BC3D

2021

	Session	Tokyo	Delhi	Buda-pest	London	Boston	San Fran-cisco
Monday, January 4	Invited talk 1: **Giorgio Vallortigara** *Of chicks and babies. How to build a social brain based on animacy detectors*	Tue 12am	Mon 8:30pm	Mon 4pm	Mon 3pm	Mon 10am	Mon 7am
	Presentation Session 1			Mon 8pm	Mon 7pm	Mon 2pm	Mon 11am
Tuesday, January 5	Presentation Session 2	Tue 4pm	Tue 12:30pm	Tue 8am			Mon 11pm
	Presentation Session 3	Tue 9pm	Tue 5:30pm	Tue 1pm	Tue 12pm	Tue 7am	
	Discussion Session 1: *Unpacking the Implicit/ Explicit Distinction: Perspectives from Child, Adult & Comparative Research*	Wed 12am	Tue 8:30pm	Tue 4pm	Tue 3pm	Tue 10m	Tue 7am
	Presentation Session 4			Tue 8pm	Tue 7pm	Tue 2pm	Tue 11am
Wednesday, January 6	Presentation Session 5	Wed 4pm	Wed 12:30pm	Wed 8am			Tue 11pm
	Presentation Session 6	Wed 9pm	Wed 5:30pm	Wed 1pm	Wed 12pm	Wed 7am	
	Invited Symposium: *Think big! In Memoriam Jacques Mehler*	Thu 12am	Wed 8:30pm	Wed 4pm	Wed 3pm	Wed 10am	Wed 7am
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	Discussion Session 2: *How and why do infants develop an understanding of social behavior?*	Fri 12am	Thu 8:30pm	Thu 4pm	Thu 3pm	Thu 10am	Thu 7am
	Presentation Session 10			Thu 8pm	Thu 7pm	Thu 2pm	Thu 11am
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	Invited talk 2: **Laura Schulz** *Not playing by the rules: Distinctively human play and distinctively human cognitioni*	Sat 12am	Fri 8:30pm	Fri 4pm	Fri 3pm	Fri 10am	Fri 7am

BCCCD 2021

Budapest CEU Conference
on Cognitive Development

Program and Abstracts

ORGANIZED BY
Cognitive Development Center
Central European University

4-8 January, 2021
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PROGRAM AND ABSTRACTS

PLENARY SESSIONS

INVITED TALK 1

Of chicks and babies. How to build a social brain based on animacy detectors

Monday, January 4, 16:00-17:30 CET

Giorgio Vallortigara

Centre for Mind/Brain Sciences, CIMeC, University of Trento, Rovereto (TN), Italy

PLENARY SESSIONS

To what extent are filial responses the outcome of spontaneous or acquired preferences? The case of domestic chicks (Gallus gallus) illustrates the connection between predisposed and learned knowledge in early social responses. In the absence of specific experience, chicks prefer to approach objects that are more similar to natural social partners (e.g. they prefer face-like configurations, biological motion, self-propelled objects and those that move at variable speed). Spontaneous preferences are complemented by filial imprinting, a powerful learning mechanism that enables chicks to quickly learn the features of specific social partners. While neurobiological studies have clarified that the substrates of spontaneous and learned preferences are at least partially distinct in chicks, evidence shows that spontaneous preferences might orient and facilitate imprinting on animate stimuli, such as the mother hen, and that hormones facilitate and strengthen preferences for predisposed stimuli. Subpallial regions of the so-called Social Behaviour Network (including e.g. lateral septum and nucleus taeniae) seem to be involved in spontaneous preferences, whereas pallial regions in learning-plasticity associated with imprinting. Preferences towards animate stimuli are observed in human neonates as well. The remarkable consistency between the perceptual cues attended to by newborn babies and naïve chicks suggests that the attentional biases observed in babies are unlikely to result from very rapid post-natal learning, and confirms that research on precocial species can inform and guide human infant research with regards to both typical and atypical development. This has potentially important biomedical implications, opening new possibilities for the early detection of subjects at risk for autism spectrum disorders. We show how the parallel investigation of predispositions in naïve chicks and human infants, both benefiting from contact with social partners since the beginning of life, has greatly improved our understanding of early responses to social stimuli at the behavioural and neurobiological level.

https://slack.com/app_redirect?channel=invited-talk-vallortigara

DISCUSSION SESSION 1

Unpacking the Implicit/Explicit Distinction: Perspectives from Child, Adult & Comparative Research

Tuesday, January 5, 16:00-17:30

Organizer:
Laras Yuniarto, University of St Andrews
Amanda Seed, University of St Andrews
Juan-Carlos Gómez, University of St Andrews

Discussant:
Ian Apperly, University of Birmingham
Derek Ball, University of St Andrews
Raphaëlle Malassis, University of St Andrews
Andrew Tolmie, University College London

The implicit/explicit distinction has been used across developmental science in the study of learning and mental representation across several domains. However, what exactly is meant by 'implicit' and 'explicit' varies widely between fields, and there has been little conversation between disciplines about the ways in which they use these terms. This discussion panel brings together five speakers to discuss the implicit/explicit distinction in their respective fields: sequence learning, theory of mind, philosophy of mind, science learning, and causal learning, in populations ranging from children to adults to nonhuman animals. We suggest several key aspects of the implicit/explicit distinction that cut across these domains. One is format: implicit and explicit cognition can be distinguished by contrasting 'implicit' procedural/perceptuo-motor representations with 'explicit' language-linked conceptual representations (Tolmie), and in broad terms, we can consider the ramifications of different representational vehicles (Ball). Another possible distinction is the cognitive processing that underlies implicit and explicit cognitions (Apperly, Malassis), for example distinguishing automatic processes from effortful and deliberate ones. Finally, they might be distinguished by measuring levels of awareness and reportability, though this can be misleading in adults (Apperly), and work with young children and nonhuman animals highlights the need to use additional properties to distinguish implicit/explicit cognition (Malassis). We will also discuss work that seeks to expand our understanding of the implicit/explicit distinction, such as interactions between implicit and explicit cognition during representational redescription (Yuniarto, Seed, & Gómez), and the question of how implicit and explicit cognition can be distinguished in nonhuman species (Malassis).

https://slack.com/app_redirect?channel=discussion-session-implicit-explicit

INVITED SYMPOSIUM

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Think big! In Memoriam Jacques Mehler

Wednesday, January 6, 16:00-17:30

What does it mean to be human? What are the precursors of complex human abilities? How do infants learn language and how do they make sense of their environment? These are only a couple of the big questions Jacques has addressed across several decades together with his infant research teams established in Paris and Trieste. Besides innovative research, one of the greatest feats of a cognitive scientist is asking the right questions and mentoring novices such that they themselves will strive at understanding the big picture. Jacques favorite phrase "Let's think more!" had led many of us explore unknown territories, and we can only hope that we have inherited his passion for science and, most importantly, that we can also successfully transmit this. In this symposium we aim to provide an insight into a couple of studies that Jacques' former Trieste collaborators and students currently perform spread to different parts of the world. Speakers include Marcela Pena and Luca Bonatti, as well as short contributions by Judit Gervain, Alan Langus, Amanda Saksida, Ana Flo, Silvia Benavides, Jean-Remy Hochmann.

https://slack.com/app_redirect?channel=invited-symposium-jacques-mehler

DISCUSSION SESSION 2

How and why do infants develop an understanding of social behavior?

Thursday, January 7, 16:00-17:30

Organizers:

Lindsey Powell, UC San Diego

Olivier Mascaro, Université de Paris/CNRS

Discussants:

Moritz Köster, Freie Universität Berlin

Kiley Hamlin, University of British Columbia

Jesús Bas, Université de Paris/CNRS

Yasuhiro Kanakogi, Osaka University

Lindsey Powell, UC San Diego

From birth, humans are driven to seek social interaction and relationships. To successfully affiliate with others, it is critical for human infants and children to form a basic understanding of and align with the conventions, norms, rituals, and rules of the groups to which they wish to belong. How do infants' and children's basic affiliative motives promote and interact with their early concepts of and interactions in social relationships and groups? To what extent is this development supported by 1) innate expectations and biases, 2) domain-general categorization and inference processes, and/or 3) the development of a domain-specific intuitive theory of social relations?

The panelists will outline their views on how and why infants and toddlers link affiliation and social behavior, which overlap in some ways and diverge and conflict in others. They will also debate the limits of infants' understanding of social behavior. Some of the questions that will be touched on include: Is infants' learning of social behavior particularly driven by motives to maximize their own social bonds? Are there evolved expectations that some behaviors will be socially shared? Do infants expect distinct types of relationships map onto distinct patterns of behavior transmission or conformity? Does an early understanding of normative and prosocial behavior promote cooperation? The moderator will also encourage the panelists to discuss how this area of inquiry should move forward. What theoretical and methodological approaches would best advance our understanding of how infants master the complex affiliative and behavioral social landscapes that surround them?

https://slack.com/app_redirect?channel=discussion-session-social-understanding

PLENARY SESSIONS

INVITED TALK 2

Not playing by the rules: Distinctively human play and distinctively human cognition

Friday, January 8, 16:00-17:30 CET

Laura Schulz

Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology

Few notions are as uncontroversial as the idea that play supports learning; the proposal that play helps children gain information, reduce uncertainty, and increase the accuracy of their predictions has been influential in fields ranging from neuroscience to AI. For many years, my abstracts would have been consistent with this, starting something like: "Although children's exploratory play may seem noisy and unstructured, it is characterized by rational epistemic practices that support information gain, including an ability to generalize from samples to populations, use statistical data for causal attributions, and selectively explore ambiguous and confounded evidence." I will briefly review this work (as well as several other accounts of play and learning). But I will argue that none of these accounts, including my own past work, does justice to the richness of distinctively human play, or its connection to distinctively human curiosity and learning. Here I focus on the tension between rational accounts of human play and a nearly ubiquitous feature of it: the fact that in play, people subvert normal utility functions, setting up problems where they incur needless costs to achieve arbitrary rewards. I will suggest that we should take the seeming inutility of play seriously and consider why it could be useful to engage in "useless" behavior. I propose that our capacity to invent small problems helps solve a big problem: the problem of how to generate new ideas and plans in an infinite search space.

https://slack.com/app_redirect?channel=invited-talk-schulz

PRESENTATION
SESSIONS

A-0002 How sensory skills can impact children's learning?

Stephanie Armstrong-Gallegos[1]; Roderick I. Nicolson[2]

[1]Department of Psychology, The University of Sheffield, Sheffield, UK; Universidad Autonoma de Chile, Chile Roderick; [2]Department of Psychology, Edge Hill University, Ormskirk, UK

There is pervasive evidence that problems in sensory processing occur across a range of developmental disorders, but their aetiology and clinical significance remain unclear. The present study investigated the relation between sensory processing and literacy skills in children with and without a background of special educational needs (SEN). Twenty-six children aged between 7 and 12 years old, from both regular classes and SEN programmes, participated. Following baseline tests of literacy, fine motor skills and naming speed, two sets of instruments were administered: the carer-assessed Child Sensory Profile-2 and a novel Audiovisual Animal Stroop (AVAS) test. The SEN group showed significantly higher ratings on three Child Sensory Profile-2 quadrants, together with body position ratings. The SEN participants also showed a specific deficit when required to ignore an accompanying incongruent auditory stimulus on the AVAS. Interestingly, AVAS performance correlated significantly with literacy scores and with the sensory profile scores. It is proposed that the children with SEN showed a specific deficit in "filtering out" irrelevant auditory input. The results highlight the importance of including analysis of sensory processes within theoretical and applied approaches to developmental differences and suggest promising new approaches to the understanding, assessment, and support of children with SEN.

https://slack.com/app_redirect?channel=a-0002-Armstrong-Gallegos-s6-s10

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0004 Beyond Representation: Why young children count wrong units

Theresa Elise Wege[1], Bert De Smedt[2], Camilla Gilmore[1], Matthew Inglis[1]

[1]Centre for Mathematical Cognition, Loughborough University, UK; [2]Parenting and Special Education Unit, KU Leuven, Belgium

When young children are asked to count object collections they often incorrectly count all discrete objects instead (i.e. counting all individual animals when asked "How many kinds of animals are there?"). Previous research suggests that young children count incorrect units, because they cannot cognitively represent the correct unit. We consider the alternative explanation, that children apply the counting procedure incorrectly. In two preregistered studies with 4-5-year-old children (N = 64 and N = 46) we show that counting of incorrect units is not the result of incorrect unit representation, but is closely linked to the counting procedure and associated with children's general numerical skills. We conclude that counting incorrect units is a counting error rather than an error of representation and propose a link to children's understanding of the abstraction principle of counting.

https://slack.com/app_redirect?channel=a-0004-Wege-s4-s9

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0005 Ostensive-inferential cognitive skills as the initial impulse for language acquisition

Renato Caruso Vieira

University of Sao Paulo, Sao Paulo, Brazil

Psycholinguistic studies traditionally assume parsing operations as the first cognitive filter of linguistic input responsible for distributing to language learning mechanisms (e.g. LAD, the Language Acquisition Device) data in a properly linguistic format. However, how would it be possible that infants count on linguistic representations to recognize "linguistic sound waves" even before the conversion of sound waves into language? What would prevent [parsing + LAD] to build a grammar of melodic tones? And how is such system even warned that linguistic stimuli must be of sound kind for hearing infants and of visual kind for deaf ones and, in the latter case, that certain seen body gestures must count as elements of grammar building and others must not? Based on Sperber & Wilson's Relevance Theory and Csibra's Natural Pedagogy, we propose that human's natural tendency to recognize ostensive communication and to learn from it is the originating and cohesive force behind the recruitment of the cognitive mechanisms responsible for grammar formalization/systemizing and the overall enormous mental processing effort involved in language acquisition. Our main arguments are: i) pre-verbal children already engage in ostensive-inferential communication through pointing gestures (Tomasello, 2008), ii) intention-reading is crucial for lexical learning (Poulin-Dubois & Forbes, 2002), iii) if language acquisition relied only on formal/computational processes, autistic children would show advantages in such skill, when the opposite is true (Foudon, Reboul & Manificat, 2007), and iv) melodic tones can be linguistic-like categorized by infants if they are perceived as being used communicatively (Ferguson & Waxman, 2016).

https://slack.com/app_redirect?channel=a-0005-Vieira-s1-s6

Session 1 (Monday, 4.1., 8 pm CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0006 Understanding social norms - a gradual developing ability

Anna Strasser

independent researcher

Debates about necessary and sufficient conditions of social norm understanding are highly controversial. Assuming that this ability can be realized in multiple ways, a conceptual framework characterizing norm understanding as a gradual developing ability is suggested. Thereby, minimal and demanding forms can be captured as various instances in a spectrum of a continuum ranging from sophisticated philosophical conceptions (Bicchieri et al. 2018) to minimal positions (Andrews 2020). Focusing on minimal instances, a hypothetical stage model is suggested describing the earliest building blocks of social norm understanding. Starting with a minimal passive social norm understanding, requiring only the ability to perceive social norms as regularities, anticipate actions as guided by social norms and recognize violations accompanied by a rudimentary understanding of some social properties (emotions mark social regularities, social agents are aware of each other). Followed by a minimal active social norm understanding that additionally requires the ability to act intentionally according to (or violate) social norms and implies a growing understanding of specific social properties such as attribution of conscious awareness and intentions to others. This stage model's plausibility will be examined by discussing research findings in developmental psychology, such as the 'daxing study' (Rakoczy et al. 2009). References: Andrews, K. (2020). Naïve Normativity: The Social Foundation of Moral Cognition. Journal of the American Philosophical Association, 6(1),36-56.; Bicchieri, C. et al. (2018). Social Norms. The Stanford Encyclopedia of Philosophy.; Rakoczy, H. et al. (2009). Young children's selective learning of rule games from reliable and unreliable models. Cognitive Development 24,61–69.

https://slack.com/app_redirect?channel=a-0006-Strasser-s8-s9

Session 8 (Thursday, 7.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0007 Language and Theory of Mind: roles and directions of interaction in cognitive development

Zsuzsanna Schnell

Research group for Theoretical, Computational and Cognitive Linguistics, department of Linguistics; Department for Culture theory and Applied Social Sciences, University of Pécs, Hungary

Background: Our study aims to clarify what levels of mentalization and theory of mind are in place before language, how language aids further cognitive development and how we eventually arrive at the complex human specific skill of pragmatic competence. Method: The research is based on a long-term series of experimental pragmatic experiments, mapping the interaction of mentalization and pragmatic competence, analyzing the comprehension of literal and figurative structures, metaphors, irony, irony with surface cue, humor and the recognition of maxim infringements in neurotypical (NT) preschoolers with coherent and comparative methodology. We map the different levels of mentalization that empower different levels of pragmatic meaning construction, and evaluate the results with statistical analysis (MannWhitney and ANOVA). Results: The findings reveal the relationship and direction of interaction between Language and theory of mind: how social-cognitive skills enhance, facilitate and provide a basis for language acquisition, and in return, how linguistic structures (DeVilliers 2000) provide a framework for further development of mentalizing skills that contribute to a fully fledged pragmatic competence. Conclusions: The Developmental study of experimental pragmatic focus offers a differential-diagnostic measure with NT subjects, thus serves as a baseline in further empirical research for atypical cases. This enables the study of populations where language and ToM development is disturbed, reveals how language and ToM are acquired and interact, and gives an insight into what this has to do with clinical symptoms. This in turn can reveal the causal link to the given syndrome, which can set directions for therapeutic development and training.

https://slack.com/app_redirect?channel=a-0007-Schnell-s1-s2

Session 1 (Monday, 4.1., 8 pm CET)
Session 2 (Tuesday, 5.1., 8 am CET)

A-0008 Development of Sensitivity to Social Context in Partner Choice

Hang (Heather) Do[1], Justin Martin[2], Katherine McAuliffe[2]

[1]Department of Psychology, Oberlin College, Oberlin, OH 44074; [2]Department of Psychology, Boston College, Chestnut Hill, MA 02467

An important mechanism that supports human cooperation is partner choice, or the ability to avoid bad partners and find better ones. When deciding whether or not to continue interacting with a partner, adults are especially sensitive to social context: they tolerate unfair behavior to the degree that alternative partners (their outside options) are equally bad. However, past work has not explored how this sensitivity to quality of outside options emerges in development. The present study seeks to address this gap. Forty-six children from ages 5 to 8 participated in an economic game in which, for each of eight trials, they were paired up with a default partner. They were told how their partner had played in a prior round of the Dictator Game, with partners varying in how fairly they had allocated resources. Participants could play another round of the game with their default partner or switch to a randomly selected partner from their outside options of 5 individuals. For those assigned to the Good condition, most of their partners had played fairly previously, whereas most had played unfairly in the Bad condition. Children were additionally orthogonally assigned to either the Costly condition (in which switching to a new partner costed a resource) or the Non-Costly condition (in which switching was free). Overall, we found that as children age, they become more sensitive to outside options, and are more willing to pay a cost to find a better partner.

https://slack.com/app_redirect?channel=a-0008-Do-s5-s12

Session 5 (Wednesday, 6.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0009 Dynamic modulation of frontal theta power predicts cognitive ability in infancy

Eleanor K. Braithwaite[1], Emily J. H. Jones[1], Mark H. Johnson[1,2], Karla Holmboe[3]

[1]Centre for Brain and Cognitive Development, Birkbeck, University of London, United Kingdom; [2]Department of Psychology, University of Cambridge, United Kingdom; [3]Department of Experimental Psychology, University of Oxford, United Kingdom

Cognitive ability is a key factor that contributes to individual differences in life trajectories. Identifying early neural indicators of later cognitive ability may enable us to better elucidate the mechanisms that shape individual differences, eventually aiding identification of infants with an elevated likelihood of less optimal outcomes. A previous study associated a measure of neural activity (theta EEG) recorded at 12-months with non-verbal cognitive ability at ages two, three and seven in individuals with older siblings with autism (Jones et al., 2020). In a pre-registered study (https://osf.io/v5xrw/), we replicate and extend this finding in a younger, low-risk infant sample. EEG was recorded during presentation of a non-social video to a cohort of 6-month-old infants and behavioural data was collected at 6- and 9-months-old. Initial analyses replicated the finding that frontal theta power increases over the course of video viewing, extending this to 6-month-olds. Further, individual differences in the magnitude of this change significantly predicted non-verbal cognitive ability measured at 9-months, but not early executive function. Theta change at 6-months-old may therefore be an early indicator of later cognitive ability. This could have important implications for identification of, and interventions for, children at risk of poor cognitive outcomes.

https://slack.com/app_redirect?channel=a-0009-Braithwaite-s1-s9

Session 1 (Monday, 4.1., 8 pm CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0011 Chimpanzees Consider Alternative Possibilities

Jan Engelmann[1], Christoph Völter[2], Cathal O'Madagain[3], Marina Proft[4], Hannes Rakoczy[4], Esther Herrmann[5]

[1]Department of Psychology, University of California, Berkeley, USA; [2] Messerli Research Institute, University of Veterinary Medicine Vienna, Medical University of Vienna, University of Vienna, Vienna, Austria; [3]Département d'Études Cognitives, École Normale Supérieure, Paris, France; [4]Department of Developmental Psychology, Georg-Elias Müller Institute of Psychology, University of Göttingen, Göttingen, Germany; [5]Department of Psychology, University of Portsmouth, Portsmouth, UK

Humans reason not only about actual events (what is), but also about possible events (what could be). Many key operations of human cognition involve the representation of possibilities, including moral judgment, future planning, and causal understanding. But little is known about the evolutionary roots of this kind of thought. Humans' closest relatives, chimpanzees, possess several cognitive abilities that are closely related to reasoning about alternatives: they plan for the future, evaluate other's actions, and reason causally. However, in the first direct test of the ability to consider alternatives, Redshaw and Suddendorf (2016) report that chimpanzees are not able to represent alternative possibilities. Here, using a novel method, we challenge this conclusion. Our results suggest that, like human cognition, chimpanzee thought is not limited to what is, but also involves reasoning about what could be the case.

https://slack.com/app_redirect?channel=a-0011-Engelmann-s3-s11

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0012 The development of joint attention and communication from 6 to 10 months of age

Gideon Salter, Malinda Carpenter

University of St Andrews

Joint attention is a key skill in infants' social development. However, there are disagreements regarding its emergence. Some argue that joint attention emerges suddenly around 9 months (Tomasello, 1995; Trevarthen & Hubley, 1979), whilst others argue for a more gradual emergence starting earlier in development (e.g., de Barbaro et al., 2013; Striano & Bertin, 2005). Our aim was to investigate the very beginnings of joint attention, shedding new light both on its developmental origins and its relation to communication (Carpenter & Liebal, 2011). In doing so, we aimed to address core theoretical questions about what joint attention actually is. Twenty-six infants participated in a longitudinal study from 6-10 months of age, with monthly lab visits. Infants took part in free-play with mothers and 17 brief tasks examining a variety of social and non-social skills such as joint attention, communication (e.g. giving, showing), imitation and means-end understanding. Interview and diary data were also collected. Preliminary analyses indicate that over a third of infants (38%) initiated joint attention at 6 months, with a significant increase between 7-8 months. Other triadic skills (e.g. giving, showing) emerged at around 9-10 months. Joint attention and related triadic skills can thus be identified prior to 9 months, but are employed more consistently from this age. Analyses exploring interrelations between the different skills are in progress, and, regardless of outcome, will contribute to both theoretical and empirical debates about what joint attention is and when and how it develops.

https://slack.com/app_redirect?channel=a-0012-Salter-s6-s10

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0013 Can teaching 10-11 year-olds about the desirable difficulty, the testing effect increase feelings of self -efficacy in test taking?

Helen Barsham Dr Michelle Ellefson

University of Cambridge

Social cognitive theory (Bandura, 1989) includes self-efficacy theory; belief in capability in a given situation or a domain. Test anxiety can occur from age seven and affects girls more than boys. Test anxiety is a complex construct, which is transactional in nature and determined by personalities, cognitive and emotional behaviours and the environment; a construct which has a similar feel to the triad of 'reciprocal determinism' which is the fundamental relationship found in social cognitive theory. Lack of self-efficacy in test taking ability can make individuals anxious about taking tests. A metacognitive intervention, based on Bjork (1994) 'desirable difficulties', the 'testing effect' was delivered easily, in a classroom, over six weeks and taught 10 -11 year-olds to believe in their test taking abilities, that their testing routes were 'well-oiled'. The hope was that it would improve feelings of wellbeing about taking high stakes tests. The Children's Test Anxiety Scale (Wren & Benson, 2004) was used to measure test anxiety before and after the intervention. There was also a control group. A self-efficacy in test taking questionnaire was developed to measure feelings of self-efficacy in test taking and administered at the same time as the Children's Test Anxiety Scale instrument. Can teaching children about 'the testing effect' increase feelings of self-efficacy in test taking, thereby reducing test anxiety in 10 -11 year-olds because they believe that testing routes in the brain have been primed 'well-oiled' and that they have the 'mastery' of the metacognition of self-efficacy in test taking?

https://slack.com/app_redirect?channel=a-0013-Barsham-s7-s9

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0014 Representational precision of different non-symbolic arithmetic operations in young children

Chen Cheng, Melissa M. Kibbe

Boston University

Children can use their approximate number systems to approximately perform a variety of different non-symbolic arithmetic-like operations over arrays of objects, including comparison, addition, and solving for an unknown addend. We compared the representational precision of the outputs of these different computations in n=72 4-6-year-olds. In the Baseline condition, children observed an array of dots which was then occluded. In the Addition condition, children observed two arrays presented and occluded sequentially, and had to compute their sum. In the Unknown-Addend condition, children observed an initial array, which was then occluded and revealed to have increased in quantity, and had to compute the quantity that was added. We measured the precision of the outputs of these computations by asking children to compare the output representations to visible arrays, manipulating the difficulty of the comparison within each condition using four ratios: .50, .67, .75, .80. Precision was higher overall in the Baseline condition compared with the Addition and Unknown-Addend conditions (main effect of Condition, p=.002), though performance on the tasks converged at more difficult ratios (RatioXCondition interaction p=.004). Precision in the Baseline condition improved significantly with age (main effect of Age p=.012), while precision in the Addition and Unknown-Addend conditions remained somewhat consistent across age (ConditionXAge interaction p=.049). These results suggest that non-symbolic arithmetic operations inject additional noise into their outputs, that this noise may be similar across different arithmetic computations, and that the development of representational and computational precision in the ANS may follow different trajectories in early childhood.

https://slack.com/app_redirect?channel=a-0014-Cheng-s3-s4

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0015 statistical learning of a sequence of emotional faces in 12-month-old infants: the influence of social context

Julia Mermier, Ermanno Quadrelli, Chiara Turati, Hermann Bulf

Bicocca Child & Baby Lab, University of Milano-Bicocca, Milan, Italy

Previous research suggests that infants are capable of extracting statistical regularities from continuous sequences of elements. This capacity, called statistical learning, appears to be based on the transitional probabilities (TP) between the elements of the sequence. The current study examines infants' ability to extract statistical information from a sequence of emotional faces and whether the social context modulates it. We presented infants with videos of 2 actresses expressing the same facial emotion, and subsequently turning either towards (social condition) or away (non-social condition) from each other. Infants were first familiarized with a sequence of 8 videos, each displaying a different emotion (anger, happiness, fear, sadness, surprise, amusement, disgust, exasperation). During the familiarization phase, four fixed pairs of videos were presented so that the TPs were of 1.0 within each pair (units) and 0.5 between pairs (part-units). During the test phase, infants were shown units in alternation with part-units, and their looking times were measured. For the social condition, analyses indicated that infants looked significantly longer to part-units (M = 58.3 s; SD = 27.6 s) than units (M = 49.9 s; SD = 25.5 s); p = .03. These results suggest that 12-month-old infants were able to extract the statistical information embedded in the sequence of emotional expressions within a salient social context. However, whether this ability is modulated by the degree of sociality of the stimuli remains to be determined but will be answered shortly, once data collection for the non-social condition will be completed.

https://slack.com/app_redirect?channel=a-0015-Mermier-s10-s11

Session 10 (Thursday, 7.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0016 social exclusion affects infants' neural processing of emotional faces

Ermanno Quadrelli, Julia Mermier, Hermann Bulf, Chiara Turati

Bicocca Child & Baby Lab, University of Milano-Bicocca, Milan, Italy

Social exclusion is a very aversive feeling that has been shown to considerably affect adults' cognitive and emotional processes and neurophysiological responses. Yet, little is known about infants' reactions to social exclusion. The current study investigates the influence of self-experienced social exclusion on 13-month-olds' neural processing of emotional faces. To do so, infants first participated in a live ball-tossing game with two experimenters (Cyberball game; Scheithauer et al., 2013), during which they were either included or excluded. Following the exposure to the Cyberball game, infants were presented videos of faces expressing anger, fear and happiness, and event-related potentials were measured. We observed a significantly larger Nc amplitude for the inclusion condition (M= -9.90μV; SD=2.05) as compared to the exclusion condition (M= -6.10μV; SD=1.15) p= .009. In addition, analyses revealed a significantly larger Nc mean amplitude for fearful faces (M= -9.74μV; SD=4.38) as compared to angry faces (M= -6.07μV; SD=2.38), p= .013, and marginally larger Nc mean amplitude for fearful faces as compared to happy faces (M= -7.54μV; SD=2.85), p=.099. No significant differences were observed in relation to N290 and P400 amplitudes (all ps > .28). These results indicate that self-experienced social exclusion influences infants' neural processing of emotional faces, as illustrated by their larger allocation of attention towards emotional faces after inclusion versus exclusion. In addition, an attentional bias towards fearful faces emerged both after inclusion and exclusion. To date, this is the first study demonstrating that social exclusion modulates neurophysiological responses to emotional faces early in life.

https://slack.com/app_redirect?channel=a-0016-Mermier-s2-s7

Session 2 (Tuesday, 5.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0017 Neural and physiological synchrony in mother-infant dyads

Trinh Nguyen[1], Drew Abney[2], Dina Salamander[1], Bennett Bertenthal[3] & Stefanie Hoehl[1,4]

[1]University of Vienna, Vienna, Austria; [2]University of Georgia, Athens, USA; [3]Indiana University Bloomington, Bloomington, USA; [4]Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

Bio-behavioral synchrony is suggested to shape the children's socio-cognitive and affective development (Atzil et al., 2018). Interpersonal neural, behavioral, and physiological synchronization were separately documented this far. However, it remains unclear how the three levels of synchrony relate to one another. Here, we examine mother-infant dyads in both interactive and non-interactive contexts to study under which circumstances neural and physiological synchrony occur. We hypothesize that neural and physiological synchrony should be enhanced in interactive contexts as compared to non-interactive contexts. We tested 69 4- to 6-month-old infants and their mothers in three conditions. Mother and infant were either seated next to one another or the infant sat on the mother's lap as both watched a calm aquarium video. Next, mother and infant engaged in a 5-minute long free play. We assessed neural synchrony through dual-functional near-infrared spectroscopy measurements in frontal regions. Physiological synchrony was assessed through respiratory sinus arrhythmia estimates. Findings revealed a significant increase in neural and physiological synchrony during free play in comparison to the non-interactive watching conditions, $t>4.12$, $p<.001$. However, neural synchrony during the proximate watching condition was significantly increased as compared to the distal watching condition, $t>2.38$, $p<.045$. The results indicate that both neural and physiological synchrony were enhanced in the interactive free play in which mothers and infants were able to respond to each other. However, as only neural synchrony was increased in the proximate non-interactive condition, the findings thus indicate that neural and physiological synchrony might share commonalities but also diverge in their functionality.

https://slack.com/app_redirect?channel=a-0017-Nguyen-s2-s3

Session 2 (Tuesday, 5.1., 8 am CET)
Session 3 (Tuesday, 5.1., 1 pm CET)

A-0018 Young children give transgressors the benefit of the doubt

Marina Proft[1], Bahar Köymen[2]

[1]Georg-August-Universität Göttingen, Germany; [2]The University of Manchester, UK

Making moral judgments rests on reasoning about morality (whether there is harm) and theory of mind (whether the harm is intended; Piaget, 1932). The focus has been on how people evaluate moral transgressions after learning about the transgressors' intentions. In the present project we took a new angle: If there is no evidence for intentional harm, would children give the transgressor the benefit of the doubt? In two studies, we presented 5-year-old peer dyads (N=180) with moral transgressions (e.g., breaking someone's necklace). We varied the transgressor's emotional response to the transgression in three ways. The transgressor had a happy expression, a surprised expression, or the face was invisible (no face). In study 1, dyads' task was to collaboratively decide between two cause pictures, one in which the transgression was intentional (intentional picture) and one in which it was accidental (accidental picture). Children chose the intentional picture in the happy condition, the accidental picture in the surprised condition and showed no preference in the no-face condition. In their peer discussions, however, children produced mostly accidental justifications in the surprise and the no-face but not in the happy condition. In study 2, we asked the dyads to come up with a possible cause for the transgression themselves. Children stated that the transgression was accidental in almost all trials of the no-face condition. Already 5-year-olds are thus able to consider the psychology element of action and gave individuals benefit of the doubt when deciding about the intentional structure of a moral action.

https://slack.com/app_redirect?channel=a-0018-Proft-s5-s6

Session 5 (Wednesday, 6.1., 8 am CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0019 What do you know? Children predict shared cultural knowledge

Laura Anderson, Alia Martin

Victoria University of Wellington, New Zealand

Efficient communication often relies on a bank of knowledge shared between communicative part-ners, meaning that predicting your communicative partner's knowledge is imperative for a smooth interaction. How do we begin to make inferences about what others know? Three studies investigate how children use social group membership to predict shared cultural knowledge. In Study 1, 3- to 6-year-olds (n=38) expected their own cultural knowledge (but not general knowledge) to be se-lectively shared with others from the same geographic location. Participants only used informative group membership cues to predict shared knowledge (i.e., used similarity in geographic location but not possession of a similar allocated sticker). In Study 2, children predicted how novel instances of cultural knowledge are shared between different types of social groups. Three- to 6-year-olds (n=80) expected cultural knowledge (but also episodic knowledge) to be more likely shared between strangers from the same location rather than strangers who were the same age. In Study 3, chil-dren (n=40) did not use location to predict procedural knowledge and instead used age as a more informative cue, showing that children do not expect cultural group members to share all types of knowledge. This research provides insight into the selectivity of children's early inferences about how knowledge is shared.

https://slack.com/app_redirect?channel=a-0019-Anderson-s5-s10

Session 5 (Wednesday, 6.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0020 Shared Social Groups or Shared Experiences: The effect of similarity on children's perspective taking

Laura Anderson[1], Zoe Liberman[2], Alia Martin[1]

[1]Victoria University of Wellington, New Zealand; [2]University of California, Santa Barbara, United States

Similarity to a communicative partner can foster effective communication (Greenaway et al., 2015). However, closeness or similarity to a communicative partner can in fact decrease perspective-taking, since overestimating shared knowledge can lead to egocentric errors (Savitsky et al., 2011). The current studies investigate how two types of similarity to a communicative partner (shared social groups, shared experiences) influence children's perspective-taking in a communication task. 96 4- to 6-year-olds played a game (the director task; e.g., Keysar et al., 2000) which required them to take their partner's perspective. In Study 1, children played with 2 strangers who were from the same/different social groups to the participant (using country and shared preferences). In Study 2, children either played with their parent (many shared experiences) or a stranger (no shared experiences). In Study 1, children showed no difference in their perspective taking for a social group member vs. a non-member (reaching for target objects, egocentric first looks; all p>.05). When playing with their parents or a stranger in Study 2, pre-registered analyses showed that children took marginally longer to make decisions when playing with a parent (p=.057); they made numerically less correct reaches when playing with a parent (p=.095); and significantly fewer children performed at ceiling when playing with their parents than with the stranger (p=.02). Non-perspective taking trials were not affected by partner (p>.1). These results suggest that shared experiences/closeness (but not shared social groups) may lead to an overestimation of shared knowledge and in turn hinder perspective-taking in children.

https://slack.com/app_redirect?channel=a-0020-Anderson-s1-s2

Session 1 (Monday, 4.1., 8 pm CET)
Session 2 (Tuesday, 5.1., 8 am CET)

A-0021 Third-party joint attention increases 9-month-old infants' object processing

Maleen Thiele[1], Christine Michel[2,3], Robert Hepach[2], Daniel Haun[1,2]

[1]Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; [2]Leipzig University, Leipzig, Germany; [3]Max Planck Institute for Cognitive and Brain Sciences, Leipzig, Germany

In direct social interactions with others, 9-month-old infants' learning about objects is promoted by ostensive context and referential gaze cues. In this study, we investigated whether similar factors facilitate infants' observational learning from third-party interactions. In Experiment 1, N=32 9-month-old infants (n=13 female; M=291.0 days, SD=10.13 days) were presented with four types of videos showing one object together with two adults. The scenarios varied regarding the ostensive context between the two adults (ostensive vs. non-ostensive), and the adults' referential looking at the object (looking toward vs. away from the object). To assess infants' encoding performance we measured their looking times to the familiarized object when it subsequently appeared next to a novel object, assuming that an enhanced novelty preference would reversely indicate greater encoding of the familiarized object. Infants showed an increased novelty preference if they had observed two adults in an ostensive context looking at the familiarized object together (effect of the interaction: $\chi^2(1)$=4.03, p=.04, estimate=−.08, SE=.04). In Experiment 2, we found the corresponding result pattern in a matched first-party design during which N=32 9-month-old infants (n=16 female; M=282.69 days, SD=8.4 days) were directly addressed by one single adult on screen. Infants' encoding was enhanced when the adult looked at them before looking at the object (effect of the interaction: $\chi^2(1)$=5.77, p=.02, estimate=−.11, SE=.04). Our findings suggest that the capacity to learn through observing others' interactions emerges already in the first year, and that it may depend on similar factors as infants' referential learning during direct social engagement.

https://slack.com/app_redirect?channel=a-0021-Thiele-s1-s2

Session 1 (Monday, 4.1., 8 pm CET)
Session 2 (Tuesday, 5.1., 8 am CET)

A-0022 Development and relation of predictive context processing and Theory of Mind

Louisa Kulke[1,2,3], Christian Valuch[2,3]

[1]Friedrich-Alexander-Universität Erlangen-Nürnberg; [2]Göttingen University, Germany; [3]Leibniz ScienceCampus Primate Cognition

During every day social interactions, humans sometimes need to resolve perceptually ambiguous situations in order to act appropriately. They therefore need an ability to understand other people's beliefs (Theory of Mind), the development of which may depend on prior experience and contextual information. On a perceptual level, effects of predictive context can be measured using binocular rivalry paradigms. The current study related performance in such low-level paradigms with performance in Theory of Mind tasks. To investigate the development and relation of these skills, 12-13 year old children and 18-25 year old adults completed both a binocular rivalry task, using Virtual Reality goggles to measure perceptual expectations induced by a predictive temporal context, as well as two explicit Theory of Mind measures (the Reading the Mind in the Eyes Test and Strange Stories Test). Performance in the binocular rivalry paradigm was independent of age, with reliable predictive temporal context effects occurring in both children and adults. In contrast, Theory of Mind significantly improved with age. No positive relation between Theory of Mind and binocular rivalry measures was detected, indicating that lower-level predictive effects on perception and higher-level Theory of Mind related abilities may stem from different neurocognitive mechanisms. In summary, the influence of expectation on basic perceptual processing may be fully developed during early adolescence while developmental experience leads to further evolvement of more complex social cognitive skills such as Theory of Mind.

https://slack.com/app_redirect?channel=a-0022-Kulke-s4-s5

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0023 Children's (social) inferences about discourse topics

Manuel Bohn[1], Khuyen Nha Le[2], Benjamin Peloquin[2], Bahar Köymen[3], Michael C. Frank[2]

[1]Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany; [2]Stanford University, USA; [3]University of Manchester, UK

In conversation, individual utterances are almost always ambiguous, with this ambiguity resolved by context and discourse history (common ground). One important cue for disambiguation is the topic under discussion. In two pre-registered studies, we investigated 2- to 5-year-old English-speaking children's reliance on conversational topics with specific partners to interpret ambiguous words. Children heard a speaker consistently refer to objects from one category without mentioning the category itself. In the following test trial, the speaker used the ambiguous pronoun it to refer to yet another object. In study 1 (N = 71), 3- and 4-year-olds, but not 2-year-olds, interpreted the pronoun as referring to a member of the same category as the previously mentioned objects (Bayes Factor for performance above chance: 2yo = 0.59; 3yo = 90.77; 4yo = 10.39). Study 2 (N = 60) probed the social nature of this inference: we manipulated whether the speaker who established the topic of the conversation was the same as the one who used the pronoun. 4-year-olds, but not 3-year-olds, interpreted the pronoun as referring to the implied category when talking to the same speaker but not when talking to a new speaker (speaker * age in GLMM: $\beta = 1.55$, 95 %CI = 0.23 – 2.95). These studies illustrate the development of children's ability to balance different layers of discourse. Thinking of discourse as organized by overarching topics allows listeners to predict what will be talked about next and, assuming that these predictions hold, increases the likelihood of successful communication.

https://slack.com/app_redirect?channel=a-0023-Bohn-s2-s10

Session 2 (Tuesday, 5.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0024 Can language influence identification of other race faces?

Olivier Clerc[1,2], Mathilde Fort[1,3], Gudrun Schwarzer[4], Anna Krasotkina[4], Anne Vilain[5], David Méary[1,2], Hélène Lœvenbruck[1,2], Olivier Pascalis[1,2]

[1]Univ. Grenoble Alpes, LPNC, Grenoble, France; [2]LPNC, CNRS, Grenoble, France; [3]Institut des Sciences Cognitives Marc Jeannerod, Universite Lyon 1, France; [4]Giessen, Germany; [5]Gipsalab, Grenoble, France

Between 6 and 9 months, while infant's ability to discriminate faces within their own racial group is maintained, discrimination of faces within other-race groups declines to a point where 9-month-old infants fail to discriminate other-race faces. Such face perception narrowing can be overcome in various ways at 9 or 12 months of age, such as presenting faces with emotional expressions. Can language itself modulate face narrowing? We have previously found that from 9 months of age, own-race faces associated with the native language can be learned and recognized whereas other-race faces associated with a non-native language cannot. We hypothesized that the native language could restore recognition of other-race faces after perceptual narrowing has happened. We tested 9- and 12-month-old Caucasian infants. During a familiarization phase, infants were shown still photographs of an Asian face while audio was played either in the native or in the non-native language. Immediately after the familiarization, the familiar face and a novel one were displayed side-by-side for the recognition test. We compared the proportional looking time to the new face to the chance level. Both 9- and 12-month-old infants exhibited recognition memory for the other-race face when familiarized with non-native speech, but not with their native speech. Native language did not facilitate recognition of other-race faces after 9 months of age but a non-native language did, suggesting that 9- and 12-month-olds already have expectations about which language an individual should talk. Our results confirm the strong links between face and speech processing during infancy.

https://slack.com/app_redirect?channel=a-0024-Clerc-s8-s10

Session 8 (Thursday, 7.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0025 Early Cooperation and Helping Behaviour in British and Ugandan Infants

Joanna C. Buryn-Weitzel[1], Charlotte Ives[1], Santa Atim[2], Helen Biroch[2], Ed Donnellan[1,3], Kirsty E. Graham[1,4], Maegan Hoffman[1], Eve Holden[1], Michael Jurua[2], Charlotte V. Knapper[1], Nicole J. Lahiff[1], Sophie Marshall[1], Anna Nador[1], Josephine Patricia[2], Florence Tusiime[2], Claudia Wilke[1], Katie E. Slocombe[1]

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Children start to show both cooperative and prosocial behaviours early in their second year of life (Warneken & Tomasello, 2007). So far, results on whether these different behaviours might be related have been mixed (e.g., Warneken & Tomasello, 2007; Liebal et al., 2008) and cross-cultural research is still scarce. We therefore tested 84 18-month-olds from two cultural groups (39 infants from Uganda and 45 from the UK) in a standardized out-of-reach helping task and in two cooperative tasks. The helping task consisted of an experimental condition where an experimenter pretended to drop an object by accident and then unsuccessfully reached for it, and a control condition where the experimenter purposefully dropped the object on the floor and did not reach for it. In the cooperative tasks, an experimenter invited the child to play games that by design required two participants: releasing a toy from a long tube, or bouncing a toy on a collapsible trampoline. Helping was defined as retrieving the object in the experimental, but not the control condition. Preliminary analyses revealed that more Ugandan infants (56%) helped than UK infants (29%; $\chi^2(1) = 6.51$, $p = .011$). More Ugandan infants (97%) cooperated at least once to solve the tube task compared to UK infants (79%; Fishers exact p =.02), however the number of children cooperating on the trampoline task was similar across groups (Uganda 91%; UK 81%; Fishers exact p = 0.32). We will also present analyses examining associations between helping and cooperation in both cultural groups.

https://slack.com/app_redirect?channel=a-0025-Buryn-Weitzel-s2-s9

Session 2 (Tuesday, 5.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0026 How Children Change Their Beliefs in Light of Disagreement

Antonia F. Langenhoff Jan M. Engelmann Mahesh Srinivasan

University of California, Berkeley

A healthy public discourse requires that people respond to disagreement in reasonable ways. Here, we investigate children's developing ability to selectively adjust their beliefs when confronted with a disagreeing other. According to Frances (2014), one should "stick to one's guns" if one's evidence is better than that of the person one is disagreeing with; adopt the other's belief if one's evidence is worse; and suspend judgment if one's evidence is equally as strong as that of the disagreeing other. We tested whether participants in three age groups (children aged 4-6, 7-9, and adults; N=114) adhere to these principles. Participants formed an initial belief, were confronted with the opposing belief of a disagreeing other person, and then had the option of either sticking with their initial belief, suspending judgment, or adopting the other's belief. Between conditions, we varied whether the evidence supporting the participant's belief was 1) better than, 2) equal to, or 3) worse than the other's evidence. Overall, participants adjusted their beliefs selectively when confronted with the opposing belief (main effects of condition, ps<.01). Thus, some ability to respond reasonably to disagreement is present from at least the preschool years. We also found two interesting developmental differences: first, younger children adopted the other's belief more often than older children (p=.02). Second, unlike older children and adults, younger children did not yet demonstrate the "intellectually virtuous" (Haney, 1964) ability to suspend judgment in the equal evidence condition. Possible explanations for these developmental differences and future directions will be discussed.

https://slack.com/app_redirect?channel=a-0026-Langenhoff-s7-s10

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0027 Reasoning from Samples to Populations: Children's use of Variability Information to Predict Future Outcomes

Elizabeth Lapidow[1], Mariel K. Goddu[2], Caren M. Walker[1]

[1]University of California, San Diego; [2]University of California, Berkeley

The ability to reason from specific instances to infer general characteristics of populations provides a critical guide for action that goes beyond our direct experience. From items displayed in a shop's window, we can infer the category, quality, and variety of its merchandise to decide whether the shop is likely to carry a specific product, regardless of whether that product is on display. Previous work (e.g., Dewar & Xu, 2010) suggests that infants appear to infer higher-order regularities of populations from samples. However, it is unclear when learners start using these inferences to guide actions. Here, we ask whether children's second-order inferences inform their search for a novel outcome. Forty children (M = 40.1 mos., range: 25.3 – 47.8 mos.) observed balls drawn at random from two opaque containers. In one sample, all balls were one color. In the other, each ball was a different color. At test, children were asked which of the containers they thought held a ball of a novel color. Neither sample included this object; so first-order information does not indicate either container as more likely. However, if children reason appropriately from the variability of samples to form second-order inferences about homogeneity or heterogeneity of populations, we would expect them to select the varied sample's container. A significant majority of children made this selection (72.5%, p = 0.006, two-tailed binomial), suggesting that young learners not only reason about populations from samples, but can also use those inferences to guide behavior beyond the limits of direct experience.

https://slack.com/app_redirect?channel=a-0027-Lapidow-s2-s10

Session 2 (Tuesday, 5.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0028 Newborns' physiological sensitivity to different tactile stimulations

Letizia Della Longa, Laura Carnevali, Teresa Farroni

Developmental Psychology and Socialization Department, University of Padova, Italy

The sense of touch plays an essential role in early experiences with the surrounding physical and social environment, providing a foundation for the development of both sensorimotor skills and socio-affective behaviours. Tactile stimulation may promote self-regulation skills mediated by para-sympathetic responses (vagal tone), as measured by modulation of Heart Rate Variability (HRV). Interventions based on skin-to-skin contact (kangaroo care) have been shown to reduce the auto-nomic stress responses and promoting self-regulation in preterm infants. The present study aims to investigate whether newborns are able to discriminate between different types of tactile stimulation and to regulate physiological states according to sensory input, as reflected by modulation of HRV. Newborns (N= 30) were presented with two types of tactile stimulation (affective vs non-affective) lasting two minutes each and alternated with two minutes of resting. Differential RMSSD (root mean square successive difference) scores during the tactile stimulation compared to the pre-stimulus rest-ing periods were calculated as a measure of HRV changes. The results revealed that when newborns are in a calm sleeping state, affective touch (gentle stroking by hand) promotes the maintenance of a stable HRV compared to the preceding resting period, whereas non-affective touch (tapping with a brush) elicits a vagal withdrawal as reflected by a decrease in HRV. The present findings indicate that from the very first stages of development infants show physiological sensitivity to specific types of tactile stimulation, supporting the importance of providing adequate early sensory stimulation in order to promote the development of autonomic regulation.

https://slack.com/app_redirect?channel=a-0028-della-longa-s4-s11

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0029 The Rubber Hand Illusion with preterm and full-term children

Letizia Della Longa, Teresa Farroni

Developmental Psychology and Socialization Department, University of Padova, Italy

Body ownership is the feeling that our body belongs to our own and is based on the integration of multisensory signals, arising from both outside (exeroception) and inside (interoception) the body. Affective touch, slow caress-like touch, provides a link between perception of external objects and the internal feeling of the body, suggesting it may influence the sense of body ownership. Preterm children are at risk for sensory processing dysfunctions, including the ability to bind together multi-sensory information for adaptively modulating the representation of the bodily self. In the presents study we present preterm (N=23) and full-term (N=21) 6- to 11-years old children with the rubber hand illusion (RHI), a well-established paradigm that investigates the illusory experience of feeling a rubber hand as part of one's own body, based on the integration of conflicting visual, tactile and proprioceptive signals. In particular, we manipulated the stroking velocity (slow vs fast touch) during the RHI to investigate the specific contribution of the affective and interoceptive dimension of touch in the modulation of body ownership. The results revealed that both preterm and full-term children were sensitive to illusion, irrespectively of the touch velocity. Moreover, preterm children reported lower scores of subjective embodiment towards the rubber hand in all the experimental conditions, indicating a less flexible representation of bodily self. This points to the importance of investigating the integration of sensory experiences with interoceptive signals to better understand the processes of identification and differentiation between the self and the others in preterm children.

https://slack.com/app_redirect?channel=a-0029-Longa-s8-s12

Session 8 (Thursday, 7.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0030 Examining the correlation between developmental diagnostics by parental assessment via MONDEY and standardized testing via BSID-III

Rika Groß, Lena Heilig, Sabina Pauen, Stefanie Peykarjou

University of Heidelberg, Heidelberg, Germany

In addition to developmental diagnostics based on standardised testing methods and trained professionals, parents and caregivers represent an important and valuable source of information regarding the developmental status of infants and toddlers (e.g. Hagmann-von Arx et al., 2008). As an instrument designed to observe and document infant and toddler development, MONDEY (Milestones of Normal Development in Early Years; Pauen, 2011) uses this particular source of information: Parents are asked to evaluate their childęs developmental status regarding 111 milestones from eight different developmental domains. While several aspects of MONDEYs psychometric criteria have been successfully investigated (e.g. Pauen & Heilig, 2012), so far, no studies have examined correlations with a standardised testing tool. To assess the validity of MONDEY, we used the widely known Bayley Scales of Infant and Toddler development (BSID-III; Bayley, 2006) to test cognitive and language development in N = seventeen 26-month old children. At the same time, parents were asked to assess their childęs developmental status using MONDEY. Medium associations between the two instruments were expected. Indeed, statistical analyses revealed medium correlations between the cognitive domains of the two instruments (rs = .449, p < .05), as well as between the verbal domains (rs = .593, p < .05). Data collection is still ongoing and results need to be interpreted carefully due to the small sample size. Nonetheless, the current results seem to indicate that MONDEY and Bayley measure both common (construct) and discrete (assessment type) variance, speaking in favour of the validity of MONDEY.

https://slack.com/app_redirect?channel=a-0030-Groß-s3-s5

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0031 Development of False Belief Understanding in ni-Vanuatu Children

Eva Brandl, Emily H. Emmott, Ruth Mace

University College London, UK

Theory of Mind - the ability to simulate what others think, want, and feel - is a key component of social cognition. Much research has been devoted to False Beliefs – the ability to understand that others can hold beliefs that conflict with reality. Initially, the development of False Belief understanding was thought to be mostly fixed across populations, emerging at 4-5 years of age. However, some theorists have proposed that Theory of Mind is culturally learnt, and recent work shows that the developmental timing of False Belief understanding may vary across cultures. Notably, extreme findings have been obtained in rural Vanuatu, a Pacific island nation where nearly half of 13- to 14-year-olds failed to pass a classic change-of-location task. But are these findings reliable? Here we present results from a replication study with ni-Vanuatu children from a rural area, with additional controls in which participants had to justify their responses to verbal Theory of Mind tasks. We tested 175 children aged 3.5 to 11.8 years. While the majority of 5-year-olds failed a classic change-of-location task, most 9- to 11-year-olds passed (75%). Most 9- to 11-year-olds also passed Appearance-Reality (>90%), and Belief-Emotion (>90%). Justifications suggest that False Belief tasks with lower pass rates (such as Contents False Belief) do not capture the participants' true cognitive abilities in this setting. While our results suggest that Theory of Mind is in part culturally evolved, they also show that some tasks may exaggerate culture effects, highlighting the importance of additional controls in cross-cultural work.

https://slack.com/app_redirect?channel=a-0031-Brandl-s3-s10

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0032 Learning non-adjacent repetition rules and non-adjacent dependencies from human actions in 9-month-old infants: Actions sometimes speak louder than words

Helen Shiyang Lu, Toben H. Mintz

University of Southern California, Los Angeles, USA

Seven-month-olds can learn simple repetition patterns, such as we-fo-we (ABA) or we-fo-fo (ABB), and generalize these rules to sequences of new syllables (MarcusEtAl1999). While 7-month-olds can learn repetition rules from visual sequences of communicative stimuli (RabagliatiEtAl2018), even eleven-month-olds fail to learn non-adjacent ABA rules in sequences of shapes (JohnsonEtAl2009). Some researchers thus claim that sequential rule learning applies preferentially to communicative stimuli. Yet here we show that when visually habituated to a human avatar performing a sequence of non-communicative actions, 9-month-olds can learn adjacent and non-adjacent repetition rules (N=18, p=.026, Cohen's d=.49). We also show that infants can learn more complex dependency patterns: item-specific non-adjacent dependencies (AmXiBm; henceforth iNADs) with similar stimuli (N=18, p=.006, Cohen's d=.67). While prior behavioral research suggests that infants younger than 15 months have difficulty learning iNADs in spoken artificial languages (Gómez&Maye2005), our results show that prelingual infants have the computational capacity for learning iNADs, consistent with neurophysiological data (MuellerEtAl2012). The difficulty to elicit robust behavioral evidence of iNAD learning in other domains may result from limitations on memory. We propose that dynamic human actions constitute a particularly robust stimulus domain for sequential pattern learning because it results in richer memory representations, in part through activation of motor representations (Li&Mintz2015, ReideEtAl2019, SaloEtAl2019). Stimuli perceived as communicative may serve a similar role by boosting attention and thereby enhancing sequence memory. Thus, we provide new evidence and a different hypothesis for infants' learning of non-adjacent repetition rules, and the first behavioral evidence of iNAD learning in 9-month-olds.

https://slack.com/app_redirect?channel=a-0032-Lu-s1-s11

Session 1 (Monday, 4.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0033 10-month-olds respond to a contradiction with information-seeking behaviour

Péter Rácz, Ernő Téglás

Central European University, Budapest, Hungary

We know infants find impossible events interesting. What happens after they encounter these? One possibility is that events that are contradictory based on their expectations lead to an inferential dead end. The other possibility is that infants interpret a contradiction as a cue that insufficient information is available. Only the latter case should lead to extensive search behaviour. To test this question, we have shown 10-month-olds a series of contradictory events in an eye-tracking paradigm. An agent hid behind a central occluder, the occluder was then raised, revealing that the agent had disappeared. Experiment 1 (n = 24) had two within-participant test conditions: in one, infants detected the disappearance of the agent in a visual scene with other occluders that were possible hiding places for the agent. In the other, the remaining occluders were not suitable hiding places. Infants' scanning path revealed that they explored the remaining occluders longer when these were suitable hiding places, therefore the contradictory event prompted information seeking behaviour. Experiment 2 provided additional evidence helping infants to explain away the disappearance of the agent: it showed that the central occluder functioned as a lift that could remove the agent when it was raised. In this case infants did not scan suitable hiding places longer, indicating that they did not require further information to solve the puzzle. These results suggest that 10-month-olds make a distinction between grounded and ungrounded disappearance and regard the latter as a cue that they don't know enough about the environment.

https://slack.com/app_redirect?channel=a-0033-Rácz-s1-s10

Session 1 (Monday, 4.1., 8 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0034 The focus of attention in school-aged children: Can it really cycle through mental representations?

Beatrice Valentini[1], Alessandra Souza[2], Andria Shimi[3], Clara Overkott[4], Evie Vergauwe[1]

[1]University of Geneva, Switzerland; [2]University of Porto, Portugal; [3]University of Cyprus; [4]University of Zurich, Switzerland

Working memory is the cognitive system in charge of maintaining information that is no longer perceived. The literature suggests a number of mechanisms that might support working memory performance and the substantial improvement in working memory capacity observed during childhood. Refreshing is one of those mechanisms. Refreshing is an attention-based, domain-general maintenance mechanism in working memory, which improves the accessibility of mental representations. It is assumed to operate serially, with the focus of attention cycling from one mental representation to the other, in order to sequentially reactivate every item to be maintained. Even though it has been suggested that its efficiency increases between 7 and 14 years old, recent results seem to contradict this notion. This pre-registered project used an instructed refreshing paradigm to disentangle whether children aged 7 and 11 years old can perform the cognitive processes which underlie successful refreshing. In particular, the task uses one or two sequential retro-cues in order to test whether children can, respectively, (1) focus their attention on a mental representation, and (2) switch attention between representations. Our results suggest that children in both age groups can focus attention on one memory item, as reflected in the beneficial effect of a single retro-cue, but that they experience difficulties in switching attention between different representations. This suggests that attentional refreshing may not be fully developed until 11 years old.

https://slack.com/app_redirect?channel=a-0034-Valentini-s2-s4

Session 2 (Tuesday, 5.1., 8 am CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0035 Using evolutionary educational psychology as an explanatory framework for the role of instruction in preschool education

Robin Samuelsson

Södertörn University, Stockholm, Sweden

The paper enjoins recent discussions in the learning and developmental sciences (Geary, 2008; Bjorklund, 2018) on the importance of evolution as a metatheory for understanding matters of children's learning and development. The areas concerned with young children's learning has for long been without any unifying theory, and this paper makes an attempt to use evolutionary educational psychology for an understanding of early childhood education and the much debated role of formal instruction (c.f. Miller & Almon, 2009). The paper proposes a model based on Gearys' (2008) and others' (Csibra & Gergely, 2009; Tomasello, 2019) assumptions on children's natural propensities for learning through play, exploration and social learning in rich cultural contexts and argues that these may be suggestive for how an early childhood education informed by evolutionary theory might take shape. The paper discusses the role of instruction in early childhood education and offers alternatives that might be more conducive to children's evolved abilities as they are expressed in development characteristic of early childhood. Such approaches can be guided play practices (Weisberg et al., 2016) and forms of scaffolding children's learning in cultural contexts (e.g. Diamond et al., 2007), but, moreover, the role of formal instructional approaches in early childhood education are discussed in relation to the theoretical framework proposed. Furthermore, the presentation ends with a discussion of both the utility of using metatheoretical understandings for guiding practices, as well as the problems that might arise from prescription following from such approaches.

https://slack.com/app_redirect?channel=a-0035-Samuelsson-s4-s5

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0036 Musical training in children enhances serial order and rule learning abilities

Roberta Bettoni[1,2], Luca Rinaldi[3], Viola Macchi Cassia[1,2]

[1]University of Milano-Bicocca, Italy; [2]Center of Neurosciences (Neuro-MI), Milan, Italy; [3]University of Pavia, Pavia, Italy

Playing a musical instrument is an engaging, challenging activity that has been linked to benefits in several cognitive processes beyond the auditory domain. For instance, music training has been shown to enhance working memory performance, with professional musicians outperforming non-musicians in processing serial order information presented in the auditory or visual modality. Here, we aimed to investigate further this issue by assessing whether music training enhances not only the processing in working memory of item and serial order information but also the abstraction of high order rules embedded in the item sequences. Two groups of 8-11-year-old children, one with musical training (N = 33) and one without musical training (N = 33), participated in the study. In the Item task, children had to recognize whether a visual target belonged to a previously shown sequence. In the Serial Order task, children had to recognize whether the serial position of two visual elements matched the serial position of the elements in the sequence. In the Rule Learning task, children were presented with visual sequences organized into ABBA or ABAB rule-like patterns and were asked to recognize the familiar rule when presented amidst novel rules. The results showed that musicians were overall more accurate than non-musicians in all three tasks. This provides further evidence that training in the musical domain has the potential to affect cognitive processes in other domains that are not closely linked to music nor audition, extending previous findings to the ability of abstracting high-order rules from visual sequences.

https://slack.com/app_redirect?channel=a-0036-Bettoni-s2-s12

Session 2 (Tuesday, 5.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0037 The Role of Alternatives in Children's Reasoning about Constrained Choices

Jamie Amemiya, Gail D. Heyman, Caren M. Walker

University of California, San Diego, La Jolla, California, USA

Prior research has documented children's understanding that a choice made when constrained to a single option is a poor indicator of another person's preference. However, when constraints are stable and held constant over time—as they tend to be in society—constraints may lose their salience, and children may misread constrained "choices" as informative of a true preference. In this study (total N = 133 five- to twelve-year-olds), we examined if priming children with alternative choice structures—i.e., having children first observe unconstrained choices to emphasize a subsequent constrained choice, as opposed to only observing constrained choices—would increase their consideration of two types of constraints: when a second toy option was hard to reach and when there was no second toy option at all. Results indicated that children's consideration of the hard to reach constraint was highly dependent on whether they were primed with alternatives, such that almost no children considered this constraint without priming. However, there was no priming effect for the no other option constraint. Notably, for both types of constraints, children's age positively predicted their constraint consideration. Taken together, reminding children of structures in which there actually is a choice may be crucial for them to consider certain constraints (hard to reach), but other types of constraints (no other option) may become more obvious once children are older. We discuss the implications of these findings for when and why children may discount constraints in the real world.

https://slack.com/app_redirect?channel=a-0037-Amemiya-s10-s11

Session 10 (Thursday, 7.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0039 Chimpanzees seek help, but not strategically

Hanna Schleihauf[1,2], Esther Herrmann[3], Julia Fischer[2,4], & Jan Engelmann[1]

[1]University of California, Berkeley, USA; [2]German Primate Center – Leibniz Institute for Primate Research, Germany; [3]University of Portsmouth, UK; [4]Georg-August-University Göttingen, Germany

Seeking help when unable to solve a problem alone is a highly adaptive behavior. From an evolutionary perspective, strategic help-seeking can significantly increase one's chances of receiving help and improve an individual's fitness. However, it has not yet been studied experimentally whether our closest living relatives – chimpanzees – seek help strategically. In Study 1, we investigated whether chimpanzees seek help selectively when they need it. Chimpanzees (N=19) could decide whether to seek help to obtain a reward form an apparatus when help was necessary, or help was available (but not necessary). Chimpanzees selectively sought help when it was necessary, but not if they could solve the problem on their own (Chisq(1) = 30.821, p <.001). In Study 2, we investigated whether chimpanzees seek help strategically: do they preferentially ask a helper who can assist at a low versus high cost? Chimpanzees (N=14) had the choice to approach a helper who could obtain a reward for them from a high-cost apparatus or a helper who could obtain a reward from a low-cost apparatus. In a control condition, we tested whether chimpanzees consider their own costs when they could obtain the reward themselves. Chimpanzees had a stronger preference for the low-cost apparatus when they obtained the reward on their own, but not when they sought help (Chisq(1) = 7.989, p =.005). These findings imply that chimpanzees seek help when they need it, but they do not seem to strategically consider other's costs when deciding whom to seek help from.

https://slack.com/app_redirect?channel=a-0039-Schleihauf-s4-s8

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0040 Linking young children's teaching to their reasoning about mental states: Evidence from Singapore

Nina Ni Ye[1], Gail Heyman[2], Xiao Pan Ding[1]

[1]National University of Singapore, Singapore; [2]University of California San Diego, USA

To fully participate in the human information-sharing ecosystem that allows for efficient knowledge dissemination and creation, children need to learn to effectively teach others. The small existing body of work addressing how this learning occurs has been conducted in Western cultures (e.g. Davis-Unger & Carlson, 2008; Ronfard & Corriveau, 2016). The present research addresses which specific theory of mind capacities are associated with effective teaching among 4- to 6-year-old Singaporean children (N = 49). Participants learned how to play a hide-and-seek game and then taught the game to three puppets who showed different patterns of performance. We assessed children's teaching by examining their ability to engage in an elaborative teaching strategy, such as explaining the reasons for the rules, and whether they would be able to adjust their teaching based on the learners' mistakes. We found children with false belief understanding, unlike other Theory of Mind components, was positively associated with elaborative teaching and with the tendency to adjust teaching based on the learners' mistakes. In addition, children who were better able to make mental state inferences in a real-time teaching context engaged in more elaborative teaching strategies. These effects remained significant after controlling for age and language ability. Our study provides evidence that links between mental state reasoning and the development of teaching extend beyond Western culture, and point to the importance of false belief understanding and of the ability to apply mental state reasoning in real time.

https://slack.com/app_redirect?channel=a-0040-Ye-s5-s12

Session 5 (Wednesday, 6.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0041 For 19-Month-Olds, What Happens On-Screen Stays On-Screen

Barbu Revencu[1], Gergely Csibra[1,2]

[1]Central European University, Hungary; [2]Birkbeck University of London, UK

Representational objects such as animations are widely used in infancy research, yet little is known about what infants make of animations as a stimulus category when they interpret them. In the first set of studies (Experiments 1-3), we ask whether 19-month-olds take what they see on the screen to be happening here and now, or whether they think that on-screen events are decoupled from the immediate environment. We find that infants do not expect an animated ball falling on a screen to end up in real boxes below the screen, even though they can track the ball (i) when the ball is real or (ii) when the boxes are also part of the animation. In Experiment 4, we ask whether infants use a simple heuristic according to which a screen is a spatially bounded physical container that does not allow objects to pass through. They do not. When two location cues are pitted against each other, infants individuate the protagonist of an animation by its virtual location (the animation of which it was a part of) as opposed to its physical location (the screen on which the animation was presented). Taken together, the results from the 4 experiments indicate that 19-month-olds reject animation-reality crossovers but accept the depiction of the same animated environment on multiple screens. This pattern of findings is consistent with the possibility that understanding external representations is in place by 19 months.

https://slack.com/app_redirect?channel=a-0041-Revencu-s1-s5

Session 1 (Monday, 4.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0042 External Representations: What they are & what they require

Barbu Revencu[1], Gergely Csibra[1,2]

[1]Central European University, Hungary; [2]Birkbeck, University of London, UK

External representations are ubiquitous across all communicative devices in which the visual system of the interlocutor is recruited for comprehension, such as animations, drawings, graphs, and pretense. Theoretical and empirical research on representations has been mainly carried out under the assumption that reference to an actual object—something we could in principle bump into on the street—is a necessary condition for representation. Against this view, we argue that format and content are orthogonal problems and reframe representations as links between physical entities (symbols) and things we communicate about (discourse referents). From this perspective, whether representations point to the real world becomes an independent aspect that is not constitutive of understanding representations. We then outline the requirements for grasping and exploiting these relations: (i) identifying communicative contexts; (ii) tracking objects through space and time; (iii) individuating objects under a conceptual description; (iv) setting up local assignment relations between a trackable object x (the symbol) and a discourse referent y; (iv) updating one's internal model of y according to the information generated via x; and (v) discarding the x-y assignment once communication is over. We review the literature on object substitution pretense and conclude that all six capacities are both required for understanding object substitution as well as present early on in development.

https://slack.com/app_redirect?channel=a-0042-Revencu-s7-s8

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0043 Learning blossoms: Caregiver-infant interactions in a naturalistic garden setting

Valentina Fantasia[1,2], Linda S. Oña[1], Chelsea Wright[1], Annie E. Wertz[1]

[1]Naturalistic Social Cognition Research Group, Max Planck Institute for Human Development, Berlin, Germany; [2]Neurophysiology and Neuroengineering of Human-Technology Interaction Research Unit, UniversitaCampus Bio-Medico, Rome, Italy

Plants provide unique opportunities for learning by engaging all human senses. Recent laboratory studies have shown that infants use a combination of behavioural avoidance and social learning strategies to safely learn about plant properties from adults. Here we investigate how infants and their caregivers interact with plants in an outdoor garden as a first step toward examining the operation of these social learning processes in naturalistic settings. We focus on two specific aspects of spontaneous infant-caregiver interactions with plants: olfactory and touch behaviours. Additionally, we test whether infants' and caregivers' prior knowledge of the plants in our study influences infants' behaviour. Our results showed a multifaceted connection between infants' and caregivers' previous experience with the plants and their olfactory and touch behaviours. First, whether infants touched the plants before or after their caregiver appeared to be independent of whether infants had seen the plant before. Although, in general, infants tended to touch and smell the plants after their caregivers did. Second, infants systematically engaged in some of the same types of olfactory and touch behaviours their caregiver displayed toward plants. Finally, infants whose caregivers were given more information about the plants in the study showed fewer touch behaviours, but no difference in olfactory behaviours. These findings bolster the previous laboratory studies of plant learning early in life, highlight the importance of olfactory behaviours, and underscore the benefits of using naturalistic observations to explore unique aspects of development.

https://slack.com/app_redirect?channel=a-0043-Fantasia-s3-s5

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0044 Fast and slow event-related potentials involved in inequity perception in preschoolers.

Nastassja L. Fischer[1], Changrun Huang[1,2], Elizabeth B. Kim[1], Nawal Hashim[1,3], Jean Yeung[1], Rongjun Yu[1]

[1]Centre for Family and Population Research, Faculty of Arts and Social Sciences, National University of Singapore; [2]Vrije Universiteit Amsterdam; [3]Duke-NUS Medical School, Centre for Family and Population Research, Faculty of Arts and Social Sciences, National University of Singapore, Singapore.

"Inequity aversion" is the natural tendency to avoid unfair outcomes. This behavior is present since early childhood, but there is little evidence about its underlying neural processes. To investigate further, event-related potentials (ERPs) were measured in children (3 to 6 years-old) while they were played the "receiver" role in a Dictator Game (DG) task. Assets' division were shown in a computer screen and could be under three categories: 1) AI: advantageous unequal; 2) DI: disadvantageous unequal; and 3) FA: fair. In each offer, participants had to indicate how s(he) would feel, ranging from very sad to very happy. Behavioural results showed that children felt more sad with DI offers, compared to AI and FA offers. Regarding ERP analyses, we observed, in occipital areas, less positive P100 amplitudes after DI offers, comparing to FA offers. Contrasting AI and DI offers, N170 amplitudes were more negative after DI than after AI offers in the left parietal-occipital area. Finally, comparison of FA and AI offers showed less negative N100 amplitudes after AI than after FA offers in the right centro-parietal area and more positive LPP amplitudes after AI than FA offers in the right frontal area. Altogether these results show that differences in neural processing right after the exposure to the offers indicates the involvement of fast sensorial processing in a first moment of fairness appraisal. In addition, differences in ERPs occurring later in time may indicate increased recruitment of cognitive resources that can influence the emotional evaluation of the different outcomes.

https://slack.com/app_redirect?channel=a-0044-Fischer-s8-s9

Session 8 (Thursday, 7.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0045 Insightful Problem Solving and Social Learning in Children's Tool Making: Exploring the Role of Napping, Night Sleep, and Maturation

Gökhan Gönül[1,2], Anıl Karabulut[1], Annette Hohenberger[1,3]

[1]Middle East Technical University, Ankara, Turkey; [2]University of Neuchâtel, Neuchâtel, Switzerland; [3]Osnabrück University, Osnabrück, Germany

Preschool children are known to have difficulties making tools to solve multi-step problems, such as innovating a hook via combining two sticks to fetch a bucket inside a tall transparent bottle (the hook task). Some researchers suggest that tool innovation requires insightful problem solving, and is aided by social learning. Does napping and taking a task break pave the wave for insight in tool innovation in preschool children? Based on this question, we tested insightful problem solving and social learning in 3-to-5-year-old children (n=69, all habitual nappers). All children got the hook task in pre-test (Phase1), and also in post-test in three phases where no success in a phase led to the subsequent phase: repetition of pre-test (Phase2), demonstration of a ready-made tool (Phase3), and demonstration of a tool making action (Phase4). Children in the control groups took the pre-test and post-test without a break (in the morning or evening), while children in the experimental groups took the post-test 2 hours later (task break or nap). Only two children got insight into the problem (Phase2 success) and both of them were in experimental groups. Exploratory results demonstrated that age-in-months and short napping durations were positive predictors of tool making phases, unlike night sleep duration and problems (pediatric sleep questionnaire), even though they have some slight moderating role between napping durations and tool making scores. We interpreted our experimental and explorative results in the light of comparative and developmental studies. For more information, please see the following link:
https://osf.io/7962p/?view_only=d26fe9b3bb85456fac458097fd4fcdc4

https://slack.com/app_redirect?channel=a-0045-Gönül-s4-s5

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0046 Finish what you started: Instrumental helping in two-year-olds motivated by a preference for completing unfinished actions

John Michael[1,2], Alexander Green[3], Barbora Siposova[3], Keith Jensen[4], Sotaro Kita[5]

[1]University of Stirling, Stirling, UK; [2]CEU, Budapest, Hungary; [3]University of Warwick, UK; [4]University of Manchester, UK

In recent years, a considerable body of research in developmental psychology has documented the emergence of instrumental helping behavior in early childhood. Given the early emergence of this behavior, it is thought to reflect the operation of basic psychological mechanisms underpinning human cooperation. In the current study, we tested the hypothesis that one basic psychological mechanism motivating this behavior is a preference for completing unfinished actions. To disentangle this hypothesis from the hypothesis that two-year-olds are motivated by an altruistic concern for others, we designed a paradigm in which two-year-olds could help an adult even when the adult no longer wanted to complete the action he had initiated. The results showed that children continued the adult's actions more often when an arbitrary goal had been abandoned (experimental condition) than when it had been reached (control condition), although in both conditions it was equally feasible for the children to continue the action. These results support the hypothesis that helping behavior in two-year-olds is motivated by a preference for completing unfinished actions.

https://slack.com/app_redirect?channel=a-0046-Michael-s2-s9

Session 2 (Tuesday, 5.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0047 Visual object categorization in infancy

Céline Spriet, Etienne Abassi, Jean-Rémy Hochmann, Liuba Papeo

Insitut des Sciences Cognitives Marc Jeannerod - CNRS (Centre National de la Recherche Scientifique), Lyon, France

Objects are the unit of perception. Categories are the units of thought. In the adult visual cortex, object representations are spatially organized by categories, reflecting the broad distinction between animate and inanimate objects, above finer-grained distinctions between human vs. nonhuman faces and bodies, and natural vs. artificial big and small inanimate objects. Precursors of the face-selective network may be in place already at birth, but it is unknown when the larger-scale organization becomes functional so to drive and account for infants' exploration and parsing of the visual world. Using eye-tracking, we measured the differential looking time (DLT) of 4-, 10- and 19-month-olds (N=97), as they looked at pairs of pictures belonging to eight animate and inanimate categories. For each group, we built a representational dissimilarity matrix (RDM) reflecting infants' perceived similarity/dissimilarity of two pictures in each pair. Low and high DLTs were taken to indicate similarity and dissimilarity judgements respectively . Nineteen-month-olds' RDMs revealed an adult-like visual object categorization. Ten-month-olds' RDMs showed the animate/inanimate categorization. Four-month-olds exhibited a general preference for the larger image of the pair; when image size was matched, the animate/inanimate categorization emerged in 4-month-olds too. These results highlight a developmental trajectory, through which the reliance on low-level visual features increasingly gives way to higher-level principles of categorization. Four-month-olds are primarily guided by visual saliency of the images, although they can represent the core animate-inanimate disticntion; the latter prevails within 10 months. Within the 19th month, several visual-object categories emerge, refining the early animate/inanimate categorization.

https://slack.com/app_redirect?channel=a-0047-Spriet-s11-s12

Session 11 (Friday, 8.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0048 The Role of Higher-order Theory of Mind in the True Belief Task

Lydia Schidelko, Marina Proft, Hannes Rakoczy

Georg-August University, Göttingen, Germany

Studies that administered the true belief (TB) condition of the classical location-change task to broad age ranges of children yielded surprising findings of a U-shaped performance curve in this seemingly trivial task. The TB condition asks children to ascribe a veridical belief to an agent to predict her action (analog to false belief (FB) condition by Wimmer & Perner, 1983). Children before age 4 perform competently in the TB condition. Children who begin to solve the FB condition at age 4, however, fail the TB condition. They predict – systematically wrong – that the agent will search for the object in the previous instead of the actual location. Only from around age 10, children succeed again (Oktay-Gür & Rakoczy, 2017). New evidence suggests that this pattern of results reflects pragmatic confusions caused by the triviality of the task (Rakoczy & Oktay-Gür, 2020). We hypothesize that children younger than 10 cannot solve these pragmatic confusions because of their restricted higher-order ToM and fragile pragmatic language capacity. Since little is known about developmental trajectories of higher-order ToM beyond second order ("He thinks that she believes that he knows…"), the present study aimed first, to measure children's (N=81, 6-10y.) understanding for higher-order mental state ascriptions and second, to predict their TB performance with this ability in higher-order ToM and their pragmatic language understanding. Results suggest that children can resolve the pragmatic confusion of the TB task when reaching a higher level of ToM, while their pragmatic language understanding had no influence.

https://slack.com/app_redirect?channel=a-0048-Schidelko-s8-s12

Session 8 (Thursday, 7.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0049 Intent-based morality in Colombian and Spanish children

Rhea Luana Arini[1,2], Juliana Bocarejo Aljure[3], Nereida Bueno-Guerra[4], Clara Bayón González[4], Estrella Fernández[5], Natalia Suárez[5], Luci Wiggs[1], Gordon Ingram[3], Ben Kenward[1]

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The majority of the developmental literature about the role of outcomes and intentions in moral evaluations has been conducted on English-speaking children and focused on harm and property transgressions (Hilton & Kuhlmeier, 2019). We tested instead a Spanish-speaking sample of 5- to 11-year-old children from Colombia and Spain (n=123) employing moral scenarios involving disloyalty and unfairness. We found that the outcome-to-intention shift in judgements of transgression severity was moral domain-dependent. Failed intentional transgressions were judged more severely than accidental transgressions in case of disloyalty, but not (yet) in case of unfairness. According to cultural group selection (Richerson & Boyd, 2005), it makes evolutionary sense that children's sensitivity to intentionality develops earlier within the moral domains (e.g., loyalty) privileged by their own cultures (e.g., collectivistic). Regarding punishment severity, failed intentional transgressions of both moral domains began to be punished more severely than accidental transgressions around 7 years of age. Moreover, disloyalty was punished more severely than unfairness, in accordance with moral foundations theory's predictions (Graham et al., 2013). Interestingly, while punishment severity decreased with increasing age for both unfairness and disloyalty in Spanish children, in Colombian children the downward pattern was observed only for unfairness but not for disloyalty. Additionally, irrespective of whether children were asked to focus on punishment outcomes or not, they anticipated punishment to feel worse than how it actually felt during and after punishment allocation, suggesting that retribution is unlikely to be the primary motive for children's third-party punishment (Carlsmith et al., 2008).

https://slack.com/app_redirect?channel=a-0049-Arini-s6-s8

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0050 Children's Use of Social Information From Multiple Models: Cognitive Capacities Underlying Population Size Effects on Cumulative Culture

Charlotte E. H. Wilks[1], Mark Atkinson[2], Christine A. Caldwell[1]

[1]University of Stirling, UK; [2]University of St Andrews, UK

Population size has been proposed to promote cumulative culture in humans. Experimental evidence from adult humans suggests that this may be due to the potential for combining beneficial information from multiple models. However, it is possible that such combinatory social learning requires cognitive capacities restricted to adult humans. In our task, children aged 5-10 watched two models consecutively search a 3x3 grid for rewards. Models revealed different correct and incorrect reward locations. This information could be used by the child to maximise their own score on the same task. We were interested in children's ability to select rewarded locations, and avoid unrewarded ones, revealed by both models. We also manipulated the spatial and temporal displacement of the information available. Results showed that the youngest children were unable to fully benefit from the additional information provided by the two models under spatial and/or temporal displacement. Such displacement likely applies in most real-world cases of cumulative culture therefore our result may offer insight into the constraints on cumulative culture in nonhumans.

https://slack.com/app_redirect?channel=a-0050-Wilks-s4-s12

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0051 What Happens When Sally Really Needs her Marble?

Carlota Saumell[1] Mireia Hernández[1] Ferran Pons[1] Yarrow Dunham[2]

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The cooperative bias hypothesis (Helming, Strickland & Jacob, 2016) states that children might fail false-belief tasks because they are intending to help the mistaken agent, such that they treat the prediction question ("Where will Sally look for X?") as a normative question ("Where should Sally look for X?"). In a pre-registered study, we test this hypothesis by manipulating the context of the false-belief tasks. In the "neutral" condition 4- to 5-year-olds are shown a standard situation in which knowing the answer has neither good nor bad consequences for the agent (in a content false-belief paradigm there are paperclips instead of crayons in a crayon box); by contrast, in the "stakes" condition the agent would benefit from sharing the participant's privileged information (there are crayons instead of band-aids in the band-aid box and the agent is hurt and needs a band-aid). Our hypothesis is that the higher the stakes the more likely 4- to 5-year-olds will want to help the target, ironically leading to higher failure rates. Following a mixed-model design, we have been testing participants in 8 trials that combine 2 versions of each condition (2 tasks [content and location false-belief] x 2 stakes [neutral and stakes]) in a balanced Latin square design and we determined the sample size (n=72) with an a priori power analysis conducted in G*Power that gave us 80% power to detect a moderately big size effect (d=0.6) in a between-group performance.

https://slack.com/app_redirect?channel=a-0051-Saumell-s3-s5

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0052 The neonate's brain detects utterance-level prosodic contours

Anna Martinez-Alvarez[1], Silvia Benavides-Varela[1], Judit Gervain[1,2]

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Newborns have sophisticated abilities to process the prosodic properties of speech. We asked whether they can discriminate different utterance-level prosodic contours, an ability that may greatly facilitate subsequent language acquisition. We used near-infrared spectroscopy (NIRS) in 1-5-day-old French-exposed newborns (n=25), in a paradigm similar to the newborn NIRS study of Benavides-Varela & Gervain (2017). We used 4-word-long ungrammatical sequences, recorded with well-formed declarative utterance prosody. Each sequence was presented three times in Standard Blocks. Each Standard Block was followed by a Deviant block, in which the same sequence was repeated twice with the standard prosody, and a third time carrying a prosodic violation. This violation was obtained by time-reversing the standard contour, and super-imposing it on the intact segmental information. We compared newborns' hemodynamic responses to the Standard and Deviant Blocks using a 24-channel NIRS probe, querying frontal, temporal and parietal areas bilaterally. Cluster-based permutation tests revealed greater activation for Deviant than for Standard Blocks in the parieto-temporal areas in the RH. These results suggest that newborns are already capable of detecting utterance-level prosodic violations at birth. The localization in right parieto-temporal areas converges with previous results showing the right lateralization of prosodic processing from birth. This is a key ability for newborns to start breaking into their native language. Future investigations will allow us to disentangle whether discrimination was based on prenatal familiarity with the prosodic contour, its ill-formedness, or simply the detection of a change.

https://slack.com/app_redirect?channel=a-0052-Martinez-Alvarez-s9-s11

Session 9 (Thursday, 7.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0053 Phenomenological properties of autobiographical memories in blind and sighted children

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Creating an autobiographical narrative is a complex skill requiring numerous systems including language, emotions, other memory systems like verbal/visuo-spatial memory and individual senses. Among the senses, vision is central to autobiographical thinking because rich informational content stored economically in visual images direct memory search and facilitates the access to specific memories. Visual imagery is also linked to autobiographical memories' temporal distribution, retrieval time, specificity, veridicality and phenomenological properties like recollection and belief. If vision plays a vital role in autobiographical thinking then how does autobiographical memory develop in the absence of vision? By focusing on phenomenology, this question was tested by comparing visually impaired children aged 9 to 16 years (M = 13.00, N = 33) and sighted children aged 9 to 14 years (M = 11.42, N = 36). Participating children were asked to recall autobiographical memories in response to six cue words, later they were requested to give phenomenological ratings on visual imagery, spatial imagery, auditory imagery, recollection, perspective and narrative. Results indicated that although there was no difference in the strength of visual imagery ratings, blind children reported experiencing stronger auditory imagery when they recalled memories, $t(67) = 2.71$, $p = .009$. Blind children were also more likely to remember their memories from the 1st person (field) perspective rather than 3rd person (observer) perspective. Results indicate remarkable similarity in the phenomenology of memory retrieval yet auditory information also seem to compensate the lack of visual information.

https://slack.com/app_redirect?channel=a-0053-Acar-s1-s5

Session 1 (Monday, 4.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0054 Narrative Styles of Turkish Mothers during A Shared Book Reading Activity: A Middle-SES and Low-SES Comparison

Burcu Ünlütabak[1], Ageliki Nicolopoulou[2], Ayhan Aksu-Koć[3]

[1]Nuh Naci Yazgan University, Kayseri, Turkey; [2]Lehigh University, Bethlehem, PA, United States; [3]Bogazici University, Istanbul, Turkey

Research shows differences in mothers' book reading styles across different cultures (e.g., Melzi & Caspe, 2005) and socioeconomic statuses (SES) (e.g., Hoff & Tian, 2005). Evidence suggests that mother-child dyads in low-SES homes engage in book reading less frequently, have shorter and less complex conversations than mother-child dyads in middle-SES homes (e.g., Raikes et al. 2006; Rodrigez & Tamis-LeMonda, 2011). However, research examining SES differences in a variety of sociocultural contexts is limited. The current study contributes to this area by examining the narrative styles of 70 Turkish mothers from two SES groups (35 low-SES) who read Wacky Wednesday, a wordless picture book depicting extraordinary events (e.g., a mouse chasing a cat) to their 3- to 5-year-olds. We coded mothers' narrations for the use of 1) labels, 2) descriptions, 3) explanations, 4) real life connections. An exploratory factor analysis collapsing across the SES groups indicated 3 distinct narrative styles: 1) story describers, 2) story tellers, 3) story builders. There was also a significant association between mothers' narrative styles and SES, $\chi2(2) = 29.8$, $p < .001$. Mothers in the low-SES sample engaged in picture descriptions more frequently (89%) than mothers in the middle-SES sample, whereas mothers in the middle-SES sample engaged in story building more frequently (81%) than mothers in the low-SES sample. Mothers from both SES groups engaged in story telling equally often. These findings corroborate previous ones about SES differences in mother-child book reading, and has important implications for supporting children's literacy development across different SES backgrounds.

https://slack.com/app_redirect?channel=a-0054-Ünlütabak-s1-s8

Session 1 (Monday, 4.1., 8 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0055 Self-teaching across writing systems: A meta-analysis

Yixun Li[1], Min Wang[1], Daniel Espinas[1], Peng Peng[2]

[1]University of Maryland, College Park; [2]University of Texas, Austin

Previous research shows that children can teach themselves new written words via independent text reading, a process that Share (1995) termed self-teaching. The central mechanism of self-teaching is known as phonological recoding — the process that supports learners to translate written words into the sounds that make up the words —which has received plenty of support from empirical studies in first language (L1) learning across writing systems in the past decades. Importantly, learning to read in a second language (L2) is fundamentally different from that in an L1, and it is thought that learners' L1 background has an impact on their L2 learning. Despite several qualitative reviews of self-teaching research, no work has employed a quantitative meta-analysis that can yield critical findings of self-teaching across writing systems and that between L1 and L2. The current work aims to fill this gap. This is an ongoing project, and data analysis will be completed by the end of 2020. A random-effects meta-analysis and a series of meta-regression will then be carried out, with phonological recoding and L1 backgrounds being the critical factors of interest. It is hypothesized that the role of phonological recoding may vary across transparent orthography (e.g., Hebrew and Spanish) and opaque orthography (e.g., English and Chinese) in L1 self-teaching, but specific predictions could not be made on L2 self-teaching due to the lack of previous work. Findings will elucidate self-teaching across writing systems, and thus will inspire future research by offering informative foundations and clear implications for future directions.

https://slack.com/app_redirect?channel=a-0055-Li-s7-s9

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0056 The role of emotion in infants' evaluation of helping and hindering actions

Enda Tan, J. Kiley Hamlin

University of British Columbia, Vancouver, Canada

A growing literature has shown that infants prefer characters who perform prosocial (versus antisocial) actions, suggesting that rudimentary aspects of sociomoral evaluations develop early in life. However, it remains largely unclear whether emotions are involved in these evaluations. Using a blind coder rating procedure, a recent study found that infants/toddlers showed more positive facial expressions after viewing prosocial (versus antisocial) events (Steckler et al., 2018). However, the effects observed in the study were small. To clarify the role of emotions in early sociomoral evaluation, the current study used facial electromyography (EMG) to assess infants' emotional responses to sociomoral scenarios. Thirty-two 18-month-old infants viewed 2 sets of 6 videos depicting prosocial/antisocial scenarios, where a climber tried but failed to reach the top of a hill and was then helped (pushed up the hill) or hindered (pushed down the hill) by other characters (Hamlin et al., 2007, 2010). To explore infants' emotional responses, we assessed infants' facial activities over corrugator supercilii (brow; activated during negative emotions) and zygomaticus major (cheek; activated during positive emotions). Results found higher corrugator (brow) activities when the climber was first pushed down by the hinderer (versus pushed up by the helper; p=.04), followed by a shift to lower corrugator activities for hindering (versus helping) after the pushing actions were finished (p=.02). No corrugator effects were found in other phases of the scenario, nor were there effects in zygomaticus activities throughout helping/hindering events. These results provide further evidence that emotions are involved in infants' processing of sociomoral scenarios.

https://slack.com/app_redirect?channel=a-0056-Tan-s2-s7

Session 2 (Tuesday, 5.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0057 Semi-numerate children as a model for studying the origins of exact numerical equality

Rose M. Schneider[1], Roman Feiman[2], David Barner[1]

[1]University of California, San Diego; [2]Brown University

Does the ability to represent exact numerical equality depend on symbolic number systems like counting? Prior work addressing this debate has operationalized exact equality as the ability to establish one-to-one correspondence between sets, but presents a puzzle: While one-to-one does not in principle require symbolic number, non-numerate individuals nevertheless do not use it to establish equality, while numerate individuals do. One barrier to addressing this question is that non-numerate data is sparse and difficult to obtain, making it challenging to differentiate between hypotheses. Here, we show this question can be robustly addressed in semi-numerate US children by replicating methods used with non-numerate populations. We tested 3- to 5-year-olds (N = 258, 150 "full-counters" and 108 "non-counters"). Children played a "matching game" with plastic fish to create ponds matching an experimenter's. In three experiments non-counters performed similarly to non-numerate participants, and failed to use one-to-one. Further, children's numeracy was significantly related to set-matching: While non-counters struggled to match sets with >3 items, full-counters were more accurate. Still, even full-counters were well below ceiling, and did not improve even when one-to-one was highlighted by framing the task as a "sharing game." Our replication of non-numerate findings demonstrates that semi-numerate children are a valid model for testing whether representing exact equality depends on symbolic number. However, while numeracy was linked to exact equality knowledge, such knowledge was fragile even in full-counters. These findings add important data to this long-standing debate, and further show that numeracy alone is insufficient to supply concepts of exact equality.

https://slack.com/app_redirect?channel=a-0057-Schneider-s7-s8

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0059 Sorting communication in early category learning: An online Study

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Children form categories based on perceptual commonalties between objects and accompanying, less obvious linguistic cues. Indeed, starting from early on, language aids categorization processes, but non-linguistic auditory information like tones appear to not play a similarly critical role. Such findings suggest that language plays a special role in human cognitive development as children start to mentally relate objects in meaningful ways and internalize these relations to create sensible concepts about their world. However, non-verbal communication like gestures and actions are equally salient features in infant cognitive development. In an online study, we ask to what extent words and actions shape object categorization differently across early development. Across three conditions (no-cue, word-cue, action-cue), we present 12- and 24-month-olds (n=120) with eight videos of single objects from the same category which vary in color and other perceptual features, either accompanied by a word or an action being performed on that object. At test, infants see a novel object of the just-learned category or a novel object from another category side-by-side on the screen. Increased looking at the novel object from a different category at test is typically interpreted as evidence for category formation and generalization of the objects from the just-learned category. Differences in the extent to which words or actions influence category formation would suggest that input salience drives initial approaches in cognitive development.

https://slack.com/app_redirect?channel=a-0059-Bothe-s7-s11

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0060 Infants proficiently individuate faces by 5 months of age

Stefanie Peykarjou[1], Miriam Langeloh[2], Elisa Baccolo[3], Bruno Rossion[4], Sabina Pauen[1]

[1]Heidelberg University, Heidelberg, Germany; [2]Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; [3]Universitadegli Studi di Milano-Bicocca, Milan, Italy; [4]Université de Lorraine, Nancy, France

Infants can recognize their mother's face and also unfamiliar faces (de Haan & Nelson, 1997; Peykarjou et al., 2016). However, previous studies tested recognition using the same image of each face repeatedly, and little is known regarding the process of becoming familiar with a face. Here we tested individuation of the mother's face and faces familiarized either through interaction or by image using a Fast Periodic Visual Stimulation (FPVS) paradigm in EEG (N = 78 5-month-olds). Following short familiarization with the target face, 12 different images of this target face were presented among four unfamiliar stranger faces in an oddball paradigm. Images were presented at a high rate of 6 images per second (6 Hz) with the oddball appearing as every 5th image (1.2 Hz). We contrasted conditions where the target face appeared as oddball (N = 37) or as base stimulus (N = 42). Across harmonics, individuation responses were observed in all conditions (Z-scores > 2.62, p < .0045) over the occipital cortex. Statistical combination of harmonics into summed scores is under way. Bayesian mixed ANOVAs confirmed that there were no differences between conditions (all BFs > 29 in favor of the null hypothesis), providing strong support against differences between conditions. These data show that infants are able to recognize familiar and familiarized faces across different images and at a high speed. We are currently testing infants with stranger faces without any prior exposure to the face to further clarify the role of experience in infant face individuation.

https://slack.com/app_redirect?channel=a-0060-Peykarjou-s4-s5

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0061 How do young children respond to the distress of others? A behavioural and physiological investigation

Diane Austry, Zanna Clay

Psychology Department, Durham University, UK

Empathy, the sharing and understanding of others' emotional states, is a core feature of our social lives, however, we know very little on how its affective and cognitive building blocks emerge early in life, particularly when it comes to the development of its associated underlying mechanisms. In the present study, we used the emerging method of infrared thermography combined with behavioural experiments to investigate how young children (1-3 years) experience and respond to the distress of others. We measured the emotional reactions - including behavioural responses and changes in facial skin temperature- of 30 typically developing young children from UK nurseries when watching short video-vignettes of familiar and unfamiliar caregivers displaying emotional distress or neutral expressions. Results from an analysis of changes to nasal temperature confirmed a physiological reaction of children when witnessing the distress of another. The thermal response was stronger in boys than girls, although girls produced more negative facial expressions than boys suggesting gender differences in responses to others' distress. Our data also revealed an effect of stimulus familiarity on the production of negative facial expressions, but no effect of age on the physiological or behavioural responding overall. This may be due to a limited age range and high individual differences in our sample. By combining evidence of physiological and behavioural responses to others' distress, this study contributes to new theoretical and methodological advances into how internal emotions map onto external measures, thus shedding new light on the development of empathy and its underlying processes.

https://slack.com/app_redirect?channel=a-0061-Austry-s1-s4

Session 1 (Monday, 4.1., 8 pm CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0062 Newborns show a preference for dynamic displays depicting happy versus fearful faces

Silvestri Valentina, Arioli Martina, Macchi Cassia Viola

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Data from the small number of existing studies that investigated newborns' ability to discriminate facial emotional expressions depict a rather complex picture: few-days old infants fail to discriminate between fearful and neutral faces under static presentation condition, but they prefer happy over fearful static faces (Farroni et al., 2007). When faces are dynamically presented, newborns discriminate between happy and disgusted faces, but do not show a preference for any of the two emotional expressions (Addabbo et al., 2018). In the present study, we investigated whether newborns' preference for happy over fearful faces generalizes to the condition where emotional expressions are presented as unfolding from dynamic faces. Twenty 2-day-old newborns were presented with two trials depicting two videoclips of the same individual female face displaying an unfolding happy and fearful expression appearing bilaterally on the screen with the left-right position of the videoclips counterbalanced across trials (i.e., infant-controlled visual preference procedure). Total looking times to each of the two stimuli were calculated for each infant and entered into a 2 (emotion) x 2 (trial) ANOVA. A significant Emotion main effect (p = 0.03) revealed that newborns looked significantly longer to the happy face, confirming that, even under naturalistic-dynamic presentation conditions, happiness is preferred over a negatively-valenced emotion like fear. This study is the first of a series in which we will manipulate the visual spatial frequency information contained in the stimuli to investigate the nature of the visual information newborns rely on in their discrimination of facial emotional expressions.

https://slack.com/app_redirect?channel=a-0062-Silvestri-s2-s9

Session 2 (Tuesday, 5.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0063 Seven-eight-year-old children acquiring the second-order theory of mind modulate deception strategy depending on the context

Ryoichi Watanabe

Kyoto University, Japan

Previous research has shown that the second-order theory of mind (ToM2) predicts children's deception ability (Talwar, Gordon, & Lee, 2007). However, it is not clear whether ToM2 modulates when and how children deceive others. This study examined how ToM2 affected children's deception strategy in the self-benefit situation and the other person's benefit situation. Thirty-three 7- and 8-year-old children participated in this study. Children participated in two hiding games (the self-benefit situation and the other person's benefit situation), followed by the ToM2 task. In the self-benefit situation, children should deceive an enemy for getting a reward: in the other person's benefit situation, they deceive the enemy for helping the other. For analysis, the deception strategies were categorized into "telling a lie" as an active deception and "telling nothing" as a passive deception. Children also took the Ice cream story task of Perner and Wimmer (1985) as the ToM2 task. The results showed that ToM2 performance had no significant effect on the performance of the hiding games. However, in the other person's benefit situation, children passing the ToM2 task showed the passive deception more than the active deception, while children not passing the ToM2 task showed the two types of deception at the same rate. These findings suggest that children passing the ToM2 tend to deceive the others for the other person's benefit through passive deception like "telling nothing". Moreover, the ToM2 may not modulate whether children deceive others or not, but also how children deceive others.

https://slack.com/app_redirect?channel=a-0063-Watanabe-s2-s9

Session 2 (Tuesday, 5.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0064 Six-month-old infants' abilities to represent sameness and difference in speech

Irene de la Cruz-Pavía[1], Judit Gervain[1,2]

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In order to acquire grammar, infants need to extract regularities from the linguistic input. From birth, infants can detect repetitions in speech. Thus, newborns show a stronger neural activation for syllable sequences that contain adjacent repetitions (ABB: mubaba) over random syllable sequences (ABC: mubage; Gervain et al. 2008, 2012). By contrast, neural activation to both types of sequences is equally strong at 6 months of age (Radulescu et al., in preparation). Such a pattern would result if 6-month-old infants were representing the ABC sequences as strongly as ABBs. Indeed, at this age, infants begin to learn their first word forms, for which they need to be able to process sequences of different syllables. To confirm this hypothesis, it is essential to demonstrate the 6-month-old infants discriminate the ABB and ABC sequences. Using near-infrared spectroscopy (NIRS) and an alternating/non-alternating design, we examine whether 6-month-old French-learning infants discriminate the ABB and ABC sequences. Non-alternating blocks (x6) contained sequences of a single type, i.e. all sequences within a block have either an ABB (x3) or an ABC (x3) structure. Alternating blocks contained sequences of both types, presented in strict alternation (ABC-ABB [x3] or ABB-ABC [x3]). Preliminary analysis of 20 participants reveals discrimination in frontal and parietal regions. These results provide the earliest evidence that young infants explicitly represent difference in speech. This study has thus important implications for language development—particularly for word learning—as well as for infants' general ability to represent relationships predicated on sameness and difference (Hochmann et al. 2016).

https://slack.com/app_redirect?channel=a-0064-Cruz-Pavía-s2-s6

Session 2 (Tuesday, 5.1., 8 am CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0065 Eighteen-month-olds integrate verbal cues into their action processing: evidence from ERPs and mu power

Christiane Patzwald[1], Birgit Elsner[1], Daniel Matthes[2]

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Behavioral research has shown that infants use both behavioral cues and verbal cues when processing the goals of others' actions. For instance, 18-month-olds selectively imitate an observed goal-directed action depending on its (in)congruence with a model's previous verbal announcement of a desired action goal. This EEG-study analyzed the electrophysiological underpinnings of these behavioral findings on the two functional levels of conceptual action processing and motor activation. Mid-latency mean negative ERP amplitude and mu-frequency band power were analyzed while 18-month-olds (N=38) watched videos of an adult who performed one out of two potential actions on a novel object. In a within-subjects design, the action demonstration was preceded by either a congruent or an incongruent verbally announced action goal (e.g., "up" or "down" and upward movement). Overall, ERP negativity did not differ between conditions, but a closer inspection revealed that in two subgroups, about half of the infants showed a broadly distributed increased mid-latency ERP negativity (indicating enhanced conceptual action processing) for either the congruent or the incongruent stimuli, respectively. As expected, mu power at sensorimotor sites was reduced (indicating enhanced motor activation) for congruent relative to incongruent stimuli in the entire sample. Both EEG correlates were related to infants' language skills. Hence, 18-month-olds integrate action-goal-related verbal cues into their processing of others' actions, at the functional levels of both conceptual processing and motor activation. Further, cue integration when inferring others' action goals is related to infants' language proficiency.

https://slack.com/app_redirect?channel=a-0065-Patzwald-s6-s8

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0066 Age differences in white matter tracts underlie neural pattern differences during novel word learning

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*Authors contributed equally

The mechanism which allows humans to learn words appears to change with age. Behavioral studies have shown differences in memory for newly learned words between children and adults. A recent fMRI study reported that several brain regions exhibit age-related differences when accessing newly learned words in a second language (L2) (Takashima et al., 2019). While teenagers (aged 14-16 years) activated more left frontal and parietal regions, children (aged 8-10 years) activated right frontal and parietal regions. In the current study, we set out to examine the white matter tracts underlying these regions to determine whether age related differences within these connections exist. Since the vocabulary system matures with age, we hypothesized that teenagers would exhibit stronger connectivity within the core language system than children. DWI data from 21 children and 22 teenagers who participated in the aforementioned fMRI study were included in the analysis. We tested for group differences between the children and the teens in streamline density within the tracts originating from the seven functional seeds reported in the fMRI study. Group differences in streamline density were found in three mean tractograms. The teen group exhibited higher streamline density in the left superior longitudinal fasciculus (SLF) and the temporo-parietal region of the right SLF. Children showed higher streamline density than teens in the right anterior thalamic radiation. The current study provides evidence that there is a structural correspondence to the age group differences in functional activity.

https://slack.com/app_redirect?channel=a-0066-Ekerdt-s5-s7

Session 5 (Wednesday, 6.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0067 They Thought It was True: Parents' Sentential Complements are Associated with Children's Theory of Mind

Cleo Tay, Sherann Ler Ying Teo, Xiao Pan Ding

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Social constructivists argue that linguistic input in the form of parental mental state talk facilitates children's theory of mind (ToM) development (Devine & Hughes, 2018). However, mental state verbs are often used in sentential complements (SCs). SCs are syntactic structures that allow one to express attitudes (e.g., "Sally thinks…") towards propositions, i.e., statements that may be true or false (e.g., "…the marble is in the basket"). Previous studies suggest that training children's comprehension of SCs improves their false belief understanding (Hale & Tager-Flusberg, 2003). The present study is the first to explore the relationship between SCs and children's ToM in a naturalistic setting, specifically parent-child conversation. We asked 60 parents to read a wordless picture book to their three- to five-year-old child. We then coded for parents' use of SCs, as well as how frequently they talked about the characters' and their own cognitive and perceptive mental states. Children's performance on two false belief tasks was also measured. Results revealed two main findings. First, parents' use of SCs was positively associated with children's false belief understanding, even after controlling for parental mental state talk, parental verbosity, children's age, and children's receptive language. Second, the type and referent of mental state talk matters: children's false belief understanding had a positive association with parents' references to characters' cognitions, as well as interlocutors' perceptions. These findings suggest that the syntax and propositional attitudes that preschoolers are exposed to in their home environment play a role in ToM development.

https://slack.com/app_redirect?channel=a-0067-Tay-s5-s9

Session 5 (Wednesday, 6.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0068 Infants' tracking of individuals' identity over time depends on the nature of their prior observed interaction

Maayan Stavans, Gergely Csibra

Central European University

What interactions between individuals license tracking their identity across different contexts over time? We hypothesized that certain interactions could signal the existence of an enduring social relationship between the participants, especially if they involve costly acts without apparent local benefit to the actor. Building on prior research showing that infants (and adults) represent schematic GIVING events as social interactions, but schematic TAKING events as merely self-serving actions, we hypothesized that the nature of object transfer would affect infants' memory of the participating individuals. To this end, 15-month-old infants watched familiarization events in which a doll (the actor) transferred a block to (GIVING condition), or from (TAKING condition), another doll (the patient), who did not react to the transfer. Infants' memory of each doll was next probed in a manual search task, in which infants saw an experimenter hide both dolls in a box, and when retrieved, they were either the same dolls (No-Switch trial) or one of them was novel (Switch trials). Infants were then allowed to search the box for 10 seconds. Infants in the GIVING condition searched longer in both kinds of Switch trials than in the No-Switch trial, suggesting that they encoded the identities of both individuals. In contrast, infants in the TAKING condition searched equally in all trials. Infants may encode the identity of both the actor and the patient in a GIVING interaction because this is necessary to track their unfolding social relation, the existence of which is inferred from the observed event.

https://slack.com/app_redirect?channel=a-0068-Stavans-s7-s11

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0069 What was that for? Social referencing gives insights in children's and adults' causal understanding and imitation of irrelevant actions

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When demonstrated causally irrelevant and relevant actions to retrieve a reward from a puzzle-box, children and adults tend to copy both – they over-imitate. Depending on the type of irrelevant action, however, it is often unclear to which extent irrelevant actions are identified as such. One recent account holds that no-contact actions—actions involving no physical contact to the puzzle-box —may be easily identified as causally irrelevant, whereas pseudo-instrumental actions—those involving physical contact to the puzzle-box —may be harder to identify as irrelevant (Schleihauf and Hoehl, 2020). The current study aims to test this claim. We measured eye-gaze of 24 children (M=4.41 years; SD=0.25) and 25 adults (M=38.77 years, SD=5.19) while they observed an adult performing a sequence of irrelevant (no-contact vs. pseudo-instrumental) and relevant actions. We used looking times as a measure of causal understanding, assuming that participants would look longer in a person's face when observing an unexpected compared to an expected action (Striano & Vaish, 2006). In addition, we observed participants' subsequent over-imitation behavior. Participants looked longer in the model's face during the demonstration of no-contact actions compared to pseudo-instrumental and relevant actions. Thus, it seems that it was easier for children and adults to identify no-contact actions, as compared to a pseudo-instrumental actions, as task irrelevant. Furthermore, the more participants looked into the model's face, the less likely they were to over-imitate. These findings indicate that being aware of the causal irrelevance of actions reduces the tendency to over-imitate among children and adults.

https://slack.com/app_redirect?channel=a-0069-Schleihauf-s1-s2

Session 1 (Monday, 4.1., 8 pm CET)
Session 2 (Tuesday, 5.1., 8 am CET)

A-0070 Unhappy Victimizer: Children Take Moral Information into Account When Attributing Happiness

Fan Yang, Efe Dogruoz

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People feel happy when getting what they want, a common sense about mental state that even toddlers understand (e.g., Wellman & Woolley, 1990). But do children think happiness only depends on desire fulfillment, regardless of the means to fulfil one's desire? Existing research on the "happy victimizer" phenomenon suggests that children under age 7 think a person feels happy even if he gets what he wants through moral transgressions (e.g., Nunner-Winkler & Sodian, 1988). Across three preregistered studies, we explore whether children's happiness attributions are influenced by moral judgment under certain circumstances. Four-9-year-old children responded to scenarios where one character fulfills his desire, whereas the other character does not. The characters' desire fulfillments were either due to morally relevant actions (test condition) or external circumstances (control condition). We labeled the actions as "bad" and "good" (Study 1, N = 60), or played audio clips showed the reactions of the recipients (i.e., laughing or crying) (Study 2, N=120). In both studies, children across ages were more likely to indicate the individual who fulfills desires as happier in the control condition than in the test condition. Study 3 (ongoing, preregistered N = 60) examines children's attributions of happiness when there are no explicit moral labels or salient cues about the recipients' reactions. Taken together, our findings suggest that children do not equate happiness with desire fulfillment, but they are able to appreciate that being good plays a role in feeling good.

https://slack.com/app_redirect?channel=a-0070-Yang-s1-s3

Session 1 (Monday, 4.1., 8 pm CET)
Session 3 (Tuesday, 5.1., 1 pm CET)

A-0071 Is it language or social cognition? How expressive pragmatics and expressive prosody relate to other skills in preschool children.

Mariia Pronina[1], Pilar Prieto[2,1], Luca Bischetti[3], Valentina Bambini[3]

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The use of language in context is pivotal for children's social life and development. However, little is known about the relationship between expressive pragmatic skills and other developing abilities (e.g., structural language skills and social abilities). Little attention also has been paid to prosodic skills, which are highly intertwined with expressive pragmatics in development. This study sets out to investigate how both expressive pragmatics and expressive prosody are related to language and social cognition skills in typically developing preschool children. A total of 105 3- to 4-year-old children ($M = 3;9$, $SD = 3.25$ months) were assessed for pragmatics and prosody with the Audiovisual Pragmatic Test (APT), as well as for structural language skills (i.e., vocabulary and syntax) and a series of social cognition measures (i.e., false belief, emotion understanding, and metacognitive vocabulary). A combined correlational, regression, and structural equation modeling (SEM) approach was used. While correlations and regression analyses indicated that pragmatics and prosody were related with both language ($ps < .01$) and false belief ($ps < .05$), more comprehensive and conservative SEM models showed that pragmatic and prosodic abilities are significantly predicted only by linguistic skills ($b = .90$, $b = .91$, $ps < .001$), whereas the role of social cognition is negligible ($b = .01$, $b = .002$, $ps > .05$). We suggest that in early developmental stages, specifically preschool years, expressive pragmatic and prosodic skills seem to pertain to the language domain rather than to the socio-cognitive one.

https://slack.com/app_redirect?channel=a-0071-Pronina-s8-s10

Session 8 (Thursday, 7.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0072 Children's developing capacity to calibrate the verbal testimony of others with observed evidence when learning causal relations

Niamh McLoughlin[1,2], Zoe Finiasz[3], David M. Sobel[4], & Kathleen H. Corriveau[1]

[1]Boston University, MA; [2]University of Kent, UK; [3]Cornell University, NY; [4]Brown University, RI

Research has shown how children recover causal structure from observation and interaction with the world (e.g., Bonawitz, van Schijndel, Friel, & Schulz, 2012), and how children acquire knowledge from their conversations with other people (e.g., Harris, Koenig, Corriveau & Jaswal, 2018). In this study, we explored the developing ability to calibrate the confidence with which informants generate verbal testimony (i.e., the degree of verbal certainty) with the stochastic nature of observed causal data described by that testimony (i.e., the likelihood of a particular outcome). In Study 1 (N = 48), four- and 5-year-olds heard a certain or uncertain explanation about deterministic causal relations. Five-year-olds made more correct causal inferences in the certain, more calibrated condition, B = -2.83, SE = 0.99, z = -2.42, p =.016. In Study 2 (N = 72), children heard similar explanations about probabilistic relations, making the uncertain informant more calibrated. In an advance on previous calibration research, 5-year-olds learned better from an uncertain informant, but only when the explanation was attuned to the stochasticity of the data, or outcomes that sometimes occur. They made more correct causal judgements in this condition compared to the certain condition, B = -1.07, SE = 0.48, z = -2.24, p =.025, and a condition in which an uncertain informant did not acknowledge the probability of the data, B = -1.06, SE = 0.49, z = -2.18, p =.029. These findings imply that the capacity to integrate, and learn efficiently from, distinct sources of knowledge emerges in the preschool years.

https://slack.com/app_redirect?channel=a-0072-McLoughlin-s7-s12

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0073 Other-Oriented Concern – Influences on Guilt vs. Shame Responses & Empathic Helping in Toddlers

Katie Rose, Jessica Sommerville

The University of Toronto, Toronto, Canada

Empathy, a vicarious emotional reaction to another's distress that invokes concern (Hoffman, 2000), plays a critical role in our interpersonal relationships. Thus, identifying developmental contributors to individual differences in empathic responding is an important objective. We will investigate the role of guilt and shame in early empathic and prosocial responding, given that guilt and shame responses can be differentiated by their degree of focus on personal versus others' distress. Two-year-old toddlers will participate in three tasks. Data collection will begin in November, with an anticipated sample size of 25 (of an ultimate N = 50) by January, for the conference presentation. An emotion recognition task will measure toddlers' affective and cognitive empathy. Then, a helping task will measure toddlers' prosocial responding in situations involving varying costs to themselves. Next, a broken toy paradigm, in which the toddler is led to believe they have caused a mishap, will assess guilt and shame (Barrett et al., 1993). Forced-choice measures of incidental aspects of the experimenter's appearance (e.g. shirt colour) during this task will assess toddlers' other-orientation. I hypothesize that toddlers who demonstrate guilt on the broken toy paradigm will exhibit more empathy and prosocial responding than those who exhibit shame, and that they will be more likely to recall the experimenter's appearance, suggesting an association between guilt and other-orientation. These findings will link guilt-specific behaviours in response to transgressions to prosocial and empathic responding in toddlers and confirm other-orientation as the explanation for this link. Keywords: empathy, prosocial, guilt, shame, other-orientation, toddlers

https://slack.com/app_redirect?channel=a-0073-Rose-s3-s4

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0074 The ‚false' false belief task: A replication and reanalysis of Call and Tomasello's (1999) nonverbal false belief task.

Lara Martina Schröder[1,2], Sarah Janika Leikard[1,2], Michael Huemer[1,2], Josef Perner[1,2]

[1]Department of Psychology, University of Salzburg; [2]Centre for Cognitive Neuroscience (CCNS), University of Salzburg

We investigated a challenge arising from Call and Tomasello's (1999) non-verbal false belief (FB) test: An agent baits one of two identical looking boxes. One cannot see which. In the agent's absence the boxes are switched. The agent returns and marks one of the boxes. Where is the bait? Surprisingly, they reported that children solve their task as early as they master the traditional FB task. Passing the non-verbal FB task requires (1) an understanding of disjunction (box1 OR box2), (2) being able to represent that the agent knows something that oneself only has partial knowledge of, and (3) understanding that the agent mistakenly thinks that box1 (the baited box) is box2. Only older children who are capable of second-order belief ascription should be able to do so (Perner et al. 2015). In two experiments (N total = 105) we replicated Call and Tomasello's non-verbal FB task and tested whether children were choosing the correct box based on a simple heuristic instead of belief reasoning by adding two true belief tasks. We could demonstrate that the majority of 3- to 6- year-olds simply guessed where the reward might be. Furthermore, many of the children who answered all 4 trials correctly seem to use the simple strategy that the agent always points to the box on the wrong side, which they could learn from several control trials used beforehand. Hence there is no sign that the Call-Tomasello non-verbal FB test is mastered at the same age as the standard test.

https://slack.com/app_redirect?channel=a-0074-Huemer-s11-s12

Session 11 (Friday, 8.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0075 The spatial representation of serial order in pre-literate children: an online study

Roberta Bettoni[1,2], Luca Rinaldi[3], Melissa Savoldi[1], Hermann Bulf[1,2], Viola Macchi Cassia[1,2]

[1]University of Milano-Bicocca, Italy; [2]Center of Neurosciences (Neuro-MI), Milan, Italy; [3]University of Pavia, Pavia, Italy

Western adults spatially organize to-be-remembered item sequences according to the direction of their reading-writing habits, associating the first items to the left and the last items to the right. It is still not clear whether this phenomenon is entirely driven by culture or it is rooted in early constraints that drive the system towards the spatial coding of serial order information. Here, we investigated whether Western pre-literate children spatialize lists of visual items according to a left-to-right orientation and whether their parents' reading habits modulate this effect. Eighteen 4-5-year-old children were first presented with a to-be-remembered sequence of three visual objects appearing centrally on a PC-monitor. At the test, they saw pairs of lateralized objects, the target and a distractor, and were asked to select the target. The target was always the first or last item of the sequence, and its location was either congruent or incongruent with its relative position on a left-to right-oriented representational continuum. We also assessed children's spontaneous spatial bias while sampling a series of items scattered on the screen. Response times were faster for congruent (i.e., first/third element in the left/right space, respectively) than incongruent trials, and a left-to-right spatial bias was also found in children's sampling of the scattered items. The response advantage for congruent trials was modulated by parents' reading habits, suggesting not only that pre-literate children map serial order information onto a left-to-right oriented representational space, like adults do, but also that such mapping is influenced by family cultural practices.

https://slack.com/app_redirect?channel=a-0075-Bettoni-s7-s11

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0076 Earlier Parental Pretend Play Input Predicts Later Gesture Comprehension in Toddlers

Erim Kızıldere[1], Özge Eser[1,2], Nurgül Arslan[1], Tilbe Göksun[1]

[1]Koć University, Turkey; [2]Leiden University, The Netherlands

Caregivers' use of action sequences during pretend play is an important source for infants' first symbolic gesture production (Namy et al., 2008). Due to language delays observed in preterm infants (PT, born before 37 weeks of pregnancy) (Ionio et al., 2016), parents' use of input may differ. We ask whether (1) parents' specific pretend play input, as personification through attributing agency to objects, provided to infants is associated with children's gesture comprehension and (2) this link differs with respect to neonatal status. We recruited 81 infants (Mage=13.70months,SD=1.42months, 43 PT) at Time-1, and 67 of them were tested at Time-2 (Mage=26.10months,SD=1.32months, 27 PT). At Time-1, we recorded 10-minute parent-infant free play sessions and coded parental pretend play as personification and complexity of linguistic input (i.e., using clauses with multiple predicates combined with different linguistic structures). Personification was categorized into personification actor in a pretense episode as personified object (e.g., penguin doll tickling child) or as parent (e.g., parent kissing penguin doll). During Time-2, gesture comprehension (Hodges et al., 2018) was assessed through experimenter making gestures and asking which picture depicted the gesture of the experimenter. Infants' gesture comprehension at Time-2 was predicted by Time-1 parental personification input when the pretense actor was parent (β=.293,p=.052) but not personified object, controlling for Time-1 age, parental linguistic complexity, and neonatal status, ($R2$=.265),F(5,40)=2.880,p=.026. Parents' earlier personification during free play predicts later gesture comprehension of infants regardless of neonatal status. These findings suggest that observing parents' pretend actions of personification contributes to children's gesture comprehension.

https://slack.com/app_redirect?channel=a-0076-Kızıldere-s6-s11

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0077 The Relation Between Pretend Play and Gesture Production in Preschoolers

Erim Kızıldere, Feyza Nur Dik, Tilbe Göksun

Koć University, Turkey

Children's pretend play and verbal language are positively associated (e.g., Kızıldere et al., 2020), and the link between gestures and pretense is evident both in infants (Bates et al., 1979) and toddlers (Hall et al., 2013). These associations might derive from both pretense and language involving symbol construction and manipulation (e.g., Quinn, Donnelly, & Kidd, 2018). As children age, their pantomimes shift from form-based to function-based gestures, indicating development in symbolic abstraction (Marentette et al., 2016). Hence, as children master symbolic abstraction they engage in more complex gestures during pretense. Since pantomimes include action imitations, we hypothesize that gestures referring to actions will relate to children's pretense rather than gestures referring to objects. Fifty-three Turkish-learning children (Mage=61months,SD=8.79) completed the telephone task for pretense assessment, an expressive vocabulary measure, and a cartoon retelling task to assess total and representational gesture use (referring to actions or objects). Hierarchical regressions showed that neither children's total gestures nor total representational gestures predicted their telephone score, after controlling for age and expressive vocabulary, p=.299 and p=.308. Children's action gestures (β=.371,p=.012) were associated with their telephone score, after controlling for age and expressive vocabulary, (R2=.162), F(3,44)=2.830, p=.049, yet object gestures were not associated, p=.652. The current study is the first to test preschoolers' association of gesture use with their pretend play. Children's use of representational gestures in the form of actions are specifically linked to their pretense performance. Thus, specific gestures might play a bigger role in symbolic abstraction, which assists children's pretend play skills.

https://slack.com/app_redirect?channel=a-0077-Kızıldere-s2-s10

Session 2 (Tuesday, 5.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0078 Should I stay or should I go? Three-year-olds' sensitivity to appropriate motives to break a commitment

Francesca Bonalumi[1,2], Barbora Siposova[3], Wayne Christensen[2,4], John Michael[1,5]

[1]Department of Cognitive Science, Central European University, Budapest, Hungary; [2]Department of Philosophy, University of Warwick, UK; [3]Department of Psychology, University of Warwick, UK; [4]Department of Philosophy, University of Barcelona, Spain; [5]Division of Psychology, University of Stirling, UK

Commitments create obligations, but their precise scope is never fully made explicit. For instance, we expect someone to be released from her commitment anytime this conflicts with a weightier moral consideration (Shpall, 2014). Previous research shows that three-year-olds understand the obligations entailed by joint commitments (Gräfenhain, et al., 2009), and that they distinguish between instances in which a partner fails to make a contribution intentionally or for other reasons (Kachel, et al., 2017). But can they assess the legitimacy of motives leading agents to intentionally break commitments? To probe this, we conducted a study in which children (N = 60) played a game together with a puppet who suddenly interrupted this joint activity either to play another tempting game, or to assist another agent in distress. We measured whether children denied or granted release to their partner by scoring their spontaneous verbal reactions when the puppet interrupted the joint activity, and their responses to a forced binary question between granting or denying release. Our data show that children were more likely to spontaneously deny release when the partner was lured away by another game than when faced with a conflicting moral duty (CLMM, z = -2.93, p = .003), but not when they forced to make the choice (CLMM, z = -0.36, p = .718). This indicates that three-year-old children appropriately evaluate the reasons why a partner intentionally breaks a commitment, but their evaluation still does not translate into a stable attitude towards the partner, suggesting that this capacity is not yet fully developed.

https://slack.com/app_redirect?channel=a-0078-Bonalumi-s2-s3

Session 2 (Tuesday, 5.1., 8 am CET)
Session 3 (Tuesday, 5.1., 1 pm CET)

A-0079 How does resistance to interference mediate the link between working memory and maths achievement? A secondary data analysis of Cragg et al., (2017).

Kailing Li; Christopher Jarrold

University of Bristol, Bristol, UK

The importance of working memory in maths learning has long been established. Previous literature suggests that the variance in working memory performance that remains after controlling for individuals' storage capacity and processing efficiency reliably predicts reading and mathematics (Bayliss, Jarrold, Gunn, & Baddeley, 2003). Bayliss et al. attribute this residual variance to an executive component of working memory. However, it is less clear what this executive component really captures. Engle, Kane and Tuholski (1999) argued that it reflects controlled attention; Bayliss and Jarrold (2015) suggests that it reflects the ability to resist interference. This study conducted a secondary data analysis on Gilmore and Cragg's (2016) dataset to further explore the role of the executive component of working memory in maths learning. The re-analysis of 285 participants aged between 8 and 25 years old used exploratory factor analysis and correlational approaches, indicated that the executive component of working memory requires the ability to resist interference. In addition, parallel mediation analysis revealed that the ability to resist interference plays an important role in understanding the relationship between working memory and maths achievement.

https://slack.com/app_redirect?channel=a-0079-Li-s3-s4

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0080 Who do Children Prefer to Overimitate - a Matter of Context?

Jule Wolf, Sabina Pauen

Ruprecht-Karls-Universität Heidelberg

Young children are known to imitate even actions that are clearly non-functional. This phenomenon, coined overimitation, is considered an essential mechanism for the transmission of cultural knowledge. Overimitation allows for a rapid proliferation of rituals, artefacts and skills between generations. However, while studies suggest that there is not only vertical (between generations) but also horizontal (within a generation) cultural transmission, it remains unknown why evidence for peer-to-peer overimitation is scarce. This study proposes that the peer-to-peer transmission of culture might be rooted in children's play. We assume that the lack of research in favor of peer-to-peer overimitation is due to the emphasis of functional aspects in most experimental settings and hypothesize that children would indeed be keen to copy their peers when being engaged in playful activities. To test this hypothesis, we asked 4-to 6-year-old children to retrieve a coin out of a box after observing a video of either a child or an adult model demonstrating both, causally relevant and irrelevant actions. Participants were tested in either a playful or a functional context, which we manipulated with a respective priming activity and task framing. Preliminary results from this ongoing study (N = 36) indicate an interaction of model and context supporting the hypothesis that children preferably copy peers in playful and adults in functional contexts.

https://slack.com/app_redirect?channel=a-0080-Wolf-s3-s5

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0081 How do chimpanzees explore their environment prior to a risky decision?

Lou M. Haux[1], Jan M. Engelmann[2], Esther Herrmann[3], Ralph Hertwig[1]

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Seeking for information under uncertainty is a ubiquitous requirement of life. Foraging for food, territory or mates involves trade-offs between exploiting known opportunities or exploring for better ones elsewhere. The development of exploration strategies in light of human life history is becoming an increasingly studied field (e.g. Gopnik, 2020). However, it remains an open question how chimpanzees, one of humans closest living relatives, handle the explore——exploit trade-off. Studying how chimpanzees deal with uncertain environments will help us shed light on the evolutionary roots of human search and adaptive decision making strategies. In the current project, we developed a paradigm which allowed us to study how chimpanzees explore initially unknown payoff distributions before making a final exploitative draw (see Hertwig et al., 2004). More specifically, across two conditions (stable and changing), chimpanzees (N=15) could explore a risky (outcome variance) and a safe (no variance) assortment, prior to making a decision. In the stable condition, the safe and risky assortment remained on the same side and the food in the same location across trials. In the changing condition, the side of the safe and risky assortment, as well as the location of the food within the assortments changed. We investigated (1) whether chimpanzees explore changing environments more than stable environments (2) which strategies chimpanzees use to explore the choice environment and (3) which heuristics chimpanzees rely on to make a decision. I will present our new paradigm and discuss the correspondence between search and decision patterns.

https://slack.com/app_redirect?channel=a-0081-Haux-s8-s9

Session 8 (Thursday, 7.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0082 Multimedia elements in electronic storybooks improve recall performance in children

Cintia Bali, Beatrix Lábadi, András Norbert Zsidó

University of Pécs, Pécs, Hungary

In the literature there is an emerging debate about the interactive elements, used in electronic storybooks. A great amount of studies state that, using interactions can overload the immature cognitive network of the users. Evidences, that support the effectiveness of interactions in emergent literacy and story comprehension can be found as well. This might be because we have limited information about how individual factors, like attentional problems, are involved in the processing of interactive features. Therefore the aim of our study was to test if multimedia and interactive features facilitate learning in preschoolers (N=32; M=5.5 years; SD=.619) using electronic storybooks; also accounting for individual differences regarding attentional and memory capacity. Every participant saw two electronic storybooks (one contained only multimedia elements, while the other gave possibilities for interactions) and listened to one story in separate sessions. After each session, the participants were asked to answer questions to assess recall performance. In addition, the working memory capacity and attentional performance were measured. The parents and caregivers filled out the ADHD Rating Scale IV. Our results indicate that multimedia features improved the recalling performance of the children compared to the listening condition regardless of the functioning of attentional mechanisms. Further, attentional performance was associated with recall performance across all three conditions. Mediation analysis suggested that, interacting with the screen during the story can make the information processing harder for participants with attentional problems. These results can help us create personalized digital environments to facilitate learning in children, especially those with attentional problems.

https://slack.com/app_redirect?channel=a-0082-Bali-s5-s9

Session 5 (Wednesday, 6.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0083 Aspectuality of intentions as a case of advanced theory of mind

Britta Schünemann, Natalie Bleijlevens, Marina Proft, Hannes Rakoczy

University of Göttingen

When and how do children develop an understanding of the subjectivity of intentions? Intentions are subjective mental states in many ways, one concerning their aspectuality: Whether a given behavior constitutes an intentional action depends on how, under which aspect, the agent represents it. Oedipus, for example, intended to marry Yocasta, but did not intend to marry his mother (although in fact, but unbeknownst to him, Yocasta was his mother). Existing evidence suggests a surprisingly late onset of children considering the aspectuality of intentions. In neutral contexts, children failed until the age of six (Schünemann et al., submitted). Here, we investigate whether these results do indeed depict a lack of competence in younger children. While it is pretty obvious that we need to consider Oedipus' representations in the example above this might be less obvious for neutral and thus less relevant cases. Possibly, children just did not perceive the extra effort of taking the agent's perspective as necessary. To resolve this ambiguity, we now ask 4-6-year-olds to evaluate agents' actions in morally laden contexts. Via video chat, we present scenarios of agents who give undesired objects to another agent. Due to their (false) representations of their actions, agents either intend or do not intend the outcome. Preliminary data (N=29 of 72) indicate that children before age 6 did not consider the agent's intentions when evaluating her actions as good or bad. This supports existing evidence, that the aspectuality of intentions constitutes a substantial challenge in children's theory of mind-development.

https://slack.com/app_redirect?channel=a-0083-Schünemann-s1-s8

Session 1 (Monday, 4.1., 8 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0084 Multisensory Integration is Correlated with Vocabulary Differently for Male and Female Toddlers

Natalie Boyle, Chandler Gavin, Sammy Vadlamani, Rachel Williams

Virginia Tech, Blacksburg, Virginia, United States

Interesting differences in maternal communication exist across toddlers' sex. During active play with sons, mothers communicate with more object-directed and instructional comments. Comparatively, mothers provide more conversational communication (e.g., questions and opinions) in play with daughters (Clearfield & Nelson, 2006; Eriksson et al., 2011). We explored sex differences in toddlers' multisensory integration (MSI) in conditions involving auditory+visual (AV) object and people events, and their correlations to expressive vocabulary. Thirty-two 24-mo-olds (M=23.6 mo; 18 females; 14 males) were shown 12s nonsocial and social MSI trials (12 social, 12 nonsocial); one of the two lateral events on the screen was congruent with the soundtrack (clinking for objects; speech for females). Each toddler's ability to locate and maintain attention to the match was divided by that duration + attention to the non-match (MatchRatio). Mothers filled out the MCDI for expressive vocabulary. For females, MatchRatio during the social trials was positively correlated with vocabulary (r=+.64; p=.005); this was not the case for males (r=+43; p=.13). In contrast, MatchRatio during the non-social trials was positively correlated with vocabulary for males (r=+.70, p=.005); this was not the case for females (r=-.40, p=.10). Condition-dependent (social v. non-social) MSI was differentially correlated with vocabulary depending on sex of the toddler. This could relate to mothers providing male toddlers more object-based communication (and possibly less face:face interaction time) v. interactive based communication with females (and possibly more face:face interaction time).

https://slack.com/app_redirect?channel=a-0084-Boyle-s7-s12

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0085 The features underlying infants' preference in the change detection paradigm.

Gisella Decarli[1], Manuela Piazza[2], Véronique Izard[3]

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In the present study, we focused on the change detection paradigm (Ross-Sheehy, Oakes & Luck, 2003; Oakes, Messenger, Ross-Sheehy, & Luck, 2009; Dillon, Izard, & Spelke, 2020; Lauer & Lourenco, 2016; Libertus & Brannon, 2010) as it was recently adopted to investigate numerosity perception in infants. In particular, this paradigm was used to measure inter-individual differences between infants in a high impact study showing that children's achievement in mathematics can be predicted from their perception of numerosities at 6 months (Starr et al., 2013). However, the features driving infants' preferences in the number change detection paradigm remain poorly understood. Here, we tested two hypotheses that could account for infants' preference towards a stream that alternates between two different numerosities (ABABAB etc.) over a stream that shows only one numerosity (AAAAAA etc.). According to the mainstream hypothesis this preference is mainly guided by the perception of the local changes in numerosity. According to an alternative hypothesis, the preference is additionally driven by the extraction of the global alternating structure of the stream. Here, we conducted two experiments (N = 32) with 6-month-old infants to assess whether infants' preference is driven by the global structure of the alternating stream, and/or by the local numerosity changes between images. The results of our experiments provide evidence for a main sensitivity to local changes in 6-month-old infants.

https://slack.com/app_redirect?channel=a-0085-Decarli-s4-s5

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0086 Symbolic and non-symbolic numerical processing in developmental dyscalculia

Gisella Decarli[1], Francesco Sella[2], Silvia Lanfranchi[3], Maristella Lunardon[1], Giuseppe Cossu[4], Marco Zorzi[1,5]

[1]Department of General Psychology, University of Padova, Italy; [2]Centre for Mathematical Cognition, Loughborough University, UK; [3]Department of Developmental Psychology and Socialisation, University of Padova, Italy; [4]Centro Medico di Foniatria, Padova, Italy; [5]IRCCS San Camillo Hospital, Venice-Lido, Italy

Developmental dyscalculia (DD) has been attributed to multiple deficits, from lower acuity of the approximate number system, to a deficit in accessing numerical magnitude from symbols, to impairments in non-numerical cognitive abilities. The picture that emerges across studies is complicated by the use of different criteria for recruitment (e.g., school-based vs clinical samples) and for diagnosing DD. We tested a large sample of children referred for clinical assessment of learning disabilities using a standardized DD battery as well as computerized tasks investigating core numerical abilities such as numerosity estimation, subitizing, symbolic magnitude comparison, ordinal judgments on symbolic numbers, and spatial mapping of numbers. We compared the performance of children who met the criteria for DD (overall performance lower than 2 SDs on the standardized battery) with that of children who scored within the normal range (i.e., not lower than 1 SD). This allowed us to assess the distribution of deficits and the sensitivity of the different tasks as predictors of DD. We found moderate to strong evidence of deficit across the tasks. Performance in symbolic number comparison together with the match-to-sample task turned out as the best measures to classify children as DD or control.These results may inform early screening for the identification of at-risk children.

https://slack.com/app_redirect?channel=a-0086-Decarli-s6-s8

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0087 Multisensory Integration Correlates with Maternal Attention Facilitation, and Both Predict Vocabulary in Toddlers

Caroline Taylor, Robin Panneton, Madeleine Bruce

Virginia Tech, Blacksburg, United States

Infants and toddlers are skilled perceivers of multimodal events, even amid distractions (e.g., background noise). We found 2-year-olds who attended more to an auditory-visual match under distraction had higher vocabularies (Bruce, Panneton, & Taylor, 2020) only for social events, but not for non-social events. Here, we analyzed whether one aspect of maternal sensitivity (attention facilitation or ATTFal) was related to multisensory integration (MSI) and word learning (MCDI). Thirty-two toddlers at 24 months (female=18, M=23.57 mo, SD=1.30) watched clips of objects dropping (non-social) or women telling stories (social) with a central distractor. MSI was calculated as (attention to match)/ (attention to match+attention to distractor). ATTFal was scored from a 10 min mom+toddler free play and vocabulary was scored using parental report. No significant correlations were found between MSI, ATTFal, and MCDI for non-social trials. For social trials, MSI and MCDI (r= +.59, p =.001), MSI and ATTFal (r= +.35, p=.05), and ATTFal and MCDI (r= .45, p =.01) were significant. A linear regression predicting MCDI with MSI and ATTFal was significant (R2= .39 F(30, 2) = 8.93, p = .001) and explained 35% of variance in expressive vocabulary. MSI (β = .45, p=.008) and ATTFal (β = .32, p=.05) significantly predicted MCDI. When distractors are present, social MSI skills predict vocabulary, and are influenced by ATTFal; ATTFal also promotes word learning. This relationship is not found when toddlers attend to AV non-social objects, thus, social play may promote MSI skills and word learning.

https://slack.com/app_redirect?channel=a-0087-Taylor-s10-s12

Session 10 (Thursday, 7.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0088 How in-home noise is affecting adolescent learning within the context of the COVID-19 pandemic

Brittney Chere, Natasha Kirkham

Centre for Brain and Cognitive Development, London, U.K.

With it being well documented that noise negatively affects attention and learning across development (Shield & Dockrell, 2003), how have the 1.6 billion children continuing their education at home during the COVID-19 pandemic (unicef.org) been affected by in-home noise? Adolescents aged 11-to-18-years completed an online experiment including the Flanker task, the Backward Digit Span (BDS) task, and the Wisconsin Card Sorting Task (WCST). Participants concurrently listened to either an audio recording of white noise or a naturalistic noisy-home environment through their headphones. The score from a Home Noise Questionnaire was further used to group participants into noisier and quieter homes using a median split. Our hypotheses and analysis were preregistered on aspredicted.org (#45752). The current results are controlled for age and are based on 69 participants of the planned 128. While currently there is no trending main effect of background audio, there is a trending main effect of in-home noise. In the BDS task, participants from noisier homes are showing fewer correct trials (p = .085), a lower accomplished level (p = .112), and a lower proportion correct (p = .069) compared to their peers. The opposite trend may appear in the WCST, a task that contains distraction and requires inhibition. Significant interactions with in-home noise and background audio should also arise with more data. These findings would show both negative and positive long-term learning effects from being regularly exposed to noisy environments, and that adolescents with more in-home noise experience may be less negatively affected by environmental noise.

https://slack.com/app_redirect?channel=a-0088-Chere-s4-s7

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0089 Assessing the relationship between emotion and infant sociomoral evaluation using facial electromyography (fEMG)

Francis Yuen[1], Rachelle Graham[2], Enda Tan[1], Julia Van de Vondervoort[3], J. Kiley Hamlin[1]

[1]University of British Columbia, Vancouver, Canada; [2]Western University, London, Canada; [3]University of Waterloo, Waterloo, Canada

Even young infants can discriminate between and evaluate individuals based on morally-relevant factors (for review, see Hamlin, 2013). While many have explored the cognitive processes underlying infants' sociomoral evaluations (for review, see Van de Vondervoort & Hamlin, 2018), the role of emotion-based processes remains unclear. Most relevant to the current study is recent work demonstrating that infants express stronger positive emotions upon viewing prosocial versus antisocial events (Steckler et al., 2018). The current study utilizes facial electromyography (fEMG), a more objective measurement tool capable of detecting even subtle muscle movements, to measure emotional expressions. Thirty-three 7-month-olds viewed live puppet shows where a puppet, on alternating trials, is helped or hindered (adapted from Hamlin & Wynn, 2011). Activation in infants' zygomaticus major (cheek, associated with smiling) and corrugator supercilii (brow, associated with frowning) muscles was measured. A 2 (trial type: helping vs hindering) x 2 (muscle: brow vs cheek) x 4 (phase: four 2500ms bins following helping/hindering act) ANOVA revealed a significant three-way interaction between trial type, muscle, and phase ($F(3,96)$ = 2.72, $p < .05$). Post-hoc tests revealed that infants showed elevated cheek (33.79%) versus brow (7.06%) activity following helping trials in the 2500 to 5000ms bin (t = -2.19, p = .03). These results are corroborated by permutation tests (Maris & Oostenveld, 2007), which revealed a marginal effect of trial type for cheek activity (p = .089). Together, these results suggest that while effects might be small, emotions may play an important role in early sociomoral evaluation.

https://slack.com/app_redirect?channel=a-0089-Yuen-s2-s10

Session 2 (Tuesday, 5.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0090 The impact of personal costs on young children's helping behaviour

Ella van Beers, Clare Jiachun Zhang, Jessica A. Sommerville

University of Toronto

Research suggests that young children are eager to share resources (Hay & Cook, 2007) and provide help (Warneken & Tomasello, 2006). Our prior work suggests that when personal costs are increased, prosocial behaviour diminishes in children (Sommerville et al., 2018). However, whether children will overcome cost to help others, and whether they will choose to help themselves over others, remains unclear. We investigated the role of personal costs on young children's helping behaviour. Three- and four-year-old (N=32) children were presented with a novel game paradigm and trained to move desired objects (ex. cookies, stickers) into a backpack by clapping. The game consisted of 20 unique trials: half were easy (requiring one clap), and half were hard (requiring five claps). On half the trials, the child moved objects into their own backpack; on the other half they moved objects into another character's backpack. Before each trial, children were told the following trial difficulty, and if they would be playing for themselves or another character. The child could choose to play, or skip to the next trial. We observed whether children chose to play each condition, and recorded the number of times children clapped per trial. Preliminary results demonstrate that children (N=32) chose easy over difficult trials, $F(1,31)=8.466$, $p=0.007$, and helped themselves over others, $F(1,31)=11.507$, $p=0.002$ (two-way repeated measures ANOVA). We found children clapped more for themselves versus another character $F(1,31)=9.513$, $p=0.004$. These findings suggest that by three years of age, children weigh personal costs when determining whether they will provide help.

https://slack.com/app_redirect?channel=a-0090-Beers-s7-s12

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0091 How Teachers' Assumptions About Learners' Abilities Shape Inferences in Pedagogical Reasoning

Ilona Bass[1], Elise Mahaffey[1], Elizabeth Bonawitz[1,2]

[1]Rutgers University - Newark, USA; [2]Harvard Graduate School of Education, Cambridge, USA

Good teachers teach at the right level for a learner. In turn, learners must consider whether a teacher has accurately represented their abilities, and if her demonstrations are at the appropriate level. Past work suggests that children attend to whether an observed learner's prior knowledge likely differs from their own, and thus whether overheard pedagogical demonstrations are likely to be relevant to them (Bonawitz & Shafto et al., 2011). These effects raise questions about how children's inferences are shaped by what they believe a teacher knows about them. In the current study, children (age 6-8) played a picture-matching game with an experimenter on Zoom, and completed one of two matching sets. Then, a confederate (the "Teacher") joined the call, and saw participants' results reported on screen. This display was either Accurate, or it led the Teacher to Overestimate or Underestimate the child's performance (between-subjects). The Teacher then presented three new matching games, recommending one based on her understanding of the child's performance, and noting that the other two games would be too hard and too easy respectively. Participants ranked their preferences for which game they wanted to play. Preliminary results (N=15, 5/condition) reveal that children prefer easier games when the Teacher overestimated their abilities, and prefer harder games when she underestimated their abilities, while children in the Accurate condition follow the Teacher's recommendation (F(2,12)=5.2, p=.023). This work may shed insight into young learners' ability to consider others' knowledge in making rational inferences from pedagogy.

https://slack.com/app_redirect?channel=a-0091-Bass-s4-s12

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0092 The development of the Liking Gap: Children over 5 think that partners evaluate them less positively than they evaluative their partners.

Wouter Wolf, Amanda Nafe, Michael Tomasello

Duke University, NC, USA

Humans' concern for the impression they make on others contributes to much unhappiness, and not a few clinical diagnoses. Recently, researchers reported a striking demonstration of the persistent nature of these worries: After two adults have briefly interacted with one another, both believe that they like their partner more than their partner likes them. If this 'Liking Gap' is indeed driven by individuals' worrying about the impression they make on others, one would expect this phenomenon to emerge in childhood at around age 5, when reputational concerns emerge in childhood, and to intensify between 5 and 11, when children's understanding of these issues becomes more sophisticated. In the current study, 241 US children (4 to 11 years) briefly played together in pairs and were subsequently separated and asked how positively they evaluated their partner and how positively they thought their partner had evaluated them. As hypothesized, we found a Liking Gap emerging at age 5, and this gap becoming increasingly pronounced in older children. A closer inspection of the data revealed that the emergence of the Liking Gap between 4 and 5 was driven by 5 year olds evaluating their partner more positively than 4 year olds (while perceptions of how partners evaluated them did not change), whereas the widening of the Liking Gap between 5 and 11 was driven by older children becoming increasingly skeptical about their partners evaluating them. These results bear important implications for the emergence of children's reputational concerns and the impression they make on others.

https://slack.com/app_redirect?channel=a-0092-Wolf-s6-s7

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0093 Challenges of taking a comprehensive lifespan approach

Lea Moersdorf[1], Alexandra M. Freund[1,2,3], Moritz M. Daum[1,4]

[1]Department of Psychology, University of Zurich, Zurich, Switzerland; [2]University Research Priority Program "Dynamics of Healthy Aging", University of Zurich, Zurich, Switzerland; [3]NCCR LIVES, Switzerland; [4]Jacobs Center for Productive Youth Development, University of Zurich, Zurich, Switzerland

Taking a lifespan approach to describe and understand development encompasses multiple challenges, not only on the methodological but also the conceptual level. Using a study on goal focus across the entire lifespan (age range: 3-83 years) as a sample case, we point out some of these challenges and possible steps to address them. On the conceptual level, difficulties may arise in defining and operationalizing a construct across a wide age range. It is, for example, not straightforward to come up with a definition that is appropriate for different age groups and renders the construct investigable as well as relevant across the lifespan. On the methodological level, apart from questions pertaining to the general assessment setting (e.g., how to make the setting as similar as possible across age groups), challenges concerning the concrete measurement of the construct arise. To exemplify, we show that in the sample case of goal focus, the different measures applied hardly converged. These results point to the difficulties in assessing a psychological construct across age groups which differ in multiple aspects such as (social-)cognitive and verbal performance. We conclude with why in the case of goal focus a comprehensive lifespan approach is still worthwhile despite all of these challenges. For this we discuss questions that one might want to consider before engaging in lifespan research (e.g., what is the added value of a comprehensive lifespan approach?). Furthermore, we identify issues that remain unresolved (e.g., how to continue if measurement invariance cannot be established).

https://slack.com/app_redirect?channel=a-0093-Moersdorf-s2-s6

Session 2 (Tuesday, 5.1., 8 am CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0094 Association between the repetition effect and the change detection response with brain overgrowth

G. López-Arango[1,2], I. S. Knoth[1], F. Deguire[1,3], F. Barlaam[1], V. Côté[1,3], C. Dupont[3], K. Agbogba[1], El-Jabout R[1], A Damphousse[1], S Kadoury[4], S. Lippé[1,3]

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The repetition effect and the change detection response on brain activity are considered to reflect basic learning functions (Turk-Browne, et al., 2008). The purpose of our study was to investigate whether brain maturation (age) and cognitive development (adaptive skills) influence the repetition effect and the change detection response. Furthermore, we investigate whether brain overgrowth, a condition that has been associated with neurodevelopmental disorders, affects repetition effects and change detection response (Dougherty et al., 2016; Rommelse, et al., 2011). Brain volume was obtained with 3D transfontanellar ultrasound images. Adaptive skills were measured using the GAC score obtained through the parent form of the Adaptive Behavior Assessment System Second Edition (ABAS-II). We recorded high density EEG in 116 healthy infants at the CHU Sainte Justine hospital, 35 with macrocephaly (14 females) and 81 normocephalic (39 females) classified according with the HC WHO norms, aged between 3 and 10 months. The experimental design consisted of an oddball paradigm adapted from Basirat and colleagues (2014). A time-frequency analysis and a linear mixed model approach were performed to investigate differences between groups. Age, brain volume and GAC score were tested as predictors. Our results showed that our predictors significantly improved our models and that repetition effects and change detection responses were significantly different between groups in 5-10Hz activity [$F_{(1, 296.39)}=5.79$, $p=0.034$] and 10-20Hz activity [$F_{(1,692.23)}=11.16$, $p=.004$] respectively, suggesting that brain overgrowth may disturb both basic learning processes.

https://slack.com/app_redirect?channel=a-0094-López-Arango-s1-s3

Session 1 (Monday, 4.1., 8 pm CET)
Session 3 (Tuesday, 5.1., 1 pm CET)

A-0095 Kinematics of reaching movements in children with ADHD: motor planning and control

Irene Valori[1], Alessia Angeli[2], Gustavo Marfia[3], Teresa Farroni[1]

[1]Department of Developmental Psychology and Socialisation, University of Padova, Italy; [2]Department of Computer Science and Engineering, University of Bologna, Italy; [3]Department for Life Quality Studies, University of Bologna, Italy

The development of motor skills is strictly connected to the optimisation of cognitive abilities, such as the effective inhibition of incorrect or inappropriate responses. Difficulties to inhibit motor behaviours are common to neurodevelopmental disorders such as ADHD. However, the motor and cognitive processes beneath the interindividual differences that characterize this population remain unclear. For instance, motor planning and control might play distinctive roles in the way children execute or inhibit a prepotent response and execute an alternative option. To explore these mechanisms, we applied an adapted version of the Go/No-Go task which required a reaching movement in either a prepotent or alternative condition. Considering a cohort of 13 children (6-13 years old), a low-cost 3-axis accelerometer was employed to analyse kinematic measures that individuate the planning and the control components of the two movements. Whether the maximum peak velocity occurred earlier or later within the movement duration could suggest a participant's higher need for either motor planning or for an on-line adjustment. At the group level, children with ADHD did not use different strategies to carry out the two different movements. However, a finer visualisation of individual results suggests the existence of at least three sub-groups of children. While some children did not differentiate their behaviour during the two movements, two subgroups devoted greater movement time to either motor planning or control to inhibit the prepotent response and perform an alternative one. Further research is needed to investigate the individual factors that might underlie these differences and typify inhibition atypicalities.

https://slack.com/app_redirect?channel=a-0095-Valori-s11-s12

Session 11 (Friday, 8.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0096 Baby-led weaning in Italy and potential implications for child development in the first two years of life

Elsa Addessi[1], Amy T. Galloway[2], Claire Farrow[3], Twila Wingrove[2], Hadley Brochu[2], Francesca Bellagamba[4], Arianna Pierantozzi[4], Barbara Caravale[4], Flavia Chiarotti[5], Valentina Focaroli[1], Melania Paoletti[4], Giulia Pecora[1], Corinna Gasparini[4], Serena Gastaldi[1]

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The complementary feeding period (when infants are introduced to foods and liquids different from milk) has lifelong consequences for physical, cognitive, and socio-emotional well-being. In recent years, there has been a rise in an approach to feeding solids which has been termed "baby-led weaning". This approach is based on the infant eating finger foods on their own rather than being fed puréed foods on a spoon by a caregiver, setting the pace and amount eaten at the meal, and often eating at the same time as other family members. We aimed to investigate the association of infant feeding practices with developmental outcomes in a sample of 1235 Italian mothers of 6-12 month-old infants through an online survey. The frequency of baby-led weaning was positively associated with breastfeeding, later exposure to complementary foods, earlier exposure to both finger and family foods, and higher interest in family food and shared family meals. Infants who were introduced to solids using baby-led weaning were more likely to have met important developmental milestones: percentage of family feeding was positively associated with sitting unsupported at an earlier age and a low spoon-feeding style was associated with crawling at an earlier age. These data suggest that the potential influence of baby-led weaning on developmental domains beyond diet and eating behavior warrants further exploration. To this purpose, we have just begun a longitudinal study aiming to evaluate in more depth the impact of complementary feeding on child cognitive development in the first two years of life.

https://slack.com/app_redirect?channel=a-0096-Addessi-s6-s8

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0097 The (in)effectiveness of moral stories on promoting children's honesty: A dual-system approach

Qiqi Cheng, Joey Cheng, Xiao Pan Ding

Department of Psychology, National University of Singapore

Stories, known to be powerful and ubiquitous persuasive devices that influence beliefs and behaviors, are not always effective in promoting preschoolers' honesty. Drawing from a dual-system approach, we propose that processing fluency in System 1 is critical for the effectiveness. Previous related studies suggest that older age (vs. younger), negative-consequence stories (vs. positive), and stories without encouraging epilogues (vs. with) might harm preschooler's processing fluency. Thus, we hypothesize that those factors' impact on System 1 will result in impaired effectiveness of moral stories on promoting honesty and reduced positive emotion experienced when preschoolers listen to stories. After participating in a guessing game, 3-6-year-old children (N=250) listened to a moral story and then were asked if they had peeked during the guessing game. Participants' honest behavior was encoded from their answers and the evidence of experienced positive emotion was assessed at the moment they occur from the recorded videos. The behavioral results show that younger children in the positive moral story with encouragement condition were more likely to tell truths than the children in other conditions. The facial expression results show that there are significant reductions in the evidence of positive emotion experienced in older children, negative story conditions, and conditions without encouragement during their corresponding moment. Taken together, both the behavioral and emotional results are consistent with the predictions of a dual system framework in explaining the (in)effectiveness of moral stories. The findings have theoretical and practical implications in moral education, children's lying, and story persuasion.

https://slack.com/app_redirect?channel=a-0097-Cheng-s6-s11

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0098 Can humanoid robots be intentional agents like humans?: An eye-tracking study on infants' understanding of goal-directed action

Federico Manzi[1,2], Mitsuhiko Ishikawa[3], Shoji Itakura[4], Takayuki Kanda[5](6), Hiroshi Ishiguro[6,7], Cinzia Di Dio[1,2], Davide Massaro[1,2], Antonella Marchetti[1,2]

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Infants interpret human actions as goal directed from the first year of life (Woodward, 1998). This early socio-cognitive ability is associated with the development of the Theory of Mind skills (Aschersleben et al., 2008). Recently, robots are employed in various daily situations (Marchetti et al., 2020), showing that humans perceive robots as possible social partners (Marchetti et al., 2018). Recent studies on infants demonstrated that infants may perceive robots as a plausible interactive partner even if they still prefer the social signals from the human partner (Manzi et al., 2020; Okumura et al., 2013). The present study aimed at examining the understanding of the goal directed action performed by a human or a robot in 17-months-old infants (N=30) by measuring anticipator looking patterns (i.e., whether infants look to the goal of the action before it is completed). Infants watched videos of the human or the robot reaching a toy on a table with the hand. To evaluate the infants' understanding of goal-directed action to the targets we conducted a t test for each agent condition comparing the time of gaze arrival at goal relative to arrival of actions and the time of agent's actions. This result suggests that infants anticipate the action for both agents. However, there was not difference in the anticipation time between human and robot. This finding indicates that infants are sensitive to the robot's action similarly to the human's action. It is suggested that robots could be intentional agents like humans.

https://slack.com/app_redirect?channel=a-0098-Manzi-s5-s10

Session 5 (Wednesday, 6.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0099 Efficacy of an early auditory training in modifying the electrophysiological pattern underlying language acquisition in typically developing infants

Chiara Cantiani, Chiara Dondena, Massimo Molteni, Valentina Riva

Scientific Institute IRCCS Eugenio Medea, Bosisio Parini, Italy

Previous studies (e.g., Cantiani et al., 2016) show that early auditory processing impacts later linguistic development, and that it is impaired in infants at familial risk for Developmental Language Disorder (DLD). The present study aims at developing an ecological early intervention based on auditory enrichment to be tested on infants with/without risk for DLD (7-9 months of age), in an attempt to modify their developmental trajectories before the emergence of any symptoms. Here, preliminary results about its efficacy on typically developing infants are reported. 18 infants participated to the intervention (INT+) whereas 14 did not (INT-). The intervention provides exposure to and active synchronization with complex musical rhythms. Basic auditory skills at age 6 and 12 months were characterized via EEG/ERP using a double-deviant oddball paradigm; also, expressive and receptive language skills were assessed by means of standardized tests. Results show that INT+ infants presented at age 12 months a more mature ERP pattern, characterized by shorter latency of the P1 component (standard stimuli) and enhanced P2 component (MisMatch Response), resembling that of INT- children at age 24 months. INT+ infants also show significantly broader improvement in both expressive and receptive language skills ($p = .031$ and $p = .007$, respectively). These results provide some preliminary evidence on the efficacy of such an intervention in modifying infants' electrophysiological functioning underlying auditory processing skills, as well as early linguistic competences. The next steps will investigate the efficacy that this intervention may have on infants at risk for DLD.

https://slack.com/app_redirect?channel=a-0099-Cantiani-s2-s12

Session 2 (Tuesday, 5.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0100 Audiovisual speech integration and sensory responsiveness: atypical ERP responses in infants at risk for Autism Spectrum Disorder

Valentina Riva, Elena Maria Riboldi, Chiara Dondena, Caterina Piazza, Massimo Molteni, Chiara Cantiani
Scientific Institute IRCCS E. Medea, Bosisio Parini, Italy

Atypical sensory responses are included in the diagnostic criteria of Autism Spectrum Disorder (ASD), showing that sensory difficulties are core features of ASD. In addition, autistic individuals perform poorly during conditions that require information integration across multiple sensory modalities such as audio-visual (AV) integration processing. Previous research investigated neural processing of AV integration in infancy. Yet, this has never been studied in infants at risk for ASD (HR-ASD) using neurophysiological (EEG/ERP) techniques. In this study, we investigated whether and to what extent ERP measures of AV integration differentiate HR-ASD from typically developing (TD) infants and whether early AV integration abilities are associated with clinical measures of sensory responsiveness. At age 12 months, AV integration processing in HR-ASD (n= 21) and TD infants (n= 19) was characterized by high-density event-related potentials (ERPs) in response to a novel paradigm measuring the McGurk effect. Clinical measures of sensory responsiveness were evaluated by the Sensory Profile questionnaire for parents. Different brain responses over the left temporal area emerge between HR-ASD and TD, specifically when auditory and visual stimuli cannot be integrated into a fusible percept. Furthermore, ERP responses related to integration of AV incongruent stimuli were found to be associated with clinical measures of sensory responsiveness, with reduced AV incongruency ERP effects being associated with reduced reactivity to sensory input. These data suggest that early identification of AV deficits may pave the way to innovative therapeutic strategies for the autistic symptomatology.

https://slack.com/app_redirect?channel=a-0100-Riva-s5-s6

Session 5 (Wednesday, 6.1., 8 am CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0101 Waste aversion override Chinese children's inequity aversion

Zhen Zhang[1], Avi Benozio[2]

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An underlying aspect of the development of fairness is the aversion from unequal treatments towards equally deserving parties. By 7-years-of-age, children from western cultures are even willing to go as far as waste resources in order to avoid inequity (Shaw & Olson, 2012(. To assess the robustness of this phenomena, we have addressed children who live in a culture that emphasises the value of "Thrift" and followed a well-established procedure (Choshen-Hillel et al., 2019). In a series of five studies, 7-years-old Chinese participated in 3rd-party (N=83; Mage=7.05; SD=0.31; 49% girls) and 1st-person distributive tasks (N=84; Mage=7.20; SD=0.33; 48% girls), in which they had to decide whether to create inequity (via distributing extra resource to one of two recipients) or rather avoid inequity (via wasting the resource so no one can have it). Our findings revealed both similarities and differences between Chinese children and their western counterparts. Specifically, Chinese accepted inequity in the presence of waste (unlike Americans) but avoided inequity in the absence of waste (similarly to Americans), both in 3rd- and 1st-party interactions, thus suggesting that in addition to "inequity-aversion" per se, "waste-aversion" is at least as valuable among Chinese. Overall, these cross-cultural differences in the sensitivity to "waste" (i.e., object-related consideration) fit well with a developmental trajectory that was recently found in other object-related domains (e.g., scarcity; Diesendruck et al., 2019). In addition to the role of cultural factors (e.g., "Thrift"), non-cultural factors (e.g., Methods, SES) will be discussed as well.

https://slack.com/app_redirect?channel=a-0101-Zhang-s9-s11

Session 9 (Thursday, 7.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

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A-0102 The Role of Self-Correction in Promoting Behavioural and Representational Change in a Causal Task

Laras Yuniarto, Amanda M. Seed, Juan-Carlos Gómez

School of Psychology & Neuroscience, University of St Andrews, St Andrews, United Kingdom

Children's performance on physical tasks often follows a U-shaped performance curve over development. Karmiloff-Smith (1992) suggested this reflects early implicit procedural knowledge being redescribed into increasingly explicit representations of physical principles, which may initially be incomplete or naïve, leading to errors before competence and flexibility are achieved. Causal trap-tasks may be particularly difficult for children because mistakes (moving a reward into a trap) usually cannot be corrected. We investigated whether including self-correction in a trap-task would promote the early procedural mastery thought to be critical for representational redescription. In Phase 1, 2.5–4-year-old children received a trap-task that either allowed mistakes to be corrected (by retrieving trapped rewards, n = 46) or one that did not (n = 42). In Phase 2, all children attempted a trap-task that assessed representational flexibility by reversing the functional roles of task components. GLMM analyses in Phase 1 showed no condition differences in number of mistakes, although self-correcting children eventually succeeded in each trial. In Phase 2, there was a three-way interaction between condition, age, and trial number (1–10). Follow-up analyses showed an age × trial interaction in the No-Correction condition whereby older children showed an effect of trial, adapting their response to the novel trap over time, but younger children did not. The Self-Correction condition showed only an effect of trial: children of all ages transitioned to avoiding the trap. These results suggest that in younger children, self-correction triggers partial redescription that leads to transitory impaired performance, as predicted by representational redescription.

https://slack.com/app_redirect?channel=a-0102-Yuniarto-s9-s10

Session 9 (Thursday, 7.1., 1 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0103 Linguistic skills and SES: Two oft forgotten factors in child metaphor comprehension

Nausicaa Pouscoulous, Alexandra Perovic

University College London, UK

The development of metaphor understanding in children has experienced a surge of interest. Metaphor understanding can be tricky for children until mid-childhood, yet some research suggests that preschoolers are already competent. Many factors have been proposed to play a role in the development of metaphor comprehension (e.g., mentalizing ability; the ability to attribute two labels to the same object; analogical reasoning skills). In this study we focus on two obvious contenders that have been overlooked in recent years: general language skills and socio-economic status (SES). To investigate the role of general linguistic abilities and SES in metaphor comprehension, we recruited 264 children (2;11-11;04) from a range of SES backgrounds from the South East of England (including inner and outer London). They were assessed on standardised measures of vocabulary (BPVS) and grammar comprehension (TROG), as well as non-verbal reasoning (KBIT). Metaphor comprehension was tested with a simple reference assignment paradigm designed by Pouscoulous and Tomasello (2020), where children have to choose one of two similar looking toys based on a metaphoric description. It uses novel perceptual metaphors that do not require any previous exposure, or learning, and correspond to young children's world knowledge and linguistic abilities. Additionally, the participants' SES was established using a composite measure linked to school location (Index of Multiple Deprivation). The findings suggest that novel metaphor understanding is associated with age, as has been found elsewhere in the literature. Importantly, it is linked to vocabulary skills; grammar comprehension and SES also contribute but to a lesser extent.

https://slack.com/app_redirect?channel=a-0103-Pouscoulous-s6-s7

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0104 Unwilling versus unable: dogs' understanding of human intentional action

Judith Keller[1], Britta Schünemann[1], Hannes Rakoczy[1], Juliane Bräuer[2]

[1]University of Göttingen, Germany; [2]Max Planck Institute for the Science of Human History, Jena, Germany

Successful human interaction depends to a substantial degree on understanding other agents' intentions (Astington, 2001). Dogs appear to face a similar challenge. They have evolved special communicative skills to live in close local and social proximity to humans (Kamniski & Marshall-Pescini, 2014). An extremely adaptive function to engage in these forms of interaction and communication would be the capacity to understand human intentions. But how much do dogs really understand? One basic aspect of understanding intentions is the ability to identify intention-in-action, i.e. to differentiate between intentional and unintentional behavior (Searle, 1983). To test for this ability in dogs we adapted the Unwilling vs. Unable paradigm (Call et al., 2004). This compares subjects' reactions to intentional and unintentional human behavior. All dogs received three conditions: In the Unwilling condition an experimenter intentionally withdrew a reward from them. In the Unable Clumsy condition she accidently failed to administer the treat and in the Unable Blocked she failed because her access to the dogs was blocked. Dogs (N=51) hesitated significantly longer to leave their initial location and approach the withheld treats when the experimenter was unwilling than when she was unable ($\chi2(2)=28,14$; $p<.001$).These results strongly suggest an understanding of human intention-in-action in dogs. This is especially surprising against the background that it is generally doubted that dogs have developed a genuine form of understanding human intentions (Bräuer, 2014).

https://slack.com/app_redirect?channel=a-0104-Keller-s2-s10

Session 2 (Tuesday, 5.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0105 Exploring the development of attentional set shifting in young children with a novel intradimensional/extradimensional task

E. Reindl[1], C. J. Völter[1,2], J. Campbell-May[1], J. Call[1] & A. M. Seed[1]

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Assessing Executive Functions in young children has become a major focus in developmental psychology, yet there is still a shortage of tasks measuring attentional set shifting. A frequently-used task is the Dimensional Change Card Sort (DCCS) test, however this task poses some additional cognitive demands, i.e., processing verbal instructions. We developed a novel version of the Intradimensional (ID)/Extradimensional (ED) Shift task which avoids using explicit verbal instruction to direct attention, and rather uses feedback from within the game. Ninety-five 3- to 5-year-old children were presented with pairs of trays, each filled with a different substrate. Two differently-shaped cups placed upside-down on the substrate provided 4 possible cup/substrate combinations. Children were asked to find stickers and had to learn which feature (i.e. which substrate or cup) predicted the rewards. In the post-switch phase of the game, all stimuli were exchanged. In the ID condition, the same dimension was relevant to finding the sticker as in the pre-switch phase (e.g. cup-cup). In the ED condition, the relevant dimension changed (e.g. cup-substrate). Results showed that the task measured attentional set shifting as ID shifts were easier than ED shifts for all age groups. We did not find a significant effect of age. This could support the hypothesis that in tasks with a verbal component, developmental improvement reflects a growing capacity to use labels to control attention (Buss & Spencer, 2014). Future work manipulating instructions, stimuli and labels will further investigate the impact of labels on children's attention shifting.

https://slack.com/app_redirect?channel=a-0105-Reindl-s1-s12

Session 1 (Monday, 4.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0106 Breastfeeding and cognitive development in 4-month-old children

Valentina Focaroli[1], Melania Paoletti[2], Giulia Pecora[1], Maria Antonia Carrillo[2], Barbara Caravale[2], Corinna Gasparini[2], Serena Gastaldi[1], Flavia Chiarotti[3], Francesca Bellagamba[2], Elsa Addessi[1]

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Breastfeeding has important benefits for physical and cognitive growth. It strengthens the infant's immune system and contributes to the development of the brain. Some studies (e.g. Cai et al. 2015) showed that breastfeeding has been associated also to better intellectual performance. However, limited research has examined the benefits in infants under one year of age. This research investigated the cognitive development of 90 four-month-old infants, gathering information about the type of milk feeding (breastfeeding vs. bottle feeding), the frequency of milk feeds and the overall duration of breastfeeding in months. Control variables as infants' temperament and social and demographic status were considered. For the assessment of the cognitive development, we employed standard measures as the Developmental ProfileTM-3 (Alpern 2007). Analyses are currently in progress, but we expect that DP3 scores reveal a better performance of breastfed- vs. bottle-fed children, already at 4 months of age.

https://slack.com/app_redirect?channel=a-0106-Focaroli-s10-s11

Session 10 (Thursday, 7.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0107 Parents' Sound Symbolic Input Responsive to Infants' Age and Expressive Vocabulary

Şeref Can Esmer, Erim Kızıldere, Tilbe Göksun

Koć University, Istanbul, Turkey

Sound symbolism refers to non-arbitrary links between sound and meaning (Imai & Kita, 2014). To facilitate infants' language development, adults use more sound symbols when communicating with infants than when communicating with adults (Perry et al., 2018). Infants' first words also include many sound-symbolic forms (Massaro & Perlman, 2017). However, how parents tailor their sound symbolic input to their infants' age remained unanswered. This study examines whether (1) parents change their sound symbolic input by time, and (2) this change is related to infants' expressive vocabulary knowledge. We recruited 38 full-term infants (Mage=14.20months, SD=1.16months) at Time-1 and 33 of them (Mage=20.30months, SD=1.22months) participated at Time-2. During both sessions, we recorded 10-minute free play sessions and coded parents' overall utterances and sound symbolic instances, including a wide range of sounds such as 'meow' for cat, 'beep' for machine, 'boom' for explosion, or 'achoo' for sneezing. To measure the expressive vocabulary of infants at Time-1, we used the Turkish adaptation of MacArthur-Bates CDI. The number of utterances parents used did not change, p=.202, yet, their sound symbolic input decreased from Time-1 to Time-2, t(32)=2.870, p=.007. Moreover, parental sound symbolic instances at Time-2 was negatively predicted by expressive vocabulary levels of infants at Time-1 (β=-.458,p=.010), controlling for age at Time-2 and sound symbolic input at Time-1, ($R2$=.334),F(3,29)=4.85,p=.007. Parents decrease their sound symbolic input as infants age possibly because they observe that their infants have already benefited from sound symbolism.

https://slack.com/app_redirect?channel=a-0107-Esmer-s4-s11

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0108 Out Of The Mouth Of Babes: The Effects Of Phonological Complexity On Early Language Acquisition

Nadège Marin[1], Chiara Semenzin[1], Natalia Kuzminykh[2], Elika Bergelson[3], Marisa Casillas[4,5], Meg Cychosz[6], Pauline Grosjean[7], Leslie Marie-Louise[1], Camila Scaff[1,8], Sarah Walker[7], Anne Warlaumont[9], Alejandrina Cristia[1]

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Research has mainly examined language acquisition in children from WEIRD cultures learning IndoEuropean languages (Slobin, 2014; Henrich et al., 2010), relying on transcriptions of the speech by a small number of infants, likely causing us to underestimate diversity of typical language development trajectories and lack the power to detect them. This study uses a big-data approach to determine whether differences emerge in early language acquisition due to differences in the sound and syllable inventories of the languages being learned. Daylong audio-recordings of 114 children (1-40 months) learning one of 16 languages were annotated to estimate each child's proportion of canonical vocalisations (i.e. vocalisations containing a clear consonant-vowel/vowel-consonant sequence), an early index of language acquisition (Cychosz et al., 2019). Languages were described using typical syllable complexity and consonant/vowel inventory sizes (Maddieson, 2005). Results show significant differences across languages with differing syllable complexity levels, following a non-monotonic relationship: children learning languages with moderate complexity show lower canonical proportions and a weaker change with age than children learning languages with low or high complexity. In contrast, phoneme inventory sizes appear not to influence the canonical proportion -- reasonable since inventory size should affect phonemes rather than syllables. Thus, appropriation of the canonical pattern significantly varies with languages' syllable complexity, not inventory size. The lack of monotonicity invites further research assessing the causal pathways through which this effect emerges. Nonetheless, this evidence suggests that the universal capacity for language may lead to varying acquisition rates depending on individual language properties.

https://slack.com/app_redirect?channel=a-0108-Marin-s2-s3

Session 2 (Tuesday, 5.1., 8 am CET)
Session 3 (Tuesday, 5.1., 1 pm CET)

A-0110 The Development of Common Racial Stereotypes About Competence and Warmth

Roya Baharloo[1], Lin Bian[2], Fei Xu[1]

University of California, Berkeley, USA; [2]Cornell University, Ithaca, USA

Stereotypes about social groups are captured by two dimensions: competence and warmth (Fiske et al., 2002). In the U.S., Black people are stereotyped as lower on competence and warmth than White people, whereas Asian people are stereotyped as more competent but less warm than White people. These stereotypes influence how group members fare within society. Yet, less is known about the origins of these stereotypes. We examined when children endorse stereotypical beliefs associating competence and warmth with different races. Experiment 1 examined if children associate White people with high competence and warmth relative to Black people. Five-, 6-, and 7-year-olds (N = 72) heard stories about a "really smart" and "really nice" person (child-friendly terms for competence and warmth), then saw pictures of White people and Black people and guessed who was in each story. Across all ages, children tended to select White people as being smart and nice, suggesting that children attribute competence and warmth to White people relative to Black people. Experiment 2 focused on the comparison of White people and Asian people. The procedure was identical to Experiment 1, except that children saw pictures depicting White people and Asian people. Although 5- and 6-year-olds were equally likely to attribute competence and warmth to White people, 7-year-olds were significantly more likely to select an Asian person in smart trials than in nice trials. These findings suggest that even young children endorse common racial stereotypes. Future work should pinpoint factors that influence the distinct development trajectories of these stereotypes.

https://slack.com/app_redirect?channel=a-0110-Baharloo-s1-s2

Session 1 (Monday, 4.1., 8 pm CET)
Session 2 (Tuesday, 5.1., 8 am CET)

A-0111 Children's Prediction of Emotions in Cooperative Versus Competitive Resource Sharing Contexts

Bianca Dietrich[1], Helena Petersen[1], Marco F. H. Schmidt[1,2]

[1]University of Bremen, Germany; [2]LMU Munich, Germany

From early in ontogeny, children have descriptive expectations that resources will be allocated equally (Schmidt & Sommerville, 2011) and expectations about others' resource sharing become normative by 3 years of age (Rakoczy et al., 2016). But do children also have expectations about the beneficiary's emotional state (who stands to benefit from someone's resource sharing)? A potential recipient may be happy (expecting to benefit from sharing) if a partner reaches a shared goal. In contrast, the potential recipient may be sad (expecting not to receive any resources) if a competitor reaches her individual goal. Here, we investigate younger and older preschoolers' prediction of an individual's emotion in resource sharing contexts contrasted as cooperative versus competitive. We developed a target task with two open-ended picture stories. Here, different individuals play a game to obtain divisible resources. In the cooperative context, they agree on playing together, whereas in the competitive context, they agree on playing individually against each other. In both contexts, children observe the "unlucky" individual (but potential recipient) not obtaining the resources herself but witnessing the other "lucky" individual acquiring them. Children are then asked whether the potential recipient will be happy or sad. We expect older, but not younger children, to be more likely to predict that the potential recipient will be happy in the cooperative context than in the competitive context. This work may open new avenues for investigating the ontogeny of normativity and may help bridge the literatures on early norm and emotion understanding.

https://slack.com/app_redirect?channel=a-0111-Dietrich-s2-s9

Session 2 (Tuesday, 5.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0112 The Sound of Pedagogy: Acoustic Features of Pedagogical and Information-Seeking Questions

Igor Bascandziev[1], Sophie Bridgers[2], Patrick Shafto[1], Elizabeth Bonawitz[1,2]

[1]Rutgers University, Newark, US; [2]Harvard University, Cambridge, US

Inferring pedagogical context dramatically improves learning (Csibra & Gergely, 2009). However, many of the cues that signal pedagogy (e.g., child-directed speech) are ambiguous because they are also used in non-pedagogical contexts. A recent study found that prosodic cues carry specific information about pedagogical intent both within child-directed and adult-directed speech (Bascandziev, Shafto, & Bonawitz, 2020). Here, we ask which acoustic features reliably differentiate pedagogical questions (PQs, where the asker knows the answer and intends to teach via questioning) from information-seeking questions (ISQs, where the asker does not know the answer and intends to learn it). We analyze audio data (analysis is ongoing) from a corpus of 100 identical PQs and ISQs, recorded in child-directed and adult-directed speech, in English and Macedonian language. The audio files are of utterances that were accurately classified by 256 American MTurk participants. An initial finding is that the rate of speech of PQs is slower than that of ISQs, both within adult- and child-directed speech, and both in English and Macedonian (all ps < .001). This result suggests that the rate of speech is an important cue to pedagogical intent across different types of speech. In ongoing studies, we are testing if PQs and ISQs differ systematically along other acoustic features. In addition, we are testing if children can differentiate PQs from ISQs, and if yes, then which acoustic features do children rely on when making accurate judgments.

https://slack.com/app_redirect?channel=a-0112-Bascandziev-s9-s10

Session 9 (Thursday, 7.1., 1 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0113 Topology versus shape in children's representations of object kinds

Praveen Kenderla[1], Sung-Ho Kim[2], Melissa M Kibbe[1,3]

[1]Department of Psychology and Brain Sciences, Boston University, USA; [2]Department of Psychology, Ewha Womans University, South Korea; [3]Center for Systems Neuroscience, Boston University, USA

Children extend novel labels to objects that are similar in shape, but not texture, color or material, suggesting shape is privileged in representations of object kinds (Landau et al., 1988; Diesendruck & Bloom, 2003). Topological properties (i.e., whether an object has a hole) play a central role in object recognition and tracking (Chen, 1982; Chien et al., 2012; Kibbe & Leslie, 2016). We asked whether topology also may be privileged in kind representations. In experiment 1, we presented n=66 2-7-year-olds with a novel object (the standard) accompanied by a novel label (e.g. 'toma'). We then presented 3 test objects - one with the same shape but different topology as the standard, one with the same topology but different shape, and a distractor, and asked children which shared a label with the standard. Children selected the topology- and shape-matched objects at equivalent rates (p=.235, BF01=5.13). In control experiment 2, holes were replaced by gray patches, equating topology but changing figure/ground relations across objects, and children showed a strong shape bias (n=24, p<.001, BF10=6493.5). In ongoing experiment 3, stimuli were identical to experiment 1, except that both children and adults were asked to select which object was the same "kind" as the standard. Preliminary results suggest children may be more biased than adults toward shape compared with topology when specifically asked about object kinds. These results suggest that topology may compete with shape in extensions of novel nouns, but may play a more nuanced role than shape in determining object kind.

https://slack.com/app_redirect?channel=a-0113-Kenderla-s4-s12

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0114 Children and Adults use Cost and Need to Make Evaluations About Generosity

Quang Tri Huynh, Emily Onyshko, Mia Radovanovic, Jessica A. Sommerville

University of Toronto, Toronto, Canada

Children are sensitive to information about the utility of giving actions. Even infants recognize the needs of others in instrumental help-seeking tasks (Paulus, 2020) and register the costs of their helping behaviors (Sommerville et al., 2018). However, it is unclear whether children reference cost and need of giving actions when evaluating others. We investigated whether 6- and 7-year-old children consider need and cost when making inferences about others' generosity and compared it to a group of adults. Experiments 1 and 2 investigated whether children (n = 24) and adults (n = 64) consider need and cost when comparing the generosity of two givers. Participants viewed scenarios involving two givers and two recipients. Half of the scenarios manipulated the cost of giving actions and half manipulated the need of the recipients. In each scenario, one giver incurred a greater cost or gave to the needier recipient, and participants chose which character they thought was more generous. Experiments 3 and 4 investigated whether children (n = 36) and adults (n = 96) consider need and cost when rating givers on a continuous scale. Participants completed the same task as Experiments 1 and 2, however each scenario featured one giver and one recipient, and participants rated the giver as "a little," "a medium amount," or "a lot" generous. Our results demonstrated that children and adults consider systematic factors such as need and cost when making comparative and stand-alone generosity evaluations, which is contrary to the belief that prosocial evaluations are unique to situations.

https://slack.com/app_redirect?channel=a-0114-Huynh-s3-s4

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0115 Adults explore more broadly than children when pedagogy is emphasized

Mia Radovanovic, Ece Yucer, Denise Arefhaghi, Christie Lai, Jessica Sommerville

University of Toronto, Toronto, Canada

Social learning allows information to be transmitted efficiently across the lifespan. However, teaching can be incomplete, requiring individuals to sometimes surpass teaching and innovate. Relative to adults, children tend to explore broadly, reducing uncertainty (Schulz et al., 2018), but underperform when required to innovate rather than explore broadly (Cutting et al., 2014). This tension may exist because of an emphasis on social learning and convention in childhood. To test this possibility, the present study contrasts the literature on independent problem-solving with a novel scenario in which 6- to 11-year-old children and adults are given incomplete teaching about a platforming game over Zoom. The nature of the platforming game requires exploration for success, but typical patterns of broad exploration in children may be attenuated by the pedagogical social context. Indeed, children relied more on this incomplete teaching than adults, spending a greater proportion of their time testing the ineffective solution, and exploration increased significantly with age (t(86) = 2.19, p = .03). Additionally, if it is true that these differences are due to social context, individual differences in sensitivity to conventionalism ought to also predict differences in exploration (t(78) = 2.06, p = .04). Thus, we collected an age-appropriate measure of authoritarianism. Exploration decreased as authoritarianism increased, controlling for age (t(86) = -2.28, p = .03). This work provides initial evidence that when social information and exploration are in tension, participants reduce their innovation. Future work will continue to probe these differences by experimentally manipulating pedagogical framing and authority.

https://slack.com/app_redirect?channel=a-0115-Radovanovic-s1-s3

Session 1 (Monday, 4.1., 8 pm CET)
Session 3 (Tuesday, 5.1., 1 pm CET)

A-0117 Infant Visual Sensitivity to the Emotional Valence of Touch: an EMG Study

Victoria Licht, Margaret Addabbo, Chiara Turati

University of Milano- Bicocca, Milan, Italy

Early in development infants acquire the ability to pick up others emotional states by relying on various sources of information, such as facial expressions, body postures, and kinematics. Adult studies have shown that also interpersonal touch provides fundamental information about other emotional states. Indeed touch, early in life, represents one of the primary modalities through which we receive sensory and affective information from the external world. To date, no study explored whether infants are sensitive to the affective information conveyed by observed interpersonal touch. To assess this issue, we measured electromyographic (EMG) activity over the muscles involved in happy (zygomaticus major, ZM), and angry (corrugator supercilii, CS) facial expressions while 11/12-month-old infants observed videos showing an actress receiving an affective touch (a caress) or a non-affective touch (a scratch) on her arm. Results demonstrate that affective touch induces in infants a greater activity of the ZM compared to the CS, while the non-affective touch elicits an opposite facial reaction (greater activation of the CS compared to the ZM). Our finding suggests that 11/12-month old infants are able to detect the affective information from others' tactile experiences.

https://slack.com/app_redirect?channel=a-0117-Licht-s8-s10

Session 8 (Thursday, 7.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0119 Keeping Score!: A School-Based Attention Training Programme for Improving Sustained Attention

Eadaoin J Slattery[1], Patrick Ryan[1], Donal G Fortune[1], Laura P McAvinue[1,2]

[1]Department of Psychology, University of Limerick, Ireland; [2]School of Education, University College Dublin, Ireland

Background: The importance of sustained attention for learning and functioning in school has been widely documented. Cognitive attention training (or attention network training) is one intervention that has the potential to improve attentional capacity in children. Despite this, there is no attention training programme widely used by school personnel to enhance students' capacity to sustain attention. Objective: This study evaluated the impact of a theory-driven attention network training programme, Keeping Score!, in improving students' sustained attention capacity. Training was based on sustained updating. Students engaged this process by mentally keeping score during a fast-paced, interactive game without external aids. Methods: Students (9-11 years) with low attentional ability were assigned to either the training programme (n = 18) or an active control (n = 18) and received 15-minute sessions, three times a week for six weeks during the school day. Cognitive assessments of sustained attention/working memory and parent rating scale measures of executive function were completed at pre-training, post-training and one-month follow up. Results: The results provided no evidence of improvements in students' sustained attention capacity/working memory capacity or parental ratings of executive function. Conclusion: Despite this theoretically motivated attention training programme, attentional capacity did not improve. We tentatively conclude that the complex nature of sustained attention may not lend itself to enhancement through attention network training in children.

https://slack.com/app_redirect?channel=a-0119-Slattery-s7-s9

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0120 Early social adversity influences executive function in juvenile macaques

Alice Massera[1], Holly Rayson[1], James Bonaiuto[1], Mauro Belluardo[2], Suliann Ben Hamed[1], Pier Francesco Ferrari[1]

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Early social adversity (ESA) is associated with an increased risk for psychopathology, but the neurodevelopmental pathways underlying this remain unclear. One mechanism through which this may occur is via poor development of executive processes. In particular, poor executive function (EF) is hypothesized to underlie many negative consequences of early social deprivation, where socio-cognitive stimulation and learning opportunities with a sensitive caregiver are especially limited. Non-human primate models could be extremely helpful to address questions concerning individual differences in EF development and related outcomes. Accordingly, we adopted a rhesus macaque model of ESA to address two main objectives: i) investigate how early social deprivation may influence EF development in macaques; and ii) establish this as a suitable translational model for subsequent research into the ESA-EF relationship and its neural substrates. To achieve this, we a used a modified 'A not B' paradigm to assess EF in two groups of juvenile macaques (mother-reared/peer-reared). A computational model of decision making was also fit to the choices of each individual to probe mechanistic differences in EF between groups. Peer-reared animals performed significantly worse than mother-reared animals, an effect similar to that of early institutionalization in humans. Furthermore, analysis of the fitted model parameters yielded novel insights into the functional decomposition of group-level EF differences underlying the performance effect, including working memory and choice hysteresis. These findings extend our knowledge on the ESA-EF relationship, and establish the utility of macaque models for investigations into the computational mechanisms behind this relationship and related risk or resilience.

https://slack.com/app_redirect?channel=a-0120-Massera-s1-s11

Session 1 (Monday, 4.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0121 Smart, or just lucky? Inferring competence from strategy efficiency versus effectiveness in a question-asking game

Nora Swaboda[1], Azzurra Ruggeri[1,2]

[1]Max Planck Institute for Human Development, Berlin, Germany; [2]School of Education, Technical University Munich, Germany

Previous research shows that children evaluate the competence of others based on how difficult they found a task, and their success. We investigate whether 5- to 10-year-olds and adults (N=121) infer people's competence from the efficiency and/or effectiveness of their strategies. Whereas efficiency is a reliable indicator of competence, effectiveness may depend on additional unrelated factors (e.g., luckiness). Participants observed four agents solving a 20-questions game where they had to identify the target among a set of eight candidate hypotheses (e.g., "Which of these objects is a blicket?") by asking yes/no questions. We varied across the agents the efficiency (i.e., informativeness) and effectiveness (i.e., number of questions needed to solve the task) of their strategies: One agent employed the most efficient constraint-seeking strategy that targets half of the available hypotheses at each step of the search ("Are blickets round?"), and always requires precisely 3 questions to reach the solution (CS condition). The other agents employed the less efficient hypothesis-scanning strategy that targets hypotheses one by one ("Is this one a blicket?"). We manipulated the effectiveness of the HS strategy ("luckiness"), with agents stumbling upon the solution after 1, 3 or 8 questions (1HS, 3HS, and 8HS conditions). Only adults identified the CS agent as more competent, and all participants erroneously attributed higher competence to those HS agents who needed fewer questions. Overall, our results suggest that participants had difficulty differentiating between competence (efficiency) and luckiness (effectiveness). We are planning a series of follow-ups to explore the mechanisms underlying this difficulty.

https://slack.com/app_redirect?channel=a-0121-Swaboda-s2-s4

Session 2 (Tuesday, 5.1., 8 am CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0122 Delayed Match Retrieval for testing infants' working memory: A five-year retrospective

Zsuzsa Kaldy[1], Chen Cheng[2], Erik Blaser[1]

[1]University of Massachusetts Boston; [2]Boston University

Five years ago, we introduced an eye-tracking based visual working memory (VWM) task for infants called Delayed Match Retrieval (Kaldy et al., 2016). DMR is a naturalistic task, based on a popular game: virtual cards are exposed one-by-one, obscured, then a target card is revealed and the participant is to find the match (among the now-hidden options). At the end of a trial, a reward animation accompanies the reveal of the match. Here, we review how DMR differs from other VWM paradigms, and the factors that affect performance. Instead of measuring passive reactions, as in change detection or violation-of-expectation paradigms, DMR measures anticipatory actions: infants choose a response, based on a learned rule ("Find the match!"), using recent memories of object-location bindings. In our first study, we found that 10-, but not 8-month-olds were able to choose the correct card. However, 10-month-olds' performance is not yet robust (Fitch et al., under review). Rule learning may be a limiting factor. Consistent with this, 6-12-month-olds were unable to perform above chance in a version that modified rule learning aspects (Sanders & Johnson, in press). Subsequently, we found that 13-month-olds' trial-by-trial cognitive effort (as measured by pupillometry) predicted success in DMR. Then, bridging the "toddler gap" (aka, the "dark ages") we tested memory updating: at 25-, but not 20-months, infants were able to track cards' shifting positions while face-down. Lastly, we found that 2.5-year-olds have the memory capacity to play DMR with three cards (Cheng, Kaldy, & Blaser, 2019a, 2019b, 2020).

https://slack.com/app_redirect?channel=a-0122-Kaldy-s1-s9

Session 1 (Monday, 4.1., 8 pm CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0123 Examining Associations between the Content of Earliest Memories, Self-Construal, and Acculturation by Culture and Sex

Caleb A. Schlaupitz[1], Jennifer G. Bohanek[2], Angela F. Lukowski[1]

[1]University of California, Irvine, United States; [2]University of Missouri, Columbia, United States

The present study was conducted to examine whether participants differentially recalled details of their earliest memories in relation to culture and sex, as well as to identify the manner in which individual difference variables are associated with autobiographical memory. One hundred eight university students participated. Students who were born in the United States to mothers who were also born in the United States were placed into the European American group; students who were born in the United States to mothers who were born in China were placed into the Chinese American group. Participants completed a one-session online questionnaire on which they wrote about their earliest childhood memory and completed individual difference measures assessing self-construal and acculturation. Data collection and coding is complete; statistical analyses are ongoing. Each utterance in the narrative was coded into one of six content categories pertaining to the who, what, when, where, why, and how of the event. In addition, each mention of cognition, emotion, and meta-memory terminology was also coded. Planned analyses will be conducted to identify whether group, sex, and their interaction is associated with the count and proportion of terms used in each category and to determine whether terms coded from the narratives are correlated with self-construal and acculturation. Other planned analyses will be conducted and reported as well. We anticipate that the findings of this research will provide important information as to how emerging adults think about and conceptualize their earliest memories in relation to their current understandings of themselves.

https://slack.com/app_redirect?channel=a-0123-Schlaupitz-s4-s6

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0124 The Influence of Timing in Praise and Persistence during Challenging Tasks

Antonia Soldovieri[1], Mia Radovanovic[1], Rachel Horton[2], Kelsey Lucca[2,3], Jessica Sommerville[1,2]

[1]University of Toronto, Toronto, Canada; [2]University of Washington, Seattle, USA; [3]Arizona State University, Tempe, USA

The benefits of caregiver praise, specifically process praise (i.e., praise for effort) relative to person praise (i.e., praise for stable traits) have previously been established. These findings bear important implications for our understanding of the role of caregiver language in early persistence, as well as the lifelong positive outcomes associated with it (Banerjee & Tamis-LeMonda, 2007; Ekreis-Winkler et al., 2014). However, the timing of praise may also be important. In particular, praise given during success may be understood as a job well done, communicating the value of effort for success. In contrast, praise occurring during trying may reinforce the inherent value of effort. To investigate how differences in the timing of process praise relate to effort, behavioural coding was performed using previously collected data (Lucca et al., 2019). Twenty-nine typically developing 18-month olds completed several persistence-related tasks, including an independent persistence task and semi-naturalistic dyadic task. Parental praise utterances, child trying behaviors, and task successes were coded and examined temporally. Preliminary data from 15 infants indicate that process praise occurred at similar rates during infant trying and task success. Interestingly, only the presence of parental process praise during moments of success predicted persistence on the dyadic task (p = .05), as well as predicting persistence on an independent task completed prior to receiving parental coaching (p = .02). Next steps of this work will include processing the remainder of the sample, as well as launching a semi-naturalistic, follow-up experiment in order to explore the causal pathways established by these correlational analyses.

https://slack.com/app_redirect?channel=a-0124-Soldovieri-s6-s7

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0125 A New Measure of Individual Differences for Predicting Children's Risk Taking Behaviors

Avi Benoziorn, Reshit Cahanian

Hebrew University of Jerusalem

Behavioral Inhibition and Activation systems have been long proposed to underly individual differences in our sensitivity to risk and reward (Gray, 1981). The Behavioral Inhibition System (BIS), is suggested to be sensitive to cues of punishment, lose, and novelty, whereas the Behavioral Activation System (BAS) is suggested to be sensitive to cues of reward. Here, we present a proof-of-concept for a new direct measurement that is aimed to assess these motivational components in children. Ninety-nine 3-8-year-olds (Mage=5.65, SD=1.35, 47% girls) were presented with the "BIS-BAS-Book" – a picture book that was inspired from the BIS-BAS-questionnaire for adults (Carver & White, 1994). An indirect measurement via a caregiver was also taken (i.e., BIS-BAS questionnaire), and two scores were computed from each measurement type. To estimate whether children's motivational bias can predict behavior in a real-life context, a preference-choice task was used, in which children were asked to choose a prize for themselves – either a visible prize ("safe") or a wrapped one ("risky"). GLM analysis included Choice as dependent variable (safe or risky) and as predictors – Age, Gender, "BIS-BAS-Book"-score, Caregiver-score, and all interactions. Likelihood Ratio Test comparison between the full and null model was significant ($X2(83)=26.69$, $p<0.01$), and two M.Es were found, one for Caregiver-score (estimate ± SE=0.32±0.15, z=2.06, p<.05) and a second, stronger effect, for "BIS-BAS-Book"-score (estimate ± SE=0.44±0.17, z=2.62, p<.01), suggesting that across age and genders, "BAS-oriented" children were more likely to choose a risky reward for themselves, whereas "BIS-oriented" children were more likely to choose a safe reward.

https://slack.com/app_redirect?channel=a-0125-Benozio-s1-s11

Session 1 (Monday, 4.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0126 How automated markerless motion capture is making a mark on developmental psychology.

Hannah Solby[1], Mia Radovanovic[1], Rachel Horton[2], Kelsey Lucca[3], Jessica Sommerville[1]

[1]University of Toronto, Toronto, Canada; [2]University of Washington, Seattle, USA; [3]Arizona State University, Temple, USA

While motion capture data has long been used to gain insights into motor processes, research investigating complex psychological processes has not fully utilized this method. This is largely due to the challenges inherent in coding motion data by hand as well as the expense of larger scale motion tracking systems. Advancements in artificial intelligence are removing these barriers. DeepLabCut is an open source software that performs customized post-hoc motion tracking analyses using a neural network. This network can be trained accurately within a few hours, without specialized equipment (Mathis et al., 2018). After training, participant videos can be run through the network allowing researchers to gain new insights into old data. We demonstrate the versatility of this software by applying DeepLabCut to data previously collected by Lucca et al. (2020). 18-month-olds watched an adult attempt a means-end problem, pulling a rope to retrieve an out-of-reach toy, and then tried to solve the problem themselves. Lucca et al. (2020) found infants persisted longer after observing an adult persist rather than solving the problem easily, or failing. DeepLabCut will be used to analyze spatial variability of infants' trying behaviours to investigate if variability differs as a result of condition. Thus, the application of DeepLabCut will reveal new information regarding strategies underlying infants' persistence. This study showcases how markerless motion capture technology can reveal nuanced, objective psychological data. The accessibility of the software allows researchers to facilitate important scientific discoveries even while face-to-face data collection is not possible.

https://slack.com/app_redirect?channel=a-0126-Solby-s1-s9

Session 1 (Monday, 4.1., 8 pm CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0127 Toddlers expect novel communicative cues to be informative and easy to process

Marie Aguirre[1,2], Mélanie Brun[2], Auriane Couderc[2], Olivier Morin[3], Anne Reboul[2], Pauline Le Floch[2] & Olivier Mascaro[1,2]

[1]Université de Paris, CNRS, Integrative Neuroscience and Cognition Center, F-75006 Paris, France; [2]Institute for Cognitive Sciences Marc Jeannerod, CNRS UMR 5304/Univ Lyon, Bron, France; [3]Institut Jean Nicod, ENS, EHESS, PSL University, CNRS, Paris, France

Many theories posit that interpretation of communicated information is guided by positive expectations about the cognitive utility or relevance of informants' meanings. We investigated the early development of such expectations. In Study 1, a pompom was hidden under one out of three upside-down buckets (one transparent, two opaque). The experimenter consistently placed the marker on the empty opaque bucket, thus making it possible to discover the pompom by excluding the cued bucket. Two-year-olds (N = 18) demonstrated the capacity to exclude the cued bucket. Nonetheless, they had a strong tendency to search for the pompom under it. Thus, when faced with a cue that was ambiguous, they prioritized the interpretation of the cue that was easier to process: They assumed that the cue indicated directly the reward's location rather than indirectly, through the exclusion of a location. Study 2 was comparable to Study 1, with the addition of a familiarization phase allowing participants to learn the meaning of the cue. Participants (N = 32) were more likely to keep choosing the cued bucket first in an opaque (three opaque buckets) than in a transparent (one transparent, two opaque buckets) condition. Furthermore, in the opaque condition, where excluding the cue was insufficiently informative and did not allow participants to discover the location of the reward, toddlers kept selecting the marked bucket more often than predicted by chance. Thus, toddlers tend to treat novel communicative cues as easy to process and informative even when presented with repeated evidence to the contrary.

https://slack.com/app_redirect?channel=a-0127-Aguirre-s4-s11

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0128 Investigating the Development of Kinship Detection in Early Childhood

Anna Michelle McPhee, Sinamys Bagh, Mark A. Schmucker, Jessica A. Sommerville

University of Toronto, Toronto, Canada

Although kinship detection has been studied in adults, the origin of this ability, thought to emerge in childhood, has received little attention (Lieberman et al., 2007). In the present study, we investigated whether 4- to 7-year-old children (n = 69) can use partiality of resource sharing (advantageous vs. equal; Liberman & Shaw, 2017) to identify parent-child relationships. The first task consisted of reading children storybooks in which an adult distributed resources (e.g., cookies) to two children, either in a partial (in favour of the target child) or impartial manner (equally to both children). The participants were then asked to determine if the adult was or was not the mother of the protagonist. Across all ages, children identified the adult as the protagonist's mother significantly above chance after viewing partial (p < 0.01), but not impartial (p = 0.68), resource distributions. The second task consisted of reading participants storybooks in which an adult, identified as either the protagonist's mother or neighbour, distributed resources to two children. Participants were asked to determine whether the adult would give more, the same, or less resources to the target child compared to the other child. A multinomial logistic regression showed that adult identity significantly influenced participants' expectations (p < 0.01); participants were more likely to expect favouritism towards the protagonist when the adult was the child's mother rather than their neighbour. Together, these findings suggest that partiality in resource sharing is a cue used by young children to guide their understanding of third-party relationships.

https://slack.com/app_redirect?channel=a-0128-McPhee-s1-s12

Session 1 (Monday, 4.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0129 Representations of simple ignorance guide the interpretation of requests for information Evidence from toddlers, children and adults.

Marie Aguirre[1,2], Mélanie Brun[2], Auriane Couderc[2], Anne Reboul[2] & Olivier Mascaro[1,2]

[1]Université de Paris, CNRS, Integrative Neuroscience and Cognition Center, F-75006 Paris, France;

[2]Institute for Cognitive Sciences Marc Jeannerod, CNRS UMR 5304/Univ Lyon, Bron, France

People can search for a piece of information only if they know that they lack it. We test whether this fact guides humans' interpretation of questions. We assess whether the interpretation of requests for information is guided by representations of simple ignorance (tracking what people ignore), or by representations of Socratic ignorance (tracking what people know that they ignore). In our experiments an adult asks an ambiguous question about the location of an object using a label that can refer to one of two different objects. The ambiguity can be resolved by tracking the adult's state of knowledge. In the first-order question tests, the adult is ignorant about the location of only one of the two objects, while in the second-order question test, the adult ignores the location of both objects but knows about her ignorance for only one of them. Results from the second-order question tests show that two-year-olds (N = 18) do not discriminate between simple and Socratic ignorance when disambiguating questions (Study 1). Five- to seven-year-olds (N = 72) show a similar pattern of results, even when considering only the performance of participants who succeed on standard second-order false belief tasks (Study 2). Adults (N = 320), show a systematic bias towards treating Socratic ignorance just like simple ignorance when interpreting questions (Study 3). Thus, the interpretation of requests for information rests primarily on the mere representation of what people ignore — and not of what they know they ignore — a heuristic that reduces processing costs.

https://slack.com/app_redirect?channel=a-0129-Aguirre-s5-s6

Session 5 (Wednesday, 6.1., 8 am CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0130 Uncovering Category Representations with Markov Chain Monte Carlo with children

Pablo Leon-Villagra[1], Isaac Ehrlich[2], Chris Lucas[3], Daphna Buchsbaum[2]

[1]University of Warwick, UK; [2]University of Toronto, Canada; [3]University of Edinburgh, UK

Imagine a child seeing a persimmon for the first time. Given its shape and leaves, she might think it is a tomato, but its size and color remind her of oranges. To infer what fruit it is, she has to weigh how similar the persimmon is to previous fruits given a representation of fruit categories. What is the structure of these representations, and how do they develop? Markov chain Monte Carlo with people (MCMCP) is one method for uncovering these representations. In MCMCP, participants repeatedly choose the more representative category instance from examples. Given enough repetitions, these choices correspond to samples from participants' category representations. However, while MCMCP can explore relatively complex categories in detail, experiments are repetitive and lengthy, limiting their use in developmental studies. To overcome this limitation, we introduced a linked variant of MCMCP, in which each participant completes just a short run of MCMCP trials, which are then combined. We found that for adults, linking produced results that were practically indistinguishable from classical MCMCP (Leon-Villagra et al., 2020). These results motivated us to conduct the first developmental experiment using MCMCP. Our ongoing experiments show that MCMCP experiments can be engaging and child-suitable tasks. By adopting a linked MCMCP design, in combination with a child-friendly presentation, we obtained category representations in short online experiments. We present these results and directly compare the category representations of fruits for 4-5-year olds, 6-7-year-olds, and adults.

https://slack.com/app_redirect?channel=a-0130-Leon-Villagra-s10-s12

Session 10 (Thursday, 7.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0132 The effect of source claims on children's belief formation and accountability judgments

Johannes B. Mahr[1], Francesca Bonalumi[2], Gergely Csibra[2,3]

[1]Department of Psychology, Harvard University, Cambridge MA, USA; [2]Department of Cognitive Science, Central European University, Budapest, Hungary; [3]Department of Psychological Sciences, Birkbeck, University of London, United Kingdom

This projects seeks to address two questions: (1) Do 4-7 year-old children differentially believe claims to first- ("I saw") and second-hand ("Somebody told me") evidence? (2) Can such differences in belief be explained by how much children hold a speaker making such claims accountable for the truth of their assertion? Children will be asked to help an agent find a lost object by asking two informants. Each informant will provide a different answer about the location of the object based on a different source claim. In a between-subject design, each informant will either (1) claim to have seen where the object is, (2) claim to have been told by someone about its location, (3) or say where they 'want' the object to be. Next, it will be revealed that both informants had in fact been wrong about the location of the object and children will be asked who should give up one of their own possessions as compensation. We will measure whose advice children will follow in looking for the lost object (believability measure) and which informant they will ask to provide compensation (accountability measure). Previous results suggested that children tended to believe speakers who provided a reason for their claim without differentiating between claims to perception and hearsay. The current study aims to test whether children indeed view claims to first- and second-hand evidence as equally good reasons for believing a statement and whether they might nonetheless differentiate between these conditions in terms of our accountability measure.

https://slack.com/app_redirect?channel=a-0132-Mahr-s6-s11

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0133 Children and adults display an "anti-convert" bias

Emily Gerdin, Yarrow Dunham

Yale University, New Haven, Connecticut, USA

The present research investigated adults' and children's evaluations of converts (i.e., people who change their social groups). Across two pre-registered studies, we introduced children (ages 5-10; n=284) and adults (n=236) to a novel social group and asked them to rate how much another member of the group would like both a convert and a lifelong member. We also asked how much the participants themselves liked and trusted both targets. Children and adults alike expected others to hold an "anti-convert" bias, meaning they expected people to like lifelong members of their group more than converts to their group. For adults, competitive contexts strengthened this expectation of "anti-convert" bias among group members. Additionally, children and adults were biased against converts themselves, both liking and trusting lifelong members of a novel group more than converts. Finally, adults' political affiliation and the extent to which they value loyalty (as measured by the loyalty items from the Moral Foundations Questionnaire; Graham et al., 2008) both predicted their first-party evaluations: The more conservative a participant was, or the more they valued loyalty, the more likely they reported liking and trusting the lifelong target more than the convert. As early as in kindergarten, children display a bias against social group converts, and also expect others to be biased against converts. This bias is present even when children are shown novel groups that they are not a part of themselves, suggesting that anti-immigrant bias and other anti-convert sentiments stem from this general aspect of intergroup reasoning.

https://slack.com/app_redirect?channel=a-0133-Gerdin-s3-s4

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0134 Trusting information from friends: Adults expect it and preschoolers don't

Narges Afshordi, Melissa Koenig

University of Minnesota, Minneapolis, UA

Preschoolers have rich concepts of friendship (Afshordi, 2019), and a burgeoning understanding that it can bias people to speak in favor of each other (Liberman & Shaw, 2020). However, do preschoolers understand that people often privilege information from their friends? To answer this, we showed children (aged 4-5) three people: Maya, her best friend, and a nice stranger. Participants saw the stranger provide correct labels for everyday objects. They also saw the friend provide either correct labels for the same objects (Baseline condition), or incorrect ones (Inaccurate Friend condition). We then asked participants to ask for and endorse either labels for novel objects (Experiment 1, n=64; also n=64 adults), or personal opinions, e.g. about books (Experiment 2, n=64). We asked for these judgments from the participant's own perspective, and also Maya's. Adults (Experiment 1) thought that Maya—unlike themselves—would favor her friend even if she had been inaccurate. For children, however, there was a significant interaction between condition and experiment, but no effect of perspective. Regarding labels (Experiment 1), children in the Baseline condition were split between the friend and stranger, while those in the Inaccurate Friend condition trusted the stranger. Regarding opinions (Experiment 2), children chose the friend and stranger equally. Consistently, children's judgments for themselves and Maya were indistinguishable. Thus, children did not take friendship or perspective into account, caring only about accuracy, and only when labels and not opinions were at stake. Overall, preschoolers' ability to incorporate friendship into judgments about third-party learning is under development.

https://slack.com/app_redirect?channel=a-0134-Afshordi-s4-s10

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0135 (When) do children know what "each" means?

Michelle 'Misha' Oraa Ali, Roman Feiman

Brown University (Providence, USA)

Since Inhelder and Piaget(1964), many studies show children making non-adult-like 'quantifier spreading errors' in understanding expressions like, "Each girl rode an elephant". Since Brooks and Braine(1996), a parallel literature investigates children's resolution of scope ambiguities: Does "each girl rode an elephant" mean one elephant, or one-per-girl? Both literatures presuppose that children know the logical words ("each", "a"), and struggle with their composition. But children's non-adult-like behavior is unsurprising if they just don't know what "each" means. For adults, "each of the blocks plays music" means that any block alone does. What does it mean to children? In a 'blicket-detector' task, children and adults were shown a novel toy composed of three blocks joined together, and told, "[each,all,some,dax] of the blocks" makes a box play music. The box activated by placing the toy either upright (with a single block on the box) or flat (with all blocks down). Understanding "each" should lead to placing the toy upright, testing whether any individual block works. We found that 3-5-year-old children (total n=28) respond to "each", "every" or "all" the same as to "dax", while adults(n=60) placed the toy upright more in response to "each"($p<0.0001$) and "every"($p<0.05$), and flat more in response to "all"($p<0.05$). This suggests that 3-5-year-olds may not yet understand the meaning of "each". This may explain children's difficulties with scope ambiguity resolution and quantifier spreading, without appealing to either compositional semantic or pragmatic deficits.

https://slack.com/app_redirect?channel=a-0135-Oraa-Ali-s4-s6

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0136 Self-Structured Activities' Impact on Children's Task Performance and Learning

Ece Yucer, Mia Radovanovic, Jessica Sommerville

University of Toronto, Toronto, Canada

Many factors influence our intrinsic motivation, which, in turn, benefits task performance (Cerasoli et al., 2014). Our autonomy over our activities varies, which may impact our motivation to complete tasks, especially when we have no other choice. Further, our motivation may be impacted by our overall engagement in self-structured activities. Thus, the contributions of intrinsic motivation to task performance may be moderated by habitual engagement in self-structured tasks. To address this relationship, we will first have parents fill out a questionnaire online, assessing how often their elementary or middle-school-aged children (n=64) behave in self-structured ways and make their own choices. To assess how variability in the frequency of engaging in self-structured activities influences performance and learning, participants will be asked over Zoom to choose between two exploration-based computer games. Then we will manipulate whether participants are assigned to play their self-selected game or not. We expect children who engage in more habitual self-structured activities would see benefits in learning and task performance. Additionally, we expect a larger disparity in performance between self- and other-selected games than children who engage in fewer habitual self-structured activities. We will also test a sample of adults to investigate any developmental changes. This study will help us understand how habitual engagement in self-structured activities influences task performance and exploratory behaviour. Given the growing popularity of child-structured activities and teaching (Byun et al., 2013), this study could provide important insights into the effects of increased autonomy in a child's environment on motivational and learning processes.

https://slack.com/app_redirect?channel=a-0136-Yucer-s7-s9

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0137 The feeling of "kiki": tactile experience and visual imagery can enhance abstract audio-tactile crossmodal correspondences in early childhood, but do they alter haptic exploration strategies?

Vivian M. Ciaramitaro, Julia Kelly, Cuong Nguyen

University of Massachusetts Boston, USA

Associations between abstract shapes and nonsense words, the bouba-kiki effect, are found early in development, especially for well-studied audio-visual associations, but may be weak (Chow & Ciaramitaro, 2019) with small effect sizes (see meta-analysis Lammertink, et al., 2016; Fort, et al., 2018). We also found weaker audio-tactile (AT) associations between nonsense sounds and felt abstract shapes in 6-8 year olds compared to adults, even after providing explicit instruction on how to explore shapes optimally via touch or providing twice the amount of exposure (Chow et al., in revision). Interestingly, AT associations could be strengthened if participants first matched nonsense sounds to complementary seen abstract shapes (audio-visual) or matched felt shapes to complementary seen shapes (visuo-tactile). Given that both these conditions provide prior visual exposure to shapes, and that early-blind-adults show weak AT associations (Fryer et al., 2014), we considered the role of visual imagery and of highlighting relevant shape features via touch, in forming AT associations in early childhood. We tested if (1) prior tactile-only (TT) exposure, matching via touch a small shape to one of 2 large shapes, or (2) prior visual imagery of abstract felt shapes, imagining a cloud or star, (TI) could enhance AT associations. We found that both prior TT and TI exposure, which provide no direct visual experience, enhanced AT associations in 6-8 year olds. Together these results suggest that direct visual experience of abstract shapes, i.e. visual experience, may be sufficient, but not necessary, in forming the abstract AT associations tested here.

https://slack.com/app_redirect?channel=a-0137-Ciaramitaro-s1-s6

Session 1 (Monday, 4.1., 8 pm CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0139 The Effects of Mindfulness Based Yoga Intervention on Preschoolers' Self-Regulation Ability

Eda Önoğlu Yıldırım, Jedediah Wilfred Papas Allen

Bilkent University, Ankara, Turkey

Developments in self-regulation during preschool have long-term effects on individuals' academic and social life. Research has shown that this ability can be enhanced through appropriate interventions. Accordingly, the current study uses mindfulness-based yoga to enhance preschoolers' self-regulation ability. To measure different aspects of self-regulation, a child-battery was developed by the researchers. This battery included tasks that measure Executive Funtions (EF): cognitive flexibility, interference control, working memory, motor control, and delay of gratification. In addition to this child-battery, mother and teacher reported EF scales were used. The intervention was conducted with 45 preschoolers; of these; 24 were in the yoga group and 21 were in the waitlist control group. The intervention group received yoga twice a week for 12 weeks for a total of 15 hours of yoga. The study used a pre- and post-test design where the testers were blind to the conditions/hypotheses of the study. For the child-battery, results showed that children who were in the yoga group performed better on working memory but none of the other aspects of EF that were measured revealed a difference. In contrast, teachers reported no difference between the two groups for any aspects of EF. Lastly, mothers evaluations indicated that the two groups were different in terms of positive affect such that children in the yoga group were evaluated as higher. Future directions for implementing mindfulness-based yoga interventions will be discussed.

https://slack.com/app_redirect?channel=a-0139-Yıldırım-s1-s5

Session 1 (Monday, 4.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0140 Development of empathy in two cultural contexts (Budongo, Uganda & York, UK)

Carlo Vreden[1], Joanna Buryn-Weitzel[2], Santa Atim[3], Helen Biroch[3], Ed Donnellan[2], Kirsty Graham[2], Maggie Hoffman[2], Eve Holden[2], Michael Jurua[3], Charlotte Knapper[2], Nicole Lahiff[2], Sophie Marshall[2], Josephine Patricia[3], Florence Tusiime[3], Claudia Wilke[2], Katie Slocombe[2], Zanna Clay[1]

[1]Department of Psychology, Durham University, United Kingdom; [2]Department of Psychology, University of York, United Kingdom; [3]Budongo Conservation Field Station, Masindi, Uganda

Empathy, sharing and understanding others' emotional states, is essential to navigating our social lives. Recent studies have advanced our knowledge of its ontogeny, yet many questions remain unanswered, especially outside Western cultural contexts. Although empathy itself may be a cultural universal, cross-cultural variation in several factors associated with its development – such as emotion regulation development or parental socialisation goals – poses the question whether empathic development varies cross-culturally. Using a classic comforting paradigm, the current study investigates how infants (N = 61) in two different populations – Budongo, Uganda and York, UK – develop empathic concern and comforting behaviour in the first two years of life. In a longitudinal design at 9 and 18 months old, infants watched their mother or an experimenter pretend to injure themselves, accompanied by a standardised set of communicative signals. Infant reactions were video coded for markers of cognitive and affective empathy, and comforting behaviour. Preliminary analyses suggest no cultural or familiarity differences in cognitive empathy despite variation in parental socialisation goals but identified differences in affective empathy. In response to their mother's distress, Ugandan infants were more likely to show concerned affect than UK infants, whereas UK infants produced more facial expressions of positive affect than Ugandan infants. Comforting behaviour was produced at similar rates and both UK and Ugandan infants comforted their mothers more often than experimenters. This suggests that the capacity for empathy may reflect a cultural universal, but its development might not be entirely unaffected by cultural socialisation.

https://slack.com/app_redirect?channel=a-0140-Vreden-s9-s10

Session 9 (Thursday, 7.1., 1 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0141 Do toddlers trust a leader more than a bully?

Francesco Margoni[1], Luca Surian[2]

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Previous research from our Laboratory has shown that already in their second year of life, children are able to tell respect-based power exerted by a leader from fear-based power exerted by a bully. Here we asked whether toddlers trust a leader more than a bully. Two groups of toddlers (15 younger toddlers: 18-23 months; 13 older toddlers: 24-30 months) and one group of 32 adults (age range: 20-39 years) were initially presented with two computer-animated events involving geometric characters. In one event, three protagonists interacted with a leader character: they bowed to it and gave it their ball. In the other event, the protagonists interacted instead with a bully who hit them and stole their ball. Then, participants saw a scene containing two novel objects (A, B). During this third event, the leader indicated one object while saying "Look! A zaffo! This is a zaffo!", whereas the bully labeled in the same way the other object. After the movies, participants were presented with a set of the novel objects (two A objects, two B objects) and two familiar objects (two cubes), and were encouraged to give a zaffo to the experimenter ("Please give me a zaffo"). Results showed that most of the younger toddlers selected the object indicated by the bully, whereas most of the older toddlers and adult participants selected the object indicated by the leader. This research can help understand how the type of power displayed by who is in charge can shape learning processes early in life.

https://slack.com/app_redirect?channel=a-0141-Margoni-s6-s11

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0142 Do German infants understand common nouns? – An eye tracking study

Jessica N. Steil, Claudia K. Friedrich & Ulrike Schild

Eberhard Karls University of Tuebingen, Germany

Work with the looking-while-listening paradigm suggested that six-month-old English-learning infants understand several common nouns. This was evidenced by systematic fixations towards a target picture (while one distractor picture was present) named by either infants' caregiver (Bergelson & Swingley, 2012, PNAS) or by an unfamiliar talker (Bergelson & Swingley, 2018, Child Development). However, Norwegian-learning infants did not systematically fixate target pictures named by an unfamiliar speaker until they were 8 to 10 months old. Moreover, their success in this task appeared to be modulated by frequency differences between target and distractor: High (resp. low) frequent targets attracted more fixations if they were paired with low (resp. high) frequent distractors (Kartushina & Mayor, 2019, Royal Society Open Science). In the present eye tracking study, we tested 49 monolingual German infants age four to 14 months by means of a looking-while-listening paradigm. Infants saw two pictures side-by-side on a screen, whilst an unfamiliar male talker named one of both. Overall, infants did not fixate the target picture more than the distractor picture (Bayes factor in support of null effect with anecdotal to moderate evidence). Imbalance between target-distractor frequencies was a better predictor of target fixation probability than age of infants was. Our results further emphasize cross-linguistic differences in early word learning and strengthen the view that infants might use extra linguistic cues, such as frequency imbalance, to disambiguate between two potential referents.

https://slack.com/app_redirect?channel=a-0142-Schild-s2-s9

Session 2 (Tuesday, 5.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0143 CuriousMind: a game-based intervention to enhance social cognition in early childhood

Nara Andrade[1,2], Akshika Srinivasan[2], Lucas Carmo[3], Elizabeth Spelke[2], Chrissie Carvalho[4]

[1]Catholic University of Salvador, Salvador, Brazil; [2]Harvard University, Cambridge, USA; [3]Federal University of Bahia, Salvador, Brazil; [4]Federal University of Santa Catarina, Florianópolis, Brazil

Interventions during early childhood may help to increase school readiness, particularly in socio-cognitive domains. In this study, we developed and evaluated, in a small-scale experiment, a new game-based curriculum: CuriousMind (CM). The games aimed to enhance children's understanding of, and response to, social and emotional information: critical skills for effective communication, metacognition, and learning from others. The effectiveness of CM was evaluated in Salvador, Brazil, with children living in extreme poverty. In a preregistered, double-blind pilot study, we randomized 107 children (mean=69.7 months) to 3 conditions: the CM intervention, a Math Intervention (active control) and a no-treatment control. Children were evaluated before and after the 10-week intervention. A multiple linear regression served to predict children's social and emotional abilities at the endline, based on conditions and adjusting for baseline performance. A significant effect was found ($F_{(2.104)}$=53.37, p=<0.01) with an adjusted R^2 of .50 on the preregistered composite z-score generated from tasks that evaluated emotion understanding and theory of mind. Children receiving the CM treatment scored 0.72 z-score points above those in the control groups ($β$=0.49, p<0.01). Exploratory analyses suggested that the CM games especially enhanced children's emotion understanding. The CM therefore showed evidence of effectively stimulating children's socioemotional skills. These preliminary findings may serve as a basis for future field experiments, using the methods of randomized controlled trials, to evaluate games-based social cognitive curricula for enhancing children's aptitude and motivation for learning in schools and other social settings.

https://slack.com/app_redirect?channel=a-0143-Andrade-s4-s6

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0144 Parental contribution to language development: The case of Turkey during the COVID-19 pandemic

Junko Kanero[1], Aslı Aktan-Erciyes[2]

[1]Sabancı University, Istanbul, Turkey; [2]Kadir Has University, Istanbul, Turkey

COVID-19 caused significant changes in young children's learning environments around the world. The experience in Turkey has been somewhat unique because (1) most children had been taken care of at home even before the pandemic, and (2) relatively relaxed confinement measures were introduced, and children could still go outside with some limitations. As one of the most notable changes for many Turkish children was the father's increased presence at home, we evaluated the influence of fathers on development, namely vocabulary learning. Some studies, though mostly limited to the US, examined the father's influence on vocabulary development, and a few even found paternal input to be a better predictor than maternal input (e.g., Pancsofar & Vernon-Feagans, 2006). Our two-part online survey assessed children's vocabulary during the pandemic-related confinement measure (Time 1) and after its lift (Time 2). Parents of children at ages 8-36 months participated in the study (N = 133 for Time 1; N =52 for Time 2). As a proxy of the parental language input, parents wrote a story as if they were telling a bedtime story to their child. We found that (1) although the time fathers spent with their child increased during COVID-19, mothers still spent more time with the child than fathers, and (2) the number of words used in the story by mothers, but not fathers, predicted the child vocabulary at Time 2. We also report the relations among several factors including SES and the use of digital devices.

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Session 4 (Tuesday, 5.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0145 Examining the Role of Teacher and Parent Behaviors on Executive Function Development of Children: A Systematic Review

Sümeyye Koşkulu, Hanna Mulder, Eva van de Beijer-Bergsma, Elma Blom

Utrecht University, Department of Education and Pedagogy

Previous research has demonstrated effects of parent behaviors on Executive Function (EF) development and the theoretical framework of this effect is relatively well-established. As children start to spend more time in educational settings at an early age, teachers - just like parents - become significant adults who provide emotional and instructional support for children, which in turn may influence their cognitive development. The effects of teacher behaviors on EF development and how these can be understood are, however, understudied. The aim of this study is to develop a comprehensive theoretical model regarding the role of teacher behaviors in early childhood EF development by combining and comparing relevant findings from parenting and teacher studies. To this end we conducted a systematic review. Four search engines (PsychInfo, ERIC, Scopus and Web of Science) were screened separately for parent and teacher behaviors and their relations with EF performance of children aged between two and twelve. The search resulted in N=1,853 articles (n=1,459 for parent and n=394 for teacher behaviors). Based on the abstracts of the articles, N=292 articles (n=240 for parent and n=52 for teacher behaviors) were selected. Currently, the selected articles are being coded in terms of parent/teacher behaviors, their relationships with children's EF performance and the theoretical framework provided in the articles for the findings. In the presentation, we will discuss the outcomes thereby focusing on EF related parent and teacher behaviors and we will demonstrate how insights from the parenting literature can inform research about teacher behaviors.

https://slack.com/app_redirect?channel=a-0145-Koşkulu-s6-s11

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0146 Decoding brain networks through graph measures in infancy: The case of emotional faces

Silvia Polver[1], Ermanno Quadrelli[1,2], Chiara Turati[1,2], Hermann Bulf[1,2]

[1]Department of Psychology, University of Milano-Bicocca, Milan, Italy; [2]NeuroMI, Milan Center for Neuroscience, Milan, Italy

The current study aimed to apply graph theoretical measures to assess the topological structure of 7-months-old infants' brain functional networks in response to static and dynamic facial expressions of emotion. To disambiguate differential sets of brain activity, we combined a decoding technique (i.e., the Principal Component Regression; PCR) to graph metrics computation. More precisely, we first decomposed infants' EEG data and applied the PCR to evaluate the components specific to the static vs dynamic emotional faces in each EEG frequency band. We then computed nodes' strength to probe functional networks backbones and the Within Module Degree Z Score (WMDZ) as a measure of modular organization. Taken together, our results show that infants' brain activity contains enough information to differentiate between the processing of static and dynamic facial expressions of emotions (Bae & Luck, 2018). Indeed, we found a coherent differentiation between dorsal and ventral visual streams in both strength and WMDZ across frequency bands. Moreover, in line with previous findings pointing toward differential patterns of functional network topologies across frequency bands in infants (Tóth et al., 2017), our results indicate the presence of invariances across frequency bands denoting an already present rudimental network structure tuned to face processing at 7-months of age. Overall, these findings affirm the fruitfulness of the application of graph measures in developmental samples, due to their flexibility and the wealth of information they provide on infants' networks functional organization.

https://slack.com/app_redirect?channel=a-0146-Polver-s2-s12

Session 2 (Tuesday, 5.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0147 Auditory repetition suppression in infants at risk for Autism Spectrum Disorder and for Language impairment

Silvia Polver*[1], Chiara Cantiani*[2], Hermann Bulf[1,3], Chiara Turati[1,3], Massimo Molteni[2], Valentina Riva[2]

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In this study we sought to determine whether auditory repetition suppression dysfunctions are related to higher risk for language impairment across different disorders or they are a specific deficit characterizing infants at higher risk for Autism Spectrum Disorder (ASD), possibly associated to their sensory and socio-communicative impairments (Kolesnik et al., 2019). To this end, we investigated repetition suppression using an EEG non-linguistic auditory oddball paradigm (Riva et al., 2018) in three groups of 12-month-old infants, i.e. infants at familial risk for ASD (HR-ASD; n= 18), for Language Impairment (HR-LI; n= 18), and low risk (control) infants (n= 19). To avoid a priori choices of frequencies, time points and electrodes' clusters of interest, we applied cluster-based statistics on the rate of change from the first to the third repetition of tones. Results reveal the presence of a significant cluster differentiating HR-ASD and controls. The cluster underlying this difference comprised central and right temporo-parietal electrodes in the Gamma band. This result entails a coherent reduction of Gamma evoked activity after the first stimulus presentation (indexing an appropriate attentional allocation) in the control group but not in the HR-ASD group. Our results point toward the presence of a dampened auditory repetition suppression, underlying an enhanced sensory sensitivity in ASD. The absence of significant clusters for the HR-LI group suggests that repetition suppression impairments may not be directly related to language development per se, but might represent a specific biomarker of the sensory over-responsiveness of ASD, potentially affecting the development of socio-communicative skills.

https://slack.com/app_redirect?channel=a-0147-Polver-s10-s11

Session 10 (Thursday, 7.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0148 Sleep Quality in Toddlers Predicts Executive Functions in Early Chidhood

Maayan Peled, Anat Scher

Haifa University, Israel

Sleep is important for learning and cognitive development (Jennie & Dahl, 2008). In the early years, executive functions (EF) undergo accelerated development (Garon et al., 2008); only few studies addressed whether sleep quality is linked to EF (e.g., Bernier et al 2010). The present study examined the interrelations of sleep and EF during the transition from toddlerhood (age 2) to early childhood (age 3). We focused on working memory (WM), inhibition, and effortful control (EC) to examine if sleep plays a differential role in accounting for EF components, concurrently, and across time. rnThirty-six low-risk 2-year-olds (20 girls) were administered with EF age-appropriate tasks (Carlson, 2005); parents completed sleep questionnaire; a year later, children performed EF tasks, and sleep was measured by actigraph – movement detector validated for sleep assessment. rnAt 2 years, short sleep was linked to better WM (r=-.32 p=.05), at age 3, longer duration was positively correlated with EC (r=.47, p=.007) and negatively with WM (r=-.39, p=.03). Lower inhibition was associated with night-waking (r= -.42, p=.01), and latency (r=-.48, p=.003). Sleep quality at age 2 predicted subsequent EF (r=.44, p=.007). rnIn sum, sleep characteristics were linked to neurocognitive performance both concurrently and consecutively. Different components of EF showed specific links to sleep aspects; moreover, the links were age-dependent. This pattern of results, fit with Dahl (1996) theoretical perspective on sleep and development, highlighting the contribution of sleep to young children's neurocognitive performance. More studies that target the underlying cortical processes and mechanisms are needed.

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Session 2 (Tuesday, 5.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0149 Infants compute agent-specific costs of different actions

Barbara Pomiechowska[1], Gergely Csibra[1,2]

[1]Cognitive Development Center, Department of Cognitive Science, Central European University, Budapest, Hungary; [2]School of Psychology, Birkbeck College, University of London

Infants interpret observed goal-directed actions using the assumption that agents minimize action costs (i.e., the amount of energy or effort spent to reach a goal). Action costs depend both on the environment in which a given action is performed and on the motor competence of the actor. The environmental factor of action costs can be estimated by treating cost as a monotonic function of certain geometric elements of the scene (e.g., path length, size of the object to be lifted). The motor competence of unfamiliar actors, however, is difficult to assess. Nevertheless, by the assumption of efficiency, it can be inferred from the variability in an agent's behavior by relating her action choices to the environmental constraints. Across three looking-time experiments, we investigated whether 10-month-olds perform such inferences to learn about motor competence of agents. Experiments 1-2 established that infants recognise that costs of different kinds of actions vary as a function of obstacle size (e.g., detouring is less costly to bypass narrow walls; jumping is less costly to bypass long walls). Experiment 3 demonstrated that cost attributions are agent specific: when agent A always jumped while agent B jumped only to bypass low obstacles, infants inferred that jumping was more costly for B than for A. Our results suggest that infants (1) appreciate that action costs can vary across different actions and different agents and (2) infer them from the variability of observed behavior by assuming that agents act efficiently.

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Session 8 (Thursday, 7.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0150 The effect of eye gaze on infants' cortical tracking of speech and word recognition

Melis Çetinçelik[1], Caroline F. Rowland[1,2], Tineke M. Snijders[1,2]

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In child-caregiver interactions, eye gaze is a powerful social cue that facilitates children's learning. This is because the ability to establish eye contact and follow gaze allows infants to orient and attend to the relevant information in the naturally noisy environment. As a result, measures of early gaze-following and responses to joint attention correlate positively with receptive and expressive vocabulary (Brooks & Meltzoff, 2008). However, the effects of eye gaze on other aspects of language development is less clear. This is an important omission given the potential role of eye gaze as an ostensive cue that optimizes information transfer between the child and the adult (Csibra & Gergely, 2009). Eye gaze might have a general enhancement effect, facilitating learning in different aspects of language such as speech perception and word segmentation. In the current study, we investigated infants' cortical tracking of continuous speech and later word segmentation in ostensive and non-ostensive conditions. In an EEG study, 10-month-old infants watched videos of an adult telling stories, using either direct or averted eye gaze. In these audio-visual stories, one word was repeated in every sentence. Each video was followed by audio-only isolated words (familiar/novel), to test for an ERP word familiarity effect. We aimed to determine if infants' cortical tracking of speech was associated with word recognition performance, and whether eye gaze facilitates speech processing and word recognition. Preliminary results will be presented at the conference.

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Session 5 (Wednesday, 6.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0151 Relationship between individual variations in visual attention and executive function in one-year-olds

Sándor Nikolett Gabriella[1,2], Lábadi Beatrix[1], Balogh Eszter[1]

[1]Institute of Psychology, University of Pécs, Pécs, Hungary; [2]Institute of Psychology, Pázmány Péter Catholic University, Budapest, Hungary

Numerous prior studies showed an association between attentional performance and executive functions in preschool years. However, there are few studies investigated how early visual attentional processes influence the emerging executive functions in infancy. Based on our hypothesis we studied whether infants' look duration in Early Childhood Vigilance Task is associated with cognitive processes, and we proposed that shorter look duration predicts less time to process and encode stimuli in working memory, which leads to a result a better performance in executive function tasks. 210 neurotypical infants (12 months) participated in our research. To measure attentional performance, we used the looking time design of the Early Childhood Vigilance Task. Executive functions were measured in infants-friendly situations, including a working memory task, an A-not-B task, and an inhibition control test. Two expert independent raters evaluated and coded the attentional videos and an additional eye-tracking software analysis was also applied. Our preliminary findings indicated that looking time in attentional vigilance task was associated with early executive functions. More specifically, the shorter looking time predicted better performance in inhibition control. The results supported that the individual differences in infant visual attention are associated with some early executive functions. Keywords: infants, executive functions, visual attention, looking time

https://slack.com/app_redirect?channel=a-0151-Sándor-s8-s12

Session 8 (Thursday, 7.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0152 How Children Reason About Fairness, Inequalities and Reparations Inderpreet

K. Gill, Christina Starmans

University of Toronto, Toronto, Canada

When considering whether and how to correct pre-existing inequalities, adults focus on the original cause of the inequality, as well as the amount of time that has passed. Children, like adults, recognize that some causes of inequality, such as hard work and merit, are permissible, because they represent fair outcomes (Starmans, Sheskin, & Bloom, 2017). Here, we investigate how children reason about when past inequalities should be corrected, and when they are fair. In Experiment 1, younger (5-6 years) and older (7-8 years) participants were presented with pictures of three pairs of children who had unequal resources due to differences in hard work, bias, or luck, and were asked to distribute additional coins to the children. Younger children distributed coins equally regardless of condition, while older children distributed more coins to the child who had worked harder (thus increasing inequality), and to the child who was biased against or unlucky (thus decreasing inequality). Experiment 2 proceeded similarly, except the inequalities were described as having happened due to merit, bias, or luck one year in the past, while the two children worked equally hard today. As in Experiment 1, younger children distributed extra coins equally in all conditions, and older children again distributed more to the child who was biased against or unlucky. However, older children were more likely to distribute coins equally in Experiment 2 than Experiment 1, suggesting that they are less likely to rectify inequalities created in the distant past than those created recently.

https://slack.com/app_redirect?channel=a-0152-Gill-s5-s10

Session 5 (Wednesday, 6.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0153 The effect of gender in repetition-based rule learning: a meta-analysis of infant NIRS studies

Jessica Gemignani, Judit Gervain

University of Padova, Padova, Italy

Gender differences are known to exist across many linguistic skills: from a young age, girls have better word comprehension than boys (Fenson et al 1994, Eriksson et al 2012), they have a larger vocabulary size (Fenson et al 1994, Galsworthy et al 2000, Bouchard et al 2009), they produce more communicative gestures (Fenson et al 1994, Eriksson et al 2012), they produce longer and more syntactically complex sentences (Maccoby and Jacklin 1974, Hyde and Lynn 1988, Eriksson et al 2012). Gender differences in linguistic abilities are thought to arise from the interplay of a number of factors, including differences in hemispheric lateralization (Shaywitz et al 1995), in cortical volumes associated to language functions (Harasty et al 1997), in hormonal influences (Burnstein et al 1980) and also in parental interactions (Halverson and Waldrop 1970). However consistent the effect of gender is in many linguistic dimensions, its effect size is normally small and only accounts for 1-2% of the variance; therefore it's normally too subtle to be investigated in single studies. The goal of this work is to establish whether a gender difference also underlies repetition-based rule learning at birth (Gervain et al 2012) and to shed light on their hemodynamic correlates. To this end, a meta-analytic approach is employed to analyse nine experiments (N= 174, 90 boys, 84 girls) investigating patterns of functional activation in response to repetition sequences by means of functional near infrared spectroscopy (fNIRS). Preliminary results suggest girls exhibit higher activation than do boys in the left hemisphere.

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Session 1 (Monday, 4.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0154 What's inside? Preschoolers' intuitions about novel animate agents

Jonathan F. Kominsky, Patrick Shafto, Elizabeth Bonawitz

Rutgers University - Newark

Previous work with preschoolers has found that they expect familiar biological kinds (e.g., sheep) to have biological-looking insides, and familiar artifacts (e.g., cars) to have mechanical-looking insides (Simons & Keil, 1997). The origins of these 'insides' intuitions are unclear. Children typically have little direct experience with the insides of these entities, particularly biological ones. One intriguing possibility is that these expectations are derived from early-developing intuitions about animate agents. From infancy, humans have the ability to distinguish animate agents from inert objects. We examined whether preschool children (N=92; 62 from preschools in the Newark, NJ area, 30 online) have specifically biological expectations about novel animate agents, or if they only have more general expectations that animate agents should have an internal source of motion. We presented preschoolers with a novel animate agent and a novel inert object, and asked them whether each one had mechanical insides, biological insides, or was empty. Preschoolers were significantly less likely to say the self-propelled object was "empty" (31/92), Chi-sq(1) = 3.998, p = .046, but they were equally likely to pick mechanical and biological insides, p = .74. However, they were able to accurately match biological insides to familiar animals and mechanical insides to familiar artifacts (Accuracy score, 0-2, M = 1.21, SD = .75), t(91) = 2.64, p = .0096. These results suggest that preschoolers' biological intuitions are only applied to familiar entities and are not generally applied to all animate agents.

https://slack.com/app_redirect?channel=a-0154-Kominsky-s3-s7

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0155 Whole-head fNIRS technology for located motion tracking

Iara de Almeida Ivo[1,2], Tommaso Ghilardi[2], Marlene Meyer[2], Sabine Hunnius[2], Jörn M. Horschig[1], Willy Colier[1],

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Recent literature on wearable functional Near Infrared Spectroscopy (fNIRS) suggests that we can reduce movement artefacts and increase the number of usable trials in datasets with external information, such as movement behavior, channel position, and variable channel depth. The aim of this study is to examine the relationship between channel location and quantified head movements to better understand their effects on infant fNIRS data. By using an Inertial Measuring Unit (IMU), we can effectively track motion of the participant, thus quantifying movements performed during an experiment. Motion tracking is especially important since movement artefacts are the number one cause of epoch removal in infancy research with neuroimaging techniques. We will relate the IMU-measured head movements to their effect on fNIRS amplitude changes across a wide net of channel locations across the scalp. To that end, we are currently recording data of 12-month-old infants with a 45-channel fNIRS device, which incorporates a head mounted IMU. The sessions are video-recorded to identify movements and cross-validate the data of the movement sensor. The effects of movement episodes on oxygenated and deoxygenated haemoglobin concentration amplitude will be examined per channel. In the future, the results of this study will be used to develop a head motion artefact correction algorithm for infant data. Furthermore, we recommend all fNIRS studies to use head-mounted IMU sensors to correct for head movement, for the inclusion of IMUs in data driven algorithms, and consequent movement artefact removal will have profound influence on infant data quality and studies.

https://slack.com/app_redirect?channel=a-0155-Ivo-s7-s8

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0156 Children's Inferences of Moral Character Across Different Moral Subdomains

Aisling M. Curtin, Inderpreet K. Gill, Jessica A. Sommerville

University of Toronto, Toronto, Canada

Character traits can be beneficial as abstract tools to navigate our social worlds to infer an individual's future behaviour (Heyman & Gelman, 1998). Although young children may not reliably use trait terms (Heyman & Gelman, 1998), they may show an implicit understanding of traits by demonstrating behavioral generalizations across different contexts. We investigated children's understanding of character traits in the moral domain. After watching a resource distribution in which a character distributed resources equally (i.e., fairly) or unequally to two individuals (i.e., unfairly), we showed 4- to 7-year-old children a scenario in which the same individual either helped another actor or hindered her. Children were then asked if protagonist's behaviour in the help/hinder scenario was surprising. Their conceptual understanding of surprise was measured. Children's reaction to the test event varied based on whether it was morally consistent with the familiarization event in both conditions, $\chi2$ (1, N = 82) = 8.72, p = .004. Moreover, children were more likely to be unsurprised by a morally consistent event than they were by an inconsistent event. Additionally, children's conceptual understanding of surprise did not predict their performance on the moral character task. These findings suggest that young children expect consistency in moral behavior across subdomains. In addition, their ability to report surprise on this basis does not depend on their conceptual understanding of surprise.

https://slack.com/app_redirect?channel=a-0156-Curtin-s3-s10

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0157 Children's integration of prior evidence in generalizations about antisocial behaviour

Denise Arefhaghi, Rebekah Gelpí, Jessica A. Sommerville

Department of Psychology, University of Toronto, Canada

A core challenge that we must contend with across development is accurately inferring the intentions and future behaviour of others (Buchsbaum et al., 2012). We may use information through automatic perception of traits and cues and background knowledge of normative social behaviour to predict how others are likely to behave (FeldmanHall & Shenhav, 2019). Pilot data (N = 15) suggests that children draw strong generalizations about moral violators when presented with dispositional cues such as laughing and pointing at a potential victim, but are much less likely to do so when these cues are not present, $t(13) = -3.34$, $p < 0.01$. In the absence of such cues, children may rely more heavily on normative beliefs of how one should behave; alternately, they may integrate new dispositional information in a Bayesian fashion and hold strong prior beliefs that actors will generally follow social norms. To distinguish these two predictions, ongoing research tests children's generalizations from dispositional cues about characters who previously committed a moral violation and those who did not. In this study, children ages 6 to 8 view an actor committing a moral violation (e.g. hitting), a kind act (e.g. giving cookies), or neutral act (e.g. jogging), and then infer the actor's likely behaviour in new situations where dispositional cues are absent, hidden, or consistent with an antisocial behaviour. This data will offer insight into how children's social reasoning influences their understanding of prosocial and antisocial agents. Keywords: moral judgment, generalization, Bayesian inference, moral development

https://slack.com/app_redirect?channel=a-0157-Arefhaghi-s1-s6

Session 1 (Monday, 4.1., 8 pm CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0158 Infants' Expectations Across Moral Subdomains Inderpreet

K. Gill, Jessica A. Sommerville

University of Toronto, Toronto, Canada

Adults use information about an individual's moral character to infer future behaviour across contexts (Siegel, Crockett & Dolan, 2017). Past work with infants suggests they prefer agents who help over those who hinder (Hamlin & Wynn, 2011) and are sensitive to unequal resource distributions (Schmidt & Sommerville, 2011). However, unlike adults, it is unclear whether infants generalize behavior across moral domains. Related work shows 15-month-olds expect agents who previously helped another agent to distribute resources equally (Surian, Ueno, Itakura & Meristo, 2016). Here we investigate whether infants expect fair agents to subsequently be helpful, and for unfair agents to subsequently be unhelpful. Infants (12-24 months) saw a protagonist distributing cookies between two individuals either fairly or unfairly during familiarization trials. During test trials, the protagonist either helped a new agent achieve her goal or hindered her. Preliminary results show that infants in both conditions look longer to the helping event than the hindering event: unfair condition, t(15) = 2.507, p = .024; fair condition, t(17) = 2.373, p = .030. A prior control experiment suggests that our findings are unlikely to stem from a baseline preference for the helping event. Infants may be interpreting both distributions as generous (i.e protagonist is giving away resources) as the faces of the recipients are not featured whereas in prior work, recipients' side profiles are visible (Lucca, Pospisil & Sommerville, 2018). Future work seeks to explore whether contextual factors such as visible faces influence expectations of the distributor.

https://slack.com/app_redirect?channel=a-0158-Gill-s1-s2

Session 1 (Monday, 4.1., 8 pm CET)
Session 2 (Tuesday, 5.1., 8 am CET)

A-0159 Inequity aversion in preschoolers and school age children

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For human cooperation, fair resource sharing is very important which is promoted by inequity aversion. We measured the inequity aversion of children between the ages of 4 and 9 to examine how fairness behaviour functions in them. Our aim was to investigate how young children respond to disadvantageous inequity (when their partner gets more candies) and advantageous inequity (when they get more candies). Children played with same sex individuals from another (pre)school group a simple choice game in which they decided between two allocations of candies. One of them acts as the decider who directly affect the choice between allocations, meanwhile the other child is a passive partner. Every child encountered only one condition, either advantageous or disadvantageous. In each treatment, they had to decide between equal amounts and different inequal amounts. Additionally, we asked the children about the reason of their decisions and analysed the answers with qualitative methods. We found that children do not exclusively attend to their own pay-off although at times they seem to make random decisions. For the most part girls and boys did not differ in their choices, although boys are more prosocial and have shown an other-regarding choice. Generally speaking, it can be stated that older children pursue equality more often than preschool children, but 65 % of them still choose more candies if the quantity is big. Children can use different strategies through the game, although they cannot or do not want to tell the cause of their decisions.

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Session 8 (Thursday, 7.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0160 Altruism as a Cue for Kinship Detection in Early Childhood

Sinamys Bagh, Anna Michelle McPhee, Jessica A. Sommerville

University of Toronto, Toronto, Canada

Children and infants use behavioural cues to anticipate and infer third-party social affiliations (Liberman & Shaw, 2017; Powell & Spelke, 2018). However, little research has focused upon whether children use the presence and absence of these social cues to differentiate between and ascribe meaning to these relationships beyond mere group affiliation; in particular, whether these cues are used to aid in kinship detection. The current study aims to examine whether young children (4- to 7-years-old) use the presence and absence of altruistic behaviour (e.g., taking care of a sick child) to infer kinship, or lack thereof, between an adult and child. In the first task, participants will be read stories about an adult character who either does or does not behave altruistically towards a child. The participants will be asked to determine whether or not the adult is the child's parent. We predict that children will use the presence of altruistic behaviour to anticipate a kinship relationship between the adult and child. Next, participants will be read stories about an adult, identified as either the parent or neighbour of the target child, and asked to determine how the adult will act towards the sick child (either altruistically or selfishly). We predict that participants will expect the adult to display altruistic behaviour when they are identified as the parent, but not the neighbour, of the protagonist. The findings from the current study will provide insight into the types of social cues children use to aid in kinship detection.

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Session 3 (Tuesday, 5.1., 1 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0163 Does verbal highlighting of a tool's function help 18- and 24-month-olds to imitate?

Léonie Trouillet[1], Ricarda Bothe[2], Nivedita Mani[2], Birgit Elsner[1]

[1]Department of Psychology, University of Potsdam, Germany; [2]Psychology of Language Research Group, University of Göttingen, Germany

Infants often observe action demonstrations that are accompanied by communicative cues (e.g. socio-emotional cues, Fukuyama et al., 2013; verbal highlighting, Elsner & Pfeifer, 2012). This may help them to direct their attention to relevant aspects of the action demonstration and to identify new information (Elsner & Pfeifer, 2012; Gergely & Csibra, 2005). In the current study, we investigated how the semantic content of verbal information influences infants' learning of novel action-object-associations. In an imitation study, we demonstrated 18- and 24-month-old infants (n = 44 per age group) with two tool-use actions. One object for pushing and one object for pulling were used on a novel effect box. In a between-subjects design, the action demonstration was accompanied by verbal input with varying semantic content. In a specific language condition, the model highlighted the action-object association ("I'm pushing/pulling with the Tanu/Löki"), but in an unspecific language condition, the input did not differentiate between the actions ("I'm doing this with that"). We expected infants to benefit from the semantic content in their imitative learning (imitation specific condition > imitation unspecific condition), and that 24-month-olds, with increasing linguistic capabilities, would profit more from the specific verbal input than 18-month-olds (larger condition difference). Preliminary analyses indicate that 18-month-olds were able to learn the action-object-associations. Further analyses determining a possible effect of verbal information on learning rates in 18- and 24-month-olds are still pending. This study will provide new insight on the influence of verbal information on learning of action-object-associations during the second year of life.

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Session 7 (Wednesday, 6.1., 8 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0164 Infants' Neural Processing of Speech in Parent-Infant Interactions

Katharina Menn*[1,2], Christine Michel*[3,4], Stephanie Hoehl[†5], and Claudia Männel[†1,6]

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Infants are inherently social individuals and engage in social interactions long before they are able to speak. Correspondingly, in addressing infants, adults accommodate their speech in a characteristic way called infant-directed speech (IDS). Infants benefit from this speech register, as they prefer listening to IDS over adult-directed speech (ADS) (Cooper & Aslin, 1990; ManyBabies Consortium, 2020), and there are first indications of increased processing of IDS over ADS on a neural level (Kalashnikova et al., 2018). Yet, neural processing of IDS in social interactions has not yet been studied, specifically when infants are listening to their own parent's highly familiar speech patterns. To this end, we here investigate infants' neural processing of speech in a natural communication context, contrasting infants' responses to their parent's IDS versus ADS. In parent-infant dyads, parents described novel objects to their 9-month-olds while the infant's EEG was recorded. For IDS, parents were instructed to talk to the infant as they would typically do, while for ADS, parents were supposed to describe the objects to an adult. To confirm this speech manipulation, we will quantify the acoustic features of parents' IDS versus ADS. To determine infants' neural processing of speech (N=30), we will employ speech-brain coherence, which measures the phase consistency between the neural signal and the speech envelope. We hypothesize infants to show a higher speech-brain coherence for IDS than ADS at the syllabic rate. These results would imply that parents' speech adaptations in interacting with their child aids the infant's neural processing of speech.

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Session 2 (Tuesday, 5.1., 8 am CET)
Session 3 (Tuesday, 5.1., 1 pm CET)

A-0165 Statistical Learning in Developmental Language Disorder: Tracking Learning with Online and Offline Measures

D. Dobó[1,2], K.S. Lukics[1,2], K. Németh[1,2], Á. Szőllősi[1,3], Á. Lukács[1,2]

[1]Budapest University of Technology and Economics, Hungary; [2]MTA-BME Lendület Language Acquisition Research Group, Budapest, Hungary; [3]Institute of Cognitive Neuroscience and Psychology, Hungarian Academy of Sciences, Hungary

The vulnerability of statistical learning (SL) in developmental language disorder (DLD) has mainly been demonstrated with metacognitive offline measures which give little insight into the more specific nature and timing of learning. We explored SL in school-age DLD (n=15) and typically developing (TD) control (n=15) children in acoustic verbal segmentation tasks with an online target detection task with reaction times (RT) and offline two-alternative forced choice (2AFC) and production measures. Learning was evident in both groups in the online RT measure, while the offline tasks only showed evidence of learning in the TD group. The RT patterns showed significantly slower and less effective SL in DLD than in TD, but the comparison of accuracy during the online task did not reveal any SL impairment in the DLD group. The offline TD advantage was more evident in the production task than in the 2AFC measure. Our findings from different measures confirm previous findings that children with DLD show impaired SL in the acoustic verbal domain, but they provide a more fine-grained pattern about learning by showing differences in the timing of learning in the two groups. The results also imply that online RT measures provide more sensitive and valid indices of SL than online accuracy and offline tasks, and are better suited for testing SL in children.

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Session 10 (Thursday, 7.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0166 Do Communicative Signals During Joint Attention Promote Mutual Neural Processes?

Anna Bánki[1], Moritz Köster[2], Radoslaw Martin Cichy[2], Stefanie Hoehl[1]

[1]University of Vienna, Austria; [2]Freie Universität Berlin, Germany

Communicative signals such as eye contact have been shown to increase infants' brain activation in response to visual stimuli (Hoehl et al., 2014) and considered to promote shared attention (Siposova & Carpenter, 2019). In this study, we will assess whether communicative signals enhance infant-caregiver dyads' mutual neural processes during joint attention. 30 infants (age: 11-12 months) with their mothers will observe rhythmic visual stimuli (images depicting natural objects) in two conditions: joint attention interaction with or without communicative signals. To track dyads' mutual neural processes, images will be flickered at 4 Hz, thus will elicit evoked responses in the brains of infant and caregiver that can be recorded with dual electroencephalography (EEG) (Köster et al., 2017). First, we predict that communicative signals should lead to increased attention and thus enhanced visual processing (higher evoked responses) within the dyad. Second, we hypothesize that communicative signals will facilitate a greater attention alignment (higher amplitude correlations between infant's and caregiver's evoked responses) that leads to more similar processing of perceptual input. To assess if communicative signals increase the similarity between the activated object representations of the dyad, we will conduct representational similarity analysis (Cichy et al., 2014). This study will be the first to apply rhythmic visual stimulation as a means to measure the impact of communicative signals during joint attention. In contrast to focusing solely on infants' brain responses, this approach will enable new insights into how joint attention modulates both infants' and caregivers' brain activities and shapes shared visual experience.

https://slack.com/app_redirect?channel=a-0166-Bánki-s1-s2

Session 1 (Monday, 4.1., 8 pm CET)
Session 2 (Tuesday, 5.1., 8 am CET)

A-0167 The pragmatics of mentalization in preverbal infants

Bálint Forgács[1], Judit Gervain[2,3], Eugenio Parise[3], György Gergely[4], Ildikó Király[1]

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Preverbal infants are able to attribute language comprehension to social partners, which demonstrates that Theory-of-Mind is not limited to perceptual object tracking in infancy. However, the neural bases of these mechanisms are not clear. An electrophysiological indicator of semantic processing, the N400 effect was apparent, together with a frontal response, when objects were labeled correctly for infants, but incorrectly from the perspective of another person. Previous studies combined false belief induction with incongruent object naming. Our current question was: were neural responses driven by language use or by mentalization? How tightly are these systems linked? In our live puppet-theater paradigm we measured the EEG responses of 14-month-olds, while we created a false belief in an Observer by secretly replacing an object she saw (e.g., a teddy bear) by another one from the same category (another teddy bear). In a control condition the toy was slightly raised and shaken to induce a state but no object change, and then objects in both conditions were pointed at and labelled but instead of their names, by verbal exclamations such as "hmm" or "oh". Infants exhibited frontal and parietal responses but with different characteristics than previously reported. Even though these results are not straight forward to integrate with prior findings, they demonstrate that both frontal and parietal neural systems contribute to mentalization in infancy, be the representations attributed to social partners referenced by content words or vague exclamations. The results are an important step towards understanding the neural systems subserving ToM in infancy.

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Session 5 (Wednesday, 6.1., 8 am CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0168 The Linguistic Expression of Causation in typically developing Russian children 9 to 30 months.

Elena Galkina[1], Sofia Krasnoshchekova[2]

[1]Pavlov Institute of Physiology RAS, St. Petersburg, Russia; [2]Institute for Linguistic Studies RAS, St. Petersburg, Russia

We have investigated the acquisition of the expression of causation in in typically developing Russian children aged from 9 months to 2.5 years. We understand a causative situation as composed of two interrelated events viewed by the speaker as causally dependent on each other. We have used longitudinal children's speech recordings (14 children aged from 9 months to 2.5 years). The emergence of causative statements starts at the pre-speech stage. The early semantics in cause-utterances is semantic of condition, it reflects the interactions between the children and the surrounding environment. It was found that at the age of 1.6 - 1.8 years, the child is already capable of: explain his request, describe your condition and its cause, give reasons for refusal, talk about the motives for their own actions, talk about the consequences of your own actions. The main means of expressing causation in the speech of children up to two and a half years are causative verbs, complex non-union sentences, and case forms with causal meaning. The "secondary" ways of expression where the causality is combined with other meanings are particular for the early child utterances. The verbalization of causation goes in accordance with the development of mental and physical models. In the beginning, the statements are built according to the principle of functionality and subjectivity.

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Session 5 (Wednesday, 6.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0169 How Maternal Guidance of Attention Shapes Infants' Basic Visual Perception? – A Cross-Cultural Neuroscience Approach

Anna Bánki[1], Daiki Yamasaki[2], Shoji Itakura[3], Stefanie Hoehl[1], Moritz Köster[4]

[1]University of Vienna, Austria; [2]Kyoto University, Japan; [3]Doshisha University Center for Baby Science, Japan; [4]Freie Universität Berlin, Germany

Human visual perception differs profoundly between cultures. In Western cultures, the relative focus on the object versus the background of a visual scene is higher than in Eastern cultures (Masuda & Nisbett, 2001), a phenomenon coined context-sensitivity. Köster & Kärtner (2018) found that inter-individual differences in children's context-sensitivity are explained by parental attention guidance. In the present study, we investigated whether maternal attention guidance affects 11-12-month-old infants' context-sensitivity in a culture specific way. We assessed 84 mother-infant dyads from two cultural contexts, Japan (n=37) and Austria (n=47) using a frequency tagging approach. This is, pre-senting object and background at different driving frequencies elicits separate evoked responses for each element (Köster et al., 2017). Dyads were shown visual scenes with an object in front of a background flickered with different frequencies while infants' brain activity was recorded with electroencephalography (EEG). We applied a pre-post design with a training phase in between: in the pre- and post-phases, mother-infant dyads observed the scenes. During training, mothers were instructed to point out interesting elements of their choice to their infants. Results revealed that Austrian mothers guided their infants' attention more frequently to the object versus the background, compared to Japanese mothers (p<0.001, t=3.9), indicating that cultural differences in maternal at-tention guidance already emerge in early interactions. Further, we will assess if maternal attention guidance increases infants' evoked responses to the element pointed out during training. We will discuss our findings regarding the main hypothesis that maternal attention guidance shapes infants' basic visual perception.

https://slack.com/app_redirect?channel=a-0169-Bánki-s5-s9

Session 5 (Wednesday, 6.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0170 Success and Failure in Preschoolers' Reasoning about Possibilities

Neha Khetrapal, Péter Rácz & Ernő Téglás

Cognitive Development Center Department of Cognitive Science Central European University Budapest, Hungary

In absence of modal concepts, one lacks the capacity to entertain multiple incompatible alternatives and as a consequence, fail with problems that require reasoning about possibilities. The emergence of modal concepts may show a protracted development. Redshaw and Suddendorf (2016) designed a minimal task to assess children's ability to take into consideration multiple, yet equal, possibilities in parallel. They gave preschoolers the opportunity to catch an item dropped into a forked tube with two bottom openings. The item had an equal probability of exiting from each of the two openings. On this task, only children older than four years of age maximized their success by covering both the bottom openings with two hands. In a touchscreen adaptation of this task, we requested 3 and 4 year olds to catch a falling ball by navigating a basket at the bottom of the screen (Experiment 1 & 2). Our results are in line with the previous findings: while both age groups performed better than chance, 4 year olds outperformed the younger age group. In a further manipulation of the tube task, we assessed 4 year olds' ability to reason about outcomes that are not equiprobable. Their performance, however, dropped to chance level when they were required to combine (Experiment 3) or compare (Experiment 4) outcomes with different probabilities. Our findings reveal children's difficulty to deal with possibilities that are not equal, suggesting that the capacity to reason about possibilities in a flexible manner continues to develop during the late preschool period.

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Session 2 (Tuesday, 5.1., 8 am CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0171 Touchscreen device usage and cognitive development in one-year-old infants

Beatrix Lábadi[1], Eszter Balogh[1], Diána Á. Varró-Horváth[1], Krisztina Kopcsó[1,2], Nikolett G. Sándor[1], Melinda Pohárnok[1]

[1]Institute of Psychology, University of Pécs, Pécs, Hungary; [2]Hungarian Demographic Research Institute, Budapest, Hungary

Children begin using digital media earlier and in increasing proportions, which may have direct and indirect impacts on cognitive and social-emotional development. Most of the previous studies have examined the use of digital devices of young children and its effects by parental self-reports, while little research has conducted directly assessing the effects on children's abilities. Our aim was to explore the impact of early exposure of digital devices on overall developmental indicators and those cognitive abilities that are good predictors of later social-cognitive development. In the current study we assessed the use of digital devices of families with one-year-old infants (N=245, Born in South-west, as part of Growing Up in Hungary). We examined children's developmental status, reported by a parental screening test (ASQ-3), and early executive functions (inhibition, working memory), measured by task-based methods. The results showed that passive TV viewing and touchscreen media usage became increasingly prevalent among toddlers, and infants' screen time activity is highly correlated with parental screen media habits. Among the infants' developmental indicators, the fields of gross and fine motor development, problem solving, working memory performance and inhibition showed negative association with early digital media consumption patterns. These empirical findings contribute to the understanding of the developmental impact of early screen activity and to help developing paediatric recommendation.

https://slack.com/app_redirect?channel=a-0171-Lábadi-s2-s10

Session 2 (Tuesday, 5.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0172 Screen Use at Home is Associated with Shorter Triadic Interactions in Infant-Caregiver Pairs

Berna A. Uzundag[1], Ezgi Yildiz[1], Merve Nur Altundal[1,2], Dilara Kessafoglu[1,3]

[1]Kadir Has University, Istanbul, Turkey; [2]Özyeğin University, Istanbul, Turkey; [3]Koç University, Istanbul, Turkey

Parents' use of mobile devices and background TV (i.e. TV on while nobody is watching) result in a decrease in parental responsiveness and in the quality and quantity of parent-child interactions (Kirkorian et al., 2009; Kildare & Middlemiss, 2017). Longer triadic interactions where both the parent and the child attend to a third entity together predict better language development (Tomasello & Todd, 1983). This study is the first to investigate whether triadic interactions last shorter at homes where parents use mobile devices and background TV around their infants. Forty-five infants were video-recorded at home for 60 minutes when they were 8, 10, and 18 months of age. During the observation, a researcher marked the beginning and the end of each triadic interaction episode (i.e. parent and child attend to an object/activity together) on a tablet computer. Background TV and caregivers' mobile device use around their children were coded as binary variables (none/present) via watching the video recordings. Triadic interactions lasted shorter at homes with background TV compared to homes without background TV both at 8 ($t(39)=2.1$, $p=.047$) and 10 months ($t(41)=2.3$, $p=.024$). Furthermore, triadic interactions at 10 months were shorter at homes where parents used their mobile devices around their infants compared to parents who did not, $t(41)=3.0$, $p=.006$. These results suggest that for younger infants parental use of screen-based technology at home is detrimental for triadic interactions, which play an important role in language development.

https://slack.com/app_redirect?channel=a-0172-Yildiz-s8-s10

Session 8 (Thursday, 7.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0173 Infant's perception of speaker-selection in multi-party conversations

Lilla Magyari[1,2], Bálint Forgács[1,3], Ildikó Király[1,3]

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A number of previous studies have shown that infants already around their first birthday or even earlier expect speech to evoke contingent responses between social partners during verbal interactions. However, it is not well understood how these expectations mature with developing linguistic and paralinguistic knowledge. Therefore, we studied infant's expectations regarding communicative interactions, specifically turn-taking behaviour in multi-party conversations from a third-person perspective using eye-tracking. We aimed to study whether infants between 16-20 months of age expect a response from a person who is addressed by a direct eye-gaze during a multi-party conversation and whether such an expectation is facilitated by linguistic information conveyed during the speaker's turn. In our experiment, infants were watching short video-clips in which three persons interacted communicatively. At the beginning of the clip, one person either uttered a two-syllable-long novel word (speech) or coughed. While she vocalized, she simultaneously either gazed at one of the other persons (speaker selection) or looked down (no-selection). Data gathering is still ongoing, but preliminary analyses suggest that infants expect a response from the interlocutor who was selected by the speaker's eye-gaze and this expectation is stronger when accompanied by speech compared to a non-speech cough. If confirmed, results would suggest that infants not only expect a turn-taking structure in verbal interactions, but they are also sensitive to the communicative function of eye-gaze in next speaker selection. Such outcome would support the view that multiple information sources are integrated in infancy, while we are learning the pragmatics of human communication.

https://slack.com/app_redirect?channel=a-0173-Magyari-s8-s12

Session 8 (Thursday, 7.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0174 A Cross-Cultural Investigation of Altercentric and Egocentric Biases

Feride Nur Haskaraca Kızılay, Marina Proft, Hannes Rakoczy

University of Göttingen, Göttingen, Germany

Two types of biases have been well-studied in social cognition research: Egocentric bias refers to the phenomenon that individuals are slowed down and led into error by their own perspective when explicitly asked to focus on others' perspectives (e.g., Samson et al., 2010). Altercentric bias suggests that our own judgments are modulated by how we think other agents perceive the world, indicating that we implicitly represent their perspectives, even when those are irrelevant or interfere with our own task (e.g., Southgate et al., 2020). However, whether and in which ways these biases are affected by cultural frameworks remains unknown. Therefore, the current study aims to investigate the egocentric and altercentric biases cross-culturally in relation to the culturally adopted type of self-construal. To this end, 94 German (Mage=28.11) and 94 Turkish adults (Mage=27.05) were tested whose cultures represent independent and interdependent type of self-construal, respectively. Tests were administered online on either the egocentric or the altercentric bias in the format of the so-called Sandbox task (Sommerville et al., 2013). Each subject received two types of trial per condition: experimental (aimed to measure biases arising from conflicting perspectives) vs. control (aimed to control for baseline biases that are irrelevant for perspective taking, e.g., memory bias). Within-subject comparisons of trials revealed no difference between the biases shown in experimental vs. control trials in neither condition/group. Between-cultures comparisons showed that Turkish adults displayed bigger altercentric bias than German adults (U(94)=835.0, Z=2.038, p= .042) but the amount of egocentric bias did not differ across cultures.

https://slack.com/app_redirect?channel=a-0174-Kızılay-s3-s8

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0175 Turkish Speakers' Conceptualization Of Belief-Related Words And Its Implications For Theory Of Mind Tasks

Feride Nur Haskaraca Kızılay[1], Hande Ilgaz[2]

[1]University of Göttingen, Göttingen, Germany; [2]Bilkent University, Ankara, Turkey

This study is composed of 3 substudies. Study 1 and 2 investigate whether there are pragmatic nuances between belief-related mental state verbs (MSVs, e.g., to think, guess, and falsely think) acknowledged by Turkish-speaking adults, and whether Turkish adults' implicit processing of the belief-including situations such as false belief (FB) tasks are affected by the appropriate (vs. inappropriate) use of these verbs. Study 3 investigates whether Turkish-speaking preschooler's performance in belief-related tasks of Theory of Mind (ToM) Battery [Diverse Belief (DB) and FB tasks, Wellman & Liu, 2004] is affected by the verb used in these tasks. In Study 1, 150 Turkish-speaking adults completed an online survey and judged the appropriateness of mental state words in belief tasks. Study 2 investigated Turkish-speaking adults' (n=61) accuracy rates and reaction times in response to interchangeable use of MSVs in FB tasks. In Study 3, 60 Turkish-speaking children were tested on both the original ToM Battery and on the pragmatically modified versions of the DB and FB tasks. The DB and FB tasks were modified by either a) replacing the MSV used in the task (i.e., "think") with a pragmatically and semantically more appropriate one (e.g., "guess" or "falsely think"); or, b) changing the epistemological circumstances of the task by adding an evidential basis for the belief so that the MSV used in the task (i.e., "think") conformed with the pragmatics of Turkish. Results revealed that Turkish-speaking children only benefited from one modification that involved a manipulation of the epistemological basis for the MSV.

https://slack.com/app_redirect?channel=a-0175-Kızılay-s2-s10

Session 2 (Tuesday, 5.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0176 Infants' interpretation of information-seeking actions

Bálint Varga, Gergely Csibra, Ágnes Melinda Kovács

Central European University, Budapest

We tested the hypothesis that infants would understand the purpose of information-gathering actions when they serve as sub-goals of instrumental tasks. We presented 14- to 15-month-old infants (n = 24) with actions that were inefficient with respect to the agent's instrumental goal but could be justified as information-seeking behavior in situations of uncertainty. Infants were familiarized to an agent selectively approaching one of two targets. In the test phase, the targets hid at separate locations either visibly (Certain condition) or invisibly (Uncertain condition) from the agent's perspective. In both conditions, the agent then took a detour to a position where it could gain visual access to the locations that served as potential hiding places for the targets. We paused the animation at this point and measured infants' looking time and pupil dilation, expecting longer looks and larger pupil size in the Certain condition, where the detour was unjustified. The results were in line with our expectations in both measures. While this evidence is compatible with our hypothesis, further studies are in progress to rule out alternative interpretations of our findings.

https://slack.com/app_redirect?channel=a-0176-Varga-s7-s11

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0177 Digital game-based learning about entropy

Lara Bertram[1,2], Eric Schulz[4], Matthias Hofer[5], Laura Martignon[3], Jonathan D. Nelson[1,2]

[1]University of Surrey, UK; [2]Max Planck Institute for Human Development, Berlin, Germany; [3]University of Education, Ludwigsburg, Germany; [4]Max Planck Institute for Biological Cybernetics, Tübingen, Germany; [5]Massachusetts Institute of Technology, Cambridge, Massachusetts

In today's digital information society, mathematical and computational literacy is becoming increasingly important. How information-theoretical, computational and mathematical skills can be effectively taught in school is a pressing question in educational, developmental and psychological research. Digital game-based learning promises to give students low-threshold access to active learning experiences while being emotionally and motivationally engaging. We present results from a classroom educational intervention in mathematics aimed at teaching students stochastic concepts and information-theoretical intuitions, using the novel game Entropy Mastermind. In a pre and post test experimental design we tested the effectiveness of using Entropy Mastermind to foster children's intuitions about entropy and probabilities and investigated effects of game-play on emotional and motivational variables (scales from PISA and TIMSS and standardized psychological scales). Based on our results we discuss the potential and limitations of digital game-based mathematics education in classrooms of today and the future.

https://slack.com/app_redirect?channel=a-0177-Bertram-s5-s10

Session 5 (Wednesday, 6.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0178 Neural Correlates of Observed Prosocial Actions in Infancy

Victoria Licht, Elena Nava, Margaret Addabbo, Chiara Turati

University of Milano-Bicocca, Milano, Italy

The present study investigates the neural correlates of prosocial and antisocial events in infancy and the role of individual differences, such as the attachment quality of the mother-infant dyad and infants' temperament, in prosocial processing. Infants were first familiarized to helping and hindering scenario, then in the following testing phase, ERP responses to short clips of the prosocial and antisocial action were measured. Significant differences were found over the N290 temporal component, which was larger in amplitude in response to prosocial compared to antisocial scenes. The Nc central component showed increased amplitudes in response to the antisocial condition compared to prosocial. Marginally significant effects were found over the central LPP component, which showed larger amplitudes in response to the prosocial condition. While effects in the LPP are trending toward significance in the differentiation of conditions, a regression analysis revealed scores of the Maternal Postpartum Attachment Scales are positively associated with amplitudes of the LPP in response to the prosocial events over central areas. Overall, our results suggest that infants differentiate at the neural level between the prosocial and antisocial scenes and that the quality of attachment in the mother-infant dyad, as well as the infants' temperament, have an impact on prosocial processing.

https://slack.com/app_redirect?channel=a-0178-Licht-s6-s11

A-0179 Preschoolers' understanding of misrepresentation: Why the false sign test overestimates performance in german-speaking children

Bianca A. Schuster[1], Michael Huemer[2,3] ,Beate Priewasser[2,3], Josef Perner[2,3]

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The current study aimed to examine whether previously observed discrepancies concerning the relationship between Wimmer and Perner's (1983) false belief- and Parkin's (1994) false sign task in German- and English speaking children could be explained by language related direc-tional cues present in the German false sign version. With the purpose of avoiding the use of directional elements, a new false representation task has been created with a coloured flag as representational medium. Comparisons of the performance of preschoolers aged 38 to 64 months in the three tasks revealed the original false sign task to be substantially easier than the false belief- and the flag task. Simulta-neously, false belief understanding and performance in the FS flag task were significantly correlated even after controlling for executive functions and verbal abilities. This supports a domain-general view of false belief understanding. Results suggest that using a direction sign as a representational medium can lead to overestimation of German-speaking children's representational understanding.

https://slack.com/app_redirect?channel=a-0179-Huemer-s5-s6

Session 5 (Wednesday, 6.1., 8 am CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0180 Alphie, the good mobile - The effect of an interactive mobile interface on 4-6-year-old children's socio-emotional skills

Krisztina Liszkai-Peres[1,2,3], Veronika Konok[4], Zsolt Jurányi[4], Renáta Tóth-Farkas[4], Zsófia Budai[4], Adrienn Kocsis[4], György Kampis[4], Ádám Miklósi[4]

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Popularity of mobile touchscreen devices (MTSDs) has markedly increased in children. Being mainly a solitary activity, it substitutes offline social interactions, thus MTSD use might hinder socio-cognitive development. However, MTSDs could be utilized as social agents that react to the users' behavior and facilitate social interaction with companions counteracting the negative effect of MTSDs. We investigated whether MTSD use in children is associated with worse socio-cognitive skills and whether a mobile interface (Alphie) decreases these differences between users and non-users. We measured socio-emotional skills in users and non-users (Non-user Control Group; NCG; users were randomly assigned to either the Experimental Group (EG; using Alphie) or the User Control Group (UCG). Alphie behaves like an artificial agent (e.g. expresses emotions) and facilitates interactions with partners through games. We logged digital activity in EG and UCG for 2 months, and EG deployed Alphie in the 2nd month. After two months, the same socio-emotional skills were measured again in the three groups. According to preliminary results, users were better in emotion recognition before treatment, but worse in complex theory of mind skills than non-users. Many children have not completed the second test yet, thus treatment effect will be evaluated later. MTSD use might hinder complex socio-cognitive skills, but not hinder socio-emotional skills that develop earlier, before children get attracted to MTSDs. Better performance on emotion recognition in users might be explained by the task having been presented on computer screen. Further data provide information about whether MTSDs can support children's socio-cognitive development.

https://slack.com/app_redirect?channel=a-0180-Liszkai-Peres-s2-s3

Session 2 (Tuesday, 5.1., 8 am CET)
Session 3 (Tuesday, 5.1., 1 pm CET)

A-0181 Discrimination of spatial relations between bodies by human adults, infants and rhesus macaques

Nicolas Goupil, Jean-Rémy Hochmann, Holly Rayson, Alice Massera, Pier Francesco Ferrari, & Liuba Papeo

Institut des Sciences Cognitives Marc Jeannerod - CNRS UMR2559, Bron, France

Socially relevant objects like faces or bodies, recruit attention more strongly than other familiar objects in the visual world. This attentional bias develops precociously in life in primate species. While most previous studies have focused on perception of single faces/bodies, recent studies on human adults have shown that in crowded environments, human groups with bodies positioned face-to-face are more likely to recruit attention than groups with other spatial relations (back-to-back). We asked whether such attentional bias also exists in other social species such as non-human primates, and when it emerges in human infants. We tested juvenile rhesus macaques (Macaca mulatta, N=21), human adults (N=24), human infants at seven (N=20) and 22 (N=20) months, in a preferential looking time paradigm. In each trial, subjects were presented with two images on a computer screen, featuring one face-to-face and one back-to-back dyad. Differential looking times were measured with eye tracking in human participants, and through offline video coding in macaques. Human adults and macaques looked longer at face-to-face dyads, whereas 7-month-olds infants looked longer at back-to-back dyads and 22-month-olds infants looked equally at both types of dyads. While shorter looking times to facing dyads in young infants may follow from an ease of processing, the emergence of a preference for facing dyads after 22 months may indicate at what age infants/children represent the stimuli through mature cognitive processes.

https://slack.com/app_redirect?channel=a-0181-Goupil-s5-s10

Session 5 (Wednesday, 6.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0183 Co-collectors: Children's recognition and reliance on trait information relevant for partner choice

Laura Schlingloff*[1], Maayan Stavans*[1], Barbu Revencu[1], Gergely Csibra[1,2]

[1]Cognitive Development Center, Department of Cognitive Science, Central European University, Budapest, Hungary; [2]Department of Psychological Sciences, Birkbeck, University of London, London, UK

Influential theories suggest that social interactions are regulated by partner choice decisions based on cooperation-relevant traits, which people infer by observing the behavior of potential partners. The most relevant traits are the partner's ability (e.g., skills) and willingness (e.g., prosociality) to contribute to others' welfare. In this project, we test whether 5- to 10-year-old children indeed use information from observed third-party social interactions for partner choice. We designed a touchscreen foraging game in which children watch and interact with animated agents who vary along specific traits (competence, prosociality, or both), and where children's payoff depends in part on their partner. In Experiment 1, we assessed whether children comprehend the agents' behaviors in a third-party context: After watching interactions between two agents, we asked children which one was more skilled or more helpful. We found that children accurately identified the agent who was higher on the given trait. In Experiment 2, we test whether children's own partner choice is informed by these observations: During the game, they select one of the previously seen agents to collaborate with. Children are not explicitly informed or asked about traits or behavioral differences. Hence, if children systematically prefer partners whose behavior is indicative of a particular trait, it would show that children's trait inference from behavioral observation informs their partner choice. Data collection is ongoing, and findings will be presented at the conference.

https://slack.com/app_redirect?channel=a-0183-Schlingloff-s2-s6

Session 2 (Tuesday, 5.1., 8 am CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0184 A novel task to measure children's planning of sequential and dependent actions

Christian Kliesch[1], Laura Maffongelli[1], Marie-Therese Neumann[1], Angela Friederici[2], Markus Paulus[3] & Nicole Altvater-Mackensen[1]

[1]Johannes Gutenberg University, Mainz, Germany ;[2]Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany; [3]Ludwig Maximilian University of Munich, Germany

Complex actions can be described in terms of hierarchies of action units. Whilst some units can be carried out independently of each other in a sequential fashion, others require a specific order because the action steps are dependent on the completion of the previous unit. Few studies have investigated children's hierarchical action planning in these constraints. We report a novel test for children's action planning abilities based on the commercially available CamelotJr stacking game. Dependent relationships are expressed through levels in which one block is stacked on top of another, requiring a fixed order. In sequential levels, blocks can be stacked independently, without constraints on the order. We constructed 12 levels of increasing difficulty by modifying the number of blocks, rotations and types of moves necessary and controlled these variables between both conditions. We tested 43 children in a kindergarten (Age: mean=59months, range=41–75 months, 19F). A binomial mixed effects analysis on trial level showed a performance decrease with increasing difficulty ($\chi^2(1)$=7.9, p=0.005, β=-0.27, p=.037), however adding action type did not improve model fit ($\chi^2(1)$=2.1, p=.14). Additionally, we correlated the highest level achieved with children's mental rotation, language scores, theory of mind, working memory capacity and end-state comfort action planning. Performance in CamelotJr increases with age (R=0.36, p=.018) and correlates with children's language score (R=0.34, p=.043). Other correlations did not reach significance. Although we found no evidence of sequential/dependent context, CamelotJr is a potentially useful task to measure children's action planning, particularly given its correlation with language.

https://slack.com/app_redirect?channel=a-0184-Kliesch-s7-s8

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0185 Fine Motor Abilities, Visual Perception and Executive Functions in Preterm and Full-Term Infants

Mert Kobaş[1], Aslı Aktan-Erciyes[2], Tilbe Göksun[1]

[1]Koç University, İstanbul, Turkey; [2]Kadir Has University, İstanbul, Turkey

Executive function (EF) is considered as a top-down control mechanism, but it has recently been investigated within grounded cognition perspectives (Gottwald et al., 2016). In infancy, EF development is intertwined with sensorimotor actions like visual perception (VP) or fine motor abilities (FMA) (Koziol et al., 2012). Preterm infants' (born before 37 weeks) weaker motor abilities may result in problems with EF abilities. We investigated whether (1) FMA and VP at 20 months predicted EF abilities at 26 months and (2) this association differed for preterm and full-term infants. We tested 64 infants (for Time 1, Mage=19.8, for Time 2, Mage=26.1, 25 preterm). FMA and VP were assessed with Mullen Scales of Early Learning. We used a categorization task (Bernier et al., 2010) that requires putting objects into appropriate boxes (i.e., big cubes to the big box and small cubes to the small box) to assess EF abilities. Preterms were not different than full-terms for FMA, VR, and categorization (all ps > .05). Our regression model showed that FMA predicted categorization scores in the first step (β=.24, p=.032), controlling for age ($R2$ =.21, $F(4,59)$=3.99, p=.006). In the second step, VP predicted categorization scores after controlling FMA, age (β=.24, p=.013). Overall, results suggest that FMA and VP are related to early EF abilities. Manual actions stabilize visual perception, so action control as a key factor in early EF abilities may become easier. Therefore, VP can be a possible mediator between FMA and EF abilities.

https://slack.com/app_redirect?channel=a-0185-Kobaş-s9-s11

Session 9 (Thursday, 7.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0186 Two-lab close replication study of Southgate, Senju, & Csibra (2007)

Dora Kampis[1], Petra Kármán[2], Gergely Csibra[2], Victoria Southgate[1], Mikołaj Hernik[3]

[1]University of Copenhagen; [2]Central European University; [3]UiT The Arctic University of Norway

The present study aimed to replicate Southgate, V., Senju, A., & Csibra, G. (2007). Action anticipation through attribution of false belief by 2-year-olds. Psychological Science, 18(7), 587-592. In the original study, 2-year-olds showed patterns of gaze anticipating another person's action congruent with the other's false belief. These results were consistent with other findings indicating infants' sensitivity to others' beliefs. In recent years, replication attempts of this paradigm have yielded mixed results with several studies unable to replicate the original results (Poulin-Dubois et al, 2018). This has raised doubts about the suitability of the anticipatory looking paradigm to assess non-verbal action prediction and Theory of Mind (Baillargeon et al, 2018). Here, in a pre-registered collaborative study we tested 160 24- to 26-month-olds with the original stimuli and procedure used in Southgate et al. (2007), across two locations (n=80 per lab). The total sample size was based on pilot data, to approximately double the sample of the original study after applying the inclusion criteria. The methods and analyses were chosen to best approximate those in the original paper. Data collection has finished, analyses are ongoing and expected to finish October 2020.

https://slack.com/app_redirect?channel=a-0186-Kampis-s7-s11

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0187 Individual Differences in Attention During Shared Book Reading Predict Learning of Novel Words in Toddlers

Nicole Altvater-Mackensen

Johannes Gutenberg University, Mainz, Germany

Reading picture books with toddlers provides rich cues for language learning, fostering vocabulary growth and general language development. However, to date little is known how children use the rich input provided by natural reading for word learning. The current study monitored toddlers' attention during one-to-one picture book reading using eye tracking glasses. Subsequently, recognition of a novel label-object pair that had been embedded in the story was assessed in a preferential looking task. Data from 43 toddlers (23 female, 16 bilingual, mean age: 45.5 months) indicate increased target looking after labelling for trials presenting familiar words ($t(42)=4.9499$, $p<.01$) as well as trials presenting the novel word when correctly pronounced ($t(42)=1.9957$, $p=.05$), but not when mispronounced or altered in shape ($p<.2$). This suggests that toddlers successfully learned the novel label-object association during shared reading with sufficient detail to detect manipulations of phonological form or referent shape. Yet, we observed remarkable individual differences in attention during reading: children showed relatively high rates of interest (mean looking time to speaker or book: 62%, range 9-99) but did not attend much to the speaker's face (mean 7%, range 0-27). While general attention relates to toddlers' word learning (rs =.35, p=.02), a selective correlation between attention to the face and sensitivity to mispronunciations (rs =.38, p=.01) points to a role of visual speech information in natural word learning. Further analysis will relate toddlers' attention and learning in the reading task to their home reading experience which was assessed through a questionnaire administered to parents.

https://slack.com/app_redirect?channel=a-0187-Altvater-Mackensen-s4-s5

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0188 Children's understanding of relief in others

Matthew Johnston[1], Teresa McCormack[1], Agnieszka J. Jaroslawska[1], Sara Lorimer[1], Sarah Beck[2], Christoph Hoerl[3], Aidan Feeney[1]

[1]Queen's University Belfast, UK; [2]University of Birmingham, UK; [3]University of Warwick, UK

Relief has been understudied relative to its psychological importance. Moreover, developmental psychology has focused only on the type of relief that is felt when comparing reality to a worse counterfactual world (counterfactual relief). Relief is also experienced, however, when an unpleasant experience is over and in the past (temporal relief). The current study aimed to explore whether these two types of relief dissociate developmentally which would support the notion that they have separate cognitive prerequisites. Across four experiments, we presented six vignettes to 407 children and 60 adults. Each vignette comprised of two protagonists who either endured an unpleasant episode, in temporal relief stories, or avoided an unpleasant episode, in counterfactual relief stories. The characters had different preferences, such that the endured or avoided episode was in fact negative for only one character; for the other character it was neutral. To test their ability to attribute relief, at the end of each story, participants decided which character felt happier. The results of Experiment 1 suggest that even 10-year-olds struggle to spontaneously understand relief, of either type, in others. However, in Experiments 2-4, when children were encouraged to focus on the differences between characters' emotional states, we found that 6-year-olds demonstrated a fledgling understanding of relief whilst 8-year-olds displayed adult-like judgements. We found little support for separate developmental trajectories in understanding the two types of relief. This study provides the first evidence about when children begin to attribute relief to others and has theoretical implications for recent accounts of relief.

https://slack.com/app_redirect?channel=a-0188-Johnston-s3-s10

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0189 Parents' Gestures Scaffold Preterm Children's Vocabulary Use Through Children's Gestures

Işıl Doğan[1], Mert Kobaş[1], Erim Kızıldere[1], Aslı Aktan-Erciyes[2], Ö. Ece Demir-Lira[3](4), İpek Akman[5], Tilbe Göksun[1]

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Parents' gestural input is associated with children's later vocabulary (Rowe et al., 2008). Children's gesture use generally mediates this relationship. Less is known about whether this association also remains for children having different developmental trajectories. Preterm children (PT, born before 37 weeks of gestation) experience delays in language development compared to their full-term peers (FT) (Sansavini et al. 2011). We investigated the mediating role of children's gestures on the relation between parents' gestures at 14-months-olds and children's expressive vocabulary at 20-months-olds for PT and FT children. We recruited 61 infants (28 PT) at two time points: Time1 (Mage=13.70months, SD=1.41months) and at Time2 (Mage=20months, SD=1.28months). At Time1, parents' hand movements without objects during 10-minute play sessions were coded as gestures and total gestures (i.e., the total number of deictic, iconic, beat, conventional gestures) divided by the total number of utterances. Children's gestures at Time1 and expressive vocabulary at Time2 were measured by parental reports, i.e. Turkish adaptation of MacArthur-Bates CDI (Aksu-Koç et al., 2019). The mediation analyses showed that children's gestures mediated the relation between parental gestures and children's expressive vocabulary for PT after controlling for age (β=.217; SE=586.3; 95% CI=144.9, 2443.34; p=.027). The same relation did not hold for FT (β=-.0215; SE=516.3; 95% CI=-1145.51, 878.68; p=.796). These findings indicate that parents' gestures can be more helpful for PT children who have risks for language delays. Overall, parents' gestures support PT children's later vocabulary through their assessment of children's gesture use.

https://slack.com/app_redirect?channel=a-0189-Doğan-s1-s2

Session 1 (Monday, 4.1., 8 pm CET)
Session 2 (Tuesday, 5.1., 8 am CET)

A-0190 Exploring Task Co-representations and Theory of Mind Among Children Aged 3-5

Anna Kispál, Katalin Oláh

Eötvös Loránd University, Budapest, Hungary

While engaging in a joint action humans form task co-representations of their partner's complementary parts of the task which often appears in the form of interference in task achievement (Sebanz, Knoblich & Prinz 2003). The current study investigated whether task co-representations during a joint action can be observed among children aged 3-5. A crucial aim was to conduct a study targeting the younger age group as well, as joint action seems to appear at an early age (Brownell, 2011), however the methods used in previous studies found evidence of task co-representations only above the age of 4 (Milward, Kita & Apperly, 2017). The study also investigated whether forming co-representations is connected to individuals' theory of mind (ToM) abilities using false belief tests, since previous research found a relationship between self-other representations of ToM and co-representations (Milward, Kita & Apperly, 2017). We employed the computer-based bear-duck task by Milward et al. 2017, and we also designed a new task which is more suitable for testing 3-year-olds, including a common goal which requires cooperation. We are expecting a relationship between the performance on the co-representation task and the Sally-Anne false belief task among 4-5-year-olds. We are also expecting that children at the age of 3 will also be able to form task co-representations in the new, more sensitive task and this will be in connection with their performance shown on the non-verbal version of the Sally Anne task. Results of our on-going study will be presented at the conference.

https://slack.com/app_redirect?channel=a-0190-Kispál-s5-s12

Session 5 (Wednesday, 6.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0191 14-month-old infants detect a semantic mismatch when occluded objects are mislabeled

Dora Kampis[1], Emilie Poulsen[1], Eugenio Parise[2], Dimitris Askitis[1], Victoria Southgate[1]

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Once infants learn their first words, they might also notice when those words are used incorrectly. The N400 is an ERP component sensitive to semantic violations such as mislabeling, or incongruent ending of sentences (Kutas & Hillyard, 1980). At 14 months of age, infants detect such mislabeling when they are presented with an object (or an image thereof), which is then labeled while still in sight (Friedrich & Friederici, 2005; Forgács et al, 2018). However, referents are often out of sight when we communicate about them. The present study probed infants' detection of semantic mismatch when the object is hidden at the time of naming. Specifically, we tested whether (in)correct naming referring to a sustained object representation can elicit semantic mismatch, indicating that the object's identity is also remembered. We presented 14-month-old Danish-speaking infants with videos where a person first shows an object, then puts it in a box. This is followed by a hand pointing towards the box, and an auditory label (congruent or incongruent with the content of the box) presented concurrently with pointing. If infants detect a mismatch, a larger N400 is expected for the incongruent labels. The study is pre-registered with n=28 infants to be included. Data with n=27 infants shows an effect of semantic mismatch (larger negativity in incongruent trials) at the N400 peak at the areas of interest (based on Parise & Csibra 2012; and Forgács et al, 2018), between 400-600ms (t(26)= 2.2235, p=0.035 two-tailed, CI= [-7.2084, -0.2829]; Mcong= -0.9741µV; Mincong= -4.7198µV).

https://slack.com/app_redirect?channel=a-0191-Kampis-s4-s5

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0192 Infant Perception of Audio-Visual Temporal Synchrony Between Musical Stimuli

Martina de Eccher, Anna Bánki, Steanie Hoehl, Gabriela Markova

University of Vienna, Austria

The ability to integrate multimodal stimuli based on temporal synchrony is emerging early in infancy. While 4-month-old infants can detect synchrony between simple audio-visual stimuli (Provasi et al., 2017), synchrony perception among complex social stimuli develops only from 8 months (Hannon et al., 2017). To close this gap, we examined 4-month-olds' ability to detect synchrony between audio-visual stimuli that are socially meaningful to infants in a preferential looking paradigm. Infants in the experimental group (n = 17) were presented with two side-by-side videos, one synchronous (S) and one asynchronous (AS) with a children's song. The complexity of visual and auditory stimuli was manipulated. In the simple condition, a baby being bounced to a simple version of the song was shown. In the complex condition, infants saw a person dancing to a complex version of the song. Infants in the control group (n = 5) saw the same visual stimuli without music. Preliminary results show that both groups took the two displays into account (p < .01), but did not show synchrony or asynchrony preference within condition. There was no effect of group and condition on synchrony preference (p = .40; p = .45). However, in the experimental group a significantly higher number of infants displayed a stable preference pattern to either the S or the AS display across conditions compared to the control group ($\chi2$ (1, N = 22) = 6.5, p = .01). We will discuss our findings with respect to the importance of music in early social exchanges.

https://slack.com/app_redirect?channel=a-0192-Markova-s6-s8

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0193 Structured composition in infancy

Rachel Dudley, Ágnes Melinda Kovács, Ernő Téglás

Cognitive Development Center, Central European University, Hungary

The meaning of a complex expression is a product of (I) the meaning of its parts and (ii) how they are combined. We target (ii) and investigate which compositional procedures are available early in development. Compositional procedures can be conjunctive, analogous to set intersection: a "red shoe" is both a red thing and a shoe. But this kind of procedure will fail to capture the vast majority of complex expressions that humans regularly entertain. In particular, this conjunctive procedure cannot capture the thematic relations underlying events: "Mary kissed John" does not merely describe a kissing event with Mary and John as participants, but rather a kissing event where Mary is the agent and John is the patient. Instead, a structured compositional procedure is required. In a preferential-looking paradigm, we ask whether 14-month-olds possess a compositional procedure that enables the encoding of thematic relations. In the critical condition, infants are shown two containment events (a box inside of a bucket vs. a bucket inside of a box) along with a test sentence ("The box is in the bucket"). If infants merely possess a conjunctive procedure, the meaning that they compose will be compatible with both of the events that they are shown, both not others (e.g., a ball inside of a bucket, which we employ in the control condition). But if infants possess a structured procedure, then they should look more towards the event described by the test sentence. Preliminary data reveal the compositional strategies that infants may use at this age.

https://slack.com/app_redirect?channel=a-0193-Dudley-s3-s8

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0194 Building action expectations in infants: an fNIRS study

Tommaso Ghilardi[1], Iara de Almeida Ivo[1,2], Marlene Meyer[1], Jörn M. Horschig[2], Willy Colier[2], Sabine Hunnius[1]

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Recent studies show that infants use top-down processes to predict upcoming stimuli and that the fundamental architecture required for expectation-based modulation of the sensory cortex is already in place from an early age. Expectation-based modulation in infants has been explored in the sensory domain, but to date only a few studies investigated if similar processes occur in the motor cortex. The studies that focused on this top-down activity of the motor cortex mostly relied on EEG paradigms that measure brain activity only indirectly and have poor spatial accuracy. In this study, we use high-density functional near-infrared spectroscopy (fNIRS) to examine whether 12-month-old infants' action predictions modulate their sensory-motor cortex. To specifically target top-down processes and avoid possible confounds of stimulus novelty or repetition suppression, we used a cross-modal (audio-visuomotor) omission paradigm associating a sound to a video of an action while measuring the infant's hemodynamic response. We hypothesize that both the motor and visual cortex show significant activation during both stimulus presentation and stimulus omission trials. As no stimulus is presented during the omission trials, such activity would be indicative of top-down processes. Thus, it would reliably determine that infants not only rapidly build sensory prediction, but they also build predictions about actions, and that those predictions are reflected in the activity of the motor cortex. Data collection is currently ongoing and results from 25 infants will be presented at the conference.

https://slack.com/app_redirect?channel=a-0194-Ghilardi-s2-s4

Session 2 (Tuesday, 5.1., 8 am CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0195 Children's weighing of local versus global effectiveness in information search

Andreas Domberg[1], Caren Walker[2], Azzurra Ruggeri[1,3]

[1]Max Planck Institute for Human Development, Berlin, Germany; [2]University of California San Diego, U.S.; [3]Technical University Munich, Germany

Over the past decade, behavioral science has been gradually challenged by the realization that generalizing over different phenomena or across populations requires diverse data. In this project, we investigate the emergence and development of learners' intuitions about the effectiveness of representative testing strategies when learning about diverse populations. Five- to 8-year-olds are presented with a large global population of differently colored items, some of which are desirable "blickets", and can choose between two "blicket detectors" that vary in their color-specific sensitivity. The "monolingual" detector reliably reveals which yellow items are blickets or not, but remains mute about blue items, whereas the "bilingual" detector is informative about both colors, but less sensitive. Crucially, children learn about the detectors' properties on a local sub-population, sampled from the global one. Here, in the representative condition, color proportions match the global population, whereas in the unrepresentative condition, they are reversed. Preliminary results from our ongoing data collection suggest that children in the unrepresentative condition prefer the bilingual detector (18/22), i.e., the overall more effective testing strategy, while dispensing with immediate local effectiveness. In the representative condition, where the bilingual detector yields 30% fewer detected items, children are at chance (14/25 bilingual). We are currently testing two control conditions to further explore children's preferences and the role of heuristic processes in their response patterns in the above conditions, namely, whether they rely merely on the item ratio or on a simple categorical preference for a bilingual detector, or whether they indeed "do the math".

https://slack.com/app_redirect?channel=a-0195-Domberg-s5-s7

Session 5 (Wednesday, 6.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0196 Causal action sequence understanding develops across early childhood

Emma C Tecwyn[1], Nishat Kazi[2], Nafisa Mahbub[2], Daphna Buchsbaum[3]

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The ability to identify causal relationships is a fundamental cognitive skill. Like older children and adults, toddlers can learn simple cause-effect relationships between a single action and its outcome—e.g., that pressing a button on a puzzle-box causes it to dispense a sticker. However, successfully navigating the real world requires understanding of more complex causal relationships. Previous work has raised the question of whether toddlers have difficulty learning causal action sequences—e.g., that you need to first turn a knob and then press a button to get a sticker. To explore this, Experiment 1a investigated whether toddlers (12- to 35-month-olds, N=88) can infer that a 2-action sequence is necessary to produce an effect. Toddlers watched an experimenter interact with a puzzle-box, and saw evidence that the action sequence AB led to a sticker being dispensed, whereas the single action B did not. On their first interaction with the puzzle-box, only 28% of toddlers performed an AB sequence; instead, they tended to manipulate B first. In contrast, 67% of preschoolers (Exp. 1b, 3- to 5-year-olds, N=55, ongoing) immediately produced an AB sequence. Experiment 2 (ongoing) is investigating what inferences toddlers and preschoolers make when they see evidence that a 2-action sequence is not necessary (AB and B alone are both effective). Our preliminary findings suggest the ability to infer that a sequence of actions is causally necessary may develop over early childhood, adding to our understanding of children's ability to infer causal structure from the actions they see others perform.

https://slack.com/app_redirect?channel=a-0196-Tecwyn-s10-s12

Session 10 (Thursday, 7.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0197 Is infants' object processing influenced by what others can see? - Using evoked oscillatory brain activity to track early visual perspective taking

Anna-Lena Tebbe[1], Katrin Rothmaler[1], Moritz Köster[2], Charlotte Grosse Wiesmann[1]

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Already at around 1 year of age, infants form expectations based on what another person can see. Moreover, recent research indicates that infants' own representation of their environment is influenced by the perspective of others. This raises the question how others' visual perspective affects infants' neural object processing. We investigate this question by using steady-state visual evoked potentials (ssVEPs) - i.e., oscillatory brain activity induced by rhythmic visual on-off stimulation ("flickering"). We test whether, in addition to being driven by what infants see themselves, 10-months-old infants' oscillatory brain responses are also modulated by what others can see. Infants are presented with videos in which an agent observes a flickering object moving across a table that disappears either into a tunnel (no visual access neither for agent nor infant) or behind an occluder (visual access only for the agent). In the absence of visual access, the evoked ssVEP should drop as soon as the flickering object has disappeared. We hypothesize that the ssVEP will be sustained, if the agent still has visual access to the flickering object, even if the infant can no longer see it. Since this is the first study examining ssVEPs using moving stimuli in infants, we have shown its feasibility in a pilot study and determined power differences between infants' theta (4Hz) and alpha (6Hz) ssVEPs in response to our stimuli. Data collection for the main study is ongoing and expected to be completed by December 2020.

https://slack.com/app_redirect?channel=a-0197-Tebbe-s2-s6

Session 2 (Tuesday, 5.1., 8 am CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0198 Stability and discontinuity of false praise-telling from 5 to 7 years of life

Joanna Jakubowska, Anna Filip, Marta Białecka-Pikul

Institute of Psychology, Jagiellonian University, Kraków, Poland

Early school age children tell prosocial lies, which include giving other people false praises - expressing opinions towards them that—although favorable—are not truly held. Prior research show that in the following years, the number and complexity of motives underlying such behavior increase. The current study focused on children's overt behavior, examining two aspects of the development of false praise-telling: individual stability and group-level discontinuity. Using an art-rating task, a total of 164 children between 5 and 7 years of age were tested at 3 points in time (MT1 = 5.66, SD = 0.1, MT2 = 6.65, SD = 0.16, MT3 = 7.61, SD = 0.14). The results show that having become capable of giving false praise in politeness settings at age 5 and a half, children continue to flatter others in this way at later ages, which indicates that false praise-telling is an individually stable characteristic. Additionally, a statistically significant increase in the proportion of false praise-telling to non-lying behavior in children over the 2-year study period was observed. It indicates that the discontinuity, namely the growth in children's false praise-telling occurs between 5 and 7 years of age. The findings are discussed with respect to the diverse factors that might underlie and impact children's ability to praise others falsely in politeness settings. Keywords: deception, lying, false praise, prosocial lie, politeness

https://slack.com/app_redirect?channel=a-0198-Jakubowska-s5-s9

Session 5 (Wednesday, 6.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0199 Perspective conflict in infant theory of mind

Emanuela Yeung, Victoria Southgate

University of Copenhagen, Copenhagen, Denmark

Although many years of research in developmental psychology had converged on the conclusion that mentalizing was an achievement reached somewhere between 3 and 4 years of age, new data suggests that young infants are already making inferences about other people's thoughts. This has led to considerable debate, largely centered on whether behaviour that looks like mentalizing in infants reflects the same underlying processes that enable older children to pass traditional verbal mentalizing tasks. One popular but untested explanation of infants' success on NVMTs (non-verbal mentalizing tasks) is that these tasks do not demand inhibitory control, and thus enable infants to reveal their belief-tracking ability by removing the need to inhibit their own conflicting perspective. Although there is general support for the idea that inhibitory control may be related to false belief understanding in older children, there is not yet evidence that the same processes are required to pass NVMTs. In addition, it may be the case that infants do not experience a perspective conflict until they develop the ability to represent the self-perspective. This pre-registered study uses eye-tracking and pupillometry to assess whether NVMTs involve perspective conflict, by examining whether the relationship between inhibition and belief-tracking is greater for infants who show self-awareness. To test these questions, we will present infants with a novel NVMT and use pupil diameter as a marker of conflict processing, and anticipatory looking as a measure of action-based false belief attribution. Based on the hypothesis that self-awareness may present infants with a perspective conflict in a false-belief scenario, we hypothesize that inhibitory skills will primarily be necessary for correct anticipatory looking once infants experience this conflict. Thus, we will test the prediction that there is a relationship between inhibitory skill and correct anticipatory looking, only in those infants who pass the mirror self-recognition task.

https://slack.com/app_redirect?channel=a-0199-Yeung-s6-s11

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0200 Learning tool function through video or live demonstrations

Uyen Tran[1], Dalila Bovet[1], Idikó Király[2], Rana Esseily[1]

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Many developmental studies have compared learning through video and through live demonstrations. It is known that children seem to have a harder time extracting information from videos to use them again in the context of learning, as opposed to live situations, especially in the case of those who are younger than 24 months old. This phenomenon has been called video deficit by Anderson and Pempek (2005). However this can be overcome depending on the context. In this study, we tested whether children can learn tool function from video demonstrations with similar performances as with live demonstrations. For that purpose, we used the paradigm of mutual exclusivity, which is the propensity to attribute one exclusive label or function to an object (Markman and Wachtel, 1988; Peto et al., 2018). We compared learning performances of 4-year-old children in four different tasks either in a video demonstration condition or in a live demonstration condition. After a demonstration (video or live) of four tools' function in different tasks, the children had to choose a tool among the demonstration tool and an unfamiliar one in order to achieve four new tasks. Afterwards we coded their tool choice. The statistical analysis is still currently in progress. Our hypothesis is that children will show better learning performances by picking the alternative tool more when the demonstration was live and choose randomly when the demonstration was shown in a video.

https://slack.com/app_redirect?channel=a-0200-Tran-s7-s8

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0201 Questions as Cues? Children's Reasoning About Competent Questioners

Hailey M. Gibbs, Lucas Payne Butler

University of Maryland College Park, College Park, United States

Questions play a critical role in children's learning experiences, but children themselves struggle to generate effective questions until later in schooling. Previous work, however (e.g., Herwig, 1982; Ronfard et al., 2018; Ruggeri et al., 2017), has found that young children can identify others' more efficient questions and can use this information to guide their learning. The present study sought to: (1) replicate this finding; and (2) extend this work to clarify whether questions may serve as a cue for reliability and subsequent informant candidacy. In an online PowerPoint-based Question Game, 4-7-year-olds (N= 160) determine which of two puppet characters poses the more efficient (i.e., broad vs. narrow) questions and, across three later test trials, whether or not that individual might also be more reliable, more knowledgeable, and broadly more competent. Children are asked to explicitly justify their answers across all trials. Planned analyses include one-sample t-tests assessing age-related differences and logistic regressions revealing the potentially predictive power of children's identification of better questions toward their assessments of the questioner as having these other capacities. Children's justifications for their choices will also be coded according to their reference to question quality (i.e., relative information gain) will use ordinal logistic regressions to determine whether justification quality predicts choice of questioner. Preliminary findings are promising, show-ing (1) a replication of earlier work indicating children's successful identification of more competent questioners; and (2) that children's assessments of more competent questioners relate to those individuals' presumed knowledgeability and broader competence, but not general reliability. Ex-pected completion is in February of 2021. This work has implications for our understanding of how children search for information and the assessments they make of the people who provide it; this, in turn has implications for children's learning in the information age and their later science and information literacy.

https://slack.com/app_redirect?channel=a-0201-Gibbs-s4-s6

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0202 The Sandbox Task – a novel task to measure implicit and explicit Theory of Mind

Marie Luise Speiger[1], Laura Langemeyer[2], Hannes Rakoczy[3], Ulf Liszkowski[2], Charlotte Grosse Wiesmann[1]

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Until recently, Theory of Mind (ToM) – the ability to ascribe mental states to others – was assumed to develop around the age of 4 years. In the past, this capacity was tested using verbal false belief tasks. The last 1.5 decades provided data suggesting ToM abilities already before 2 years of age using non-verbal false belief tasks. Recent data indicates that verbal and non-verbal ToM abilities rely on different processing systems (Grosse Wiesmann et al., 2020), often referred to as implicit and explicit ToM. The system underlying implicit ToM, however, requires further investigation and a direct comparison to explicit ToM is missing. We adapted an existing false belief task – the Sandbox task (Bernstein, 2011) – which yields a continuous measure for explicit ToM by measuring an egocentric bias in one's judgement of another person's false belief about an object location. In addition, we developed an implicit version of this task, which measures an altercentric bias in one's own judgement of an object's location. These two versions allow for explicit and implicit ToM to be measured within the same task. We tested the implicit version with a real object Sandbox in the lab with 18 4-year old children before Covid-19 related lock-down. There was a trend for a difference between the false belief and true belief control conditions that points in direction of an altercentric bias (t(17)=-1,89, p=.08). On this basis we created a tablet version of the Sandbox task for an online study with children aged 2 to 7 years, data collection is ongoing.

https://slack.com/app_redirect?channel=a-0202-Speiger-s4-s5

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0203 Spontaneous Gesture Production Promotes Analogical Transfer in Preschoolers

Minju Kim, Caren M. Walker

University of California at San Diego, San Diego, USA

Although prior work has examined the role of spontaneous gestures in schematization and generalization of knowledge for abstract reasoning (e.g. Kita et al, 2017), few studies have examined the role of spontaneous gestures in supporting the early development of analogical reasoning (e.g. Miller et al, 2020). We hypothesize that children who produce spontaneous gestures during learning may be better able to engage in analogical transfer, compared to children who did not use any gestures. To test this, 43 5-7-year-old children were provided with three superficially distinct stories that shared a common goal and solution. After listening to each of the first two stories, participants were asked to retell how the protagonist solved the problem. Then, in the third story, participants were presented with the same problem, and asked to generate the solution themselves. Two experimenters analyzed children's speech and spontaneous gesture during the retelling tasks, and coded whether the children engaged in analogical transfer -- applying the same solution they observed to the third story. Results demonstrate a positive correlation ($r = 0.34$, $p < 0.05$) between spontaneous gesture production and analogical transfer, in which children who gestured during retelling were more likely engage in analogical transfer than those who did not ($X^2(1) = 5.04$, $p < 0.05$). Although the type of gesture was not significantly correlated with the analogical transfer task, this may be due to the small sample size. This initial study suggests that children's spontaneous gestures may provide a window to children's analogical processing, which may be indicative of later performance on analogical transfer.

https://slack.com/app_redirect?channel=a-0203-Kim-s5-s7

Session 5 (Wednesday, 6.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0204 Testing the Altercentrism Hypothesis in Young Infants

Velisar Manea[1], Dora Kampis[1], Charlotte Grosse Wiesmann[2], Victoria Southgate[1]

[1]University of Copenhagen, Denmark; [2]Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

The altercentrism hypothesis (Southgate, 2020) proposes that infants use social cues as a guide to valuable information in the environment: things that others attend to are worth adding to the infant's model, whereas things that the infant witnesses alone constitute a landscape of relatively lower information value. Altercentric infants are thus biased to best remember the objects of others' perspectives. We test the hypothesis with 7.5-to-8.5 month-olds with a location memory experimental design. Infants witness the hiding of an object in two locations in succession, and, under normal conditions, will expect the object to be in the second location. In our critical condition, we wanted to induce a reversal of this common pattern by socially cueing only the first location: we predicted a memory error where although they saw the object being transferred to the second location, they remember it in the first, and are more surprised when the object is revealed to be absent from the first than the second location. We compare total looking time and first look duration to both of these outcomes. Over four conditions (n=32 each) we show that our paradigm is able to reveal memory for the true location of the object in a non-social context (both hidings witnessed alone). However, in our critical condition where the first hiding is co-witnessed, but infants witness the final displacement alone, they expect the object to be present at the first (socially-cued) location, rather than the second location where they have last seen the object displaced. Thus, we predicted and found an interaction between condition and outcome, ($F = 4.32$, $p = 0.006$ for total looking time and $F = 3.73$, $p = 0.013$, first look), which is driven by the critical condition ($t = -2.81/-2.27$, Cohen's $d = 0.5/0.4$).

https://slack.com/app_redirect?channel=a-0204-Manea-s3-s5

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0205 The pedagogical origin of human communication

Nima Mussavifard, Gergely Csibra

Central European University, Budapest, Hungary

The different characterizations of human-specific communication (often called ostensive communication) have inevitably led to radically diverging adaptive scenarios for explaining the evolutionary emergence of this unique system. We believe that this is partly due to approaches that are committed to specific underlying cognitive mechanisms instead of specifying a genuinely ultimate, functional approach to ostensive communication. Defining ostension with regards to its function of marking behavior as communicative allows for a straightforward assessment of evolutionary hypotheses. We argue that the pedagogical hypothesis provides the strongest explanations for the peculiarities of human communication. The need for teaching about functionally opaque cultural knowledge necessitates a flexible system of communication. But beside such a necessity, the human capacity to mark an open-ended range of novel behaviors as communicative is best explained by active transmission of cultural knowledge, which by definition goes beyond what natural selection endowed humans with. The pedagogical hypothesis accounts for not only the 'uniqueness' of ostensive communication but also other limiting criteria that are applied for assessing the validity of evolutionary hypotheses about the origin of human communication. Crucially, teaching through demonstration allows for communication without conventional symbols – thus explaining the immediate 'utility criterion'. Finally, the pedagogical hypothesis is backed by empirical studies in developmental psychology, which point to the early emergence of cognitive mechanisms that facilitate the transmission of generic knowledge from parent to child.

https://slack.com/app_redirect?channel=a-0205-Mussavifard-s1-s11

Session 1 (Monday, 4.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0206 Preschoolers Negatively Evaluate Social Excluders, But Don't Always Disprefer Them

Amanda M. Woodward[1,2], Lindsay A. Horen[1], Sarah K. Knoll[1], Jonathan S. Beier

[1]University of Maryland, College Park, US; [2]University of California, Riverside, US

Social exclusion is harmful and places children at risk for a range of negative outcomes (Stenseng et al., 2014). To reduce the consequences of exclusion, children use strategies that increase feelings of social belonging and the likelihood of connecting with social partners, such as imitating or sitting closer to others (Marinovic et al., 2017; Watson-Jones et al., 2014). However, promoting oneself as a good partner is insufficient to ensure future inclusion. It is critical that children selectively direct these efforts toward people likely to include them. In this study, children (N = 69, 3- to 6-year-olds) watched two games; an inclusion and an exclusion game. Children answered an exclusion detection question and evaluated the niceness of players after each game. Then, children answered a memory check question and chose which character to play with. Finally, the experimenter probed children's play choices. Across age groups, children evaluated excluders (M = 2.83, SD = 1.98) more negatively than includers (M = 5.29, SD = 1.32, V = 65.5, p < 0.01). Only older children preferred to play with the includers (30 of 34, p < 0.01). Although younger children detected exclusion readily ($\chi^2(1)$ = 27.03, p < 0.01), and remembered the events (33 of 35, p < 0.01), they showed no play partner preference (19 of 35, p = 0.37). This work replicates the dissociation found by Hwang & Markson (2020) and suggests that future work should examine whether this pattern is specific to social exclusion or a more general developmental pattern.

https://slack.com/app_redirect?channel=a-0206-Woodward-s5-s7

Session 5 (Wednesday, 6.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0209 The importance of control for the study of early agency

Florian Markus Teichmann[1,2,3], Kristina Musholt[2,3], Charlotte Grosse Wiesmann[1,2]

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The question whether preverbal infants have a sense of agency, and when this ability develops, has been one of the central debates in developmental research and theory. Once infants are able to act, their interaction with the environment becomes more purposeful and rewarding. We review existing studies that have investigated agency in the first years of life. In the classical Mobile Paradigm, for example, infants increase the movement of a limb, if this limb is attached to a mobile. These paradigms indicate that infants detect multi-sensory contingency and have been interpreted as evidence for the development of a sense of agency. Here, we argue that neither of these measures allows conclusions about the presence of agency because they fail to indicate the infant's control over the movement. Multi-sensory contingency learning, we argue, does not go beyond reinforcement learning. Consequently, it does not tell us whether infants perceive themselves as agents or have any control over their movements. We suggest that, instead, what will inform us about agency, are infants' reactions to a break-down of contingency, and the extent to which these reactions show infants' control over and flexible adaption of their actions. In sum, we take an interdisciplinary perspective to show how control, as an important criterion of agency in philosophy, has been overlooked in the empirical research on agency. We combine previous empirical work from different fields to derive an experimental suggestion for a test of agency in a non-verbal population.

https://slack.com/app_redirect?channel=a-0209-Teichmann-s3-s11

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0210 Cognitive dissonance from 2 years of age? – Toddlers prefer what they previously chose blindly

Charlotte Grosse Wiesmann[1,2], Dora Kampis[1], Emilie Poulsen[1] & Victoria Southgate[1]

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As adults, our choices have an impact on our values and preferences. We do not only choose what we prefer, but we also tend to adapt our preferences post-hoc in accordance with our previous choices. This is thought to result from cognitive dissonance as an effort to reconcile our behavior with our values. Here, we investigated when this phenomenon develops. We reasoned that inconsistent choices and values could only cause dissonance once children have a concept of themselves that holds these values. Therefore, we hypothesized that this phenomenon might emerge between the second and third year of life when children have been argued to develop an explicit self-concept. In a preregistered study, we offered children aged 16-35 months (N=148) a blind choice between two equivalent objects. After this initial choice, they were given a second choice between a third new object and either the object they had initially chosen or the object they had previously discarded. Importantly, the actual objects of choice remained hidden so that any actual preference could not have influenced the child's choice. Children indeed showed evidence for an age-related change towards choices in line with cognitive dissonance theory in the studied age range (Bayes Factor, $BF_{10} = 7$). More specifically, we found moderate evidence that 2-year-olds avoided the previously discarded object as predicted by cognitive dissonance theory ($BF_{10} = 4.6$), whereas 1-year-olds picked randomly ($BF_{10} = 0.2$). These results support that children's choices might indeed be influenced by cognitive dissonance from around 2 years of age.

https://slack.com/app_redirect?channel=a-0210-Wiesmann-s2-s7

Session 2 (Tuesday, 5.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0212 "What is the bear thinking?" - Narrative Input and Theory of Mind in deaf children with cochlear implants.

Agnieszka Pluta[1,2], Magdalena Krysztofiak[1], Małgorzata Zgoda[2], Joanna Wysocka[1], Karolina Golec[1], Maciej Haman[1]

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The ability to attribute mental states to others - Theory of mind (ToM) - is critical for social behaviors. Previous research has reported that deaf children of hearing parents are at risk of delayed ToM development. The main objective of the study was to investigate differences in preschoolers' ToM development in relation to parents' preferences for using mental state language in conversations with their child in 36 deaf children with cochlear implants (CI) and 42 children with typical levels of hearing (TH) (aged 3-7). All children with CI received their first CI before the second year of life. A computerized change-of-location false belief task (cFBT) and The Theory of Mind Inventory-2 were used to investigate ToM development. Mental state discourse was examined while parents and their children jointly read a storybook. Narratives were analyzed for mental state language using The CLAN Program. Although group comparisons did not indicate differences in cFBT, parents from the CI group attributed significantly lower ToM abilities to their children than parents from the TH group. There were no significant correlations between child's performance in cFBT and parental mental state references, however, in the CI group there was a significant positive correlation between cFBT and literal references. These results contribute to a growing body of research on how family processes interconnect with children's social understanding. The study is in progress and more data is expected to be collected. This work was supported by the NCN [2017/25/B/HS6/01624]

https://slack.com/app_redirect?channel=a-0212-Pluta-s4-s11

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0214 Haemodynamic response related to anticipatory looking in the non-verbal False Belief Task: simultaneous fNIRS and gaze-recording study with participation of preschool-aged children.

Karolina Golec[1], Maciej Haman[1], Agnieszka Pluta[1,2], Tomasz Wolak[2], Joanna Wysocka[1], Kaja Jakóbczyk-Roman[1], Jakub Jaślan[1]

[1]University of Warsaw, Faculty of Psychology, Poland; [2]World Hearing Center, Bioimaging Research Center, Kajetany, Poland

The main objective of the study was to investigate the relationship between susceptibility to others' beliefs, referred to as implicit Theory of Mind (ToM), and neural activity within the ToM brain network in preschool-aged children. A computerized non-verbal change-of-location False Belief Task was used to collect looking behavior and neuroimaging data simultaneously, enabling to measure anticipatory looking (AL) as well as the cortical hemodynamic response. Within-subject design with three conditions (False Belief, True Belief, No-Belief) was applied. 33 preschool-aged children (age range 3-5 years) took part in the simultaneous gaze recording and functional near-infrared spectroscopy (fNIRS) session. The results on looking behavior revealed that 27 out of 33 subjects spent more time looking at the location congruent with the agent's belief as indicated by their differential looking score (DLS). Interestingly, those subjects demonstrated early anticipation (at the stage of belief formation, N=10), late anticipation (immediately preceding the agent's action, N=11), or anticipation in both time windows (N=6). The next step of the analysis was to correlate the pattern of neural activation with AL data to examine whether the time course of haemodynamic response differs depending on the type of anticipation (early/late). Preliminary results suggest that the peak of Oxygenated Hemoglobin concentration in False and True Belief conditions is related to the belief-relevant events of the scenario. However, as for now, no interaction between haemodynamic response and anticipation type has been observed. Research is in progress and was financed by NCN grant 2017/25/B/HS6/01624.

https://slack.com/app_redirect?channel=a-0214-Wysocka-s9-s11

Session 9 (Thursday, 7.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0215 Developing a mother-child reminiscing scale: A pilot study

Aslı Aktan-Erciyes[1], Çağla Aydın[2], Başak Şahin-Acar[3]

[1]Kadir Has University, Istanbul, Turkey; [2]Sabancı University, Istanbul, Turkey; [3]Middle East Technical University, Ankara, Turkey

Research indicates that parental scaffolding on children's developing autobiographical memory is crucial (Sales & Fivush,2005). Mothers vary in how elaborately they reminiscence with children depending on factors including mother–child attachment and emotional expressiveness (Fivush & Vasudeva,2002). In the present study, we investigated factors that influence how mother-child dyads are engaged in reminiscing activities. Seventy-five mothers participated in the study. We asked how mothers and children were engaged in conversations about past, including child-related factors (e.g., children's knowledge of time related adverbials, talking about emotions, distinction between remember/know). Correlation analyses indicated that mother-child talks about what child was up to when they were not together and mothers' inquiry about what the child had done, eaten and seen are factors seem to be positively correlated with many factors including dyadic reminiscing about emotion, child's knowledge about the distinction between remember/know, child's accuracy of event sequencing, source memory as well as time related adverbials, (all r's>.50, p's<.01). Moreover mother's verbal and nonverbal cues that are used to express interest in the dyadic conversations is positively correlated with: mother-child reminiscing about what child was up to when not together, r(74)=.26, mothers' questions about what the child had done, eaten and seen, r(74)=.28. Additionally, mothers' perceived difficulty to communicate with the child is negatively correlated with mother-child reminiscing about events, r(74)=-.24, as well as maternal listening when child talks, r(74)=-.30 and child's initiation of reminiscing, r(74)=.24. Overall, results indicate that joint-reminiscing relies on both maternal and child-related factors and how these factors interact with one another.

https://slack.com/app_redirect?channel=a-0215-Aktan-Erciyes-s4-s11

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0216 Automatic detection of developmental disorders by Machine Learning based on digital inertial sensors

Veronika Konok[1], Krisztina Liszkai-Peres[2,3], Gábor Csizmadia[1], Bence Ferdinandy[2], Judit Balázs[3], Ádám Miklósi[1]

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The growing abundance of mobile devices benefits research by providing new methods for data acquisition, at the same time it poses health risks to children. Games that encourage and measure movement may help decrease risks associated with sedentary lifestyle, while providing means of diagnosis and improvement of children with e.g. autism spectrum disorder (ASD) or attention deficit and hyperactivity disorder (ADHD), whose motions may differ from those of typically developing peers. Our aim is to discern the differences between the movement characteristics of children with ADHD, ASD and typically developing children and to detect ADHD and ASD by machine learning (ML) technology using movement data. We also develop a game app for a smartphone and smartwatch pair that encourages physical activity and provides feedback for the child. We asked 6-8-year-old children (typical/ADHD/ASD) to execute playful and everyday movements and recorded these motions with smartwatch inertial sensors. We video recorded and labelled their movements to train ML models to identify movement types, as well as group membership (typical/ADHD/ASD). Preliminary results show that the overall accuracy of detecting 10+ movement types is above 80%. However, with increasing sample size and fine-tuning of the models, we expect a significant increase in accuracy. The gathered data facilitate the better understanding of ADHD/ASD and automated, objective diagnosis in a younger age enables earlier intervention and better prognosis. The game app helps in promoting physical activity and improves motor (and cognitive) skills of children with developmental disorders.

https://slack.com/app_redirect?channel=a-0216-Konok-s5-s12

Session 5 (Wednesday, 6.1., 8 am CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0217 Exploring prosocial shame in young children

Stella Gerdemann[1,2], Bianca Dietrich[3], Jenny Tippmann[4,5], Jan M. Engelmann[6], Robert Hepach[7]

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Shame motivates the adherence to social norms and thereby contributes to the stability of cooperation. Despite the relevance of shame to children's motivation to follow cooperative norms and standards (e.g., Kagan, 1981; Kochanska et al., 2002), key questions regarding its early development have remained unaddressed. For instance, little is known regarding when and whether children express shame in response to not helping others. Here, we explored the development of prosocial shame in young children using a novel method to automatically and objectively record the change in children's body posture. In two studies, we measured a key feature of shame——a decrease in upper body posture——after preschoolers were unable to help someone in need. In Study 1, 5-year-old children (N = 68) expressed a shame-like emotional response (a lowered upper body posture) both when they were observed by an audience and when they were unobserved, and in response to being unable to help or complete their own goal ($\chi2(1) = 10.45$, $p = .001$). To investigate the development of this emotional response and to replicate the findings of Study 1, we conducted a second study. In Study 2, 4- to 5- year-old children (N = 93) showed a shame-like emotion in response to not helping in an observed and an unobserved context ($\chi2(1) = 4.231$, $p = .04$). An exploratory analysis showed that 5-year-olds' upper body posture was more decreased than 4-year-olds' ($\chi2(1) = 5.612$, $p = .018$). These results suggest that preschoolers apply social norms and standards for cooperation to themselves to the degree that not helping others elicits a shame-like emotion. In addition, evaluation by an audience did not affect children's emotional expression, suggesting that norms regarding some kinds of prosocial behaviors are intrinsic by late preschool.

https://slack.com/app_redirect?channel=a-0217-Gerdemann-s5-s7

Session 5 (Wednesday, 6.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0218 Toddlers' ability to separately represent spatial and numerical information

Aldo Antonio Sarubbi, Chiara Nascimben, Rosa Rugani, Silvia Elena Benavides-Varela

Universita degli Studi di Padova (UNIPD), Italy

Previous research demonstrated that infants remember the number of hidden objects and can update the representation of the array's numerosity when an object is added or subtracted from the initial set (Wynn et al., 1992). However, this process appears to be modulated by several factors, including the number of updating operations (Baillargeon et al., 1994; Moher et al., 2012) and the distribution of the objects, namely, whether two consecutive objects are hidden sequentially in the same location or alternately in two different locations (Moher & Feigenson, 2013). Less is known about the spatial arrangements that infants expect from the hidden arrays and how they influence their numerical representations. The present study adds to this research line by exploring the value that toddlers confer to variations in spatial and numerical arrangements of a hidden set. Toddlers (N=34, Mage= 22+3 months) observed the experimenter placing three objects behind two panels located on the left and right side of a stage (e.g., two objects on the left and one object on the right). In the test, the the screens were lifted to reveal the outcome, which could be: numerically and spatially expected (e.g., two on the left and one on the right), numerically expected but spatially unexpected (e.g., one on the left and two on the right), or numerically unexpected (e.g., one on the left and one on the right). The results of a mixed-effects model indicated that toddlers looked significantly shorter and explored the two arrays more intensively (as measured by the number of shifts from one array to the other) in the numerically unexpected than in the other conditions. These results confirm previous works by showing that toddlers successfully updated their representations of hidden arrays. Moreover, the findings also suggest that toddlers' memory for numerical information excels memory for spatial configurations.

https://slack.com/app_redirect?channel=a-0218-Sarubbi-s7-s8

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0219 Do Infants Respond Similarly to an Online Version of a Live Puppet Show?

Raechel Drew, Francis Yuen, Anni Persson, J. Kiley Hamlin

University of British Columbia (UBC), Vancouver, Canada

Covid-19 sent shockwaves through the developmental research community; however, resulting restrictions have provided new opportunities for data collection as studies transition to online formats. In the current study, we address the question of whether infant data collected online is comparable to its in-person equivalent. Prior to the pandemic, we assessed 5- to 7-month-olds' sociomoral evaluations using a live, in-lab puppet show in which a puppet plays with and drops a ball. On alternating events, a 'helper' puppet returns the ball and a 'hinderer' puppet takes the ball away. Following a habituation phase, infants are presented with the helper and hinderer and asked to choose between them, with choice defined as the first visually-guided touch. We now administer a pre-recorded version of this same show online using the Lookit platform (Scott et al., 2017). Despite methodological differences between the in-lab testing session and the online version of the show, including presentation format (i.e., live vs. recorded) and how infants' "choices" are evaluated (e.g., reaching vs. looking preferences), we expect that findings from the original study (Hamlin & Wynn, 2011) will still replicate. Per our pre-registration, we are examining infants' preferences for helpful versus unhelpful characters, as well as comparing effect sizes and infant attention across the two different versions of the study. We are currently processing data for ~30 infants per condition and expect to exceed our minimum target (N=32) within two weeks. Insights gained from this research become increasingly important as more infant studies transition to online formats.

https://slack.com/app_redirect?channel=a-0219-Drew-s8-s10

Session 8 (Thursday, 7.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0220 BabyRhythm at Home: The influence of parental sensorimotor synchronization on infant rhythmic timing

Sinead Rocha, Adam Attaheri , Áine Ní Choisdealbha, Perrine Brusini, Sheila Flanagan, Natasha Mead, Panagiotis Boutris, Samuel Gibbon, Helen Olawole-Scott, Christina Grey, Isabel Williams, Henna Ahmed, Usha Goswami

University of Cambridge, UK

The BabyRhythm project is a longitudinal study of 113 infants from two- to 30- months-of-age, investigating neural entrainment and sensorimotor synchronisation (SMS) to acoustic rhythm, in relation to typical language development. Here we ask whether individual differences in parental ability to move in time with music predict infant rhythmic timing. At 11-months we used Motion Capture to measure parent SMS when moving on their own (drumming), and when bouncing their infant, to an external beat. We hypothesised that infant rhythm production, as measured by infant drumming ability at 11 months of age, and by infant capacity to sing and clap in time with an experimenter at 24 and 30 months of age, would be predicted by the accuracy of parental SMS. As we are interested in the language environment of the infant, we took an index of parental reading difficulties using the Adult Reading History Questionnaire. We further ask whether parent SMS is related to their level of reading difficulty, since individuals with dyslexia typically show less accurate SMS. We present our modelling approach for our longitudinal data, exploring methods of looking for moderators and interactions between parent and infant factors. We also discuss how Covid-19 adaptations affected our data quality and analysis plan, given that our language acquisition measures (being given live until March 2020) were redesigned to be run by parents at home using Zoom and YouTube videos for instruction.

https://slack.com/app_redirect?channel=a-0220-Rocha-s7-s12

Session 7 (Wednesday, 6.1., 8 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

A-0221 Selecting educational apps for children: How useful are website rating systems?

Gemma Taylor, Joanna Kolak, Eve Bent

University of Salford

Parents often use recommendations and the internet to search for apps for their children (Livingstone et al., 2018). However, there is little research to date assessing whether apps labelled as educational using website rating systems can promote children's learning (see Callaghan & Reich, 2018; Papadakis et al., 2018 for math and literacy apps). In the present study, the 10 highest and 10 lowest scoring apps for preschool age children from two app review websites were selected (40 apps total). Five-minute recordings of app use were coded for educational potential using two tools: (1) a questionnaire for evaluating the educational potential of apps where apps can score between 0-20 and (2) coding criteria for quantifying the app features (see Kolak et al, in review). Overall, we found that high scoring apps were more likely to have a learning goal than low scoring apps, $\chi2(1,40)$ = 51.190, p < 0.001. The presence of a learning goal targeting early skill development is an essential feature of educational apps. However, there were no differences between the high (M = 9.20, SD = 3.07) and low scoring apps (M = 5.75, SD = 3.42) on the educational potential index (p = 0.775). Cognitive activities are important for promoting learning (Hirsh-Pasek et al., 2015), however, there was no difference between high and low scoring apps in the frequency of cognitive activities (p = 0.813). Our findings demonstrate that website ratings systems are not a useful resource for parents looking for educational apps for preschool age children.

https://slack.com/app_redirect?channel=a-0221-Taylor-s3-s7

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0222 Selective Preference for Dominance Traits from Female Faces in 2-year-olds

Cristina-Ioana Galusca, Martial Mermillod, Olivier Pascalis

LPNC, CNRS, Université Grenoble Alpes, Grenoble, France

Human adults make rapid and automatic judgements of the character of faces (e.g. if someone is dominant or assertive; Willis & Todorov, 2006). These judgements have a lasting impact not only on low-level processes (e.g. how faces are processed), but also on higher-level decision-making processes (e.g. election results; Todorov, Mandisodza, Goren, & Hall, 2005). So far it is unclear whether character judgement of faces is learnt through experience or whether this is an inherent step of face evaluation from early on in infancy. In a set of three experiments, we employed a visual preference paradigm to study 2-year-old toddlers' sensitivity to dominance traits from different types of faces ranging in familiarity. All face stimuli were judged for dominance by adults and matched in attractiveness. Experiment 1 (N=16) tested the visual preference for natural female faces (high familiarity). When faces were presented upright, toddlers showed a preference for the dominant character, but no preference was found when the same stimuli were inverted. Experiment 2 (N=16) presented natural male faces (moderate familiarity) and no preference was found for the upright or inverted conditions. Experiment 3 (N=16) presented artificial morphed faces (no familiarity) and toddlers showed no sensitivity to dominance traits in either the upright or inverted conditions. Taken together, these results show that early in development infants prefer to look longer at faces judged as dominant by adults, but only in the case of very familiar types of faces (here, same race female faces). One possible interpretation of these results is that sensitivity to dominance traits from faces is primarily the product of extensive experience, that begins to unfold in the second year of life. Yet further studies are needed to confirm that infants are indeed capable of extracting dominance traits from faces.

https://slack.com/app_redirect?channel=a-0222-Galusca-s2-s4

Session 2 (Tuesday, 5.1., 8 am CET)
Session 4 (Tuesday, 5.1., 8 pm CET)

A-0223 Inferring competence from emotional responses to performance outcomes

Mika Asaba, Yang Wu, Brandon Carrillo, Hyowon Gweon

Stanford University, Stanford, CA USA

Learning about one's own and others' competence is an important social skill, especially for children who are trying out new tasks and building relationships with others. But how do children learn who is good at what? Much work has looked at how children use explicit, direct cues to competence such as the target's own performance outcomes (e.g., failures and successes) or the valence of others' verbal feedback (e.g., praise). Here we test a novel source of information that has an indirect yet robust influence on children's evaluations of competence: others' expressions of surprise. Adults (Exp.1; N=70) and children (Exp.2: in-person testing; N=28 4-9 year-olds; Exp.3: pre-registered; zoom testing; N=90 6-8 year-olds) saw trials where two students both succeeded or both failed at different activities. The teacher showed surprise to one student and no surprise (neutral, happy expression) to the other. When asked who was better at the activity, we found that adults and older children, but not younger children, selected the "no surprise" student in success trials and the "surprise" student in fail trials. Even though both students achieved the exact same outcome, children used the teacher's surprised expression as an indicator of the students' underlying competence. These results provide initial evidence that school-aged children can draw sophisticated inferences about relative competence even from others' emotional expressions. Future work will investigate how such inferences from emotional expressions may also inform children's beliefs about their own competence and social groups broadly.

https://slack.com/app_redirect?channel=a-0223-Wu-s8-s10

Session 8 (Thursday, 7.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0224 Children's Understanding of Possibility

Umang Khan, Christina Starmans

University of Toronto, Toronto, ON, Canada

Theories suggest children may explore unconventional ideas because they are more open to possibility than adults (Gopnik, 1998). However, research suggests that children judge merely improbable events to be impossible (e.g., Shtulman & Carey, 2007). How can we reconcile these ideas? We suggest that children's understanding of possibility has been obscured by the forced dichotomy created between "impossible" and "possible". When adults judge an event to be improbable, they categorize it with "possible" events, whereas children categorize it with "impossible" events. However, both age groups might be making the same underlying judgment: this event is really improbable. In this study, we investigate whether providing children with the additional option to judge events as "improbable" reveals a more adult-like understanding of possibility. We also examine whether children are more flexible about what is possible in the future than in the past. Five- to eight-year-olds were told about possible, impossible, and improbable events set in the past or the future, and asked whether they were: "Possible and could definitely happen", "Impossible and could never ever happen", or improbable "It could maybe happen once but probably won't". Results to date (N=60) suggest that children are more likely to judge improbable items as improbable than as impossible or possible. Furthermore, children are overall more likely to judge events to be possible in the future than in the past. These findings support the idea that children have a nuanced and adult-like understanding of possibility, allowing them to explore the improbable, while avoiding the truly impossible.

https://slack.com/app_redirect?channel=a-0224-Khan-s4-s9

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0225 The role of shape bias in categorisation in Autism

Leigh Keating[1], Calum Hartley[1], Katie Twomey[2]

[1]Lancaster University, UK; [2]University of Manchester, UK

From around 24-months old, children develop a tendency to generalise names for solid objects to novel examples that are the same shape, placing less importance on colour or material. This shape bias may reflect a shift in attentional resources towards the perceptual feature that gives the most informative cue towards category membership, and is robust across a range of tasks and contexts in typical development. Due to its usefulness for noun learning, there is interest in whether children with Autism Spectrum Disorders (ASD) also have this bias, though the evidence to date is mixed. The current research investigates whether conflicting reports of shape bias in ASD can be explained by the differing demands of the experimental tasks used. Children with Autism (aged 4 to 9 years) and TD children matched on receptive vocabulary (aged 30-months to 4-years) participated in a series of studies measuring shape bias in both 'forced choice' and 'yes or no' task variants. Each task included both an 'online' condition, where the standard remained visible for reference, and an 'offline' condition where it was not immediately visible. Our findings suggest that children with Autism do prioritise shape in forced choice tasks in both online and offline conditions, as do typically developing children. However, in a yes/no task children with ASD tend to over-generalise to non-shape-match distractors. We suggest both groups can use shape as a cue for category inclusion, however shape difference as a basis for category exclusion is stronger in typical development.

https://slack.com/app_redirect?channel=a-0225-Keating-s4-s6

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0226 The role of object novelty and pragmatic reasoning in referent selection and retention

Natalie Bleijlevens[1], Friederike Schütte[1,2], Tanya Behne[1,3]

[1]Developmental Psychology, University of Göttingen, Germany; [2]Department of Psychology, University of Potsdam, Germany; [3]Leibniz ScienceCampus 'Primate Cognition', Göttingen, Germany

Research on children's referent selection revealed the tendency to map novel labels onto novel (compared to preexposed) objects. Whereas some authors assumed this tendency to be solely based on pure object novelty (e.g. Mather & Plunkett, 2012), others argued for the necessity of social-pragmatic inferences, e.g. discourse novelty, in referent selection (e.g. Akhtar et al., 1996). Our study aims to specify the role of pragmatic reasoning and object novelty in disambiguation and retention: In a pre-registered online study, we manipulated availability of pragmatic cues for disambiguation and explored 2- and 3-year-olds' as well as adults' performance in referent selection and retention. To date, we collected 85% of children's and 100% of adults' data. Our results revealed that adults had difficulties in interpreting our disambiguation situations. They performed at chance in both referent selection conditions, yet succeeded in retention trials (that could be solved using cross-situational learning strategies if one remembered the original settings). Children showed the opposite pattern, succeeding in the referent selection but not in the retention trials . They chose the more novel target in both conditions, regardless of pragmatic cues. Interestingly, however, children were less certain if their choices were solely based on pure object novelty (indicated by higher reaction times) and showed first signs for retention only after learning in contexts with pragmatic cues available. Our data suggests that pure object novelty may be sufficient for disambiguation in children, but pragmatic information may facilitate and enhance their learning. For adults, however, our setting may have created ambiguous pragmatic cues in referent selection that led to confusion: the way the objects were pre-exposed may have created common ground that counteracted effects of discourse novelty. Thus, we are re-running the study with an adjusted method to explore the role of discourse vs. object novelty in adults.

https://slack.com/app_redirect?channel=a-0226-Bleijlevens-s5-s7

Session 5 (Wednesday, 6.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0227 Error Management in Generalisation: The Food and Danger Domains

Connair J. S. Russell, Camille Rioux, Annie E. Wertz

Max Planck Institute for Human Development, Berlin, Germany

Cognitive systems appear to be shaped to minimize costly errors, and such error minimization has been argued to help explain social learning biases for certain evolutionarily relevant content such as food and danger. Due to asymmetries in the cost of generalisation errors in these domains—overgeneralising edibility may result in more costly mistakes than undergeneralising—there may also be bias in generalisation. We tested this in 4- to 6-year-olds (N = 80*) and adults (N = 90) who participated in a property generalization task across three between-subjects conditions: danger, edibility, and a neutral control. Participants saw pairs of unfamiliar fruit images and were told one fruit has a property (e.g., edible) while the other does not (e.g., not edible). They were then shown a morph of the two images, taken from a sequence transforming one fruit into the other, and asked if this morph has the property. This was repeated for five morphs of four fruit pairs. For the most ambiguous morphs (i.e., the morph equally similar to its two target fruits), adults were more likely than chance to generalize danger information (Binomial P = 0.60, p = .03) and less likely than chance to generalize edibility information (P = 0.39, p = .02). Generalization for the same morph in the neutral condition did not differ from chance (P = 0.51, p = .78). This suggests that where similarity judgments are uncertain, adults use cautious generalization strategies consistent with minimizing costly errors. Final data collection for children is underway

https://slack.com/app_redirect?channel=a-0227-Russell-s1-s5

Session 1 (Monday, 4.1., 8 pm CET)
Session 5 (Wednesday, 6.1., 8 am CET)

A-0228 Normative Expectations in Preverbal Infants

Moritz Köster[1], Robert Hepach[2]

[1]Freie Universität Berlin, Germany; [2]Oxford University, UK

Social norms are foundational to human cooperation and culture. In this pre-registered study, we show that young infants understand social norms already in their first year: They expected individuals who conformed to the behavior of others to be met with approval, but individuals who did not conform to be disapproved of and ostracized. This was indicated by infants' pupillary surprise response for unexpected social reactions, namely the disapproval and exclusion of a conforming individual or the approval and inclusion of a non-conforming individual. Thus, infants grasped that the conformity to others' actions is the basis for social evaluation processes (i.e., social reinforcement or social sanctioning), which is an essential building block of human normativity. That already preverbal infants show basic expectations about social norms is much earlier than previously assumed, and in stark contrast to current theories on human normative development.

https://slack.com/app_redirect?channel=a-0228-Köster-s8-s9

Session 8 (Thursday, 7.1., 8 am CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0229 Parental teaching at the kitchen table in five cultures

Moritz Köster[1], Joscha Kärtner[2], Marta Giner[3], Shoji Itakura[4], Lilia Cavalcante[5], Patricia Kanngiesser[6]

[1]Freie Universität Berlin, Germany; [2]University of Münster, Germany; [3]University of Münster, Germany; [4]Universidade Federal do Pará, Belém, Brazil; [5]Doshisha University, Kyoto, Japan; [6]Plymouth University, UK

Parental teaching plays an essential role in early child development, laying the ground for culture-specific developmental pathways (Keller & Kärtner, 2013). However, mapping similarities and differences in parental socialization across cultures remains a challenging task. In the present study, we observed parents and children at home, during their daily mealtime interactions, to assess parental socialization in an ecological but standardized setting. Specifically, we video-recorded 2 typical mealtime situations of mother, father and child triades, with children aged 2 to 3 years from urban Japan, urban Germany, urban Argentina, rural Brazil and rural Ecuador (N ~ 110, 20-25 triades per context). We coded both the content of parents' teaching and parental teaching styles, following a coding schema by Kline (2015). A first analysis of 4 of the 5 contexts revealed that the way parents socialized their children differed profoundly between cultures. Most importantly, mothers from the urban samples (Germany, Argentina) used more deliberate teaching styles (e.g., providing children with choices of food), whereas Brazil and Ecuador employed more assertive teaching styles (e.g., prompting their children what to do). The findings will be discussed in the light of children's lifeworlds, which were assessed in an additional interview. Overall, our approach offers a new avenue to study cultural transmission by assessing parental teaching in a standardized, daily setting. This is, daily life interactions circumvent the ecological commitments made in experimental designs (Dahl, 2015) and allow a direct comparison of observed behaviors across contexts, which goes beyond the limits of anthropological approaches. Our study will thus contribute to a better understanding of the versatile developmental processes that lay ground for cultural diversity.

https://slack.com/app_redirect?channel=a-0229-Köster-s2-s7

Session 2 (Tuesday, 5.1., 8 am CET)
Session 7 (Wednesday, 6.1., 8 pm CET)

A-0230 The development of non-referential gestures and the ability to mark IS in narrative speech: A longitudinal study

Júlia Florit-Pons[1], Ingrid Vila-Giménez[1,2], Patrick Louis Rohrer[1,3], Pilar Prieto[4,1]

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Different types of gestures, such as referential iconic gestures, deictic gestures and non-referential gestures have been documented to mark referent status both in children's and adult's discourse. Nonetheless, no prior investigation has studied the relationship between non-referential gestures and information status marking in children's narrative speech from a developmental perspective. To assess this question, the current study examines this pragmatic characteristic of non-referential gestures (in comparison to referential iconic gestures) using a longitudinal database consisting of 332 narratives performed by 83 children at two different time points in development (i.e., 5-6 years of age and two years later). Preliminary results (from 49 children) showed an increase in the production of children's non-referential gestures over the years (53 at 5-6, and 114 at 7-9, as opposed to 76 and 119 for iconics) and revealed that while at the age 5-6, there is no difference in the pragmatic marking of information status between the two types of gestures (50% for non-referentials and 40% for iconics), at 7-9 years of age, non-referential gestures are used predominantly to introduce new referents in discourse (non-referentials: 52.83% vs. iconics: 37.14%). These results reveal first that non-referential gestures tend to mark more discourse-new referents than discourse-given or discourse-accessible referents, while referential iconic gestures do not seem to show any clear pattern in terms of information status marking. All in all, our findings suggest that the ability to mark information status in narrative discourse goes hand in hand with children's development of non-referential gesture production.

https://slack.com/app_redirect?channel=a-0230-Florit-Pons-s5-s6

Session 5 (Wednesday, 6.1., 8 am CET)
Session 6 (Wednesday, 6.1., 1 pm CET)

A-0231 Referential iconic vs. Non-referential beat gestures performed in children's narratives: The predictive value of iconic gestures

Ingrid Vila-Giménez[1,2], Ö. Ece Demir-Lira[3,4,5], Pilar Prieto[6,1]

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Gesturing is a powerful tool across language learning. Importantly, evidence has demonstrated that complex gestures performed in children's more elaborated discourses (i.e., narratives) still act as harbingers of next linguistic steps. For instance, using iconic character-viewpoint gestures when performing narratives can predict later better-structured, complete goal-based stories. However, there are no previous studies that have assessed and compared the predictive effects of other gesture types (i.e., referential iconic gestures and non-referential beat gestures) performed in narrative corpora in children's later narrative productions. To address this question, the present study follows a longitudinal approach with an audiovisual corpus of natural narrative productions (n = 332) at two time points in development (Time 1, at 5-6; and Time 2, two years later) from 83 children, who were administered a narrative retelling task with the same two wordless cartoons at each time point. Narratives collected at Time 1 were coded for gesture type and at Time 2 were analyzed and scored for narrative structure. A stepwise regression analysis examined the predictive value of gesture production (iconics vs. beats) at 5-6 years in later narrative performance. Results found that iconic gestures (as opposed to beats) performed in children's narratives were significant predictors of better-structured narratives two years later. Findings are interpreted within a theoretical framework that supports the beneficial role of embodied narrative retellings using body movements in narrative abilities. All in all, this study suggests that gesture types performed while retelling stories can contribute differently when predicting oncoming changes in narrative production.

https://slack.com/app_redirect?channel=a-0231-Vila-Giménez-s2-s8

Session 2 (Tuesday, 5.1., 8 am CET)
Session 8 (Thursday, 7.1., 8 am CET)

A-0232 Do the early parent-child book-reading interactions influence the development of theory of mind?

Eszter Balogh[1], András Láng[1], Diána Á. Varró-Horváth[1], Krisztina Kopcsó[1,2]

[1]Institute of Psychology, University of Pécs, Hungary; [2]Hungarian Demographic Research Institute, Budapest, Hungary

The aim of the present study was to examine whether parent-child joint book reading has an impact on the emerging social-cognitive abilities of preschool children in Hungary. We investigated this question in a follow up study by measuring theory of mind (ToM) and the characteristics of parent-child book-reading interactions among 3-7 years old children (mean age = 67 months) and their parents. Children's ToM was measured by a standardized assessment (TOMI-2) and a parental report (TOMI-2, Toddler Screen), while the parent-child book reading interactions were explored by a semi-structured survey and a book reading diary method completed by caregivers. Data were collected for an average 80 days with three appointments during the follow-up period. Preliminary findings showed that children's verbal ToM performance was associated with the average length of the parent-child book-reading interactions. However, parent-child book reading interactions in general did not have any direct impact on the changes of children's ToM performance over time during the follow-up period. Results also showed association between children's ToM development and parents' representations of children's ToM performance. Furthermore, the family's socioeconomic status was also associated with the frequency of joint reading and the children's verbal ToM performance. In conclusion, our results add to the existing literature on the relationship between parent-child joint book reading and children's mentalization outcomes. These findings suggest that there is a specific association between the characteristics of book-reading interaction and the development of social-cognitive skills.

https://slack.com/app_redirect?channel=a-0232-Balogh-s3-s11

Session 3 (Tuesday, 5.1., 1 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0233 Young children's spatial communication in drawings and language

Agata Bochynska, Moira R. Dillon

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Young children's drawings include mostly individual objects or collections of objects, not the extended layout (e.g., Dillon, in press; Machón, 2013; Piaget & Inhelder, 1967). Such trends in children's drawings could be driven by a greater attention to objects for symbolic communication in general (Waxman & Markow, 1995; Rosch et al, 1976), by a challenge in capturing layout geometry on a piece of paper (Lange-Kütter, 2014; Kosslyn et al, 1977), or by both of these explanations. The present study thus asked different groups of 4-year-old children (N = 23) to either draw or describe for a naïve research assistant the location of targets in a large "fort." Targets were either next to walls or next to objects and therefore drew children's attention to layout or object information. Children included walls in both their drawings (M = 1.54 elements) and descriptions of targets near walls (M = 1.32 elements), suggesting that attention can modulate what children include in their symbolic communication in general. That said, children in the drawing condition included more elements overall, regardless of the target's position, while children in the language condition modulated their communication to include the wall or object most relevant to the location of the target ($\beta = 2.27$, Wald Test $\chi2(1) = 14.25$, $p < .001$). These results suggest that attentional hierarchies — not only to layouts and objects, but also to other early emerging domains of thought (e.g., agents and social partners) — might influence human symbolic production in both pictures and language.

https://slack.com/app_redirect?channel=a-0233-Bochynska-s6-s10

Session 6 (Wednesday, 6.1., 1 pm CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0234 Six-Year-Old Children Preserve the Reputation of Others

Amanda Mae Woodward[1,2], Suzanne Dora Woller[1], Jonathan S. Beier

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One's reputation is important in cooperative environments. Children are sensitive to the importance of reputation. They manage their own behavior to appear favorable to peers and share information regarding others' reputations (Engelmann et al., 2012; Engelmann et al., 2016; Fu et al, 2015). While there is evidence that children maintain and use reputation information, it is unclear if children will act to maintain the reputations of others. We examined 6-year-old children's responses to the tarnishing of another's reputation across two studies. In Experiment 1, 42 children watched a puppet show. One puppet created a drawing that gets ruined because another puppet poured water on it (Purposeful condition) or because the water spilled by itself (Incidental condition). The owner found the ruined drawing and proceeded to blame the other puppet. We measured whether children protested or affirmed blame when it was justified (Purposeful condition) versus when it was not (Incidental condition). Overall, children protested more when blame was not justified and affirmed blame more when it was justified (p <0.001). This suggests that children correct others to preserve the reputations of other people, but only do so when the negative reputation is not warranted. Experiment 2 sought to determine if children's protests were specific to reputation or if they were just correcting inaccurate information. Children's protest and affirmation behavior was similar across conditions (p = 0.35). We plan to examine the content of children's protests and affirmations to better understand this pattern.

https://slack.com/app_redirect?channel=a-0234-Woodward-s4-s11

Session 4 (Tuesday, 5.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0235 The effects of sensory modulation and sensory-motor processing on the development of executive functions and self regulation

Cecília Nagy-Tószegi, Beatrix Lábadi

Institute of Psychology, University of Pécs, Hungary

Previous studies have shown that sensory processing patterns are related to adaptive and challenging behaviors in the general population of children. The aim of this research is to investigate the association among sensory processing, executive functioning and self regulation. Our recent study involved children with sensory processing difficulties between the age of 4 and 7 years (N=55) along with typically developing children (N=55) who were matched by IQ, age, gender and caregiver's education. During the course of the research, we compared data collected from the questionnaire package compiled for parents (sensory processing, behavioral scales) and the empirical study of children. The inhibition control subcomponent of executive functions was measured with a Go / No-Go type task, and the cognitive flexibility subcomponent was measured with the help of a card-sorting task (DCCS). To examine children's sensorimotor integration, we used some subtests of the South-Californian Sensory Integration Test (SCSIT): posture imitation, body midline crossing, bilateral motor coordination, and balance with eyes open and closed. The questionnaire package contained three questionnaires. We examined the sensory processing (Sensory and Motor Experiences Questionnaire), behavioral and self regulation (Child Self-Regulation and Behavior Questionnaire) and behavioral difficulties (Strength and Difficulties Questionnaire) assessed by parents. The results indicate that children with sensorimotor processing difficulties exhibited impairments in executive functioning (working memory and inhibitory control), showed slower reaction in cognitive flexibility. Disorder of sensory processing in modulation was associated with difficulties in the areas of emotion and cognitive regulation. There was strong correlation between posture imitation, body midline crossing, bilateral motor coordination and all the three component of executive functioning. Taken together, these findings suggest that the impaired sensory process may contribute to the development of higher order social and cognitive deficits and regulatory functions which can fundamentally affect school readiness.

https://slack.com/app_redirect?channel=a-0235-Nagy-Tószegi-s2-s10

Session 2 (Tuesday, 5.1., 8 am CET)
Session 10 (Thursday, 7.1., 8 pm CET)

A-0236 The relation of theta power and objective vs. subjective measures of habitual sleep in the first year of life

Louisa Katharina Gossé[1], Frank Wiesemann[2], Clare Elwell[3], Emily Jones[1]

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Introduction: Theta power is associated with slow wave activity during sleep, which in turn has been linked to cognitive markers such as memory consolidation. Recent studies (Braithwaite et al., 2020, Jones et al., 2020) have indicated that theta power change in infants in response to watching videos is predictive of concurrent and later cognitive functioning. This study explores how theta power and its change are related to sleep patterns in the first year of life to identify the ways in which theta power could be an indicator for the effect of sleep on cognition and development. Methods: For this longitudinal study (up to 4 study visits/participant) 76 typically developing infants were studied (age: 4-14 months, 166 individual study visits). Sleep measures were: 7-day sleep diary and actigraphy (w-GT3X-BT, ActiGraph Corp.). EEG was recorded using 20-channel ENOBIO and infants watched multiple rounds of videos of women singing nursery rhymes. Correlational analyses and linear mixed models (LMMs) were used to analyse the data. Results: Correlational analyses showed theta power was associated with actigraphy-measured night sleep (r=.489*) and diary-measured day sleep (r=-.244*). Theta change was only associated with actigraphy (r=.302*) but not diary-measured night wakenings. Results of follow-up LMMs to account for developmental changes are presented. (*p<.05) Conclusion: Objective and subjective sleep measures yield different results in association with theta. Preliminary findings hint towards the importance of night wakenings for the development of later cognitive functioning as indicated by lower theta change in those infants with more night wakenings.

https://slack.com/app_redirect?channel=a-0236-Gossé-s1-s9

Session 1 (Monday, 4.1., 8 pm CET)
Session 9 (Thursday, 7.1., 1 pm CET)

A-0237 Development of functional brain networks processing infant directed and adult directed speech - a longitudinal study

Gábor P. Háden*, Brigitta Tóth, Kinga Kerner, István Winkler

Research Centre for Natural Sciences, Budapest, Hungary

Infant directed speech (IDS) is used in most cultures to communicate with young children. The main role IDS plays in parent-child interactions appears to change over time from conveying emotion to facilitating language acquisition. There is EEG evidence for the discrimination of IDS form adult directed speech (ADS) already at the time of birth as well as in several older age groups. However, less is known about the development of brain networks responsible for differentially processing IDS and ADS. The current study compared topological characteristics of functional brain networks obtained from 49 healthy infants at the age of 0, 6, and 9 months listening to the same fairy tale presented by the same speaker in IDS and ADS speech. Brain connectivity was assessed by the phase lag synchronization index in 6 frequency bands (delta, theta, low alpha, high alpha, beta, gamma). The topology of the large scale network organization was quantified using minimum spanning tree graphs, separately for each band. The delta band cortical network's organization was found to be significantly more hierarchical and had a more cost-efficient organization during listening to ID compared to listening to AD. This network organization changes with age as nodes over the frontal cortex become more central within the network. Our results suggest that ID speech specific differences in network topology are related to changes in the role of IDS during the first year of life.

https://slack.com/app_redirect?channel=a-0237-Háden-s1-s11

Session 1 (Monday, 4.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0238 Lexical Tone as a Linguistic Cue During Cross-situational Statistical Learning

Ye Li, Viridiana Benítez

Arizona State University

Adults learn 1:1 word-referent mapping by calculating co-occurrences between words and referents across multiple scenes (Cross-situational statistical learning, CSSL; Yu & Smith, 2007). Also, adults learn 2:1 word-referent mapping where two words share the same referent (CSSL 2:1 mapping; Benitez et al., 2016; Chan & Monaghan, 2019). Bilinguals encounter translation equivalents daily, where the two words of the same object are linguistically distinctive. However, current CSSL literature have not fully investigated the linguistic difference between the two words. Therefore, this study intends to answer two questions in a CSSL 2:1 mapping paradigm: a). How do adults learn artificial words when two words of the same referent differ by a linguistic cue? and b). How does language experience play a part in word learning, e.g. being bilingual and/or familiar with the linguistic cue? To answer the first question, we use a CSSL paradigm where each object co-occurs most often with two words (e.g. object A co-occurs most often with word1 and word2) (See Fig1). In the cued condition, word1 and word2 differ by a linguistic cue—one without tones and the other with Mandarin lexical tones (raisingT2-fallingT4 or fallingT4-raisingT2). In the uncued condition, word1 and word2 are both without tones (See Fig2). To answer the second question, we compare non-tonal monolinguals (English) and non-tonal bilinguals (Spanish-English) to ask language-general impact on word learning (e.g. being bilingual). We also compare non-tonal bilinguals and tonal bilinguals (Chinese-English) to ask language-specific impact on word learning (e.g. being familiar with a specific linguistic cue).

https://slack.com/app_redirect?channel=a-0238-Li-s10-s11

Session 10 (Thursday, 7.1., 8 pm CET)
Session 11 (Friday, 8.1., 8 am CET)

A-0239 Improving Math Proficiency of School-Age Children with Working Memory Training: Interference Theory

Selma Boz

ELTE

An alternative explanation for capacity limitations in working memory (WM) has been provided by the interference theories. Interference theory points out that the ability to resist interfering information is a key element in updating WM contents as well as a source of individual differences in WM performance. In this line, interference control and resistance to interference will be cornerstones of this research where these terms will be described as the capability to resist irrelevant information and distractors in a given task. The purpose of this study is to describe how an experimental design of the WM training can help us to understand WM and math and to discover how trained, process-specific improvements in WM performance, as defined by the interference theory, may contribute to mathematical improvements in school-age learners. An adaptive version of n-back tasks will be implemented for the proposed study, within WM load and interference lures. The study will be carried out with 40 school-age children between the ages of 9 and 12, and Solomon four group design method will be used to group them. d' (D-Prime) theory will be conducted in order to obtain detailed comparison between groups as well as interpretation of individual differences in processing of information.

https://slack.com/app_redirect?channel=a-0239-Boz-s9-s12

Session 9 (Thursday, 7.1., 1 pm CET)
Session 12 (Friday, 8.1., 1 pm CET)

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