state inference for out-groups* by Bryony Payne 4. *The impact of incidental anxiety on the neural signature of mentalizing* by Li-Ang Chang 5. *The Influence of Loneliness on Social Cognitive Capacity: Exploring the Role of Self-Perceived Social Cognitive Proficiency* by Łukasz Okruszek	1h10
	Talk	Dr. Clare Eddy: *Self-other distinction in Neuropsychiatry: From psychosis to movement disorder.*	45 min
15:00-15:30		**Coffee & tea break**	30 min
15:30-17:00	Talk	Dr. Anne Katherine Fett: *Social cognition and interpersonal functioning in psychosis.*	45 min
	Talk	Dr. Amy Pinkham: *Measuring Social Cognition in Schizophrenia and Related Disorders*	45 min

17:00-18:45	Discussion	**World café** (discussions on selected issues)
		by C. Lamm, C. De Meulemeester, F. Van Overwalle, A. Bigot, D. Golab, E. Pronizius & H. Bukowski
		   1. How should look like the next-gen assessment of social cognition?
		   2. Do interpersonal problems lead to impaired social cognition or the other way around?
		   3. What's in self-other distinction and how to tease its components apart?
		+ drinks + light snacks
			1h30

Time	Event	Topic	Duration
Friday, September 1st 2023			
Time	Event	Topic	Duration
8:30		**Coffee & tea**	30 min
9:00-11:15	Talk	Dr. Matthias Schurz: *The neurofunctional organization of social cognition: Insights from brain imaging.*	45 min
	Talk	Dr. Annabel Nijhof: *"Autos" and Autism: a (neural) focus on the self*	45 min
	Talk	Dr. Rebecca Böhme: *Touch as an approach to understand self and other in neurotypical and neurodiverse populations.*	45 min
11:15-13:00		**Poster session and lunch break**	1h45
13:00-15:00	Talk	5 short talks: 1. *Self-related processing and mentalizing in adolescents with autism* by Letizia Amodeo 2. *Developing Brain Signatures for Self- & Other-Referential Thought* by Dorukhan Acil 3. *The effects of cerebellar stimulation on social sequences: a tDCS-fMRI pilot study* by Beatriz Catoira 4. *Revisiting the mirror neuron system in children with autism: "broken" mirroring or inefficient modulation?* By Jellina Prinsen 5. *The role of the cerebellum in social sequencing, and a new hypothesis on autism* by Frank Van Overwalle	1h10
	Talk	Dr. Amy Pinkham: *Self-awareness of cognitive and social cognitive impairments in severe mental illness*	45 min
15:00-15:30		**Coffee break**	30 min
15:30-17:30	Talk	Dr. Philipp Kanske: *Psychopathology and Plasticity of the Social Brain*	45 min
	Discussion	**Discussion with all speakers**	45 min
	Talk	Organizers: *Conclusions and best poster awards by* Claus Lamm & Henryk Bukowski	30 min
18h15-…	Social	Optional **dinner and drinks in Brussels center at Wolf** (not covered)	…

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Short talks (chronological order)

Title	Unraveling the Complexity of Self-Other Distinction
Author(s)	Ekaterina Pronizius (1), Henryk Bukowski (2), Claus Lamm (1)
Affiliation(s)	(1) Department of Cognition, Emotion, and Methods in Psychology, Faculty of Psychology, University of Vienna, Austria; (2) Faculty of Psychology and Educational Sciences, Psychological Sciences Research Institute, University of Louvain, Louvain-la-Neuve, Belgium
Abstract	Self-other distinction (SOD) is a process via which humans disentangle self- from other-related mental representations. In an online study, we investigated two unresolved questions: (1) whether SOD is underpinned by a unitary process across three types of mental representations: motor, cognitive, and affective representations, and (2) whether SOD largely coincides with domain-general processes related to cognitive control. Participants (N = 243) performed three well-established SOD tasks (motor representations: automatic imitation inhibition task [AIT]; cognitive representations: visual perspective-taking task [VPT]; affective representations: emotional egocentricity bias task [EEB]) and two cognitive control tasks (Stroop task and stop-signal reaction time task). The correlation analysis didn't reveal significant associations between the corresponding indexes from the three SOD tasks. Moreover, the subsequent confirmatory factor analysis has not supported the one-dimensionality either. Domain-general cognitive control indexes were strongly associated with the VPT task, whereas stimulus laterality played a significant role in all SOD tasks but to a greater extent in the AIT task. Including control indexes in the CFA has not improved the model fit. These findings suggest that (1) SOD for motor, cognitive, and affective mental representations is not supported by a unitary process and (2) that different domain-general processes underly distinct SODs.

Title	COSIMO: Paving the Way for Social Cognition in Screening Diagnostics
Author(s)	R. Johannessen (1,2), M. Eicher (1), H. Jokeit (1,2)
Affiliation(s)	(1) University of Zurich, Switzerland; (2) Swiss Epilepsy Centre
Abstract	Social cognition plays a vital role in promoting quality of life and maintaining mental health. However, it often receives little attention in neurological and psychiatric diagnostics. The lack of well-validated, sensitive, and cost-effective tests for assessing social cognition may contribute to this gap. To address this issue and facilitate screening for social cognition deficits, we have developed COSIMO (Cognition of Social Interaction in Movies). COSIMO is an online screening tool that efficiently evaluates participants' comprehension of social interactions within approximately 5 minutes. This tool utilizes 25 brief, silent video vignettes depicting dyadic interactions. One of two test versions was administered to 524 German-speaking participants, including 289 neurotypical individuals and 235 patients with neurological and psychiatric disorders. In line with previous research, patients with temporal lobe epilepsy (N = 32) differed significantly from neurotypical participants (Hedge's g = .79, p = .006) in terms of social cognition as assessed by COSIMO. A weak correlation was found between COSIMO and the Montreal Cognitive Assessment (N = 86, r = .23, p = .03), suggesting little dependence on general neurocognitive integrity. A moderate to high correlation was found with the Movie for the Assessment of Social Cognition (N = 41, r = .66, p < .001), a video-based test of social cognition with high ecological validity, and a weak, non-significant correlation was found with the Faux Pas Recognition Test (N = 33, r = .25, p = .15), a text-based, more artificial test of Theory of Mind. Preliminary results suggest satisfactory convergent and divergent validity. COSIMO is a sensitive, ecologically valid, user friendly and cost-effective screening tool for social cognition. It is readily available to researchers and clinicians through its web app-based format, and we welcome collaborations and requests for its use.

Title	Poorer representation of minds underpins less accurate mental state inference for out-groups
Author(s)	Bryony Payne (1), Geoffrey Bird (2), & Caroline Catmur (1)
Affiliation(s)	1 Department of Psychology, King's College London, United Kingdom 2 Department of Experimental Psychology, University of Oxford
Abstract	People use their theory of mind to infer the mental states of others. Yet, despite a wealth of studies suggesting that mental state inference differs – and is poorer – for out-group members relative to in-group members, none has determined why. Are people less prone to theorise about the minds of out-groups, or simply less able to do so? In our new mental state inference task, participants (n=128) made inferences about beliefs held by real in-group and out-group members, and could then choose whether to seek further information to improve these inferences. We tested whether group status (in-group vs out-group) affected people's propensity to seek further information or the accuracy of their mental state inferences. Further, we assessed whether people's awareness of their own ability to make accurate inferences differed for in-groups and out-groups. We report three key findings: 1) participants sought significantly more information about out-groups' mental states than those of in-groups but; 2) despite this, people had significantly reduced accuracy in mental state inference for out-group minds and; 3) were also less aware of their (in)ability to make accurate inferences about the out-group minds, such that their confidence in doing so was misplaced. Given that this reduction in accuracy of occurred in spite of access to more information about the out-group minds, we show that the poorer mental state inference is not underpinned by a reduced propensity to consider out-group minds but instead by a relatively poorer representation of them.

Title	The impact of incidental anxiety on the neural signature of mentalizing
Author(s)	Li-Ang Chang (1), Jan B. Engelmann (2)
Affiliation(s)	University of Amsterdam, Netherlands
Abstract	While the effects of anxiety on various cognitive processes, including memory, attention, and learning, have been relatively well documented, the neurobiological effects of anxiety on social cognitive processes remain largely unknown. We address this gap using threat-of-shock to induce incidental anxiety while participants performed two false-belief tasks, a standard and economic-games version. During belief formation and belief inferences, regions in a canonical social cognition network showed activation reflecting mentalizing, including the temporoparietal junction (TPJ), precuneus, and dorsomedial prefrontal cortex (dmPFC). At the same time, we found threat-related suppression of these regions during belief inferences. A conjunction analysis confirmed that a network of regions was simultaneously engaged during mentalizing and suppressed by anxiety: bilateral TPJ, bilateral IFG, and putamen. Furthermore, we found simultaneously enhanced anxiety-related and mentalizing-related activation in the precuneus and medial-TPJ during belief formation. Next, the impact of threat on connectivity between seed regions from the conjunction analyses and their targets was analyzed. During belief formation, a suppressed connectivity was observed between the precuneus seed and two key mentalizing nodes, the dmPFC, and right TPJ. However, during belief inferences, increased connectivity was identified between the left TPJ seed and the posterior precuneus. Finally, we used a latent distress variable obtained from a factor analysis across 34 personality questionnaires to examine connectivity-behaviour associations. Results showed that dispositional distress significantly modulated threat-related suppression of connectivity between the left TPJ seed and left IPS, substantiating the involvement of the attentional network in social cognitive processes and the negative effects of anxiety on this relationship. Our results highlight the important effects of incidental and dispositional anxiety on specific nodes of the social cognition network. Taken together, our study uncovers novel interactions between the reward, social cognition, and attentional systems, indicating that social cognitive processes rely on support from other large-scale networks and that these network interactions are disrupted under incidental anxiety.

Title	The Influence of Loneliness on Social Cognitive Capacity: Exploring the Role of Self-Perceived Social Cognitive Proficiency
Author(s)	Łukasz Okruszek (1), Marta Chrustowicz (1), Szymon Mąka (1), Aleksandra Piejka (1), Marcelina Wiśniewska (1)
Affiliation(s)	(1) Social Neuroscience Lab, Institute of Psychology, Polish Academy of Sciences
Abstract	Tracking the trajectories that link perceived social isolation (commonly referred to as 'loneliness') with cognitive mechanisms is crucial for understanding its relationship with a wide range of physiological sequelae. Due to the lack of consistency in the methods used to examine the association between loneliness and social cognitive mechanisms, we recently proposed the use of a well-established battery of psychometric measures derived from clinical psychology (Social Cognition Psychometric Evaluation, SCOPE) to systematically investigate social cognitive mechanisms in loneliness research. By employing this approach, we were able to demonstrate in a group of 254 healthy individuals that while objective social isolation is negatively associated with social cognitive capacity, no such relationship may be observed for loneliness. Since lonely individuals tend to have more negative self-evaluations, one possible factor influencing social cognitive performance in this group is their self-perceived lack of social cognitive skills. Therefore, to expand on previous findings, we examined the association between objective social cognitive capacity (measured by four SCOPE tests) and subjective cognitive ability (measured by the DACOBS 18 Social Cognition Problems scale) in a sample of 505 nonclinical young adults (including 254 from the initial study). In line with our predictions, we found a strong association between loneliness and self-reported social cognitive problems (beta = .466, p < .001), but no direct effect of loneliness on social cognitive capacity (beta = -.042, not significant). However, considering the association between objective and self-perceived social cognitive capacity (beta = -.301, p < .001), we observed a significant indirect effect of loneliness on social cognitive abilities. Taken together, these findings suggest that lonely individuals may experience secondary social cognitive problems due to their low self-perceived social cognitive proficiency rather than actual social cognitive impairments.

Title	Self-related processing and mentalizing in adolescents with autism
Author(s)	Letizia Amodeo (1,3), Annabel D. Nijhof (1,3), David Williams (2), Jan R. Wiersema (1,3)
Affiliation(s)	(1) Department of Experimental Clinical and Health Psychology, Ghent University, Belgium (2) School of Psychology, Keynes College, University of Kent, UK (3) EXPLORA, Ghent University, Belgium
Abstract	The self is a multidimensional concept that can be represented at a pre-reflective (first-order) level, at a deeper, reflective level (second-order), or even at a meta-level (representing one's own thoughts, i.e. self-related mentalizing). Since self-related processing and mentalizing are crucial for social cognition, both constructs have been researched extensively in individuals with autism, who experience persistent socio-communicative difficulties. A number of studies suggested autism-related reductions of the self-bias, i.e. tendency to preferentially process self- over other-related content. Other studies observed a decreased ability to mentalize on one's own thoughts in autism. However, prior research examined distinct levels of self-related processing in isolation, in the context of independent studies. In this investigation, we directly compared self-bias, self- and other-related mentalizing within the same sample of adolescents with and without autism, to identify which of these are altered in this condition. Thirty adolescents with autism and 26 age- and IQ-matched controls performed a visual search task (first-order self-bias), a trait adjectives task (second-order self-bias), a feeling-of-knowing task (self-related mentalizing) and the Frith-Happé animations task (other-related mentalizing). Parents were also asked to complete two questionnaires (i.e. SRS, SCQ) assessing the adolescent's degree of autism traits. Our findings replicated previous research showing reduced other-related mentalizing in autism. However, we did not find any difference between adolescents with and without autism in terms of first- or second-order self-bias, nor in the ability to mentalize on one's own thoughts. In line with recent investigations, our results do not support earlier claims of altered self-related information processing in autism.

Title	Developing Brain Signatures for Self- & Other-Referential Thought
Author(s)	Dorukhan Açıl (1, 2), Jessica Andrews-Hanna (3), Marina Lopez-Sola (4), Mariët van Buuren (5), Lydia Krabbendam (5), Liwen Zhang (6), Lisette van der Meer (7), Paola Fuentes-Claramonte (8), Edith Pomarol-Clotet (8), Raymond Salvador (8), Peter J. McKenna (8), Martin Debanne (9), Pascal Vrticka (10), Patrik Vuilleumier (11), David Sbarra (3), Andrea M. Coppola (3), Lars O. White (2), Tor D. Wager (12), & Leonie Koban (13, 14)
Affiliation(s)	(1) IMPRS NeuroCom, Leipzig; (2) Leipzig University; (3) University of Arizona; (4) University of Barcelona; (5) Vrije Universiteit Amsterdam; (6) University of California, San Francisco; (7) University of Groningen; (8) Fidmag Research Foundation, Spain; (9) University College London; (10) University of Essex; (11) University of Geneva; (12) Dartmouth College; (13) Center for Research in Neuroscience in Lyon; (14) CNRS, France
Abstract	Thinking about self and others are fundamental processes for adaptive navigation through the social world. It has been shown that these processes overlap substantially both in terms of cognition and their neural representations. Key regions of self-related thought, including mPFC, PCC, and precuneus, are also involved in other-related thought, and an open question remains about how these two processes are differentiated in the brain. Here, we aimed at developing brain markers for self- and other-referential thought by using a brain signatures approach (Kragel, et al., 2018). Brain signatures are multivariate models of brain activity trained to predict mental states and/or behavior across individuals and datasets. We first trained whole-brain support vector machine (SVM) classifiers of self, and other-referential thought in a training dataset (Koban, Pichon & Vuilleumier, unpublished) of n=21 adult participants who completed a trait-evaluation task with self, other, and control conditions. Using a 10-fold cross-validation procedure, both classifiers showed excellent accuracy (100% two-choice correct out-of-sample prediction, p<.001). Brain regions with significant positive voxel weights for the "self"-classifier included vmPFC, ACC, thalamus, caudate nucleus, insula, and striatum. For the "other"-classifier, significant positive weights were found in the left vlPFC, precuneus, TPJ, and left STS. Next, we tested these SVM classifiers in several completely independent datasets that used similar trait-evaluation tasks. These validation datasets included two samples of healthy adults, two adolescent samples, and three clinical (schizophrenia and bipolar disorder) samples. In these datasets, the average prediction accuracy was 77% for the "self"-classifier, and 76% for the "other"-classifier, suggesting good generalizability. In conclusion, we have trained and validated two new classifiers that predict self- and other-referential thought across different studies and different (incl. clinical and developmental) samples. Beyond informing us about the functional neural organization, these brain markers can be used as neurophysiological measures of self- and other-related mentalizing in multiple tasks and across different contexts.

Title	The effects of cerebellar stimulation on social sequences: a tDCS-fMRI pilot study
Author(s)	Beatriz Catoira (1), Frank Van Overwalle (1), Peter Van Schuerbeek (3), Hubert Raeymaekers (3), Elien Heleven (1), Kris Baetens (1), Natacha Deroost (1) & Chris Baeken (1, 2, 3)
Affiliation(s)	(1) Vrije Universiteit Brussel (2) Ghent University (3) UZ Brussel
Abstract	Over the past decades, research has increasingly highlighted the cerebellum's multifaceted involvement beyond motor functions, particularly in the domain of social cognition. Mentalizing is a crucial aspect of social cognition and it encompasses the capacity to ascribe mental states, including desires, intentions, and beliefs, to individuals other than oneself. This ability involves the use of social action sequences to predict future actions. To elucidate the causal role of the cerebellum in processing social mentalizing sequences, we applied cerebellar transcranial direct current stimulation (tDCS) within the context of functional magnetic resonance imaging (fMRI) involving healthy participants. Our study focused on a picture sequencing task in which we compared the ordering of sequences that require belief mentalizing, with social routine and non-social sequences. The tDCS montage specifically targeted the right posterior cerebellum, a region implicated in mentalizing processes. Our results unveiled a compelling link between cerebellar tDCS, sequence types, and neural activity across brain regions associated with mentalizing, such as the temporoparietal junction and the precuneus. Remarkably, we observed a decline in task performance, accompanied by a decrease in brain activation within these mentalizing areas following stimulation. Notably, this decline was most pronounced in sequences involving true belief sequences, as compared to other conditions. These findings highlight the capacity of cerebellar tDCS to modulate diverse sequence types and impact neural substrates. Our study offers a comprehensive exploration of the cerebellum's role in social mentalizing through the integration of tDCS and neuroimaging techniques. Additionally, our investigation contributes novel insights by elucidating the nuanced effects of cerebellar tDCS on different sequence types and the mentalizing network. These findings contribute to the understanding of the intricate interplay between the cerebellum and social cognition, opening doors for future research and potential therapeutic applications.

Title	Revisiting the mirror neuron system in children with autism: "broken" mirroring or inefficient modulation?
Author(s)	Jellina Prinsen (1), Ruth Op de Beeck (1), Nicky Daniels (1), Matthijs Moerkerke, (2), Jean Steyaert (3), Kaat Alaerts (1)
Affiliation(s)	(1) Neurorehabilitation Research Group , Department of Rehabilitation Sciences, KU Leuven, Belgium (2) Center for Developmental Psychiatry, Department of Neuroscience, KU Leuven, Belgium (3) Child and Adolescent Psychiatry, UPC KU Leuven, Leuven
Abstract	Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by social communication difficulties, repetitive behaviors and restricted interests. Researchers have explored various theories to understand the contributing neural mechanisms of ASD. One system that has gained significant attention is the neural action observation network, oftentimes also termed the mirror neuron system (MNS). Initially, it was argued that the MNS is inherently impaired in ASD, whereas more recent viewpoints posit that basic action simulation or 'mirroring' could be intact, but that the attunement of this response in line with the socio-interactive demands of the environment is inefficient. Here, we adopted fMRI neuroimaging to compare neural activation between 56 children with ASD and 38 typically developing (TD) children, all aged between 8-12 years and with normal intellectual functioning during action observation. Children where instructed to observe videos of a female actor performing simple hand movements or keeping her hand still while engaging in eye contact or averting her own gaze. A GLM examined group differences in the BOLD signal of specific regions of interest (ROIs), including both classic MNS regions and ROIs involved in eye contact processing (amygdala, medial prefrontal cortex) across the 2x2 task paradigm (Hand Movement, Still Hand; Direct Gaze, Averted Gaze). In general, i.e. across all task conditions, children with ASD showed decreased left inferior parietal lobule (IPL) activation, a crucial region of the MNS. Children with ASD also demonstrated significantly lower neural activation in the ventral premotor area of the MNS during movement observation. Compared to averted gaze, observed direct gaze from the actor elicited more MNS activation in the IPL during movement observation, but no group differences were noted herein. No clusters across the other comparison contrasts survived thresholds for significance after correction. An exploratory whole-brain analysis confirmed this pattern of observed effects and did not highlight additional group differences. To conclude, contrary to more recent viewpoints regarding the role of the MNS in ASD, children with ASD demonstrated decreased activations of critical MNS regions during action observation. These regions play a crucial role in motor representation and are important for action processing and understanding.

Title	The role of the cerebellum in social sequencing, and a new hypothesis on autism
Author(s)	Frank Van Overwalle & Rocio Martinez
Affiliation(s)	Vrije Universiteit Brussel
Abstract	New breakthrough research on the cerebellum has established a crucial role for social cognition. Its function is to identify the sequences in social actions which facilitates appropriate social judgments (Leggio & Molinari, 2015), in particular about other persons' mental state, termed mentalizing/theory of mind. I will review various recent studies from our lab supporting this theoretical claim. In addition, there is also growing evidence that the cerebellum is related to autism, which is characterized by difficulties in social mentalizing. The now-dominant predictive coding theories on autism claim that autism is characterized by inflexible weighting of new information at the detriment of earlier knowledge, presumably due to a context-insensitive incorporation of new information especially when that information is volatile. However, sequencing itself was never theoretically considered or manipulated in this research. In a newly created ultimatum serial response time (SRT) task, an interactive negotiation game, at each trial, a partner proposes to split 10 points between themselves and the participant, and the participant can accept the offer, or refuse it in which case nobody gets any points. Although sequencing is irrelevant in prediction coding theories, in line with the social sequencing role of the cerebellum, we predict faster responses under long (vs. short) time windows, induced by repeating the sequence for the same group of partners for a long time vs. quickly alternating different sequences between two distinct groups of partners. A pilot study confirmed this sequencing prediction for neurotypical participants. Responses were slower under short vs. long time windows, especially under volatile vs. stable offers. Studies with participants with autism are underway. Our approach illustrates a novel theoretical integration that highlights the role of an impaired time-window which combines the perspectives of social cerebellar sequencing with predictive coding theories of autism.