



University of Birmingham
School of Psychology

It takes two to tango:

A translational approach to self–other dynamics



University of Birmingham,

6th July 2015

G15 Lecture Hall, Muirhead Tower

Monday July 6, 2015

- 9:00 – 9:30** **Registration and morning refreshments –
Muirhead Tower, Entrance to Lecture Hall G15.**
- 9:30 – 9:35** **Welcome and Introduction**
- 9:35-10:30** **Keynote: [Prof. Ian Apperly](#) – University of Birmingham**
Understanding mindreading in adults should make us re-think traditional approaches to the development of social cognition
- 10:30-12:00** **Symposium: 'Nuts, bolts, and methods' in the study of self-other dynamics.**
Chair: Dr. Pia Rotshtein
[Dr. Jie Sui](#) – University of Oxford, Tsinghua University
Neuro-cognitive correlates of novel self associations
[Dr. Jessica Wang](#) – University of Birmingham
Why is it sometimes difficult to account for a speaker's perspective?
[Dr. Andrew Surtees](#) – University of Birmingham
The role of content, process and context in perspective-taking
- 12:00-12:10** **Data Blitz**
- 12:10-13:30** **Lunch and Poster Session**
- 13:30-15:00** **Symposium: Translational approaches in typical and atypical populations.**
Chair: Dr. Jessica Wang
[Dr. Geoff Bird](#) – King's College London
The Self and the Other in Autism Spectrum Disorder
[Dr. William Mandy](#) – University College London
The developmental psychopathology of social communication

impairment in children and adolescents

Dr. Lila Kossyvaki & Dr. Despina Papoudi – University of Birmingham

Enhancing self-other awareness via the lens of video in training teaching staff of children with autism

15:00-15:30

Break for Refreshments

15:30-16:30

Keynote: Prof. Shihui Han – Peking University*

Self-reflection in the brain: Cultural and genetic influences

16:30-17:30

Reception: Drinks and Poster Award Ceremony

ABSTRACTS

Ian Apperly (University of Birmingham)

TITLE: Understanding mindreading in adults should make us re-think traditional approaches to the development of social cognition

ABSTRACT: The traditional developmental perspective on mindreading focuses on when and how children acquire mental state concepts such as “belief” and “desire”, and a common hypothesis is that children come to understand the mental states of others through realising that others are “like me”. I will present data from adults suggesting that mindreading has multiple component processes that give rise to distinctive patterns in errors, response times, and brain activity, and that even the mindreading abilities of healthy adults shows significant, non-random variation. The conceptual perspective on mindreading does not provide a useful basis for understanding these patterns. I will also present data from adults and older children suggesting that the “self” perspective does not necessarily have privilege or priority over the perspectives of “others”. “Like me” does not seem to be the only way in which adults understand others, and may not be in infants either.

Shihui Han (Peking University)

TITLE: Self-reflection in the brain: cultural and generic influences

ABSTRACT: Reflection on one's own attributes is an important feature of human mental processes. While the previous brain imaging studies revealed the neural correlates of self-reflection, recent research has shown evidence that the brain activity underlying self-reflection is modulated by individuals' cultural experiences and genetic makeup. I'll present our recent work on cultural and genetic influences on the neural mechanisms involved in self-reflection on social, physical and mental attributes. I'll also discuss the implications of these brain imaging findings.

Symposium 1

'Nuts, bolts, and methods' in the study of self–other dynamics

**JIE SUI (University of Oxford, Tsinghua University) & Glyn
Humphreys (University of Oxford)**

TITLE: Neuro-cognitive correlates of novel self associations

ABSTRACT: We have developed a novel associative approach to measure self-biases in perception in which participants show a massive advantage in responses to shapes associated with themselves compared to shapes associated with others. Here we will present work using this procedure to (i) examine the relations between different drivers of social attention, and (ii) the processes that are modulated by self bias. Individual difference measures of behaviour suggest that self- and reward-biases can dissociate and there is also evidence for dissociations at a neural level, when MVPA is applied to fMRI data. In addition, we present evidence that self-reference selectively alters perceptual integration. We discuss the implications for understanding the self as an integrative hub in cognition.

Jessica Wang (University of Birmingham)

TITLE: Why is it sometimes difficult to account for a speaker's perspective?

ABSTRACT: The ability to consider others' perspectives is essential for communication. Yet the literature presents a puzzling picture: whilst adults are often egocentric (Keysar et al., 2003), 6-year-olds appear sensitive in distinguishing common versus privileged ground (Nadig & Sedivy, 2002). We identified three possible sources of these different levels of egocentrism within a communication task, corresponding to varied demands one faces in everyday social situations. Results suggest firstly, participants made many more egocentric errors when they had to infer for themselves that perspectival information was necessary to resolve reference. Secondly, the magnitude of common versus privileged ground only had a general effect on response time, but no direct effect on egocentrism. Finally, more egocentric effects were seen in eye movements when the speaker delivered more complex utterances for participants to follow. Variation in these factors explains observed variation in egocentrism across experimental studies, and identifies likely sources of everyday difficulty in theory of mind-use.

Andrew Surtees (University of Birmingham)

TITLE: The role of content, process and context in perspective-taking

ABSTRACT: Traditional methods for researching perspective-taking involve varying the nature of the content of someone's perspective and measuring a participant's performance when taking that perspective. I will present one task of this kind, in which we tested adults' self and other perspective-taking for judgments of whether items were in view *or* how a number looked. Perhaps due to the dominance of developmental and comparative approaches in perspective-taking research, there has been less focus on the precise information-processing demands it requires. I will present a second task in which we varied the distance between a target other and an object, and the angular disparity between self and other perspectives. This is one way in which we can understand the differing importance of embodied rotation and line of sight tracing in perspective-taking judgments. Professionals from other disciplines are often enthused by the idea of perspective-taking research, but somewhat disenchanted by the actuality of lab-based tasks. Recent research has suggested that fast-moving joint-action tasks can produce intriguing results. I will present a third task in which we observed a very different pattern of performance when pairs of participants completed a self-perspective-taking task in the presence of a partner than when alone.

Symposium 2

Translational approaches in typical and atypical populations.

Geoff Bird (King's College London)

TITLE: The self and the other in autism spectrum disorders

ABSTRACT: I will present evidence supporting the hypothesis that self- and other-related representations play a role across many domains of social cognition, including perspective-taking, imitation inhibition, theory of mind and empathy. I will suggest that individuals with autism have difficulties with the control of self and other representations, and that this constitutes a major source of their social impairment.

William Mandy (University College London)

TITLE: The developmental psychopathology of social communication impairment in children and adolescents

ABSTRACT: This talk aims to show how an understanding of self-other dynamics can shed light on the development of a range of emotional and behavioural difficulties, and can suggest novel treatment strategies. In the general population, people differ in their capacity to understand, communicate with and relate to others, and we describe individuals who struggle in this respect as having social communication difficulties (SCDs). I present data from the Avon Longitudinal Study of Children and Parents (ALSPAC) that demonstrate the impact of normal-range variability in social communication competence on the development of psychopathology. Evidence will be presented that SCDs are a risk factor for a range of internalising and externalising problems. Some findings to suggest mechanisms of risk will be presented. Furthermore, the idea that the extent and the nature of the risk posed by SCD is conditioned by gender will be proposed. Implications for clinical practice will be briefly discussed.

Lila Kosyvaki & Despina Papoudi (University of Birmingham)

TITLE: Enhancing self-other awareness via the lens of video in training teaching staff of children with autism

ABSTRACT: The theory of intersubjectivity argues that the infant is born with awareness specifically receptive to subjective states in other persons and research has shown that the communication between mothers and 2-month-old infants is characterized by refined synchrony, reciprocity and mutuality. These principles of attuned interaction between infants and mothers can constitute the framework of interventions for enhancing self-other awareness in faulty interactions, such as in the case of autism, via the lens of video. This presentation will briefly explore the implications of the theory of intersubjectivity for working with children with autism, will touch upon the use of video as a way of training staff by encouraging them to reflect on their own practice and will also outline a small research project as an example in practice. The study to be presented employed an action research methodology in a school-based project. Video recordings were used pre and post intervention to highlight staff good practice, encourage staff to build on aspects of good practice and develop an adult interactive style intervention (AISI). Six children with autism aged between 4 and 5 years and three members of staff took part. The results showed that post intervention all children significantly increased the frequency of their spontaneous communication and staff improved their practice and increased their self-confidence and job satisfaction.

POSTER ABSTRACTS (* presenter)

1. BEN CROSSEY^{1*}, KIM QUINN², ALAN WING¹ (¹University of Birmingham, ²DePaul University)

TITLE: Temporal versus topological alignment in coordinated movement: implications for corepresentation and interpersonal connectedness.

ABSTRACT: Dyads whose movements are aligned (i.e., synchronous) report greater levels of affiliation than those whose movements are not (i.e., asynchronous). However, research on the social outcomes of synchrony has neglected the fact that dyadic movement can be aligned or misaligned in a variety of ways (e.g., topologically/structurally and temporally), and has provided little evidence for the mechanisms that support the synchrony–liking relationship. In this experiment, dyads were randomly assigned to perform synchronous (temporally and topologically aligned), paired (temporally aligned, topologically misaligned), replicated (temporally offset, topologically aligned), or asynchronous (temporally misaligned, topologically aligned) arm movements. These movement conditions were manipulated by assignment of the same versus different movements and the use of auditory metronome beats that were either synchronous or not. Control participants made the same movements while facing away from one another, thus removing visual alignment cues. Participants completed a Social Simon task designed to assess whether temporal and/or topological movement alignment would affect corepresentational interference, as well as a variety of self-report questionnaires designed to assess interpersonal connection. Results revealed no effect of movement condition on corepresentational strength, but did influence interpersonal connectedness. In particular, synchrony and replicated/imitative action led to greater reported levels of liking, rapport and perceived similarity than did asynchrony or paired action, which in turn led to responses similar to baseline. Furthermore, since the degree of corepresentational interference (as measured with the Social Simon task) was constant across conditions it failed to predict the social outcome differences between these. Full implications will be discussed.

2. ROSANNA EDEY^{1*}, JENNIFER COOK², REBECCA BREWER³, MARK JOHNSON¹, GEOFFREY BIRD³ & CLARE PRESS¹ (¹Birkbeck College, ²City University London, ³Kings College London)

TITLE: Interaction takes two: typical adults exhibit mind-blindness toward those with autism spectrum disorder

ABSTRACT: Several clinical disorders, such as autism, are characterised by social deficits, including problems understanding others' intentions and communicating effectively. Under the 'Motor Hypothesis' these social difficulties stem, in part, from the atypical movement profile in autism. Under this account action production helps to build models used to interpret others' behaviour. Thus, those with autism likely use incorrect models for interpreting typical action, but importantly, typical individuals are likely to use models inappropriate for understanding those with autism. To test this hypothesis, we examined whether typical individuals exhibit difficulties understanding the atypical actions of individuals with autism, similarly to how individuals with autism exhibit difficulty

interpreting typical actions. Individuals with autism and matched typically developed adults manually directed two triangles to generate animations depicting four mental state interactions. Replicating previous results, analysis of the movement kinematics showed the autism group moved atypically compared to typical group. Moreover, when asked to rate the mental state portrayed in the animations, the typical group was better at rating the typical, relative to autistic, animations, whereas the autism group were comparable at rating both groups' animations. Additional correlation analysis revealed greater accuracy across groups when participants rated animations with increasingly similar kinematics to their own movements. These results suggest that we use models of our own actions to understand others, with implications for how typical individuals understand those with 'disorder' as well as vice versa. These findings have significant implications for clinical assessment and intervention in autism, and potentially other populations with atypical movement.

3. CATHERINE GRAINGER^{1*}, DAVID WILLIAMS¹ & SOPHIE LIND² (¹University of Kent, ²City University, London)

TITLE: Understanding mental states in oneself and others in children with autism spectrum disorders (ASD)

ABSTRACT: The study reported aimed to establish whether metacognition (awareness of one's own mental states) is impaired in children with autism spectrum disorder (ASD). Metacognition encompasses both meta-monitoring processes (the ability to represent one's own mental states) and meta-control processes (the ability to control one's cognitive processes). Importantly, some theories suggest that the ability to represent one's own mental states relies on the same mechanism as the ability to represent others' mental states (mindreading/theory-of-mind). Given widely accepted mindreading impairments in ASD, there are strong reasons to predict concurrent impairments in metacognition. However, to date it is unclear whether metacognition is impaired in this disorder. Thirty-two children with ASD and 30 IQ/age-matched neurotypical children participated in this study. Metacognitive monitoring/control abilities were assessed using a judgment-of-confidence task. Additionally, participants also completed a measure of mindreading ability. Alongside demonstrating impairments understanding other's minds, children with ASD showed diminished accuracy in their own confidence judgements, suggesting that individuals with ASD are impaired at understanding their own mental states. Children with ASD also used monitoring for the purpose of control significantly less than comparison participants. These results have strong implications for our understanding of self/other awareness in typically developing individuals and individuals with ASD. Additionally, impaired metacognition in ASD has important educational implications, given the strong role metacognition plays in self-regulated learning. For example, when revising for exams one needs to be able to accurately assess what information they know/don't know to revise effectively. The clinical and educational implications of these findings will be considered.

4. M.S. LI¹, J. HOWE^{1*}, W.L. CHUA¹, D. WARD², R. STABLES², A.M. WING¹ & K. QUINN³ (¹University of Birmingham, ²Birmingham City University, ³DePaul University)

TITLE: Analysing the synchronous art of trio

ABSTRACT: Interpersonal synchrony is characterised by a temporary alignment of periodic behaviours with another person. Temporal alignment is maintained through behavioural adjustments from at least one individual. Synchrony occurs in everyday activities such as walking in stride, playing co-ordinated games or participating in orchestras. In trio performances musicians seek common ground to achieve synchrony. However, music varies in tempo, dynamics, pitch, timbre and phrasing and musicians must adjust individual timing performances based on feedback to achieve synchrony. This complex interaction results in a perceived overlap among players. The present study is a work in progress using violin trios. One participant plays violin with two confederate violinists. Two factors are manipulated: 1) the recording; the musician playing accompaniment is a recording, whereas the musician playing melody is either live in an adjacent room or a recording. 2) the tempo (or phrasing) of the music; for half of the tracks, the timing is not altered and both musicians play 2/4. However, for the other half the musician playing the accompaniment plays at 6/8. The participant is asked to synchronise to the melody. Analysis will comprise: a) cross correlations as a measure of dependence (correction gain). b) Perceived level of influence or distraction by the participant for each of the confederate violinists. C) An Interpersonal Reactivity Index score. It is hypothesised that: 1) the participant will exhibit greater corrections to the violinist playing melody than accompaniment. 2) The participant's perceived level of influence will correlate with their gain. 3) Participants with high Interpersonal Reactivity Index scores will be more sensitive to influence.

5. KATIE JONES^{1*}, DERRICK WATSON¹ & MELINA KUNAR¹ (¹University of Warwick)

TITLE: Knowing me, Knowing you: Aha! New joint task paradigm shows automatic task co-representation modulates individual behaviour

ABSTRACT: Recent research suggests that co-actors consider aspects of each other's tasks even when not required for their own performance. However, there is doubt whether the paradigms used previously (such as the Joint Simon task/Joint Flanker task), provide a valid index of task co-representation due to confounds arising from turn taking. We introduce a novel paradigm, which demonstrates that co-representations modulate individual performance even when coordination and turn taking between actors is unnecessary. Pairs of participants viewed a single multi-component stimulus, the features of which signalled different responses to each co-actor. Stimuli consisted of a letter of the alphabet surrounded by two differently coloured overlapping boxes. The target for each co-actor was defined by a particular conjunction of stimulus features: one shared feature (the letter is a vowel) and one non-shared feature (each participant looked for a box of a particular colour). Independently, participants made a 'Yes' response if both of their target features were present, or a 'No' response if one or both target features were absent. Individual's RTs were influenced by the presence/absence of their target features, but also the target features belonging to the co-actor. When the presence of a co-actor's target feature promoted a

compatible response, RTs decreased, but increased when they prompted an incompatible response. Crucially, this interference occurred only when participants were explicitly aware of each other's task set and when sat next to each other attending the same monitor. This new task successfully demonstrates that people automatically represent other's actions.

6. UTE KREPLIN^{1*} & STEPHEN H. FAIRCLOUGH² (¹Coventry University, ²Liverpool John Moores University)

TITLE: The role of the rostral prefrontal cortex during self-other processing in an aesthetic context

ABSTRACT: Theory of Mind helps us understand and negotiate the social-world, of which art is one aspect. DeSmedt and deCruz (2011) argued that artworks evolved to communicate status and group belonging. Today art is still an important part of the social-world as a medium of communication. Duchamp's Fountain, for example, is admired because it pushes the boundaries of what can be seen as art. It is not the content itself that is appreciated through this work, but the ideas, concepts and emotions that the artist wishes to convey. Art is therefore closely linked to an understanding of ideas, intentions and feelings. The rostral prefrontal cortex (rPFC) may be central to this type of understanding. The rPFC has been implicated in processing information about the social-world, autobiographical-memories and emotions. We investigated rPFC activity in an aesthetic context in response to affective stimuli that were viewed in a self-relevant or other-relevant context. Eighteen positive and negative images were shown to 20 participants under two conditions: (1) self, (2) other. In (1) participants were asked to think of their own emotions, in (2) participants were asked to think about the artist's emotions. Results showed greater oxygenation in the rPFC in condition (2). An affect- condition interaction revealed greater oxygenation for positive images in condition (1) and greater oxygenation for negative images in condition (2). These findings may be indicative of threat detection in others and a positive bias towards the self. (The results are published in Kreplin and Fairclough (2015) *Neuropsychologia*, 71:38–45).

7. LUCIA MAGIS-WEINBERG¹, IROISE DUMONTHEIL^{2*} & SARAH-JAYNE BLAKEMORE¹ (¹University College London, ²University of London)

TITLE: Neural correlates of the development of the evaluation of social vs. non-social information during adolescence

ABSTRACT: Social cognition undergoes profound changes during adolescence, which might in part be determined by the development of two neural networks: the social brain and the executive control network. In a developmental fMRI study, we investigated BOLD signal in 39 participants (aged 11-31 years) while they evaluated and manipulated social or non-social information. In the social task, participants evaluated themselves or a friend, or compared themselves with their friend. In the non-social task, participants evaluated their hometown or another town, or compared the two. The consistency of participants' responses increased with age, and was greater for non-social information. Activation of the

relational integration network, including the rostralateral PFC (RLPFC), was observed in the comparison condition of both the social and non-social tasks. Medial prefrontal cortex (MPFC) showed greater activation when participants evaluated social as opposed to non-social information. There was no further increase in social brain activation when participants compared themselves to their friend as opposed to when they rated either themselves or their friend separately. Developmentally, there was greater activation in the right anterior insula in adolescents compared to adults during the comparison of non-social (as opposed to social) information. This study demonstrates parallel recruitment of the social brain and the executive function network during the manipulation of social information, in adolescents and adults.

8. DEAN PETTERS^{1*} (¹Birmingham City University)

TITLE: Self-other dynamics and the extended mind hypothesis

ABSTRACT: The extended mind thesis in cognitive science suggests that entities in the external environment may interact with internal mental processes in such a way that these entities can be seen as extensions of the mind itself. Cognitive extension is usually cast in terms of extending the mind onto inorganic objects in the environment, such as a mathematician doing their 'working' on paper. However, extension onto external agents (such as caregivers, teachers, friends or work colleagues) is not ruled out in this approach. For cognitive extension to involve extension of mental states onto an agent rather than an inorganic object, the agent must be strongly trusted, relied upon and accessible as an information provider. Between adults these conditions may sometimes occur, for example, between police partners or highly trained military or medical teams. But such closely coupled adult relationships may be the exception rather than the rule. However, in infant-caregiver dyads it may be much more widespread for infants to extend their cognition onto their caregivers. Such extension may bring numerous benefits, such as caregivers helping to label and conceptualise, structure, and facilitate self-reflection. It may also help explain the origin of certain psychopathologies. The idea that infants look to their carers as information sources about the broader world is a familiar one. The socially extended mind hypothesis goes further to suggest that when a carer (as part of the environment) is coupled to an infant's cognitive system in the right way, they become part of the infant's mind.

9. MALIHEH TAHERI^{1*} & ULRIK BEIERHOLM¹ (¹University of Birmingham)

TITLE: Neural correlates of the development of the evaluation of social vs. non-social information during adolescence

ABSTRACT: Many of our day to day decisions depends upon others decisions'. For example, in our interpersonal relationships with our romantic partner or with our colleagues we encounter situations in which two people need to cooperate together towards achieving a common goal, i.e. raising children or working on a same project. We are often required to trust, cooperate, empathize, and understand others and take risks. In some situations, we may face conflict of interest between our own benefits or the common goal that is set for

our collaborative relationships. Whilst cooperation appears to be more beneficial for the population in long-term, there are free riders who take advantage of others' generosity whilst they do not contribute to the public good. How a person can know if he or she should trust others? How to understand others' intentions before making any decisions? What are the costs and benefits of cooperative behaviour in our social world? To address these issues social psychologist and social neuroscientists have employed tasks from Game theory to investigate the psychological factors and the neural correlates of social decision making. These games are fairly simple but require participants' sophisticated reasoning and understanding of others intentions and motivations. One argument is that cooperation must be rewarding and therefore we are more prone towards cooperation because of the sense of pleasure that we feel through cooperative behaviour. Although this argument has been recently supported by a few brain imaging studies, the problem of cooperation as a social reward remains unresolved. Moreover, if cooperation is always rewarding why do some individuals cooperate and some don't? To answer these questions, we propose an fMRI study to investigate perceived social reward in human brain through cooperation. Our goal is to find out if the brain structure for cooperative social reward differs from the brain structures that involve in other sorts of rewards, i.e. gambling or competition. By conducting this research we aim to model these brain structures based on the individual difference during a cooperative task and to predict human behavior in such situations.

10. LIN ZHAO^{1*}, IAN APPERLY¹, JESSICA WANG¹ (University of Birmingham)

TITLE: The role of memory in children's perspective-taking ability during referential communication

ABSTRACT: What role does memory play in children's perspective-taking ability? A large scale of studies examining adults and children's perspective-taking ability used varied versions of a referential communication task—Director Task. In the classic Director Task, however, the visual cues of the perspective difference remained available throughout trials, which might have minimised the needs of holding perspective information in memory. As perspective information is unlikely to be completely visually available in real life situation, the current study re-designed a more realistic Memory Director Task, which requires participants to encode, store and then retrieve the perspective information in order to successfully interpret referential utterances. In Experiment 1, we varied the object array size (5, 7 or 9 objects) to manipulate the potential memory load of the Memory Director Task. Results from 10-year-old children showed an increased tendency of making egocentric errors with the increase of object array size. Experiment 2 was conducted to further explore the effect found in Experiment 1, by comparing children's performance between age groups (8 and 10-year-olds), task versions (memory and no-memory task) and object array sizes (5, 7 or 9 objects). Results from Experiment 2 showed that 8-year-old children performed differently between two task versions but not 10-year-olds. The object array size had a systematic effect on 8-year-olds' egocentrism in perspective-taking (accuracy in the experimental conditions), but only under the memory load imposed by the Memory Director Task. These findings are discussed to shed light on the role of memory in children's perspective-taking performance.



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