Lancaster University

7TH LANCASTER INTERNATIONAL CONFERENCE ON INFANT AND EARLY CHILD DEVELOPMENT

ORGANISATION

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Szilvia Linnert
Padraic Monaghan
Jeanne Shinskey
Sylvain Sirois

We are thankful to the staff and students who have dedicated their time and effort to help organise the conference!

Locations

LCICD will take place on the Lancaster Unviersity Campus, in the **Management School** building. If you stay in town, you can comfortably reach the campus by bus (until stations 'Underpass' or 'Management School'). The registration desks will be available in the Hub area.

- Management School Building
- University Print Shop
- Gala Dinner at Barker House

You can also use Mazemap (click or scan the QR-code below) to find your way around campus.

Dear LCICD attendees,

Welcome to Lancaster! We are very happy indeed to be able to welcome you here, after having had to cancel the conference in 2020 and then running it on-line in 2021. When we decided to organise it as an in-person event we were not sure at all what would happen – would anybody want to come? Would people prefer online events and were tired of travelling, or worried about it? What would be the minimum viable size for us to run the conference? Would there be another Covid wave, and might we have to cancel late in the planning process?

Given these thoughts we were more than pleased when we received more contributions than at any prior in-person LCICD (over 115!), and our invited speakers accepted quickly and happily. To us, this shows that spending time in person with like-minded people and learning about the latest developments in our field in a relaxed and friendly atmosphere is a worthwhile thing to do. We are proud that LCICD can provide for this need and has, now in its 7th instalment, established itself as one of the main European (and beyond) conferences on infant and early child research. Although we started LCICD alongside the Leverhulme Doctoral Scholarship Programme on Infancy Research, which has now ended, we hope that we can keep the conference going for many years to come.

We hope you will enjoy your time and will come away from the conference with new ideas, good feedback on your work, new friendships, and happy memories.

Gert Westermann

Katharina Kaduk

and the LCICD organising committee

SCHEDULE DAY 1 (Wednesday, 24th August 2022)

08.30 Registration

09.00 Welcome

09.15 Keynote 1: Nivedita Mani

Little Scientists and Social Apprentices in Early Word Learning
Moderator: Gert Westermann

10.15 Session 1: Lexical Development 1 *Moderator: Samuel Forbes*

Season-of-Birth Effects on Infant Vocabulary Size
Presenting author: Luis Muñoz

Comparing vocabulary size and semantic network connectivity between bilingual and monolingual toddlers
Presenting author: Serene Siow

11.15 30min Coffee Break

11.45 Session 2: Curiosity *Moderator: Szilvia Linnert*

The interplay between parental input, children's interests and word learning in children
Presenting author: Rajalakshmi Madhavan

Curiosity-based exploration as in-the-moment learning progress maximisation
Presenting author: Gert Westermann

"Stick to what you've learned and go from there": How infants' curiosity-based exploration is guided by first experiences and learning progress
Presenting author: Elena Altmann

13.15 Lunch

14.15 Poster Session 1

15.45 30min Coffee Break

16.15 Session 3: Learning *Moderator: Louisa Kulke*

Apt pupils: investigating what's going on when nothing is happening
Presenting author: Sylvain Sirois

How does language learning ability at 17 months predict language skill development over the next 3 years of life?
Presenting author: Padraic Monaghan

19.30 Conference Gala Dinner at Barker House Farm

SCHEDULE DAY 2 (Thursday, 25th August 2022)

08.30 Registration

09.00 Keynote 2: Moritz Daum

The ontogeny of multilingual communication
Moderator: Padraic Monaghan

10.00 Session 4: Temperament *Moderator: Melissa Gladstone*

Exploring correlations between infant temperament and behavioural patterns during emotional distress
Presenting author: Yu Wei Chua

Little tyrants: Explaining early physical aggression through stress response profiles
Presenting author: Stephan Huijbregts

11.00 30min Coffee Break

11.30 Session 5: Development in the global world *Moderator: Matt Hilton*

The Creation and Validation of the Global Scales for Early Development (GSED)
Presenting author: Gareth Patrick Mccray

COVID-19 first lockdown as a window into language acquisition: associations between caregiver-child activities and vocabulary gains
Presenting author: Julien Mayor

Early childhood education and care (ECEC) during COVID-19 boosts growth in language and executive function
Presenting author: Catherine Davies

13.00 Lunch

14.00 Session 6: Social Interactions *Moderator: Kirsty Dunn*

The breadth and specificity of 18-month-old's infant-initiated interactions in naturalistic home settings
Presenting author: Didar Karadağ

Development of social modulation of attention in live compared to video situations
Presenting author: Louisa Kulke

Reduced social responsiveness in infancy as an early behavioural marker of autism spectrum disorder outcomes in early childhood
Presenting author: Süheyla Özen

15.30 30min Coffee Break

16.00 Session 7: Vision *Moderator: Sylvain Sirois*

Infant Visual Preference and Aesthetics
Presenting author: Anna Franklin

A digital filter to simulate infant visual experience
Presenting author: Alice Skelton

17.00 Poster Session 2

18.00 Reception

SCHEDULE DAY 3 (Friday, 26th August 2022)

08.30 Registration

09.00 Keynote 3: Sabine Hunnius

Early cognitive development: Some lessons from infant learning
Moderator: Charlie Lewis

10.00 Session 8: Mental Representation *Moderator: Jeanne Shinskey*

Frequency tagging in infants and adults reveals neural object processing on behalf of others
Presenting author: Anna-Lena Tebbe

Pretend Play in Preschoolers: Links to Cognitive and Creative Processes
Presenting author: Ezgi Yıldız

11.00 30min Coffee Break

11.30 Session 9: Lexical Development 2 *Moderator: Perrine Brusini*

On the dimensional structure of early lexical and grammatical knowledge
Presenting author: Seamus Donnelly

The origins of sentence processing difficulties in developmental language disorder
Presenting author: Sam Jones

12.30 Awards and closing remarks

12.45 Lunch

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KEYNOTE SPEAKERS



Little Scientists and Social Apprentices in Early Word Learning

Nivedita Mani
Georg-August-Universität Göttingen

Piagetian approaches to development highlight the role of the child as a little scientist, actively exploring her world in such a way as to optimise learning. Vygostky's little apprentice, on the other hand, learns language in social interactions with knowledgeable others. I suggest that any theory of language learning must combine these two approaches to consider language as a dynamic interaction between the child, her interests, her current state of knowledge and the sociocognitive context she finds herself in. In doing so, I will ask the question why children learn language, in terms of why we find idiosyncrasies in early lexical development and whether children are motivated to learn language.

The ontogeny of multilingual communication

Moritz M. Daum
University of Zurich, Department of Psychology and Jacobs Center for Productive Youth Development

Much of our daily life is dedicated to the verbal and nonverbal interaction with others. Adequate communication skills allow a better prediction of others' behaviour, and as a result a smooth and continuous interaction. In the present talk I will present recent evidence from our research concerning whether and how social cognitive skills are influenced by the language status of children, that is between children growing up either in a monolingual or a multilingual environment. I will present evidence and discuss a theoretical framework about how potential differences depend on language combinations, cultural influences, and the particular experiences children make in their everyday interactions.

Early cognitive development: Some lessons from infant learning

Sabine Hunnius
Donders Institute for Brain, Cognition and Behaviour, Radboud University

Young children develop at a breath-taking rate. Within just a few years, the helpless new-borns change into young children who have all the abilities and skills needed to start formal education at school. To understand how such rapid cognitive development is at all possible, we can turn to five fundamental principles of infant learning. First, infants come into this world equipped to learn. From early on, they are sensitive to statistical information in their environment and readily detect and retain statistical structures they observe. Second, infants use this information to build predictive models of the world. Moreover, they are able to continuously and flexibly update these models in light of new information. Third, infant learning can be so fast and effective because it is supported by early existing attentional biases. Infants allocate attention to and preferably explore stimuli that are optimally informative. Fourth, infants' early learning experiences shape their later learning, making it even more effective. Finally, infants are not alone in their efforts to make sense of the world around them. Adult interaction partners create ideal learning opportunities for infants by skilfully adapting their behaviour to infants' attentional preferences and learning capabilities. Using a series of behavioural and neurophysiological studies, I will discuss how the intricate interaction of infants' basic learning mechanisms, their attentional and exploration biases, and their social exchanges brings about the astonishing developmental changes of early childhood.

PAPER TALK ABSTRACTS

Session 1: Lexical Development 1

Season-of-Birth Effects on Infant Vocabulary Size

Luis Eduardo Munoz[1], Natalia Kartushina[1] and Julien Mayor[1]
[1]*University of Oslo*

A considerable body of research suggests season-of-birth effects on children's school achievements: children born in the fall outperform those born in early summer (Martin et al., 2004). These effects can be attributed to either a maturational gap upon school admission - the maturity hypothesis - or to prenatal aggressions on the central nervous system during pregnancy, that are more susceptible to happen during winter (e.g., viruses, vitamin D deficiency) - the psychopathology hypothesis. Here, we evaluate whether seasonality of birth affects early language acquisition, using Communicative Development Inventories (CDIs; parental reports that assess vocabulary development). We contacted parents of 12- and 24-month-old infants in waves, every two weeks, over 15 months and collected CDIs (in comprehension and production for 12-month-olds, and in production for 24-month-olds). Our sample resulted in 448 and 724 12- and 24-month-old monolingual infants from the Oslo region, respectively. We transformed CDI scores into gender- and age-adjusted percentiles using Norwegian norms. To estimate the effect of seasonality, we ran beta regressions, controlling for maternal education, on vocabulary percentiles. We modelled seasonal variation by turning birth dates into radians and including the sine and cosine of the resulting variable into the model. We adopted a full-null comparison framework, the null model containing maternal education and the full model having the additional seasonal effects. Our results revealed significant effects of seasonality on production for 12-month-olds ($\chi 2(2) = 7.67$, $p = .022$), a borderline effect on comprehension at that age ($\chi 2(2) = 5.04$, $p = .08$), but no effects on production for 24-month-olds. For all groups, vocabulary sizes peaked in October/November and reached their minima in April/May. In sum, our results suggest that seasonal variations on language development are present before school enrolment and hence provide support for psychopathology hypothesis. However, seasonal effects on vocabulary size appear to fade over time, such that they are not significant anymore by two years of age.

Comparing vocabulary size and semantic network connectivity between bilingual and monolingual toddlers

Serene Siow[1], Nicola Gillen[1], Irina Lepadatu[1] and Kim Plunkett[1]
[1]*University of Oxford*

Words are linked by their related meanings. For example, "cat" is semantically related to other animal words like "dog". Semantic connections between words can be represented using a semantic network. Studying the structural properties of early vocabulary using analyses of semantic networks can tell us about the heuristics guiding children's vocabulary learning and help identify reasons for differences in vocabulary trajectories between groups. We analysed the semantic network connectivity of bilingual toddlers, comparing them against monolinguals of the same vocabulary size. Our sample consisted of 15 to 36-month-old toddlers, with 422 bilinguals and 426 monolinguals. We first compared the conceptual vocabulary sizes in comprehension and production between groups. Vocabulary size was measured using bilingual adaptations of the Oxford CDI. A bilingual child was coded as understanding a concept if they knew the English word, the word in their other language, or both. We saw a trend for bilinguals' conceptual vocabulary size to be smaller than same-age monolinguals, with the difference significant in both comprehension and production. To investigate if these groups also differ in vocabulary structure, we built semantic networks for each child using the concepts that they understand. We constructed two types of networks - the first where connections between nodes are defined using speech co-occurrences, and the second where connections are defined by associative links. Following common procedure in this research area, we used measures of average in-degree, clustering coefficient and average geodesic distance to evaluate semantic connectivity. The bilinguals in our sample showed higher in-degree, higher clustering and lower geodesic distance than monolinguals with the same vocabulary size. The language experience and language use of bilinguals may have resulted in differences in vocabulary structure from monolinguals. Further implications will be discussed.

Session 2: Curiosity

The interplay between parental input, children's interests and word learning in children

Rajalakshmi Madhavan[1] and Nivedita Mani[1]
[1]*University of Göttingen*

Parental language input is vital for children's vocabulary growth (Hart & Risley, 1995), and every-day activities like shared book-reading have been shown to boost language acquisition (Mol, Bus, deJong, & Smeets, 2008). Research also suggests that children actively influence their learning, by eliciting information they are interested in and retaining such information better (Mani & Ackermann, 2018). However, investigation of the extent to which children's active interest modulates the quality of caregiver-child interaction when engaging in activities is lacking. We examine whether: (1) parents can accurately pinpoint what interests their child; (2) the quality of caregiver-child interaction (QOI) during a semi-naturalistic task like shared book-reading is modulated by children's interest in the content being discussed, (3) we also examine the combined effect of QOI and children's interests on children's learning. We include 70 monolingual German 2-2.5-year-olds in our analysis. This online study has three parts: (1) Shared book-reading task where parents read two books to their child – one previously determined to be of low and one of high interest to the child (with one novel word-object mapping introduced in each book), (2) preferential-looking task to assess children's interest in our book-categories and (3) eye-tracking task to test later recognition of newly-introduced word-object mappings. Our preliminary analyses show that (1) only 25% of parents indicated a category to be of high interest to their child which was also the category that children showed longest looking times to. However, 71% correctly indicated a category as their child's high interest category, that children showed greater than median looking times to (2) the QOI during reading is significantly associated with the interest of the child. Taken together, this study examines how parents respond to children's interests in a semi-naturalistic setting, and how such responsiveness and these interests combine to boost language learning.

Curiosity-based exploration as in-the-moment learning progress maximisation

Gert Westermann[1], Elena C. Altmann[1] and Marina Bazhydai[1]
[1]*Lancaster University*

Curiosity has been variously explained as a desire to know, a drive to close a knowledge gap, and to avoid uncertainty (Bazhydai, Twomey & Westermann, 2020). These approaches ascribe a causal role to curiosity, and they presuppose metacognitive awareness of one's ignorance (Pekrun, 2019). This has led some to argue that young infants, without metacognitive abilities, cannot be curious (Inan, 2012). Yet, in recent years infants' curiosity has become a focus of research, exploring infants' active role in their information selection and knowledge construction. Here we argue for a new theoretical framework of infant curiosity that a) does not presuppose metacognitive awareness, and b) does not ascribe a causal role to curiosity in guiding exploratory behaviour. We argue that curiosity arises out of the infant's drive to maximise learning in-the-moment (Twomey & Westermann, 2018). We further argue that learning – adapting the organism to the world – is rewarding and that maximal learning progress is maximally rewarding. Curiosity in this framework is not causal in motivating information seeking but is an epiphenomenon: the sensation of expecting reward from learning progress. I will discuss how this framework provides an integrated view of diversive curiosity (seeking stimulation to avoid boredom) and specific curiosity (exploring specific objects for information gain), and that it provides a mechanistic account of an infant switching between exploration and exploitation. Furthermore, it implies that 1) as the reward linked to learning can be conditioned, so can curiosity; and 2) as learning progress is higher for learning information that relates to existing knowledge, the learning of semantic clusters is privileged over broad learning. Together, this framework suggests a parsimonious account of the infants' construction of a semantic network that is compatible with recent empirical evidence on infants' active learning about words and objects in the world around them.

"Stick to what you've learned and go from there": How infants' curiosity-based exploration is guided by first experiences and learning progress

Elena C. Altmann[1], Marina Bazhydai[1] and Gert Westermann[1]
[1]*Lancaster University*

From infancy, we are driven to explore the world based on our intrinsic curiosity. However, the cognitive mechanisms underlying such self-directed, curiosity-based exploration remain largely unknown. We assume that learning progress maximization drives engagement with and disengagement from information (e.g., Twomey & Westermann, 2018; Oudeyer, Kaplan, & Hafner, 2007): as we choose to engage with something from which we expect to learn, we eventually disengage when the environment promises higher learning potential. But what promises the highest learning potential in a new environment? It could be that infants engage with whatever they encounter first; or they may first explore the environment to make a somewhat informed decision. Here, we tested this in a novel gaze-contingent eye-tracking paradigm, where infants can freely explore two novel categories (Fribbles) by triggering new exemplars via their looking behaviour. Data from *N*=67 10-12-month-old infants (M_{age}=11.11, *SD*=0.51, 50.8% female) showed that 85.1% of infants had a clear category preference, receiving at least 60% of triggers (M_{all}=0.80, *SD*=0.16). Interestingly, this preference corresponded strongly to the category they had triggered first (*BF* = 1.072e+6; indicative of extreme evidence in support of this effect). It was unclear, however, whether this was because the first trigger was informed by an established preference or whether it created one. An additional regression analysis of the looking behaviour during category introduction suggests that, over and above all other variables, it is indeed the first trigger creating the category preference (β=0.596, $p < 0.001$). Possibly, the mechanism of triggering and viewing the first exemplar maximises experienced and expected learning progress for that category, reinforcing engagement throughout. Alternatively, this could reflect higher-level sticky-fixations (e.g., Colombo, 2001) in which it requires too much cognitive control to disengage, creating a "forced" preference. Both explanations and further implications will be discussed.

Session 3: Learning

Apt pupils: investigating what's going on when nothing is happening

Sylvain Sirois[1] and Iain R. Jackson[2]
[1]UQTR, [2]School of Health Sciences, The University of Manchester

This paper investigates the utility of pupillometry in Violation-of-Expectations (VOE) paradigms. We showed infants videos of toy trains traveling on a circular track on which there were two tunnels. In Experiment 1, 10-month-olds (*n* = 24) were familiarized to plausible events where trains were visible in the gap between tunnels and tested on a combination of plausible or implausible (i.e., the train was not visible in the gap) events involving familiar- or novel-coloured trains. Infants looked longer at the gap when a train was visible, but no effect of condition was observed using looking times. Pupil diameter analyses reveal an interaction between plausibility and familiarity when a train ought to appear in the gap. In Experiment 2, 12-month-olds (*n* = 24) were familiarized to implausible events and tested on combinations of plausibility and familiarity. Looking time analyses do not distinguish between the test trials, although infants look longer at the gap when a train was present. Pupil analyses reveal an effect of plausibility on the second passage of the train through the gap; pupil diameter was largest when the train failed to appear in the gap. In both experiments, the repeated occurrence of an implausible event within a trial has a seemingly priming effect on pupil dilation. In Experiment 1, which uses a typical procedure of familiarizing to plausible events, the implausible test trial is absolutely novel. In Experiment 2 however, infants are familiar with implausible events yet also exhibit within trial priming. Although these results are primarily driven by the absence of stimulation (i.e., there is no train to be seen), they have general implications for the design of VOE experiments. Moreover, they highlight the advantage of fine, time-locked measures like pupil diameter over the more common cumulative looking time which remains the typical dependent measure in such studies.

How does language learning ability at 17 months predict language skill development over the next 3 years of life?

Padraic Monaghan[1], Lana Jago[1], Kate Cain[1], Katie Alcock[1], Seamus Donnelly[2], Caroline Rowland[2], Rebecca Frost[3], Julian Pine[4], Heather Turnbull[4], Michelle Peter[5], Samantha Durrant[6] and Amy Bidgood[7]

[1]Lancaster University, [2]Max Planck Institute for Psycholinguistics, [3]Edge Hill University, [4]Liverpool University, [5]Great Ormond Street Hospital, [6]Manchester University, [7]Salford University

The extent to which children's early language skills can predict their language development throughout infancy is a key theoretical question about the multifaceted trajectory of these language skills with practical importance for identifying children at risk of language delay at the earliest possible stage. In typical longitudinal studies, children's natural language skills are measured at multiple stages. These studies have revealed that some children with poor language skills at 2 years of age have language delay 2 years later, but some do not (Cheung et al., 2022, Journal of Experimental Child Psychology). These studies have also tested whether vocabulary and grammar skills are distinct or stem from a generic language ability between 2 and 4 years of age, with mixed results (Brinchmann et al., 2019, Developmental Science). In this study, we measured children's ability to learn an artificial language at 17 months old, rather than measure the outcome of learning, and tested whether this could predict language development at 30 months and then even later at 54 months. We tested 71 children on an artificial language learning task which assessed both vocabulary and grammar learning (Frost et al., 2020, Cognitive Psychology). We then determined the extent to which performance on these learning tasks related to natural language vocabulary at 30 months, and to multiple measures of natural language vocabulary and grammar at 54 months. At 30 months, only artificial language vocabulary learning predicted children's vocabulary development. In distinction, at 54 months, only artificial grammar learning predicted children's vocabulary and grammar development. Together, these results indicate that language learning ability can predict later language skills, but that at different stages of maturation the ability to learn vocabulary versus grammar exerts a distinct effect.

Session 4: Temperament

Exploring correlations between infant temperament and behavioural patterns during emotional distress

Yu Wei Chua[1], Lorna Ginnell[2], Victoria Ledsham[3], Lorena Jiménez-Sánchez[2], James Boardman[2], Philip Rowe[1], Sue Fletcher-Watson[2] and Jonathan Delafield-Butt[1]
[1]University of Strathclyde, [2]University of Edinburgh, [3]University of Albany

Introduction: The modulation of emotional reactivity by emerging regulatory abilities can be a useful framework to understand why infants respond differently to emotional distress. Temperament describes relatively fixed, biological traits related to infants' regulatory abilities and emotional reactivity, decomposable into 14 factors (Rothbart & Derryberry, 1981). However, limited research has considered how this multidimensional construct is related to measurable behaviour in experimentally-induced emotional distress. Methods: 111 infants (61 born-at-term, 50 born-preterm, <33 weeks' gestation) participating in a cohort study of preterm birth were included. At 9-months of age or corrected age, infants took part in a structured play situation that elicits distress in infants during episodes when the caregiver is unresponsive, i.e., maintaining a "still-face". Negative affect and coping behaviours in two "still-face" episodes were video-coded. Data was reduced to the episode where infants first displayed negative affect. Temperament was measured on the Infant Behaviour Questionnaire (Revised). Bivariate Spearman rank correlations were examined between coping behaviours, negative affect, and temperamental domains (Negative reactivity and Orienting/Regulation) and four temperamental subdomains (previously shown to be impacted by prematurity or related to behaviour in experimentally induced emotional distress). Results: Correlations were identified with two temperamental subdomains, but not with domain-level Negative reactivity and Regulation. Infants rated greater on Fearfulness showed fewer repetitive behaviours during distress (*rho*=-0.21, *p*=0.030). Infants rated greater on Cuddliness (who soothed more easily when held close to parents) showed lower negative affect (*rho*=-0.21, *p*=0.036), and used more self-comforting strategies (*rho*=0.22, *p*=0.036). Discussion: Greater reactivity to fear may lead to over-regulated, withdrawn behaviour and infants' physical interactions with caregivers may play a role in the development of self-regulatory abilities. It is important to understand better the biological differences underlying temperament, including the impact of preterm birth, as well as modifiable factors that together shape how infants respond and cope with emotional distress.

Little tyrants: Explaining early physical aggression through stress response profiles

Stephan Huijbregts[1], Elja Meijer[1], Hanna Swaab[1] and Stephanie Van Goozen[2]
[1]Leiden University, [2]Cardiff University

The present study is part of the Mother-Infant Neurodevelopmental Study-Leiden (MINDS-Leiden), a longitudinal study of 275 mother-infant dyads, with assessments prenatally and when the child is 6, 12, 20, 30 and 42 months old. Specifically, the present study (214 mother-child dyads, 116 boys) examined whether physical aggression at 12, 20 and 30 months of age could be predicted by stress regulation, inhibitory control, and risk background at 12 months. Each of these factors were shown to individually predict physical aggression in the MINDS-study1,2. It was first examined whether the stress data of our 12-month-old participants fitted the four stress response patterns of the Adaptive Calibration Model3, using Latent Profile Analysis. A fear task (robot paradigm)4 was used to measure baseline, response, and recovery levels of the stress systems, including heart rate, pre-ejection period, respiratory sinus arrhythmia, and salivary alpha-amylase and cortisol. At 12 months, children performed a modified version of the Don't Paradigm5 to assess inhibitory control, risk status1 was systematically determined according to WHO-criteria and physical aggression was assessed through maternal reports at 12, 20, and 30 months of age. Latent profile analysis revealed three stress response profiles: (1) Autonomic Nervous System (ANS)-Responders, (2) Moderate Arousal, and (3) Hormonal Responders. At 12 months, higher physical aggression was reported for ANS-Responders and when inhibitory control was relatively poor, at 20 months physical aggression was higher for Hormonal Responders, boys and for those with a high-risk status, and at 30 months for boys and high-risk status. Moreover, at 20 months relatively good inhibitory control in girls was associated with lower physical aggression scores, but not in the Hormonal Responders. Changes in predictive models at different time points underline the importance of using a multisystem approach integrating neurobiological, neurocognitive, and social-environmental factors to explain individual differences in early physical aggression.

Session 5: Development in the global world

The Creation and Validation of the Global Scales for Early Development (GSED)

Melissa Gladstone[1], Gareth Patrick Mccray[2], Gillian Lancaster[2] and The Gsed Team[3]
[1]University of Liverpool, [2]Keele University, [3]The GSED Team

The Global Scales for Early Development (GSED) is an ambitious measure of child development that can be used across countries for 0-3-year-olds. It is designed to i) contribute to the measurement of UN Sustainable Development Goal (SDG) 4.2.1, the "proportion of children developmentally on track" and ii) measure impact of programs/interventions. GSED aims to be i) reliable and valid in culturally, linguistically and socioeconomically diverse populations, ii) predictive of future outcomes, iii) comparable across cultures and contexts, iv) free and open-access, v) easy-to-administer and feasible for use at scale, and vi) able to provide age-adjusted scores on global normative benchmarks. GSED was designed by rigorous psychometric modelling of a dataset, combining data on developmental items from 66,075 unique children (100,153 visits) across 31 countries from 51 studies using 18 instruments. Nine subject matter experts (SMEs) reviewed 807 of the 2,211 items chosen from the original dataset which best fit a Rasch model and looked at i) conceptual overlap between items, ii) developmental domains an item was measuring and iii) feasibility of each item. SME data was combined with data on item difficulties to select items to create two tools (on the same underlying scale): the caregiver-reported GSED-SF (Short-Form–139-items) and the directly-assessed GSED-LF (Long-Form–157-items). Field-testing, assessing reliability (inter-rater, test-retest, and internal measures) and validity (concurrent, convergent, and predictive), followed. GSED and associated contextual measures (SES, maternal, education, anthropometry, etc.) were administered to 3500+ children in Bangladesh, Pakistan and Tanzania, and further data on 4800+ children in China, the Ivory Coast, Brazil, and the Netherlands are being collected. The tools and most items have excellent validity and reliability across countries. After data from all 7 countries has been collected, GSED will be finalised, though a version based on the first tranche of data is available.

COVID-19 first lockdown as a window into language acquisition: associations between caregiver-child activities and vocabulary gains

Natalia Kartushina[1], Nivedita Mani[2], Christina Bergmann[3] and Julien Mayor[1]
[1]University of Oslo, [2]Georg-August-Universität Göttingen, [3]Max Planck Institute for Psycholinguistics

The COVID-19 pandemic, and the resulting closure of daycare centers, led to unprecedented changes in children's learning environments. This period of increased time at home with caregivers, with limited access to external interaction provides a unique opportunity to examine the associations between caregiver-child activities and children's language development. At the onset of the first lockdown, in March 2020, across 13 countries (Norway, Spain, the Netherlands, UK, USA, Germany, Israel, Saudi Arabia, Canada, Turkey, Russia, Poland and France) and 12 languages, 1742 parents to 8-36-month-old infants completed language-specific standardized vocabulary checklists (CDI) indicating the words their child understood (for 8-16-month-olds) and produced (for all infants). Parents were contacted again at the end of the lockdown and asked to estimate the amount of time their child was involved in activities (alone or with a caregiver) such as shared book reading, structured child-caregiver games, free play with the child, singing, one-to-one speaking, time spent outdoors, passive screen exposure (watching baby TV, cartoons, shows, with no interaction with a digital device), playing baby games on a digital device, time spent playing without an adult – on a 10-point scale ranging from "did not do this activity at all" to "more than 4 hours most days". Parents were also asked to complete the same vocabulary checklist again, so we could calculate the number of words learned throughout lockdown. The results revealed that children who had less passive screen exposure and whose caregivers read more to them showed larger gains in vocabulary development during lockdown ($p < .01$), after controlling for SES and other caregiver-child activities. Overall, children gained more words than expected (based on normative data) during lockdown ($p < .01$); suggesting that either caregivers were more aware of their child's development, or vocabulary development benefited from intense caregiver-child interaction during lockdown, or both.

Early childhood education and care (ECEC) during COVID-19 boosts growth in language and executive function

Catherine Davies[1], Michelle McGillion[2], Shannon Gibson[3], Teodora Gliga[4], Alexandra Hendry[5], Nayeli Gonzalez-Gomez[3]
[1]University of Leeds, [2]The University of Warwick, [3]Oxford Brookes University, [4]University of East Anglia, [5]University of Oxford

High-quality, centre-based education and care during the early years benefits language and cognitive development, especially in children from disadvantaged backgrounds (Archer & Oppenheim, 2021; Melhuish & Gardiner, 2020). During the COVID-19 pandemic and its associated lockdowns, access to early childhood education and care (ECEC) was disrupted. Between March and June 2020, only 5-10% of children who usually attended ECEC did so. This was followed by an extended period of quarantine measures, reduced attendance, and disruption to ECEC. We investigated how this period affected the developmental advantages typically offered by ECEC. Using parent-report data from 189 families living in the UK, we explored associations between time spent in ECEC by 8-to-36-month-olds, their socioeconomic background, and their growth in language and executive functions between Spring and Winter 2020. We found that children who attended more ECEC during the pandemic showed greater growth in their language comprehension (β=.245, p<.01), and this effect was stronger for less advantaged children within that group. While good news for those children attending ECEC, this suggests that children from less privileged backgrounds who lost access to ECEC were disproportionately disadvantaged by the social distancing measures, risking their language development and the cascading benefits that good language skills provide. Children who attended more ECEC during the pandemic also showed greater growth in their cognitive executive functions (β=.255, p<.01), regardless of socioeconomic background. Our findings highlight the importance of high-quality ECEC for the development of key skills and for levelling socioeconomic inequalities. We are currently running follow-up analyses of data to Spring 2021 to examine whether the benefits of COVID-era ECEC endure throughout the ongoing disruption in the later stages of the pandemic. As our cohort matures, we also investigate whether ECEC attendance predicts measures of school-readiness.

Session 6: Social Interaction

The breadth and specificity of 18-month-old's infant-initiated interactions in naturalistic home settings.

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[1]Lancaster University, [2]Utrecht University, [3]MEF University

In the second year of life, children's social communicative skills undergo substantial changes, becoming more diverse and sophisticated. In addition to benefitting from social communication as recipients, infants start to actively initiate a range of interactions aiming to elicit certain types of responses from social partners. In this study, we investigated interactions initiated by 18-month-old Turkish infants (*N* = 43) with their caregivers in their natural settings. We coded video recordings capturing these hour-long home observations using a novel coding scheme to account for a wide range of infant-initiated communicative goals: needs-based (e.g., biological such as feeding, or socio-emotional such as cuddling) and non-needs based (categorized as a) expressive, b) requestive; c) information/help seeking; d) informative). This is the first study to thoroughly characterize a wide and detailed range of infant-initiated communicative bids in a naturalistic environment. We used an event-based approach, defining an event when an infant starts an interaction using either verbal or non-verbal behaviour and receives a response from the caregiver within 3 seconds. Our analyses so far show that infants initiated a total of 2049 events (*M* = 3.2 seconds; *SD* = 1.9 seconds, Range = 0.9 – 8.7 seconds). Infants initiated both need-based and non-need-based interactions; however, non-need-based were more prevalent: infants initiated non-need based events (*M* = 42.02, *SD* = 5.46) such as requesting an object or seeking information significantly more than need based events such as being fed (*M* = 5.40, *SE* = 0.76). Among non-need-based interactions, 50% aimed at sharing attention, 26% aimed at requesting an object or an action, and 12% aimed at seeking information or help. These findings suggest that at 18-months, infants actively communicate with their social others to fulfil their need-based and non-need-based bids using a wide range of verbal and nonverbal behaviours.

Development of social modulation of attention in live compared to video situations

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Eye movements are affected by the social context we are in: If adults watch videos on a screen (e.g., television at home), they prefer to look at other people; however, in social situations, people avoid staring at strangers. This is explained by the dual-function of gaze hypothesis. While gaze only has the function of collecting information from the environment in non-social situations, a second function occurs in social situations: to send social signals (e.g., interest in a conversation) to others. Studies with adults suggest that they preferentially look at strangers in videos while they inhibit looking at strangers during face-to-face contact (e.g., in a waiting room). However, the development of this social inhibition of gaze has never directly been investigated. The current preregistered (https://osf.io/837wm) study used eye-tracking and electroencephalography to compare eye movements and neural responses of infants between 3 and 7 months (M_{age} = 167 days, SD_{age} = 31.8 days) and adults (M_{age} = 20.91 years, SD_{age} = 3.9 years) during a "waiting room situation." They were seated and asked to wait in a room in which either a real confederate was present (social situation) or a video of the same confederate was presented on a computer screen (non-social situation). Eye-movement analysis showed that adults looked significantly longer at the screen in the video condition than they looked at the confederate in the live condition, $t(21) = 4.48$, $p < 0.01$, whereas this tendency was not significant in infants $t(10) = -2.18$, $p = 0.054$. Interestingly, alpha power measured with EEG differed between social and non-social conditions in infants, but not in adults. The results suggest that the social inhibition of gaze develops from infancy to adulthood, but that there may already be an early tendency for gaze inhibition in social situations.

Reduced social responsiveness in infancy as an early behavioural marker of autism spectrum disorder outcomes in early childhood

Süheyla Özen[1], Jolie Keemink[1] and David Kelly[1]
[1]*University of Kent*

Prospective studies of autism assess infants with a familial history of autism, typically an older sibling (1). Despite empirical study (e.g., 2, 3) reliable later predictors of autism remain elusive in the first year of life. Keemink et al. (2021) used a gaze-contingent paradigm with typically developing (TD) and infant sibling (IS) groups in which engaging in eye contact with on-screen actors would trigger the stimulus to produce a facial expression. In addition to eye movements, the infant's response (e.g., a smile) to the stimulus was recorded. Eye movements were comparable between groups, but the infant sibling group showed reduced behavioural responsiveness. We are currently conducting follow-up work with infants tested by Keemink et al. to assess whether reduced social responsiveness is related to later outcomes via a parent-child free-play task and standardised tests. Data collection is ongoing for IS participants, with 45 TD infants (21 - 56-months) and 6 IS children (42 – 60 months) tested to date. Using a task modelled on the Parent-Child Free Play procedure (e.g., 5-7), parents and children were recorded while engaging in free-play. Following previous research (e.g., 8-10) a coding scheme evaluated five measures of social interactivity including social vocalisations, smiling and engagement in play. Parental-reports, the RBQ-2, ASQ-3 and LUI were completed online separately. Questionnaire data collection is ongoing, but free-play results indicate that IS siblings on average scored lower on all child behaviour measures with significant differences in frequency of low engagement in play (X^2 (1,51) = 11.243, p =.006). Parent and child social interactivity measures were also highly correlated. Currently, no relationship between reduced responsiveness in infancy (4) and later outcomes have been identified, however. These findings contribute to existing prospective studies of autism and also highlight the challenge of identifying first year of life predictors.

Session 7: Vision

Infant Visual Preference and Aesthetics

Anna Franklin[1,2], Alice Skelton[2], John Maule[2], Philip McAdams[2], Megan Chambers[2] and Yasmin Richter[2]
[1]The Sussex Colour Group & Baby Lab, [2]University of Sussex

Aesthetics is a burgeoning interdisciplinary field of research. However, there has been little investigation of how an aesthetic response develops. Here, we present a series of infant studies which investigate infants' visual preferences for simple stimuli, complex scenes, art and abstract images. We find that some aspects of adult aesthetic preference can be traced back to infants' visual preferences (e.g., infants look longer at colours that adults prefer). However, other adult aesthetic preferences (e.g., a preference for natural over urban scenes, and a preference for art in its original rather than manipulated colour) are not evident in infants' visual preferences, but emerge gradually over childhood. We also show that infant visual preferences for scenes and art can be predicted by the low-level chromatic and spatial statistical regularities in the image, and more so than adult aesthetic preferences can be. We discuss the nature of infant visual preference, and consider what measures could be used to establish that infants 'like' a visual stimulus. We also discuss how our findings on infants' visual preferences provide insight into infants' visual development, as well as the processes that underpin mature aesthetics. Finally, we provide examples of the application of our research on infant visual preference to commercial design for infants.

A digital filter to simulate infant visual experience.

Alice Skelton[1], Jenny Bosten[1] and Anna Franklin[1]
[1]*University of Sussex*

Infant vision is substantially poorer than adult vision. Infant sensitivity to detail, light, colour, and contrast is reduced relative to adults, and although there is rapid improvement in infancy, many elements of vision takes years to reach 'adult like' sensitivity (e.g. visual acuity is similar to adults at about 3 years old, while colour sensitivity peaks in late adolescence). As a result, the appearance of stimuli, objects and scenes differ for infants and adults. Accurate modelling to simulate how images appear to infants at different ages can shed light on what is driving infants' response to objects and the world around them. Here we present a digital filter which simulates the appearance of images for infants based on psychophysical data measuring infant visual sensitivity. Images are filtered to approximate how they would be perceived by infants at various ages based on their reduced acuity, contrast, and colour sensitivity. Additionally, we use the digital filter to demonstrate how infants' reduced visual sensitivity likely affects the visual statistics of scenes when viewed by infants. We also discuss the impact that infants' reduced visual sensitivity has on understanding what the infant 'visual diet' really is, how this might influence looking behaviours to experimental stimuli, objects and scenes, and what research is needed to enable us to simulate infant visual experience in a 3D world rather than 2D images as here. The digital filter has potential applications for those investigating infant development using a baby head-cam method, and we discuss how it could be applied to baby head-cam image databases.

Session 8: Mental Representation

Frequency tagging in infants and adults reveals neural object processing on behalf of others

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Infants' ability to track objects develops quickly within the first six months of life. From the second year of life on, they also seem to track what other people can see, referred to as visual perspective taking. Notably, both infants and adults do not only take into account the perspective of others when actively reasoning about them. The perspective of others also seems to shape our own representation of the environment when it is irrelevant to what we are currently doing (altercentric cognition). Here we ask how others' visual perspective modulates adults' and infants' neural object processing. To test this, we make use of rhythmically entrained brain oscillations: Viewing an object that flickers at a specific frequency results in brain oscillations at exactly the same rhythm; these oscillations thus provide a neural signature of our object representation. Participants were presented with an agent observing an object flickering at 4 Hz. The object either disappeared into a tunnel (blocking the participant's as well as the agent's view) or behind an occluder (blocking only the participant's but not the agent's view). We hypothesized that adults and infants (aged 12-14 months) also show oscillations in reaction to someone else seeing the object, even when they no longer see it themselves. Indeed, adults (*N*=40) showed a higher response amplitude when the agent continued to see the object (occluder condition) compared to when she could no longer see it (tunnel condition). This was the case while the object disappeared as well as after the object had been fully occluded. Infants (*N*=56) also showed a higher 4 Hz response in the occluder compared to the tunnel condition but only after the object had been fully occluded. These findings indicate that infants' and adults' neural object processing and memory is altercentrically modulated by the perspective of others.

Pretend Play in Preschoolers: Links to Cognitive and Creative Processes

Ezgi Yıldız [1] and Deniz Tahiroğlu[1]
[1]*Boğaziçi University*

Pretend play, which involves the use of fantasy, make-believe, and symbolism, has been linked to cognitive development and the facilitation of creative processes through the involvement of cognitive and affective processes (Lillard et al., 2013; Russ, 1993). It has been demonstrated that executive functioning (EF) supports creativity in children (Krumm et al., 2018). Given that pretend play fosters cognitive processes such as divergent thinking (Russ et al., 1999) and EF (Carlson et al., 2014), one can assume that early pretend play may be linked to later creativity by facilitating EF. In this study, examining the longitudinal interrelations between pretend play, EF, and creativity and the potential mediating role of EF, we collected data from 97 children at two-time points one year apart (Time 1*:* M_{age}=45.71 months, *SD* = 5.92). Pretend play was assessed with behavioral tasks such as pretend action and pretend phone tasks. Verbal (Mottweiler & Taylor, 2014) and visual creativity (Karmiloff-Smith, 1990) was measured along with behavioral EF tasks assessing shifting, working memory, and inhibitory control. Correlations between the variables are provided in Table 1. Pretend play at Time 1 predicted EF at both time points. Furthermore, pretend play at Time 1 (*b* = .30, *B* = .14, *t* = 2.12, *p* < .05) predicted creativity one year later after controlling for initial creativity and language abilities, $F(3,85)=2.29$, $p=.08$, $R^2=.04$. However, EF didn't mediate the relation between early pretend play and later creativity. The results lend support to the association between pretend play and cognitive development and suggest that higher representational abilities and engaging in more complex pretend play may contribute to the development of children's creativity. Given that EF didn't mediate the relation between pretend play and creativity, future research is needed to understand the mechanisms underlying this relationship.

Session 9: Lexical Development 2

On the dimensional structure of early lexical and grammatical knowledge

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The relationship between lexical and grammatical knowledge in young children is impressively strong. Indeed, the correlation between productive vocabulary and grammar (r = .84) is larger than that between productive and receptive vocabulary (r = .63) when measured with the commonly used Communicative Development Inventories (CDIs). This correlation fits cleanly with usage-based theories of language, which assume no clear distinction between the lexicon and grammar (Tomasello, 2003). However, it could also reflect separate systems that are mutually causally related (mutualism); initially uncorrelated domains can gradually become so correlated as to be statistically indistinguishable when they are mutually causally related (Van der Maas et al 2006). Disentangling these accounts is complicated by the non-linear relationship between true and measured grammatical/lexical knowledge, which is not accounted for in traditional regression-based approaches. Here we present a new approach to disentangling these accounts which overcomes these measurement challenges. We examined the dimensional structure of item-level data from CDI data on Wordbank (Frank et al. 2017) using item-response theory and the DETECT method (Stout et al. 1996). We first considered all non-longitudinal data from the American English subsample of Wordbank. A DETECT analysis found evidence of moderate multidimensionality with vocabulary and grammar items clustering separately, contra some usage-based accounts which assume no distinction between grammatical and lexical knowledge. Given that mutualism predicts that two domains become increasingly correlated with age, we next ran a similar analysis in separate sets of younger (~18 months) and older (~28 months) children. These data were unidimensional at 18 months and multidimensional at 28 months. In sum, our results did not strongly support either account described above and are most consistent with an initially integrated lexico-grammatical system that becomes decoupled between the second and third year.

The origins of sentence processing difficulties in developmental language disorder

Sam Jones[1] and Gert Westermann[1]
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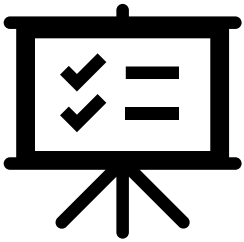
Developmental language disorder (DLD) affects around 7.5% of English-speaking children and involves severe language deficits in the absence of any clear biomedical cause. Sentence comprehension and production errors are the hallmark of DLD and have been explained in terms of underlying deficits in: (i) an innate grammar module (i.e., with reference to Chomskyan nativism); (ii) auditory processing; (iii) working memory; and (iv) statistical learning. Each of these frameworks is controversial, and the underlying causes of DLD therefore remain poorly understood. Chomskyan nativism appears brittle in the face of the genotypic and phenotypic complexity now recognised in DLD; successful grammar learning in mild-to-moderately hearing-impaired children suggests an account centred on auditory perceptual deficits alone is insufficient; and the supporting working memory and statistical learning literature are compromised by widespread methodological and interpretative problems. This makes the re-examination of the cognitive basis of sentence processing deficits in DLD well warranted, and the proposed talk will offer a novel theoretical account in this direction. Stated plainly, our position is that children with DLD show sentence comprehension and production deficits because they know fewer words than their typically developing peers. We therefore take as our starting point the least controversial claim that can be made about the language of children with DLD – that of a receptive vocabulary deficit. The challenge is, then, to provide a formal explanation of how lexical deficits are sufficient to explain the sentence processing difficulties that characterise DLD without recourse to the four dominant frameworks described above. To do this, we draw on linguistic constructivism and neural population geometry. We show that the account developed can explain not only the dominant patterns of sentence comprehension and production error seen in DLD, but also the successes seen in specific methods of clinical intervention targeting grammar.

POSTER SESSION 1



A1 Object exploration with vision and touch – Preschoolers' information sampling strategies across modalities

Penny Bounia-Mastrogianni[1], Tommaso Ghilardi[2], Francesco Poli[2], Sabine Hunnius[2] and Denis Mareschal[1]

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During exploration of new objects, learners might preferably attend to object attributes that carry an intermediate amount of new information (often termed the Goldilocks' principle: preference for medium novelty, complexity or uncertainty; Kidd, Piantadosi, & Aslin, 2012). However, other studies suggest that the maximum amount of new information is optimal for learning (Addyman & Mareschal, 2013). In the particular case of new object exploration, information is available to both vision and touch, and different amounts of information might be optimal for each modality due to contextual significance (Ernst & Lange, 2007), or for each individual due to their proficiency in haptic and visual object recognition. Specifically during the first years of life, visual perception has a faster development than touch, and the development of their coordination follows a protracted route. Furthermore, there might be individual differences in general strategies of exploration (Güclütúrk, Jacobs, & van Lier, 2016). In our study, we aimed to examine whether pre-schoolers (4-year-olds) gather information through object exploration in a different manner across visual and haptic modality. Specifically, children explored sets of 3D-printed objects with three different levels of complexity (Gartus & Leder, 2017) either through vision or touch, and the exploration time spent on each object as well as their subjective preferences for the objects were measured. Their proficiency in each sense was also measured with an object-difference recognition task. Data collection is still ongoing. We do not expect to find an overarching exploratory strategy that applies across individuals and modalities. Rather, we expect individual strategies to vary across participants, based on their general preference for a specific level of complexity, and across modalities, based on their respective proficiency.

A2 Mapping the developmental trajectory of cross-modal appreciation using pitch-motion correspondences

Nina Harrison[1], Gavin Bremner[1] and Kirsty Dunn[1]
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Cross-modal correspondences refer to perceptual phenomena wherein exposure to stimuli of a specific sensory modality reliably evokes a concurrent association in the same or another sensory modality. Previous investigations in this domain have tended to focus on associations between auditory pitch and various aspects of visual perception (e.g., visuospatial height and/or sharpness), almost exclusively using adult participants and static stimuli to do so. Albeit limited, research using dynamic stimuli has documented cross-modal appreciation in infants as young as 3 and 4-months-old (Dolscheid et al., 2014; Walker et al., 2010). However, the extent to which infant and adult research can be compared is constrained by issues related to design variability, including the stimulus dimensions under investigation and the aforementioned differences in the format of stimuli used. Moreover, it has been suggested that the interaction of cross-modal stimulus dimensions is dependent on the dynamicity of the presented stimuli (Eitan et al., 2014; Jeschonek et al., 2013). Consequently, our knowledge of the developmental trajectory of cross-modal correspondences remains somewhat unclear. Therefore, the purpose of this series of investigations, produced in fulfilment of a doctoral thesis and the findings of which are to be presented in this poster session, was to circumvent the current limitations obscuring our understanding of the development of cross-modal appreciation. To do this, our age groups of interest were 3- to-4-month-olds, 9- to 10-month-olds and adults, and, importantly, identical stimuli were presented across these age groups. Of note, these experiments transposed the salient stimulus features of the well-documented pitch-height and pitch-sharpness correspondence into a dynamic context, providing a meaningful extension of the adult literature in and of itself. These findings also shed light on the validity of the Neonatal Synaesthesia Hypothesis (Maurer, 1993), and the implications of using different methodologies to investigate infants' looking behaviours.

A3 Actions before words? Temporal dynamics in infants' multimodal environment

Ricarda Bothe[1] and Nivedita Mani[1]
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As early as six months of age, children learn and comprehend a handful of words and actions. Studies examining the factors underlying such learning have employed laboratory tasks where children are presented with either words or actions. The input that children are naturally exposed to, however, is multimodal, with simultaneous presentation of actions and words. Here, we aim to examine how word and action learning occurs as children are presented with information from linguistic-auditory and action-visual modalities simultaneously, and the factors that influence early learning in multimodal environments. Specifically, we examine the influence of the timing and temporal synchronicity of word and action input on learning, while controlling for potential individual differences in language abilities of the children tested. Children were trained on word-object and action-object associations as they were presented with novel objects, each associated with a novel name (e.g., “Oh, a Tanu!”) and an arbitrary action (e.g., hand rotates the object). Following training, we test children’s recognition of the trained novel word-object and action-object associations, using both looking time and pupillary responses as indices of recognition. Systematic patterns of word-action-object learning will allow us to identify the interplay of word and action information and the role of timing of such information in the environment of novice learners.

A4 Stress and Challenge Across the Transition to Formal Education: A Multi-Informant, Multi-Method Qualitative Study of Children's Appraisals and Coping Strategies

Arwa Katab[1], Bronia Arnott[1], Timothy Cheetham[1] and Olivia Craw[1]
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Aim: The aim of this project is a qualitative exploration of the development of children's stress appraisal during and after starting school. Background: The demands affiliated with the covid-19 pandemic may have impacted young children's ability to adapt to formal education, a known stressor. Children may have missed out on formative experiences through restrictions (Loades et al., 2020; Raw et al., 2021), and this may increase the challenge associated with starting school. Additionally, the stressors placed on families during this time may have impacted young children's ability to adapt to future stressful situations. When children experience an accumulation of demands without an effective strategy to cope, the maturation of their developing brain and stress system may become compromised and negatively impact their mental and physical health and wellbeing (McEwen, 1998; McEwen & Gianaros, 2011). Understanding how children manage and experience everyday demands, such as the transition into formal schooling, could help depict the approach interventions should take to enrich children's coping strategies. Design/Materials: Age appropriate, PPI-informed and engaging methods will be adopted when interviewing the children (age 4 years at recruitment; *N* = 10-20 parent-child dyads). Children's stress appraisal will be measured through asking them to draw themselves on their first day at school (the Draw and Write method; Collins et al., 1998), and the Pictorial Measure of School Stress and Well-Being for preschool children (Murray & Harrison, 2005) will explore their coping strategies. Qualitative interviews and diary entries from parents exploring their own appraisal of the transition, the impact of covid-19, and support offered during this period will provide multi-informant indicators of appraisal, coping and ultimately adaptation. Analysis: Thematic analysis will be implemented when analysing both the parent and child's transcripts.

A5 Effects of mobile videos for early childhood development in rural Côte d'Ivoire: a cluster-randomized trial

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Background: In low- and middle-income countries (LMICs), an estimated 250 million children under five are at risk of not reaching their developmental potential, with substantial adverse consequences in the long-term. Yet, guidance remains limited for policymakers willing to invest in early childhood development (ECD). Aims: We conducted a cluster randomised trial to measure the impact of an information campaign using mobile videos to foster parenting practices to promote ECD in Côte d'Ivoire. Methods: Short mobile videos in local languages promoting early childhood stimulation (ECS) practices (e.g., playing with ones' children, using non-violent discipline methods, etc.) to promote ECD were disseminated among caregivers of children aged <24 months. A subset of households in the 100 of 200 randomly selected villages received memory cards from health workers (targeted households). Another subset of households likely received them through village leaders (non-targeted households). Results: Of the 2,901 households surveyed, one-third of non-targeted population and 88.4% of targeted population had viewed the videos at follow-up. Among targeted male and female caregivers exposed to the videos, ECD knowledge increased by 0.21 (0.06-0.36) and 0.24 (0.10-0.38) respectively. Targeted male and female caregivers respectively also carried out more ECS activities with their child: 0.21 (0.04-0.37) and 0.22 (0.02-0.41). The intervention reduced the prevalence of physical punishment by 8 percentage points (-0.14 to -0.02). We did not find an impact on child development, as reported by caregivers. However, direct observation of the family environment (using HOME-inventory) by trained enumerators demonstrated that parents exposed to the intervention were significantly more likely to be affectionate, to spontaneously praise the child and to name objects/people with them. Conclusions: Our results suggest that this low-intensity, mobile video campaign successfully improved ECD parenting knowledge and behaviours. It can be easily scaled up in settings with extensive availability of mobiles to promote ECD.

A6 Correlates of Young Children's Screen Time

Dilara Keşşafoğlu[1], Merve Nur Altundal[2], Nursena Koç[3], Ezgi Yıldız[4] and Berna A. Uzundağ[3]

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Children younger than five spend a considerable amount of time on various screens (Przybylski & Weinstein, 2019). A growing literature shows relations between screen time and children's social and cognitive development (e.g., Hinkley et al., 2018; McArthur et al., 2021). Studies demonstrate various demographic and parent- and home-related factors associated with children's screen time (e.g., Lauricella et al., 2015; Piotrowski et al., 2015). However, most evidence comes from high-income and developed countries with early childcare access. Here, we report the findings of two survey studies conducted in Turkey, a developing country, where only 75% of mothers with young children are employed, and 6% of preschool-aged children attend child care (TurkStat, 2021) (see Table 1 for descriptive information). In a large sample of parents with children younger than age six (*N*= 647), the first online survey revealed that children's screen time was linked to parents' screen time (τ= .14), parents' positive attitudes towards technology (τ= .06) and children's use of technology (τ= .27), amount of background TV at home (τ= .38), child having a sibling (τ= .19), maternal (τ= -.23) and paternal education (τ= -.19), household income (τ= -.19) and child age (τ=.32). Another online survey with a more representative sample of mothers of children aged between 3 and 6 (*N*= 202) further showed that children's screen time was related to parent's screen time (τ= .26), child effortful control (τ= -.13), amount of background TV (τ= .26), maternal education (τ= -.11), household income (τ= -.13), and child age (τ= .10). Considering the negative influence of screen time on child development (e.g., Duch et al., 2013), particularly on infants and toddlers (e.g., Kostyrka-Allchorne et al., 2017), our results focusing on child-, parent-, and home-related factors can provide insights to develop intervention strategies to reduce screen time at home.

A7 What underlies preschoolers' curiosity-driven exploration?

Francesco Poli[1], Marlene Meyer[1], Rogier Mars[1] and Sabine Hunnius[1]
[1]*Donders Institute*

Human and artificial agents perform better in a variety of learning tasks when they are driven by their curiosity. Specifically, their intrinsic motivation to learn pushes them into picking environments that offer better learning opportunities, resulting in enhanced knowledge of the world around them. However, the developmental origins of this cognitive mechanism are still unclear. To investigate this, we are testing 4-year-old children in a learning task in which they can freely explore different unknown environments that contain learnable sequences of events. Three characters are available at any time, and children can decide which one to play hide-and-seek with. The chosen character hides behind a hedge following a predictable (yet noisy) pattern, and children have to guess where the character is hiding. Crucially, the task design allows them to learn about where a specific character tends to hide, but also to switch the character they are playing with at any moment in time. This allows us to quantify when they decide to explore and what drives their exploratory decisions. If children's exploration is driven by curiosity, we expect them to pick environments where they can learn the most, abandoning the ones where learning is diminishing or absent. To better assess their performance and exploratory strategies, we plan to fit the children's data to a hierarchical reinforcement learning model that has previously been used to quantify curiosity in adult research (Poli et al., 2022). Data collection is currently ongoing (N=10) and the final sample will be available at the time of the conference.

A8 Does active exploration lead to memory enhancements in 18- to 36-month-old toddlers?

Yi-Lan Li[1] , Pravallika Naidu[1], Francesco Poli[2] and Azzura Ruggeri[1] and Raquel Fernández Fuertes[2]

[1]Max Plank Institute for Human Development, [2]Donders Institute

Active exploration has been related to better learning performance and memory retention compared to the passive observation of study material. This effect is present across most of the life span, from childhood to late adulthood (Ruggeri et al., 2019). However, it is still unknown how the ability to actively control exploration develops during infancy, and whether infants show similar memory benefits from exploring actively. To investigate this, we tested infants and toddlers between 18 and 36 months of age on a novel gaze-contingent task with a within-subject design. Infants were presented with six empty boxes on the screen. In the active phase, infants could freely explore the content of the boxes, that is, when they looked within a box, an object or animal would appear in it. In the passive phase, infants did not have active control over which box would show the stimuli. Instead, they were presented with the stimuli appearing from inside the boxes in a pre-set order. Afterwards, infants were tested in a preferential-looking paradigm. Stimuli were presented in pairs, with one stimulus being completely novel, and the other stimulus from either the active or the passive phase. To test whether active exploration is related to memory enhancements in infants, we will compare the familiarity preference to stimuli presented in the active phase with the familiarity preference to stimuli from the passive phase using looking times and first-looks. A stronger novelty preference in the active contrast would suggest that infants encoded the stimuli more robustly when exploring actively. Data collection is ongoing (N = 30) and data analysis will be performed on the final sample (N =60).

A9 Predicting the value of information: an infant study

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Infants show sophisticated learning abilities from the first year of life. Research shows they tailor their attention to maximize information gain, both in social and non-social contexts (Poli et al. 2020; Bazhydai et al. 2020). However, little is known about how infants learn to assess the informativity of incoming stimuli. We propose that the ability to track informativity of cues in early infancy might derive from statistical learning abilities. In other words, infants may learn where to find information by guiding their attention to events that are consistently informative (Tummeltshammer et al. 2013,Tummeltshammer et al. 2014). In two studies we explored infants' ability to assess the informativity of the upcoming stimuli using eye-tracking and fNIRS. In both experiments, 8-month-old infants are presented with multiple shapes, that had either smooth or pointy borders. The border type predicted whether the shapes would be informative or not of a subsequent target location. Across multiple trials, infants could thus learn what stimuli were predictive of later events. Our hypothesis is that infants will show greater pupil dilation, higher blink rate and increased activity in the prefrontal cortex when shown informative shapes compared to noninformative ones. Pupil dilation has been shown to correlate with the noradrenergic system, while eye-blink rate has been related to the dopaminergic system (Bacher & Smotherman, 2004 Karson, 1983). The pre-frontal cortex has been linked to structuring visual inputs into abstract rules (Werchan et al., 2016) and integrating top-down knowledge to guide visual search (Tummeltshammer and Amso, 2018). These studies are designed to shed light on how infants quickly learn about the informativity of stimuli and the subcortical and cortical correlates of this ability. Our results may help explaining how infants can be so proficient in finding information even when they know little about the world around them.

A10 The relation between infants' sensitivity to learning progress and later cognitive development: a follow-up study

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It has been shown that individual differences in attention during infancy predict later cognitive development. Specifically, infant visual habituation and looking preferences have been related to enhanced memory performance, higher intelligence and advanced executive functions later in life (Cuevas & Bell, 2014; Fagan, Holland, & Wheeler, 2007; Kavšek, 2004). However, the cognitive mechanisms that might underlie such a relationship are still debated. It has been speculated that a key role is played by individual differences in infants' preferences for novel or surprising stimuli (Fantz, 1964; Kidd, Piantadosi, & Aslin, 2012; Kinney & Kagan, 1976). Recently, a study by Poli, Serino, Mars and Hunnius (2020) has found that infants' attention is not solely drawn by stimulus novelty and surprise, but more so by the amount of learning a stimulus offers. Infants preferred stimuli from which they could learn over stimuli that offered less learning opportunity. This finding is potentially pivotal for our understanding of what might underlie the relationship between infant attention and later cognitive development: Infants who are more sensitive to the learning opportunity a stimulus offers might end up having a more favorable cognitive development and higher intelligence scores. To test this, we recently (March 2022) started a longitudinal follow-up including the 72 infants who had participated as 8-month-olds in Poli and colleagues' study (2020). We examine participants' cognitive development with the Wechsler Preschool and Primary Scale of Intelligence (WPPSI-IV-NL; Wechsler, 2012) at 3.5 years. We plan to relate participants' attentional skills at 8 months to their intelligence scores at 3.5 years of age. Data collection has recently started and will continue until the end of 2022. Preliminary results of approximately 35 children will be presented at the conference.

A11 Measuring interest in early childhood – a validation of various interest measures of young children

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Studies have shown that children's interests influence their learning trajectory, by way of children actively pointing and vocalising to extract information from conversation partners, and absorbing such information better (Mani & Ackermann, 2018). Thus far, interest measures of young children have been obtained using parental reports or behavioural observation; however, recent evidence suggests that physiological responses such as pupil dilation have been shown to vary as a function of an individual's curiosity (Kang et al., 2009, Ackermann et al., 2020). The aim of the study is to examine whether a relationship exists between parental reports of children's interests in various natural categories, and (1) parents' estimation of children's vocabulary size in said categories and (2) and children's physiological (pupil dilation), and intrinsic and extrinsic (looking time toward objects, overt choices in a task) responses showcasing their interest. We recruited 81 2-3-year-old monolingual German children. Children completed two tasks: (a) a Pupillometry and looking time task, where they were presented with images from a range of defined categories; (b) A sticker-choice task, where they were asked to choose between two sticker-images from two different categories belonging to the range of categories assessed in the previous task. In addition, prior to the study taking place, parents completed two questionnaires aimed to estimate (i) their child's interests and (ii) vocabulary knowledge in the categories presented. We predict that parental reports of children's interests will be closely associated with (1) parent's knowledge of children's category size and (2) children's pupil dilation, looking time and overt choice data. With this study, we validate a wide number of measures of interest in early childhood, thereby integrating physiological, behavioural, and parental responses as to what constitutes interest in young children. Thereby, we establish dependable methods to investigate how interest affects language development during childhood.

A12 The Infant Curiosity Questionnaire – progress and next steps

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Curiosity is a concept which remains elusive with open questions especially regarding its emergence and mechanisms in infancy. While there are several self-report measures for adult and some for child-curiosity relating to specific theoretical accounts, there has not been any measure developed yet for infants. Here, we present a newly developed caregiver-report questionnaire measuring infants' general curiosity across a target age range of 5 to 24 months. Rather than constraining behavioural expressions of curiosity to a specific theoretical framework, we instead adopt a broad definition of infant curiosity as a keen desire or tendency to actively explore one's immediate surroundings. We developed 36 items reflecting how infants can actively explore and interact with their environment from birth onwards. Caregivers are asked to evaluate how well each item reflects their child's typical behaviour on a Likert-scale from 1 (strongly disagree) to 7 (strongly agree) with an option of 'not applicable (NA)' for behaviours the child does not display (perhaps because they are too young). A sample of N=197 (M_{age} = 13.63, range: 4.9-14.8, 50.8% female) UK caregiver responses indicates great internal consistency (Cronbach's α to .90) and test-retest reliability after 7-14 days (ICC = .89, p < .001, N = 31, M_{age} = 12.57, range: 5.5-24.21, 58% female). Preliminary results are promising in that the measure captures individual differences in infants' trait curiosity. Reliability analyses on the target sample size of N=360 will investigate the measure's applicability and meaningfulness. Once, the item-set is deemed reliable we will investigate its validity by testing whether it is distinct from measures of temperament and whether it can explain variance in a behavioural exploration task. If successful, this measure will inform our understanding of infant curiosity, its development, expression, and potential stability from a very early age.

A13 Differences in information-seeking behaviour between typically-developing children and children with autism

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Autism spectrum disorder (ASD) is characterized by restricted, repetitive behaviours and interests (DSM-IV; APA, 2013) which results in a reduced tendency to explore and examine novel environments (Kohls et al., 2018; Sasson et al., 2011). These characteristics might lead children with ASD to miss or avoid learning opportunities offered by the environment. Recently, it has been suggested that typically developing (TD) individuals tailor their attention to maximize information they can obtain from the environment (Oudeyer, 2007). Infants look longer at stimuli that offer more opportunity for learning (Poli et al., 2020). TD adults engage longer in environments they can learn the most from, and their exploration of new environments is guided by how much information they expect to gain from them (Poli et al., 2022). However, it remains unclear whether the explorative behaviour of individuals with ASD is similarly guided by learning progress. In the present study we aim to elucidate which mechanisms underlie the explorative behaviour of children with ASD, and whether underlying differences in these mechanisms might explain some of the atypical exploration patterns reported in ASD. We created a motion-pattern learning task, with different environments containing learnable sequences that vary in the amount of learning progress children can make. We plan to test around 40 children with ASD and 40 TD children (Mean = 7 years). A hierarchical reinforcement learning model will be used to capture children's learning in these environments and the learning opportunities they seek. We hypothesize that learning progress might guide the exploratory behaviour of children with ASD differently compared to TD children and that children with ASD might stay for longer in environments even as learning progress decreases. At the moment, task design is underway and data collection is aimed to start in July 2022. Preliminary data will be presented at the conference.

A14 Do pedagogical questions promote infants' information-seeking behaviours and learning?

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Infants produce various behaviours (e.g., social referencing, pointing) that elicit information transfer from adults, and these behaviours increase if infants receive informative responses from competent and reliable social partners. However, it is still unclear which are the specific adaptations that make information transfer most efficient. While pedagogical cues (eye gaze, motherese) have been argued to serve such a function, oftentimes information transfer is preceded by a pedagogical question (questions asked by a knowledgeable individual whose goal is teaching). Are such questions an artifact or an adaptation serving efficient learning? Here we investigated whether responding to 12- and 18-month-olds' information-seeking pointing with pedagogical questions that preceded information transfer fosters learning and increases the frequency of pointing across 8 trials. In the Experimental Condition after an object ''magically'' appeared and infants could point, the experimenter provided pedagogical questions (e.g. 'Do you know what this is for?') before demonstrating the function of an object. In the Control the function demonstration was preceded by an affirmative sentence (e.g. ''I found this in the cupboard yesterday!). We compared how often infants pointed across trials and how many functions they reproduced in a subsequent test phase. Data collection is still ongoing (18-month-olds *N*=48, 12-month-olds *N*=29). Preliminary results suggest that 18-month-olds tend to point more in the Experimental compared to the Control Condition (Experimental *M*=77%, *SD*=37%, Control *M*=64%, *SD*=34%). This trend is not observed for the 12-month-olds. However, for this group, pedagogical questions seem to boost function reproduction, (but not for 18-month-olds) on trials in which infants have not pointed (Experimental Condition *M*=16%, *SD*=19%; Control *M*=8%, *SD*=11%, *p*=0.09). If these patterns hold for the full sample, they will suggest that pedagogical questions may play a role in infants' information-seeking and learning and the circumstances under which this is the case for the specific age-groups will be discussed.

A15 The relationship between curiosity-driven motor exploration and language development.

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Language learning does not occur in isolation. Infants are simultaneously learning to crawl, walk, explore and play. These motor developments provide infants with new opportunities to actively engage with their world and independently choose what to learn from based on their intrinsic curiosity. The link between motor development and language is becoming increasingly documented. For example, early walkers elicit different input from their mothers than later walkers (Karasik, Tamis LeMonda & Adolph, 2014). However, the role the infant plays in this process has not yet been fully addressed, and the relationship between curiosity-driven learning and vocabulary development is unknown. Further, much of what we currently know is based on tightly controlled experiments, which by necessity do not accurately reflect infants' real-world learning. In the current study we coded motor behaviours from existing videos of 11-month-old infants engaged in a free-play session with their caregiver in the family home, collected as part of the Language 0-5 Project (https://osf.io/kau5f/). Coding followed a custom object manipulation coding scheme, which we designed to capture in detail both infants' curiosity-based (i.e., self-directed) motor behaviours and responsive (i.e. in response to caregiver-directed) motor behaviours. Our analyses will involve two stages. First, we will use the frequency of curiosity-based and responsive behaviours to predict infants' concurrent productive vocabulary as measured on the UK-CDI. Crucially, this analysis rests on the assumption that our distinction between curiosity-based and responsive behaviours as an index of curiosity is meaningful. To test this assumption, we will submit the frequency of all behaviours to an exploratory factor analysis, then use the factors generated to predict concurrent productive vocabulary scores. Taken together, these results will shed light on the relationship between motor development and language development and will help elucidate the nature of infants' active, curiosity-based engagement in their own learning.

A16 Pupillary responses to prosodic and syntactic boundary cues in speech segmentation across the first years of life

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During the first year of life, infants show high sensitivity to prosodic boundaries which often coincide with syntactic clause boundaries (Hirsh-Pasek et al., 1987). A well-formed prosodic boundary in German usually consists of three boundary cues: pre-boundary lengthening, pre-boundary pitch rise, and pause. While speech segmentation in children and adults seems to be increasingly influenced by syntactic knowledge (Männel et al., 2013), little is known about how infants' speech segmentation relies on bottom-up perceptual processes (driven by prosodic boundary cues) and top-down knowledge-based processes (driven by lexical and syntactic knowledge). Using pupillometry, we aim to determine whether infants rely more on bottom-up prosodic well-formedness of boundaries to segment speech streams, and at which age top-down syntactic knowledge is integrated. German-monolingual children at the ages of 8- and 42-months will listen to naturally-recorded children's stories which will be cross-spliced in order to create a 2x2 within-subjects design with the factors prosodic well-formedness (well-formed combination of all three boundary cues vs. ill-formed pause-as-sole-cue) and boundary position (syntactically expected/end of clause vs. unexpected/within clause). Each story will consist of four sentences, with each sentence containing a well- or ill-formed prosodic boundary at a syntactically expected or unexpected position. During auditory presentation, pupil size will be recorded by an automated eye tracker. We will quantify pupillary changes over time using growth curve models (Mirman, 2017). We hypothesize age-dependent differences with 8-month-olds' processing being guided primarily by prosodic well-formedness (Wellmann et al., 2012) and 42-month-olds showing an increased response to the boundary position (Männel & Friederici, 2016). The current study is a novel adaption of pupillometry, which aims at gaining a better understanding of the mechanisms that drive the development of speech segmentation from a reliance on bottom-up signals at 8-months to an integration of these signals with acquired top-down knowledge at 42-months.

A17 Probing the domain-generality of the boundary advantage during infancy: an eye-tracking study.

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By the end of the first year of life, infants are sensitive to cues that mark boundaries between actions in action sequences (Baldwin et al., 2001). Boundaries inform about the structure of action sequences and are therefore likely processed preferentially (Swallow et al., 2009). Critically, adults (Pradhan & Kumar, 2021) and toddlers (21-months-old; Sonne & Krøjgaard, 2017) demonstrate an action boundary advantage: enhanced memory for information present at boundaries relative to information present during ongoing actions. In this planned study, we want to determine whether a boundary advantage is present already at 12 months-of-age, and examine whether the boundary advantage extends to speech. We will present 12-month-old infants either with videos of action sequences (e.g., hands molding clay), or with audio recordings of short stories accompanied by unrelated videos of floating bubbles. On each trial, the stimulus will be interrupted by a 3-second presentation of an image of an unfamiliar object (the probe), which will occur either between-segments (at a boundary between actions/phrases) or within-segment (during an ongoing action/phrase). In a subsequent Visual Paired Comparison (VPC) trial, the probe will be presented alongside a novel image of another unfamiliar object, and we will record infants' looking to the images. If the boundary advantage is present, we would expect enhanced recognition memory for between-segment probes than within-segment probes, which would be indicated by between-condition differences in proportion of probe looking during the VPC trials. Whether enhanced recognition memory will result in greater looking to the familiarized probe (familiarity preference) or to the novel image (novelty preference) is not easily determined a priori (Hunter & Amess, 1988). Finding that the boundary advantage is present during both action and speech processing would suggest similar or shared processes operate during the segmentation of these stimuli. We hope to be able to present preliminary data.

A18 Examining the links between infant colour vocabulary and categorical perception

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Colour vocabulary has long been of interest to the research community, as a question that straddles the border between perceptual and linguistic development. Much research has investigated the existence of infant colour categories, with strong evidence for categories even in pre-verbal infants (e.g. Skelton et al, 2017), suggesting as well that infants perceive colour categorically. Much of the evidence for categorical perception has come in the form of looking latencies using eye-tracking, which can be dependent on fixation and region of interest definitions. In the present study we utilised two different experimental paradigms - a preferential looking paradigm and a pupillometry paradigm, to investigate whether 12- and 19-month-old infant categorical perception of colour is robust to experimental manipulations beyond reaction times, and further, whether infant colour vocabulary change how these colour category boundaries are perceived. The results indicate patterns of systematic looking indicative of colour category representation. Importantly, the results also indicate different patterns of looking depending on whether colour vocabulary had been learned. Likewise the pupillometry task indicated an effect of colour vocabulary on pupil size during the task, where the pupil size is dependent on whether the colour words are known by the participant. These tasks offer new evidence as to the nature of the interplay between infant colour categories and colour words.

A19 Labels and category learning: a help or a hindrance for young children?

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Labels facilitate novel object category learning during infancy and adulthood (Fulkerson & Waxman, 2007; Lupyan & Casasanto, 2015; Althaus & Westermann, 2016). However, findings from older children appear more controversial. On one hand, there is evidence to suggest that labels can guide 4- to 5-year-old children to categorise novel artefacts and creatures (Diesendruck & Peretz, 2013; Peretz-Lange & Muentener, 2020). However, other studies suggest that 4-year-old children's reliance on labels in guiding categorisation varies as a function of perceptual information, and labels have even been shown to impede novel object categorisation during childhood (Deak & Bauer, 1996; Best et al., 2011). Here we aimed to test whether labels aid category formation in an online study with 3- to 5-year-olds. Participants (N=129) completed two sequential games that involved allocating fantasy animals to two "families" of similar exemplars. All children first completed a game without labels. For half the children the second game (using a different category contrast) additionally contained labels. The other half continued without labels. An ANOVA with factors Game (1,2), Condition (NoLabels, Labels), and Age (3,4,5) yielded significant main effects of Game (F(1,113)=42.85, p<.001), Condition (F(1,113)=10.82, p=.001), and Age (F(2,113)=8.65, p<.001) as well as a significant interaction between Game and Condition (F(1,113)=8.94, p=.003; all remaining interaction effects n.s.). While performance improved for all children in Game 2, the increase in performance was larger for the group that was provided with labels. While categorisation performance was comparable in Game 1 (t(117)=-.423, p=.673, no labels in either group), the group with labels showed better categorisation performance than the group without labels in the second game (t(117)= -3.95, p<.001). Clearly labelling facilitated novel object categorisation in these age groups, suggesting that this beneficial effect is convergent across development.

A20 Prime Saliency in Semantic Priming with 18-month-olds

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Toddlers have demonstrated sensitivity to semantic categories from 18-months-old (Delle Luche et al., 2014), preferring to listen to words of the same semantic category over words from mixed categories, and suggesting that lexical organisation occurs by the beginning of the 'vocabulary spurt'. However, this is questioned by evidence from semantic priming studies where toddlers exhibit priming effects at 21-month-olds, but not at 18-months (Arias-Trejo & Plunkett, 2009). One reason for this finding may be that 18-month-olds require greater stimulus saliency for semantic categories to elicit a priming effect. The current study revisits Arias-Trejo and Plunkett (2009) by manipulating the saliency of the prime item. A sample of monolingual 18-month-olds were recruited (*N*=17; ongoing). The 24-trial task consisted of an auditory prime item followed by the auditory target, and target and distractor images. For half of the trials, the prime and target were semantically related and for the remaining half were unrelated. Within these conditions, half of the time the prime was repeated three times, otherwise the prime was presented once. In the singular presentation condition, the prime was presented in either the first, second or third position (see Figure 1 for the trial timeline). Initial analyses revealed that, overall, toddlers were more likely to look towards the target object on trials where the prime and target were related than on trials where they were unrelated. This finding was more prominent when the presentation of the prime was closer to the target-distractor onset and was statistically significant in conditions where the prime was repeated. This suggests that enhanced saliency may be required to elicit a priming effect amongst 18-month-olds in the traditional paradigm.

A21 Supporting referent selection through word form-meaning systematicity

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Language appears to be more systematic than previously assumed, i.e., words related in meaning tend also to be similar in form (Dautriche et al., 2017). Such systematicity can be a powerful cue during early lexical acquisition, allowing infants to narrow down the vast possibility of referent objects when confronted with a novel word by virtue of the word's phonological form. Here we ask whether word form-meaning systematicity bootstraps referent selection. The present study (Stage 1 registered report, accepted) examines whether young children rely on the systematic relation between word form and word meaning when faced with a referent selection task. Eighty-eight 24-month-old children are trained on two novel word-object associations from different object categories (e.g., "maacke"-pangolin and "peto"-jetski). Children are then tested on their retention of these novel word-object associations by presenting them with the trained labels, two trained objects and two other super-novel, perceptually and taxonomically similar objects (e.g., an aardvark and a hovercraft). Critically, to test the reliance of systematicity information, children are also asked to identify the referents of super-novel labels which are phonologically similar to the trained labels (e.g., "maasche" and "pewo") in the presence of the same four objects. We predict that, in the critical systematicity test, when asked for a similar-sounding label, children will fixate the super-novel object of the same category as the trained object. In the example above, when asked for "maasche", children should be biased to the aardvark, suggesting that they make use of word form-meaning systematicity during referent selection. On the other hand, if children look more at the category-mismatching super-novel object (i.e., the hovercraft), it would suggest that children avoid mapping a similar-sounding word to a similar-looking object, i.e., referent selection in ambiguous situations avoids systematic word-form meaning mappings.

A22 Modelling the impact of phonologically and/or semantically similar words on early word acquisition

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The arbitrariness of the sign has been widely discussed since De Saussure (1916) referred to it as one of language systems' key properties. Yet even a century later, we still do not know why word-form and word-meaning mappings are arbitrary nor do we fully understand the effects on word learning. Imagine, for instance, if the objects pear and apple to be more systematic, that is not only similar in meaning but also in sound (pear/tear); how would that impact word acquisition? Experiments revealed that word learning, category formation and lexical retrieval is leveraged through systematic form-meaning mappings (Imai & Kita, 2014; Monaghan et al., 2011). In contrast, Dautriche et al. (2015) found that children find it difficult to learn words that overlap on multiple dimensions. Similarity in either word form or word meaning is shown to boost word learning (Altvater-Mackensen & Mani, 2013; Borovsky et al., 2016; Laing, 2022; Newman et al., 2008). The current research project is the first to use statistical methods to (re-)evaluate whether existing learned words can predict which words will be acquired next. By applying logistic regression to a longitudinal vocabulary corpus, we train a model to predict which words children between 15 and 35 months will learn next. To investigate the impact of similarity, we include the phonological, semantic and form-meaning similarity into the model. We hypothesize that the model shows leveraged learning of novel words which overlap on form or meaning, but not on both levels. In addition to this hypothesis-driven method, we use the corpus-driven method principal component analysis to get insights from two different approaches. Overall, this project enables us to evaluate the effect of similar sounding and/or meaning words on word acquisition outside restricted laboratory settings and thus gives us a broader picture of the arbitrariness of the sign.

A23 Putting lexical cues into discourse context: A corpus study of relative clauses in child-directed and child speech

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Previous research has shown that object relative clauses (ORCs; e.g., the cat that the dog chased) are more difficult to process than subject relative clauses (SRCs; e.g., the dog that chased the cat), for both children and adults. However, when preceded by appropriate discourse, adults do not find ORCs harder to process than SRCs. Yet, experiments with children traditionally presented RCs in isolation, without any discourse context. In the current study, we examined the relationship between the morphosyntactic and discourse-level characteristics of noun phrases in RCs in child-directed and child speech through densely-collected English-speaking developmental corpus data (range = 2-5 years) from three caregiver-child dyads. We analysed 1126 and 495 RCs from the caregivers and children respectively. For each utterance, we coded type of RC (SRC vs. ORC) and noun phrase type (pronoun vs. proper noun vs. lexical noun phrase), givenness, and topichood of the head and embedded noun phrases. Linear mixed-effects models for the caregiver data indicate that type and topichood of the embedded noun phrase significantly predicted type of RC – a RC is more likely to be a SRC if the embedded noun phrase is a proper noun, whereas a RC is more likely to be an ORC if the embedded noun phrase is not the topic of the on-going discourse. For the child data, the models suggest that a RC is more likely to be a SRC if the embedded noun phrase is a lexical noun phrase, whereas a RC is more likely to be an ORC if the embedded noun phrase is new. Taken together, both children and adults draw on discourse-level cues when producing RCs, and the use of such cues changes with age. Our findings suggest that experimental studies examining the processing of RCs should take both morphosyntactic and discourse-level factors into account.

A24 The babe with the predictive power: work in progress examining the role of prediction in early word encoding

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Error-based theories of language acquisition posit that predictions are a key part of language processing throughout the lifespan. They suggest that adults and children are constantly anticipating upcoming input, assess these predictions and use discrepancies to update their linguistic knowledge. In order to describe the earliest stages of language acquisition, such theories hold that infants start making predictions soon after birth. However, linguistic predictions are challenging to target experimentally, and existing studies have typically focused on linguistic prediction in older age groups. As a result, there is currently limited evidence that prediction is a viable learning mechanism in infancy. This study targets the role of prediction in early word encoding to assess the feasibility of such a learning mechanism. To achieve this, we have adapted an adult EEG study focusing on syllabic prediction (Vidal et al., 2019) for an infant population. Our study starts with a learning phase, in which 39 nine-month-old infants hear two trisyllabic pseudowords. These words are then used as standard stimuli in an oddball-phase with four new words. Two of these deviant words only share their first syllable with a familiar word, while the other two share their first two syllables. We will measure whether infants' mismatch-response (MMR) differs between standard and deviant words, to address whether 9-month-olds make phonemic-level predictions. We will also assess the MMR-difference between the two kinds of deviants. An MMR difference after one versus two shared syllables would suggest that cumulative congruent input reinforces prediction. As infants' MMR can vary, we will also carry out a second task to localize participants' individual MMR responses in the form of a tone-change-detection Optimum-1 task. This task will determine the location, latency and polarity of the MMR for each infant separately, and will help ensure that the study has sufficient statistical power.

A25 Iconic words may be common in early child interactions because they are more engaging

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Iconicity is thought to play an important role in early communication, since studies have found that iconic words are among the earliest learned by infants and they are used disproportionately often by infants and their caregivers. Iconicity may scaffold word learning by helping infants to establish referentiality, but there is growing evidence that suggests we need to look beyond reference to fully understand the role iconicity plays in language development. This study asked whether another function of iconicity could be that it increases infants' engagement in interactions because there is something inherently more fun about iconic communication. Iconicity ratings were assigned to transcribed words in a mother's utterances in 41 interactions with her infant between the ages of 12 and 24 months. High and low iconicity bouts were identified by calculating the rolling average of iconicity per 5 words and focusing on those utterances with the highest and lowest averages. Key features from 58 high and 58 low iconicity bouts were then coded from corresponding video. Results showed that eye contact and additional paralinguistic features occurred significantly more often in high iconicity interactions, which also tended to be more child-directed and contain less displacement. High iconicity interactions were therefore judged to be more engaging than low iconicity interactions. These findings speak to the multi-functional nature of iconicity in parent-child interactions. They suggest that iconic words might be prevalent in early interactions because young language learners and their caregivers, find these words to be intrinsically fun and engaging.

A26 Sustained Pacifier Use is Associated with Smaller Vocabulary Sizes at 1 and 2 Years of Age

Luis Eduardo Munoz[1], Natalia Kartushina[1] and Julien Mayor[1]
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Pacifier use during childhood has been hypothesized to interfere with language processing. Evidence suggests that transient use of an object in the infant's mouth impairs speech sound discrimination (Bruderer et al., 2015) and that extensive pacifier use translates into slower processing of abstract words (Barca et al., 2020), but, to date, no studies have revealed detrimental effects of prolonged pacifier use on infant vocabulary learning. The present pre-registered study tests the hypothesis that greater accumulated pacifier use is associated with smaller vocabulary sizes at 12- (in comprehension and production) and 24-months of age (in production). Parents from Oslo filled in Norwegian CDIs, parental reports that assess receptive and expressive vocabulary in 12-month-old infants and expressive vocabulary in 24-month-old infants. We transformed CDI scores into age- and gender-adjusted percentiles using Norwegian norms. Additionally, parents reported their infant's daytime pacifier use, in hours, in 2-month intervals, from birth to the assessment date. Our final sample consists of 448 and 726 12- and 24-month-old monolingual infants, respectively. Beta-regressions on vocabulary percentiles, controlling for maternal education, revealed that accumulated pacifier use (in hours since birth) correlated negatively with 12-month-olds' vocabulary sizes in both comprehension (z=-2.12, SE=.05, p=.03) and production (z=-2.48, SE=0.04, p=.02), See Figure 1). Follow-up models revealed that infants with increasing pacifier use over age had lower vocabulary sizes at the assessment date than those with declining pacifier use, while accumulated pacifier use remained significant for both production (p's<.001) and comprehension (p=.04). Our analyses, revealing that accumulated pacifier use correlates negatively with the vocabulary sizes at 12- and 24-months of age, and that later pacifier use correlates stronger with the vocabulary size than precocious use, extend findings of momentary disruptions of sensorimotor dynamics (Bruderer et al., 2015) and suggest that prolonged constraints on infants' speech articulators may negatively impact language acquisition.

A27 Assessing Language development following preterm birth: A comparison of standardised language testing and language sample analysis

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Background: Preterm birth poses risks for language development in semantic and syntactic domains. Standardised language tests may not comprehensively reflect the language functioning of preterm-born infants due to their lack of ecological validity, their common inability to differentiate between semantic and syntactic difficulties, and the confounding influence of task demands (e.g., attentional demands). In contrast, language sample analysis (LSA) captures the naturalistic language functioning of children and thereby offers detailed descriptions of language functioning with high face validity. The current study investigates how standardised language tests and LSA may provide complementary insights into the language development of preterm-born infants. Method: 22~28-month-old (chronological age) preterm-born (< 37 weeks' gestation; *n* = 17) and term-born (≥ 37 weeks' gestation; *n* = 20) English-speaking infants completed the Expressive and Receptive Language subtests of the Bayley Scales of Infant and Toddler Development (3rd edition; Bayley-III) and engaged in a 5-minute mother-child free-play session. The free-play recordings are being transcribed (CHAT format) and analysed using CLAN to compute the child's volubility (number of utterances), lexico-semantic ability (type-token ratio), and morphosyntactic skill (mean length of utterance in words/morphemes). Analysis: Using between-groups comparisons, the language ability of preterm-born and term-born infants will be compared on both standardised language scores (Bayley-III Receptive, Expressive, and Total language scores) and LSA metrics (total utterances, type-token ratio, mean length of utterance in words/morphemes). The degree of concordance between standardised scores and LSA will also be examined through computing correlations between the Bayley-III language scores and LSA metrics among the preterm-born and term-born samples, separately. Implications: Through examining the potentially differing facets of language development which are captured by standardised tests and LSA, this study will inform how assessment methods may be chosen to maximise the comprehensiveness and sensitivity of language assessments conducted with preterm-born infants in clinical and research domains.

A28 Evaluating Measures of Language Input to Multilingual Infants

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Characterising the features of language input to infants is crucial for understanding infants' language outcomes (Hoff, 2003). Such endeavour is now possible due to day-long audio recordings of infants' home environments which allow us to measure the quantity of language input (Bergelson et al., 2019). Yet, only a small body of research explored multilingual environments using day-long recordings (Cychosz et al., 2021), and most of our knowledge on the quantity of language input in such environments stems from parental questionnaires (de Houwer, 2011). This reported exposure does not always match the observed amounts from day-long recordings (Orena et al., 2019) negatively impacting the validity of these measures for predicting language outcomes. The current study examines the reported and observed amounts of exposure to English and a second language in a sample of 21 multilingual families raising 6-20 month-olds in London. Families were asked to record their home environments for two days, and to estimate the amount of exposure their infant receives in each language using the Plymouth LEQ (Cattani et al., 2014). Families provided on average 13.94 hours of data (range = 5.8-23.2, *SD* = 5.72) from which we annotated about 52.22 minutes per family (range = 40-60, *SD* = 8.33), resulting in an average of 7.26% of available data annotated (range = 3.4%-14.36%, *SD* = 3.2). Handling the day long recording data is influenced by the definition of languages in the LEQ, therefore we split the languages into English and L2 (any second language). Figure 1 shows the variances seen in 9 of our families between observed exposure (from the audio recordings, in red) vs reported exposure (from the LEQ, in blue). Once all families have been annotated we will conduct statistical analyses to confirm any discrepancies between the observed and reported exposure figures.

A29 Which words are repeated most? Bilingual parents repeat nouns and verbs at different ratios when switching between languages in storybook narrations with preschoolers

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In monolingual child-directed speech (CDS), partial repetitions (a.k.a., 'variation sets') provide useful information for child language development (Goldstein et al., 2010), and seem to be universal (Alam et al., 2021; Brodsky, Waterfall & Edelman, 2007; Tal & Arnon, 2018). However, rates of repetitions are known to differ for specific lexical items between languages, e.g., nouns and verbs in English and Chinese CDS (Chan, Brandone & Tardif, 2009). Do English-Chinese speaking bilingual parents adapt their repetitions when switching between languages? A sample of English-Mandarin bilingual mothers in Singapore (N =93) narrated an onscreen wordless picture book to their pre-school children (Woon et al., 2021), in any language (or mix) typical for their child (Age: Median = 1;8, Range = 0;8 to 3;4). Narrations lasted 3 to 24 minutes. Consistent with rates of English use in Singapore (Department of Statistics Singapore, 2021), 46% of parents narrated in English only, while 54% used both English and Mandarin (Figure 1, Mandarin Proportion: Median 18%, Range= 0-90%). Following Li and Onnis (2021), we extracted word repetitions within a 20-word moving window. Excluding highly-frequent lexical and non-lexical items, repetitions made up around half of the parents' words (M = 0.48, SD = 0.081). For parents who repeated words in both languages (N= 48), the ratios of repetition differed between languages (English reps/English words: M = 0.48, SD = 0.092; Mandarin reps/Mandarin words: M = 0.55, SD = 0.33, Z = 1.67, p = .047). Moreover, the ratios of repetition for nouns versus verbs [Nrep/(Nrep+Vbrep)] differed between languages (Figure 2; English: M = 0.80, SD = 0.10; Mandarin: M = 0.52, SD = 0.36, $Z(39)$ = 3.49, p = .00024), suggesting parents use language-specific repetition strategies in each language. We discuss the extent to which such strategies may reflect a form of support to the learning child.

A30 Multilingual Parents Create Multilingual Language Environments: Self-reported Measures and Book-sharing

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Background. Singapore is a diverse environment for studying language acquisition, with 74.3% of the population reporting literacy in two or more languages (Department of Statistics of Singapore, 2021). Our team created a remote online study to study the language environments of multilingual Singaporean children despite the COVID-19 lockdown measures. The Talk Together Study is a remote micro-longitudinal study in which parent-child dyads participated in an online book-sharing session at three time-points, separated by at least 1 month. The book we used, Little Orangutan: What a Scary Storm, was designed in-house as a wordless picture book so that parents could freely decide what languages to use (Styles, 2020). Methods. We presented the wordless picture book via screen-sharing on Zoom. Parents were asked to describe the book to their child using whatever mix of languages they would like. Parents reported estimates of care time and language-use ratios of each caregiver using our Language Experience Overview tool (Woon, Le, et al., 2021). Estimated proportions of the use of different languages/dialects with the child by each caregiver is combined with the weighted average proportion of care-time by each caregiver, into a speaker-by-language matrix. The matrix is used to derive a Composite Language Input Profile (CLIP) for each child: a proportional representation of the language mix of their input from all caregivers. Self-reported proportions of language input from the parent participating in the book-sharing session is correlated with the actual amount of each language/dialect spoken. Results. CLIPs of 205 children (age range: 8m-40m) growing up in multilingual Singapore are presented in Figure 1. The language mixes are diverse. All children receive English input (range: 2.85% - 100%, mean = 65.5%). Positive correlation between self-reported English use (mean = 70.5%) with child and amount of English spoken (mean = 254.5 seconds), R^2= 0.096, p = 0.00018.

A31 Early language development in infants exposed to two dialects from birth: Insights from Norwegian 12-month-old infants

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Effective language use entails the ability to understand speakers across accents (e.g., dialects and foreign-accented speech), who might differ in phonetic detail from the familiar (native) accent but preserve word phonological structure. How do infants growing up in multidialectal environments adapt to this variability? This preregistered study compared early language development in Norwegian infants exposed to one or two dialects from birth and assessed the role of parental dialect similarity in infants' word recognition and comprehension. 12-month-old Norwegian-learning infants, exposed to parents speaking the same (n=35) or two Norwegian dialects (n=35), took part in two eye-tracking tasks, assessing familiar word-form recognition using preferential listening paradigm (8-item familiar word lists vs 8-item pseudoword lists) and word comprehension, using intermodal preferential listening (16 words). Both of their parents' speech was recorded and assessed for similarity by native speakers. First, in contrast to previous research, our results revealed no listening preference for words over nonwords in both monodialectal and bidialectal infants, suggesting potential language-specific differences in the onset of word recognition. Second, the results showed evidence for word comprehension in monodialectal infants (p=.015), but not in bidialectal infants (p=.40), suggesting that exposure to dialectal variability impacts early word acquisition. Third, we observed perceptual similarity between parental dialects to tendentially facilitate bidialectal infants' word recognition and comprehension (r=-.28, p=.05). Forth, the results revealed a strong correlation between the raters and parents' assessment of similarity between dialects (r=.83, p=.001), indicating that parental self-estimations can be reliably used to assess infants' speech variability at home. Finally, our results revealed a strong relationship between word recognition and comprehension in monodialectal (r=0.53, p=0.001) and the absence of such a relationship in bidialectal infants (r=-0.02), suggesting that either these two skills do not necessarily align in infants exposed to more variable input, or that the alignment might occur later.

A32 How children learn to answer questions; a comparative corpus study on Japanese and English

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Answering questions is one of the important conversational challenges children face as they learn to interact verbally with people. Although previous studies have revealed many developmental changes in children's responses to questions such as their quicker, more reliable, and norm-following responses, its learning process is understudied. This study hypothesizes that children adjust their own linguistic behaviors by attending how these behaviours are reacted to and managed by their interlocutors in the subsequent conversation. We focused on who-questions in English and Japanese and investigated how children's different kinds of responses to caregivers' who-questions are associated with the kinds of subsequent utterances by their caregivers. We used conversational data from corpora in both languages from CHILDES database (Lieven, Salomo & Tomasello 2009; MacWhinney, 2000; Miyata, 2004a, 2004b, 2004c; Miyata & Nisisawa, 2009, 2010; Nisisawa & Miyata, 2009, 2010; Theakston, Lieven, Pine & Rowland 2001), and analyzed 11467 instances in English and 997 instances in Japanese of who-questions and their subsequent utterances. Our analyses revealed that in both languages, children's utterance types after who-questions and following caregivers' utterance types are probabilistically associated (Chi-sq=883.81, p<.001 for English, Chi-sq= 94.692, p <.001 for Japanese). Some of the important differences between English and Japanese include the way in which caregivers suggest answers and repeated questions. While Japanese caregivers often provide nouns after children's no-response, British caregivers tend to use yes-no questions or repeated who-questions. Japanese caregivers also repeated their own who-questions, but more after children's uninformative response than after no-response. In terms of developmental changes, children's no response decreases as they become older in both languages (Estimate=0.055, SE=0.003, z=14.15, p<.001, Estimate=-0.039, SE= 0.007, z=-5.833, p<.001 respectively). These results have implications for future research on what learning cues children perceive during conversations and become able to interact verbally with others.

A33 Acquisition of Negation across Typologically Diverse Languages

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Negation has a central role in communication, and all languages have the canonical distinction between positive and negative propositions (Swart, 2010). Yet, languages mark negation in many different forms, and so far we know very little about how language-specific grammatical properties influence the learning process. In this study we investigated the acquisition of negation in both child speech and child surrounding speech in a large-scale cross-linguistic comparative corpus study. The data stems from the ACQDIV database (Moran et al., 2016) that includes longitudinal naturalistic corpora of child language acquisition of maximally diverse languages in their grammatical structures. We examined the development of negation across nine typologically diverse languages (Chintang, English, Indonesian, Japanese, Qaqet, Russian, Sesotho, Turkish, and Yucatec Mayan) to explore to what extent salience (morphosyntactic boundedness) and other cues are relevant for the ease of acquisition (age range 24-36 months). The distribution of free (e.g. no) versus bound negators (e.g. I don't want this) supports that children predominantly use free negators in the early stages of the age two, and only gradually move towards more complex negators towards the age three. Surrounding speakers, by contrast, use all forms of negators extensively in all recordings. Our cross-linguistic analyses with Bayesian mixed effects models showed that both frequency and morphosyntactic boundedness of negators are relevant cues of the acquisition of negation in our typologically diverse language sample. The results suggest that salience of the negator morphemes in the ambient language plays a key role in the acquisition of negation markers. Frequency of use interacts with several other factors that account for overall language learning mechanisms, and structures with more salient features are easier to be perceived and learnt over time. Our findings point to a potentially universal developmental trajectory for the development of negation while highlighting language-specific trajectories.

A34 Identity-location binding in working memory in toddlers: the impact of memory load and labels

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In this study we investigated the impact of labels on identity-location binding in working memory. In addition, to test the impact of memory load on the retrieval of object locations, participants were presented with a set of two, three and four items. We contrasted the effects of labels and non-linguistic sounds to determine whether labelling familiar objects affects recall of the objects' locations. To elucidate a potential role of vocabulary development in the labelling effects, we tested 18- and 26-month-old toddlers, i.e. just before and after notable developments in vocabulary size. Participants were presented with a novel gaze-contingent eye-tracking task. Each trial consisted of a preview, an exposure and a test phase (Figure 1). During the preview phase, participants were presented with a set of open windows, where each window contained a different object. In the immediately following exposure phase, participants were presented with the same set of windows, but the windows were closed. Participants had the opportunity to freely explore the windows, and upon being fixated, the window would open to reveal an object. During the exploration phase, objects were either labelled or accompanied by a sound when fixated. In the following test phase, the windows reappeared and one of the previously explored objects was named. When a participant identified the correct location, the window opened and a positive auditory feedback was presented. Results revealed that the distribution of first look locations at test was different as compared to the exploration phase, suggesting that memory for object locations affected the direction of the first look. In addition, the strength of the identity-location binding was affected by the presence of labels and the level of working memory load. Taken together, these results suggest that both visual load and auditory information affect successful retrieval of identity-location binding in toddlers.

A35 Do 18-month-olds understand others' individual preferences for action-effects? Findings from a violation-of-expectation eye-tracking study

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At 14 months, infants can associate a person's displayed positive affect to an object at which the affect is directed, and expect that subsequent actions correspond to the primarily displayed preference (Phillips et al., 2002). At 18 months, they can understand that other people's preferences can differ from their own (Repacholi & Gopnik, 1997). However, infants' understanding of desire and preference has mostly been studied for others' attitudes towards objects or categories (Kampis et al., 2013). This leaves the forming of a visual association between an agent and their desired object as possible explanation for the results. We aim to examine whether 18-month-olds understand that others' preferences can be directed at transient action-effects that are elicited by simple actions on an object. Because these different action-effects can never appear simultaneously, solving the task requires the infant to connect an agent to a particular action-effect rather than associating them to one of several visually distinguishable objects. In an eye-tracking study, we presented 18-month-old infants with videos depicting three adults. One of them, the "actor", performed two actions on a toy, one action eliciting a sound and the other a light effect. The two other adults observed the actions and effects, and each observer reacted excitedly to either the sound or the light effect. Across four familiarization videos with different toys, all adults kept their roles and their sound or light preference. In subsequent test videos with a novel toy, the observers reacted either congruently or incongruently to their previously displayed effect preference. We expect systematic differences in infants' gaze duration, eye movements, and pupil dilations in congruent vs. incongruent test trials. These would indicate that 18-month-olds can build a representation of others' preferences for action effects, which is key for an understanding of goal-directed action. Data collection is still ongoing.

A36 Planning instrumental and epistemic actions across development

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Goal-directed action usually refers to pursuing outcomes of expected external value. However, humans also assign value to the information they can gain from the world, and interact with their environment motivated by opportunities for learning – a motivation often termed curiosity. It has been suggested that the level of action and attention modulation by curiosity gradually decreases from infancy to adulthood, but it might also vary as a function of individual cognitive skills (especially executive functions) and more stable dispositions towards uncertainty and complexity (Silvia, Henson, & Templin, 2009). In our study, we aimed to capture the real-time process of instrumental and epistemic actions, and examine how it can be predicted by age and individual differences. We examined how 5-7 year-olds, 13-15 year-olds and adults chose between different options to interact with, when these options led either to the attainment of a rewarding goal, to missing information or to novel experiences. We examined how the competition between these options was reflected in the real-time action plans; i.e., at the specific hand kinematics while participants made their choices, as we expected an implicit modulation of movement by curiosity in the younger group even when their final choices differed. Participants completed an online decision-making task as we tracked mouse positions, as well as two stimulus-preference task with varying levels of uncertainty and complexity and standard executive functions tasks. Results showed a greater preference for novel stimulation in children. Complexity and uncertainty preferences, as well as working memory predicted participants' curiosity choices. Furthermore, temporal parameters of hand kinematics showed greater confidence in action plans leading to external rewards in teens and adults, and greater conflict between reward and novel experiences in children.

A37 Investigating the Interplay between Pretend Play, Theory of Mind and Social Competence in Preschool-Aged Children

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Development of social competence in early childhood has long-lasting positive effects such as positive peer relationships and socialization experiences (Ladd, 1999) and is linked to children's pretend play, which involves 'as if' and nonliteral actions (Dunn & Cutting, 1999). Furthermore, children's understanding of others' minds - known as theory of mind (ToM) - is associated with pretend play and social competence (Newton et al., 2011). However, the directionality of these interrelations is not well established. In this longitudinal study assessing interrelations between pretend play, ToM, and social competence, we collected data from 97 children at two-time points one-year apart (Time 1: M_{age} = 45.71 months, *SD* = 5.92). A parent-report measure was used to assess social competence, while pretend play was measured by two behavioral tasks (i.e., pretend action and pretend phone tasks). Behavioral tasks (e.g., false belief task) and parent reports were utilized to assess ToM abilities. Table 1 provides correlations between the variables. We found that ToM at Time 1 predicted pretend play at both time points. ToM also predicted social competence at each time point. A bidirectional link has been found between pretend play and social competence; pretend play at Time 1 predicted social competence at Time 2 (b = .33, B = .16, t = 1.98, p < .001), and social competence at Time 1 predicted pretend play at Time 2 (b = .33, B = .16, t = 1.98, p < .001), controlling for respective abilities at Time 1. Results highlight the role of ToM in the development of young children's social competence and their ability to make nonliteral representations and establish more complex pretend play. Furthermore, we discuss the bidirectional longitudinal link between pretend play and social competence, and the potential mediating role of ToM in this relationship.

A38 How Episodic Foresight Develops: The Role of Executive Functions and Motivation

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Episodic foresight allows humans to recognize and prepare for potential opportunities and problems prior to their occurrence and is therefore a tremendous adaptive value. The present investigates how two motivational aspects (importance of the future problem) and current desire) affect episodic foresight in preschool-aged children and how these motivational aspects modulate the role of cool and hot executive functions for episodic foresight. To this point we examined *N* = 259 (of *N* = 291 planned) 3-5 year-old children in an interactive online experiment. Children were randomly assigned to one of six groups differing according to importance of a future problem (high vs. low) and whether they hold a current desire when choosing an item for an upcoming episode in a typical episodic foresight task (two room task). Subsequently they completed five tasks examining hot and cool executive functioning. Logistic regression-based path analyses are planned, testing whether executive functions explain age-related differences in the probability to correctly solve the episodic foresight task. Furthermore, it is planned to test whether the role of "hot" executive functions increases when the future problem is more important for the children and when they hold a current desire during item selection. Finally, we will test whether the importance of the future problem and the existence of a current desire leads to an accelerated or protracted emergence of episodic foresight. The data collection, coding and analysis will be completed in June, so that results can be presented in August 2022.

A39 Is executive attention a precursor to children's cognitive controls and mind-reading?

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Attentional control has been an important aspect of behaviours in studying non-verbal infants' understanding of physical and social worlds. However, less is known about how attentional control contributes to children's behaviours in organizing and responding appropriately to the given information to achieve a goal. The present study, using an eye-tracking technique to measure attentional control directly, examined if early executive attention predicts the performance of executive function tasks. Data were drawn from 60 three-year-old children who participated in a longitudinal study of executive functions (EFs) and social understanding. Attentional controls were measured by a modified flanker task in which eye-tracking were used to identifying a correct anticipation of children's eye-movement at time 1. For the developmental outcomes, EFs (working memory, inhibition, shifting) were measured by eliciting verbal or touch responses, and social understanding was measured by false belief tasks at time 1 and time 2, with an interval of 12 months. Attentional responses to a modified flanker task for the congruent trials and for the incongruent trials revealed unique relationships with the outcome measures. Correct anticipation to the incongruent trials associated with working memory at time 1 and time 2. The correct anticipation to the congruent trials was associated with other EF tasks (inhibition and shifting) only at time 2. Additionally, one of the outcome measures of the false-belief understanding at time 2 but not time 1 was predicted by the combined measure of correct anticipation to the incongruent and to the congruent trials. These results provide a direct evidence supporting a recent study that reported a predictive relationship between the efficiency of selective attention in preschool children and the development of working memory. Early attentional control could play a role as a precursor and provide important insights into how children's executive behaviours and social understanding develop at early childhood.

A40 Exploring preschool stakeholders' perceptions of the value of the development of critical thinking skills in early childhood in Saudi Arabia

Hibah Binabdulrahman[1] and Gillian Lake[1]
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Although literature reveals the value of critical thinking skills for young children in improving language (Johnson, 1984; Rezaei, Derakhshan, & Bagherkazemi, 2011; Florea & Hurjui, 2015; Karadağ & Demirtaş, 2018; Putri, 2021), literacy (Larson & Caron, 2003; Othman & Hashim, 2006; Florea & Hurjui, 2015), science (Roehrig et al., 2011; Onion, 2014; Lamb et al., 2019) and math (Ginsburg, Lee & Boyd, 2008; Butera et al., 2014), there is a lack of research in critical thinking skills in early childhood in Saudi Arabia. However, Saudi Vision 2030 seeks to enhance educational practices that develop learners' thinking skills at an early age including critical thinking skills. This study explores preschool stakeholders' perceptions of the value of acquiring critical thinking skills in the early childhood context in Saudi Arabia. The conceptual framework for this study links key theories of critical thinking, including Dewey (1910), Bloom (1956), Lipman (1988), and Facione's (1990) approaches to the acquisition of critical thinking skills in early childhood education. This qualitative study employs an interpretivist approach, using thematic analysis to analyse data collected through semi-structured interviews with preschool stakeholders such as preschool directors, preschool teachers, preschool policymakers, academic researchers, and the parents of preschool children; focus group discussions with representatives from each target group of preschool stakeholders; and classroom observations of preschool children. Strict ethical protocols were followed in this study with informed consent being obtained for adult participants and assent obtained from child participants. This study received ethical clearance from DCU Research Ethics Committee. Through this study, it is expected to heighten awareness among Saudi Arabian preschool stakeholders to reconsider preschool curriculum, improve the quality of preschool programmes, and encourage rich explorations of materials and strategies to support the development of critical thinking skills to preschool children.

A41 Searching for reflective belief revision in 2-year-olds

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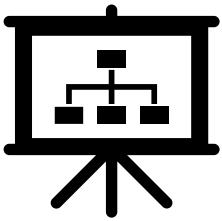
Philosophers often hesitate to attribute epistemic and rational agency to infants and non-human animals because they appear to lack the ability to reflect on and re-evaluate their beliefs and their reasons for those beliefs. However, even if they cannot express this verbally, empirical research suggests that pre-verbal infants and non-human animals may be able to process demanding types of counterevidence known as "undermining defeaters" (which suggest that evidence is misleading), and to use this information to revise their beliefs and modify their behaviour accordingly. Here we assess two-year-old infants' capacity to make inferences about the reliability of different sources of evidence based on whether the evidence the sources provide is misleading. In an object-search task we expose infants to reliable and unreliable sources of evidence, in the form of human informants. By comparing infants' responses to the different informants, we can assess whether they are sensitive to – or can reflect on – their reliability. Crucially, the informants provide evidence in three different contexts, putting the infants in the position to make a generalisation about the misleadingness of the evidence a particular informant provides. The capacity to process undermining defeaters and rationally revise their beliefs is expected to demonstrate an observable difference in infants' responses to novel information provided by reliable and unreliable informants. If infants are suspicious the first-time come across the unreliable informant in a new context, this would be the best evidence we could find of a response to undermining defeaters. Such a response could indicate anticipations that the evidence given by this informant may also be misleading in this context. This, in turn, may be a sign that they have identified what the evidence is, and that they have assessed (negatively) its normative significance.

POSTER SESSION 2



B1 Test-retest reliability of frontal theta change in toddlers

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Rapid neural and cognitive development takes place during the first few years of life, though methodological difficulties remain a significant limiting factor in investigating individual differences in toddler brain development. Electroencephalography (EEG) is a non-invasive neuroimaging method commonly used with infants, whilst recent development of portable EEG systems now provide possibility to record toddler brain activity in less-controlled, naturalistic environments. One key requirement of measures for investigating individual differences is that they must be reliable and stable over short time periods. This study used a two-visit design whereby typically-developing toddlers were presented with a novel toolbox ("Braintools") whilst wearing a low-density, portable EEG system at both visits. Sixty-one children aged 30-49 months were recruited, though only 45 children provided data at both visits. The Braintools toolbox includes a range of visual and auditory tasks. Here, we specifically focus on frontal theta change during social and non-social video viewing, a metric which seems to relate to cognitive ability in young children (Jones et al., 2020; Braithwaite et al., 2020). We will first establish that frontal theta increased over the course of video viewing, in line with previous work. We further expect that frontal theta power change at first viewing of a video will be related to theta power change over subsequent viewings of the same video, indicating a relation to learning. To assess test-retest reliability we will conduct an intraclass correlation between frontal theta power change at visit one and visit two (as in Haartsen et al., 2021). Results will be summarised in terms of how reliable the metric of toddler frontal theta power change is and implications for investigating individual differences in toddler brain development will be discussed. Once reliability is established, this set-up and metric may be useful for studying toddler development outside of highly controlled lab environments.

B2 Out of sight, (not) out of mind: New pupillometric evidence on object permanence in a sample of 10- and 12-month-old infants

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Despite extensive research on object permanence, there is little agreement on its cognitive underpinnings and age of emergence. This controversy partly concerns methodological choices: Designs using looking-time measures report object representation at a much earlier age (>3.5mo) (Baillargeon, 1987; Baillargeon, Spelke&Wasserman, 1985) than active search paradigms (8-10mo) (Diamond, 1990; Wellman, Cross&Bartsch, 1986; Munakata, 1997). Moreover, the handful of pupillometry studies to date suggest that infants do not represent occluded objects until much later (Sirois&Jackson, 2012; Pätzold&Liszkowski, 2020). In light of these findings, we seek to investigate the pupil dilation response as a marker of cognitive effort and surprise in a series of studies on object representation. The current study employs a novel VoE paradigm to assess pupillary responses to unexpected object disappearances in a sample of 10- and 12-month-old infants (N=86). Pupil diameter and eye movements are recorded using a Tobii Pro Spectrum-1200 eye tracking system. Across 2x6 test trials, we present all infants with self-recorded videos depicting simple occlusion events. First, one of 6 different objects is introduced by an agent, who then places an occluder in front of the object. The agent lifts the occluder after a 1.5s still period to reveal the object (expected outcome) or an empty set (unexpected outcome). Throughout all sequences, infants only see the agent's hands and arms. We opted for a reduced demands paradigm to optimize study outcomes. To predict pupil dilation by age group (10 vs 12mo) and condition (expected vs unexpected) we fitted a linear mixed model with an interaction term between condition and age and random effects varying within participant and condition. Results demonstrate significant pupil dilation in unexpected relative to expected outcomes (β=.04, SE=.008, t=5.18, p<.001). Neither age nor the interaction term yielded significant effects. Results may be subject to change due to ongoing data collection & analysis.

B3 Testing Infants Online using the Gorilla Experiment Builder

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Due to the Covid-19 pandemic, much infant testing moved online using Zoom or LookIt. We decided to explore Gorilla Experimental Builder as an alternative testing mode, which requires no coding experience. In a series of experiments exploring the feasibility of online testing, we demonstrate that a word association (WA) task, a word recognition study (WR), and an intermodal preferential looking (IPL) paradigm can be successfully conducted on young children at home. In Experiment 1, we use pre-recorded videos of puppets to demonstrate a WA task to 3-year-olds (*n*= 24), while their responses are recorded. The WAs replicated those from an earlier WA study in which a parent did the task with their child at home. In Experiment 2, we develop a proof of concept to test 24-month-olds (*n*= 40) using a WR procedure which was automatically administered, rather than infant-led. The results demonstrated that infants looked longer at the target picture relative to the distractor picture after the onset of the auditory label. In Experiment 3 we adapt the primed IPL task (Styles & Plunkett, 2009) into an online procedure testing 3-year-olds (*n*= 40). A prime word in a carrier phrase preceded the target label of one of two visually presented pictures. The relationship between the prime and target word was either associatively related or unrelated, using WAs from Experiment 1. Results revealed a semantic priming effect for the WA pairs taken from Experiment 1. The time course of word recognition closely replicated in-lab findings, despite the variability inherent in testing on different device types with different internet speeds. This research indicates that with some modifications to lab-based procedures, online versions of infant methodologies can be run successfully, replicating in-lab findings. In some cases, online testing might even produce better results than in-lab testing, with less attrition.

B4 Challenges and benefits of increasing inclusivity in developmental studies, illustrated with a study of joint attention

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Developmentalists may wish to embrace diversity in their studies but be baffled about how to proceed. We propose a five-step process (Fig1) to increase inclusivity in developmental studies, illustrating challenges and benefits with our study of joint attention (JA: Bard et al., 2021). The first step is to view the phenomenon from multiple viewpoints. JA skills of 1-year-olds may be evident in execution of simple chores or social etiquette (receiving and giving). In many settings, infants do not play with toys or adults. The anthropological literature (e.g., Lancy, 2015) is a great aid for understanding cultural diversity in social cognition. The second step is to view development from multiple viewpoints. Infants experience different socialization goals, caregiving practices, and beliefs that impact JA, e.g., distal caregiving (experienced by infants in Western, Educated, Industrialized, Rich & Democratic [WEIRD: Henrich et al., 2010] settings) differs from proximal caregiving (experienced by infants in many other settings: Fig2). The third step is to construct and use inclusive definitions. Knowledge of diversity gained in earlier steps is essential. With our conceptualisation of JA as triadic connectedness, we described the diversity in components of JA (Fig3). The fourth step is to sample from multiple groups. Developmentalists agree this is desirable, yet it is challenging. We chose to maximise diversity in settings (WEIRD, traditional farming, and hunter-gatherer communities) but other choices are possible (e.g., non-middle-class, multi-site consortiums, cultural archives). The fifth step is to actively minimize unconscious bias in interpretation and conclusions (Fig4). Since we followed steps 1-4, we were able to demonstrate that the WEIRD form of JA was not normative, and, in fact, different forms of JA were contextualised to each socio-eco-cultural setting. It is vital for developmental scientists to embrace diversity, especially in theories of social cognition delineating what it means to be human (Fig5).

B5 The Classic Model Room Task: A Symbol That Doesn't Measure Symbolism

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Using a model room as a symbol of another room is claimed to require understanding of representation. In principle however it only requires understanding of spatial correspondence. Here pre-schoolers' performance on the Model Room Task (DeLoache, 1987) is associated with their understanding of pure spatial correspondence but not their understanding of mental representation. The model room task is a purely spatial task and does not measure understanding of representation.

B6 Acquisition and extinction in eyeblink conditioning in 12- to 36-month-old infants: Analysis of learning mechanisms and influencing early risk factors

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Extinction learning is a fundamental associative learning mechanism with pivotal relevance for the anxiety disorders spectrum. Several biological and psychological factors such as head circumference at birth, birth weight or the child's temperament are associated with individual differences in children's cognitive abilities. However, it is largely unknown if these factors also impact associative learning processes. Thus, we examined the performance of 12- to 36-month-old infants in the acquisition and extinction phase of a three-day delay eyeblink conditioning paradigm. We analysed the association between performance in the paradigm and head circumference at birth, birth weight and the child's temperament. *N* = 200 infants from four even age groups (12-, 18-, 24- and 36-month-olds) participated in this study. Acquisition and extinction were videotaped and coded offline. Individual learning curves for each infant were calculated. Results indicate significant increase of conditioned responses during the acquisition phase in all age groups. During extinction, all age groups showed significant decrease of conditioned responses. Overall, a higher birth weight was associated with faster and more successful acquisition and extinction. For temperament, significantly higher levels of negative affectivity were found within the group of learners (i.e., infants who reached the learning criterion) compared to non-learners. Head circumference at birth and performance in acquisition and extinction were not found to be associated. In conclusion, these findings suggest that individual differences in birth weight and temperament are associated with performance in extinction learning. Results indicate that differences in extinction learning might modulate or contribute to the already known associations between individual factors (i.e., birth weight and temperament) and cognitive and behavioural abnormalities as in anxiety disorders. Thus, this study contributes to the exploration of the role of individual factors and extinction learning in the development of cognitive abilities and abnormalities.

B7 The role of audio-visual cues on infants' cortical speech tracking and word segmentation

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Speech processing is facilitated when we can see a speaker's articulatory movements (Erber, 1975). Research suggests that infants are also sensitive to these audio-visual cues and make use of visual information when acquiring language (Teinonen et al., 2008). In this study, we investigated the role of visual speech cues (i.e., a speaker's rhythmic movements of the mouth, lips, and jaw during articulation) on infants' neural processing of speech. In particular, the aim of this study was to investigate whether visual speech cues can enhance infants' cortical speech tracking and word segmentation. 10-month-old Dutch-learning infants were presented with familiarisation-test blocks. In the familiarisation phase, infants were presented with videos of a Dutch native speaker producing four sentences that contained a repeated target word. In half of the videos, the speaker's face was fully visible. In the other half, the speaker's cheeks, mouth, jaw, and larynx were occluded with a static block to mask their visual speech cues. Then, in the test phase, infants heard two single words presented as audio-only: the repeated target word (familiar word) and a control word (novel word). All materials were spoken in Dutch infant-directed speech. 32-channel EEG and eye-tracking data were recorded throughout the experiment. Infants' cortical speech tracking was measured as speech-brain coherence at the syllable and stressed syllable rate during the familiarisation phase. Infants' word segmentation was measured as the ERP familiarity effect to the familiar and novel words during the test phase. Pilot results will be presented.

B8 How do multimodal labelling moments during parent – child interactions (PCI) impact language outcomes for deaf and hard of hearing (DHH) and Normal Hearing (NH) children?

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Caregiver interactions with typically developing infants are characterised by multimodal language behaviours (Mondada, 2018) that are adapted to either follow the child's attention or redirect it towards new elements in the environment (Tomasello, 1983). Such multimodal interactions become more complex when considering infants who are deaf or hard of hearing, most of whom have parents with normal hearing (NH) (Curtin et. al 2021), leading to a mismatch that has been found to alter multimodal caregiver behaviours (Abu-Zhaya et al., 2019; Ambrose 2016). The current study aims to extend this line of work to capture differences in multimodal caregiver behaviour and their impact on language development in 14-month-olds who are Deaf and Hard of Hearing and their age matched peers with normal hearing. Using the Ambrose CHILDES corpus of video recorded dyadic interactions (Ambrose, 2016), we are examining caregivers' production of noun labels and their multimodal behaviours that accompany, precede, and follow each noun label during a 6-minute naturalistic play interaction. Specifically, we are annotating touches on the infant's body, movement of the infant by the caregiver, and caregivers' visual cues around the labelled object (pointing, touching, animating, and moving the object). Analyses are conducted using Elan (Brugman et. al., 2004); data annotation is still ongoing, and thus far, we have annotated 18 videos (30 remaining). Preliminary analyses suggest that caregivers of cochlear implant (CI) users produce the highest number of noun labels (M = 39), followed by caregivers of NH infants (M = 33) and hearing aid (HA) users (M = 15). Furthermore, caregivers of NH infants used visual cues with 50% of their noun labels whereas, caregivers of CI and HA users used visual cues with 71% and 56% of their noun labels. These findings and their implications for possible future hearing intervention programmes will be considered.

B9 Combining Pointing and Language during the Early Stages of Development: A Case Study of Russian and Chintang

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Language and pointing are universal features and central components of human societies (Kita 2003). A milestone of early ontogeny is learning how to communicate intentionally. One of the first entry points into this process is pointing (Bates 1976, Iverson et al. 2005). Many cross-cultural studies have shown that pointing emerges around the same age and is used for similar communicative functions cross-culturally (Butterworth et al 1996, Callaghan et al. 2011, Carpenter et al. 1998, Liszkowski et al 2012). During development, and in later use, pointing and linguistic utterances interact in many ways. However, little is known about the development of this relationship during acquisition. Here, we examine the relationship between pointing and accompanying vocalizations/utterances in the production of 1 to 4-year-old children in two very different cultural settings, Russia (St. Petersburg) and Chintang (a rural subsistence community in Eastern Nepal). Using hand-annotated recordings of everyday interactions, we analyze the speech acts children and adults perform and the information they convey while pointing. We assess whether the way the two domains interact is independent of language and culture. First, we compare the proportion of individual pointing gestures in the target children's and adults' production. Second, we examine how often pointing occurs without accompanying utterances and whether this changes with development and differs from the adults. Lastly, we take a detailed look at the content of the utterances that accompany pointing. Early on, a larger proportion of points is not accompanied by language. As the children's linguistic abilities develop, children first use language to specify the referent, and later elaborate on some aspect of the referent. Even though the specific systems of language and pointing differ greatly between cultures (Wilkins 2003), the development of this interplay is a candidate for a universal of human communication.

B10 Infant directed speech in UK and Ugandan mothers: an assessment of quantity and acoustic features

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Infant-directed speech (IDS) is typically slower, higher-pitched with greater pitch modulation and larger vowel space than adult-directed speech (ADS) (Saint-Georges et al., 2013). IDS may aid development of infant attention (Senju & Csibra, 2008), emotion (Fernald, 1992) and language (Golinkoff et al., 2015), though IDS quantity (Cristia et al., 2019) and acoustic features vary across languages and cultures (Moser et al., 2020). One proposed source of cross-cultural variability is the time that caregivers have infant body-contact (Falk, 2004). However, most studies involve small samples from WEIRD populations, so cultural variability is poorly estimated. We focused on free play and mother-infant interactions in Uganda and the UK to assess cross-cultural differences in IDS quantity and acoustic features and test the body-contact hypothesis. In Study 1, we calculated the proportion of free play mothers spent producing IDS and/or were in body contact with their infant (3-9 months). In Study 2 we recorded mothers speaking to their infant (3-6 months) and an adult experimenter, including naming objects to elicit the corner vowels /i, u, a/. We extracted mean pitch, pitch modulation, speech rate and vowel space measures. In contrast to the body-contact hypothesis, mothers in Uganda and the UK produced comparable amounts of IDS, despite Ugandan mothers spending significantly more time in body contact with their infant. Study 2 showed that IDS was higher in mean pitch and pitch modulation than ADS in both Uganda and the UK, but this difference was more pronounced in the UK. Speech rate for IDS was significantly slower than ADS in Uganda, but not the UK. We found no evidence of group level vowel-hyper articulation in either population. We discuss possible drivers of this cultural variation in acoustic features of IDS and highlight the importance of future work probing downstream effects of this variation on infant behaviour.

B11 Parents' hyper-pitch and vowel category compactness in infant-directed speech are associated with 18-month-old toddlers' expressive vocabulary

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The present pre-registered study examined the acoustic properties of infant-directed speech (IDS) as compared to adult-directed speech (ADS) in Norwegian parents of 18-month-old toddlers, and whether these properties relate to toddlers' expressive vocabulary. Twenty-one parent-toddler dyads from Tromsø, Norway participated in the study. Parents (16 mothers, 5 fathers), speaking a Northern Norwegian dialect, were recorded in the lab reading a storybook to their toddler (IDS register), and to an experimenter (ADS register). The storybook was designed for the study, ensuring identical linguistic contexts across speakers and registers, and multiple representations of each of the nine Norwegian vowels. We examined both traditionally reported measures of IDS: pitch, pitch range, vowel duration and vowel space expansion, but also novel measures: vowel category compactness and vowel category distinctiveness. Results of our mixed models showed that Norwegian IDS is characterized by (a) higher pitch, (b) larger pitch range, vowel duration and vowel space area, but (c) less compact vowel categories, yet (d) comparable distinctiveness of vowel categories as compared to ADS. Further, our beta-regression showed that parents' higher pitch predicted toddlers' vocabulary, β = 0.72, p = .003. However, when examining the acoustic measures of IDS only, parents' vowel category compactness predicted toddlers' vocabulary, β = 0.50, p = .049. In sum, this work provides evidence that IDS to Norwegian toddlers follow the same prosodic characteristics as typically reported in the literature for other languages, including vowel space expansion, previously reported absent in Norwegian parents to 6-month-olds. Yet, parents' vowel categories were more variable in IDS than ADS. Furthermore, the study indicated that increase in IDS pitch (over ADS) as well as vowel compactness in IDS, positively correlated with toddlers' vocabulary, suggesting that parents' increase in pitch when talking to their child and consistency in vowel production, can facilitate early word learning.

B12 Do type of toys used during play with caregiver affect infants' vocalizations?

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Infants' vocalizations are essential building blocks of turn-taking exchanges (e.g., Hilbrink et al., 2015) and they have a social regulatory function (Hsu & Fogel, 2003). Yet, it is not clear whether early vocalizations are context dependent. Hsu et al. (2013) showed differences in vocalizations across social games and Sosa (2015) found out that infants vocalized more during play with book in comparison with electronic toys. In contrast, Rome-Flanders and Cronk (1995) reported that infants' vocalizations were similar during peek-a-boo and play with a ball. Here, we tracked the changes in Polish infants' vocalizations in 51 parent-infant dyads (data collection and coding ongoing) engaging in 4 different play situations (manipulative toys, book-sharing, rattle-shaking and free play with a larger set of toys) longitudinally when infants were around 4, 6, 9 and 12 months of age. Speech-like vocalizations (protophones, syllables and words) were manually transcribed, and the proportion of time spent vocalizing during each play was calculated. In the preliminary analysis, Generalized Estimating Equations revealed main effects of play type (Wald χ^2 = 11.956, p = .008) and age (Wald χ^2 = 19.729, p < .001) as well as an interaction effect between play type and age (χ^2 = 32.474, p < .001). Our results suggest that the type of play situation with a caregiver can affect infants' vocalizations and this effect may be different depending on infants' age.

B13 Enhancing Parent's Booksharing Skills to Promote Child Language Development

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Up to 50% of children in regions of the U.K have Speech, language, and communication (SLC) difficulties, leading to lifelong academic, behavioural and social-emotional challenges. The quality and quantity of parental language is a significant predictor of SLC skills. The Murray-Cooper Dialogic Booksharing intervention leads higher quality parental communication and therefore, improved infant language, attention, and social-emotional skills, offering a resource to address the language crisis. However, literature has not explored this relationship with children aged 3–5 years, when the intervention is most effective. The aim of this study is to bridge this gap in knowledge. Observations were recorded, pre and post intervention, of parent and child booksharing (*N* = 15), which were later coded for parental attachment skills, parental word use and dyad turn taking. Significant improvement was found for parental pacing, positivity, sensitivity, and dyad reciprocity. Simple linear regressions showed a significant shift in parental skills used to engage children in booksharing. However, there was no significant change to parental language, at follow up. The intervention improves parental attachment skills such as sensitivity and reciprocity similarly in children as with infants, with previously unidentified improvements to parental pacing and positivity highlighting how child social-emotional improvements may occur. The shift in skills parents used were a stronger predictor of child engagement post intervention, highlighting that the intervention supports parents to develop higher quality tools for parent-child communication that benefits child development. Finally, non-significant changes found to parental language may explain why the intervention is more effective with older children, as quantity of parental language reduces in importance with child age, whereas quality of interaction increases in importance. However, further research is needed for mediational analysis of parental skills and older child outcomes, as well as long term data on the impact of the intervention to child development.

B14 Can interactive book-sharing improve infants' language acquisition and socio-cognitive skills?

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Book-sharing interventions (BSIs) directed to parents have been shown to improve children's language development. Arguably, BSIs constitutes a powerful learning context because: (i) the child gets exposed to new vocabulary; (ii) it contains prolonged periods of parent-child joint attention interactions; and (iii), it supports parental scaffolding techniques. Yet, it remains to be empirically tested whether BSIs leads to improvements in infant joint attention skills, as well as parent scaffolding behaviour. Purpose and aims: We are currently conducting a randomized controlled trial to evaluate the effects of a BSI for caregivers of 10-month-olds. First, we will investigate potential intervention gains in child language and joint attention skills. Second, we will investigate whether these potential effects can be explained by intervention gains in parent scaffolding behaviours. Method: Study design and timeline: Participating parent-infant dyads (*n* = 115) have been randomized to an intervention group or an active control group in. Data will be collected at pre- and post-intervention and the data collection will end in September 2022. Intervention: The intervention is delivered weekly for five consecutive weeks to groups of ¬~5 parent-child dyads. The sessions focus on teaching different interactive scaffolding techniques for caregivers to use during picture book-sharing with their child. Active control: Participants in the active control group attend the same number of group sessions for the same amount of time. In lieu of the book-sharing intervention they will receive information about child cognitive development in general. Outcomes: Child language: Receptive and expressive vocabulary is assessed with parent reports on the Swedish Early Communication Inventory. Child joint attention: Joint attention skills, is assed with tasks from the Early Social Communications Scales. Parental scaffolding: Parents' ability to provide scaffolding is assessed during a 4 min parent-child play situation where the dyad is presented with a challenging shape-sorting toy.

B15 Children's repetitions change in abstractness: a quantitative analysis on Japanese child-caregiver conversations

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One of the characteristics of child speech is frequent other-repetitions. Previous studies have argued the importance of repetitions as well as grammatical alignment or coordination between speakers in a conversation, especially at a syntactic level in English (e.g., Dale & Spivey, 2006). However, the item-specific nature of early language and cross-linguistic grammatical differences predict that children's other-repetitions tend to shift from specific (i.e., repeating exact words) to abstract (i.e., repeating the same syntactic structures), and that the coordination may be stronger at the morphological level than the syntactic level for some morphologically-rich languages like Japanese. This study uses longitudinal child-caregiver conversation data in Japanese with more than 300,000 utterances from CHILDES database (MacWhinney, 2000; Miyata, 2004a, 2004b, 2004c; Miyata & Nisisawa, 2009, 2010; Nisisawa & Miyata, 2009, 2010) to test these predictions. We extracted all instances of other-repetitions, that is, linguistic matches between adjacent turns by different speakers at the string, morphological and word-class levels. Our generalized linear models revealed that children's other repetitions generally decrease over development (Estimate=-0.003, *SE*=0.000, *z*=-10.406, *p*<0.001). Among three abstractness levels, string repetitions drop remarkably as they grow up (Estimate=-0.036, *SE*=0.001, *z*=-62.019, *p*<0.001). Children's repetitions of morphological structures (such as verb inflections and case markers) slightly increase with respect to word-class repetitions (Estimate=0.001, *SE*=0.001, *z*=2.537, *p*=0.011), which seems to suggest children's growing focus on the morphologically-marked distinctions in Japanese. Our exploratory analysis also showed that children repeat grammatical elements with different probability, which implies their language command well as their strategies in language use. These results underline the importance of crosslinguistic perspective in understanding the developmental changes in how children, explicitly or implicitly, exploit heard speech during an interaction.

B16 Caregiver sensitivity supported young children's vocabulary development during the Covid-19 UK lockdowns

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Evidence suggests that high-quality parent-child interactions enable the formation of secure attachment (Ainsworth et al., 1978), leading to healthy sociocognitive development (Kivijärvi et al., 2001; Madigan et al., 2019). However, little is known about how these relationships play out when family routines and social networks are unexpectedly disrupted. The COVID-19 pandemic allowed us to investigate the interplay of caregiver-child interactions, threats such as disrupted mental health and social support, and child language outcomes. We explored the impact of caregiver sensitivity on the vocabulary development of 8-48 month-olds (*N*=100, *M*=21.15m, *SD*=7.04) during the COVID-19 pandemic. At three timepoints (Spring 2020 - Spring 2021), we measured caregiver sensitivity from video recordings of home interactions (e.g., free play, book reading, cooking) and a modified version of the Global Ratings Scale (Murray et al., 1996), and children's vocabulary using the Oxford-CDI (Hamilton et al., 2000). We found that children who experienced more sensitive concurrent interactions with their caregiver at the beginning of the pandemic had higher caregiver-reported receptive (log-likelihood=-1258.98, overdispersion estimate=.38; *B*=0.14, *p*=.03) and expressive (*LL*=-1106.78, *OE*=.89; *B*=0.28, *p*<.01) vocabulary scores than their peers experiencing less sensitive interactions. Children experiencing more sensitive interactions six months later also showed larger concurrent receptive vocabularies (*N*=23, *B*=34.00, *p*<.05, R^2_{adj}=.25, *p*<.05). Over time, children whose caregivers showed more sensitive interactions at the beginning of the pandemic showed greater expressive vocabulary growth (*N*=58, *LL*=-701.42, *OE*=.73; *B*=.25, *p*=.02) over the following six months. Neither caregiver mental health or social support was associated with sensitivity at either tested timepoint. This exploratory study reveals a positive relationship between caregiver sensitivity and young children's vocabulary development during the Covid-19 lockdowns in the UK. Our findings underscore the importance of sensitivity for young children's development at a time when other positive influences on language development were compromised.

B17 Maternal Question Use and Its Effects on Language Development of Infants from Diverse Socioeconomic Backgrounds, Pointing, and Label Use

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Parents' questions, especially specific types of questions, constitute an important aspect of parent-child interactions by sustaining children's attention, highlighting information and eliciting responses from children (e.g., Rowe, 2012; Hirsh-Pasek et al., 2015). The current study contributes to the literature by examining the longitudinal associations between maternal questions and infants' language development across different socioeconomic statuses (SES). Specifically, we examine (i) how mothers' question types and content differ when their infants are 8- and 14-months old, (ii) how mothers' question types and contents are related to infants' language development, and (iii) whether SES moderates the association between maternal questions and infants' language skills. Participants were 42 Turkish-speaking mother-infant dyads from high- and low-SES backgrounds. When infants were 8 and 14 months old, mother-infant dyads participated in a "decorated room" (Liszkowski, 2012) session where they engaged in interactions for 5 minutes in a room furnished with different objects. We assessed infants' language skills using the Turkish version of the MB-CDI (TİGE) at 14 and 18 months. We coded maternal questions for their types: 1) Yes/No, 2) Wh- (What, Where, Who), and 3) Tag questions; and for content: 1) Referential (Label and Descriptive), 2) Preference (Attitude and Behavior), 3) Reminiscing, and 4) Attention. Proportions of each question type and content out of the total maternal utterances were calculated. Results showed that the majority of maternal questions were Yes/No, Wh- (What, Where, Who), and Referential questions at 8 and 14 months. There were significant SES differences; mothers from high-SES backgrounds asked more Descriptive and Reminiscing questions than mothers from low-SES backgrounds at 8 and 14 months. Correlation analyses revealed positive associations between Reminiscing questions at 8 months and children's language comprehension at 14 months and language production at 18 months. These results have important implications for supporting infants' language development across different SES backgrounds.

B18 Joint Attention as a Precursor to Children's Referential Communication Skills

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When describing an object during referential communication, young children often aren't adequately informative in their initial attempts but may repair their descriptions by giving more specific information in subsequent attempts. Sharing attentional focus on an entity with caregivers, known as joint attention, allows infants to establish common ground and exchange information about referents (Bruner, 1981). Early joint attention facilitates children's referential communication skills by fostering both vocabulary development (Tomasello & Todd, 1983) and perspective-taking (Moll & Tomasello, 2004). In this first longitudinal study, we tested whether joint attention episodes with longer duration in mother-infant dyads is a precursor to more advanced referential communication skills in toddlerhood. At 12 months of age, joint attention in mother-infant dyads (*N*=24) was assessed during 5-minutes of free play in the laboratory. We coded the total time spent in joint attention and the average duration of joint attention episodes for each dyad. At 34 months of age, children participated in an online referential communication task, which required them to describe target pictures among similar competitors to the experimenter. To assess children's ability to repair descriptions, we coded for (1) the number of communicative attempts children needed to provide clear descriptions of the target items, (2) the ambiguity of their descriptions (i.e., the number of pictures on the screen that a description could possibly refer to). In line with previous findings (Matthews et al., 2012; Uzundag & Küntay, 2018), the majority (97%) of children's initial descriptions were ambiguous. Mixed-effects regression analyses showed that dyads' average duration of joint attention episodes at 12 months significantly predicted the number of description attempts (Estimate=-.49, *SE*=.23, *p*=.04) when the children were 34 months but was not related to message ambiguity. We discuss why children demonstrate advanced communicative repair abilities when they have longer joint attention episodes with caregivers in infancy.

B19 Does Context and Attentional Exchanges Change the Way of Children's Competency in Using the Three-way Demonstrative Pronoun System in Turkish?

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Demonstratives are language structures used to initiate and maintain joint engagement between communicative partners. A speaker needs to adjust demonstratives considering communication's dynamically changing needs. Turkish has a three-way demonstrative pronoun (DP) system: DPs "bu" and "o" are determined depending on a referent's relative distance to a speaker; "şu" is a distance-neutral form, operated only to draw a listener's attention to the referent. Turkish-speaking adults in a goal-directed lego construction setting used "şu" independently from distance information, only to draw an addressee's attention, but used "o" for distal, unattended referents. Showing a limited sensitivity to attention status, 6-year-olds used more "bu" for proximal and "o" for distal and more "şu" for proximal, unattended referents. In the same study, 4-year-olds' demonstratives were limited to distance information. We examined how 4-to-6-year-olds' (Range= 48-to-83 months, M = 64.18, SD = 9.32) demonstratives change in a temptation eliciting context, depending on attention exchanges between the same-age peers. Four-year-olds (64.2%) produced significantly more "bu" than six-year-olds (44.8%), whereas 6-year-olds (41.2%) produced significantly more "o" than 4-year-olds (19.7%), X^2 = 24.45, p =.000. Both groups showed sensitivity to the attention status: Four-year-olds used significantly more "bu" to initiate the listener's attention to both proximal (94%) and distal (50%) referents, (X^2 (1, N=17)= 29.56, p=.003, X^2 (1, N=20)= 29.56, p=.003, respectively). Six-year-olds used more "o" (42.3%) to draw the listener's attention to a distal referent X^2 (1, N=26)= 8.22, p<.05) and more "bu" to maintain the joint attention on a proximal X^2 (1, N=18)= 10.84, p<.01) and distal (X^2 (1, N=60)= 10.84, p<.01) referent. Children showed sensitivity to attentional cues earlier than reported in previous studies, only considering attentional exchanges between interactants in a temptation eliciting context.

B20 Hansel and Gesture - A gesture-based reading intervention as a means to increase parent-infant social communicative skills

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Gesture precedes and predicts infant language development, yet very little is known regarding how pointing at the level of communicative intent (imperative pointing, informative declarative pointing, and expressive declarative pointing) relates to the development of different infant communicative abilities, and whether this can be enhanced. We propose a brief 2-month gesture-targeted reading intervention aimed at parents of infants aged 10- and 11-months-old. To target gesture, we will vary the intervention instructions provided to parents during the reading activity (asking parents to point vs asking infants to point vs no instructions), which is then compared against a control group. We will measure the communicative skills (gesture, sustained attention, and language) of parents and infants' pre-intervention, immediately post-intervention and longitudinally via a 15-minute parent-infant free play sessions, UK-CDI, Mullens Scale of Early Learning. An additional word learning task at 18-months-old will allow us to measure social communicative skills in a structured environment. We expect that all reading conditions lead to an increase in parent/infant gestural output, alongside increases in the length of infant sustained attention and increased vocabulary size. We are particularly interested in exploring how the different conditions may differentially influence the outcome measures. This work will provide important contributions for health visitors and the development of the EYFS. Future work can evaluate the usefulness of gesture interventions for atypically developing infants and children.

B21 Concurrent relations between maternal neuroticism and cognitive skills and early childhood behaviour and vocabulary in Chile

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Objectives: Early language development is related to later language, socioemotional and cognitive skills, and academic success (Reilly et al., 2010). It is to be expected that mothers' characteristics influence the available stimulation and opportunities to interact with their child. On the other hand, behaviour and emotional problems in childhood have been associated with adolescent psychopathology, with parent personality playing an important role (Bertino et al., 2012). However, most studies have been carried out with older children and in Western samples. This study aimed to investigate the influence of maternal cognitive and personality characteristics on their preschool children's language and socioemotional development in Chile. For this purpose, we examined the relation between children's receptive vocabulary and internalizing and externalizing problems with mothers' cognitive skills and personality traits. Methods: Participants were 3,322 dyads of 30- to 48-month-old children and their mothers, who were enrolled in the Early Childhood Longitudinal Study in 2010. The sample is nationally representative of children of this age. Children's measures include receptive vocabulary and internalizing and externalizing problems. Mothers' measures include vocabulary and numeracy skills and personality traits. Results: Regression analyses demonstrated that maternal numeracy and vocabulary skills were significant predictors of receptive vocabulary. Maternal vocabulary and neuroticism were significant predictors of internalizing problems. Only maternal neuroticism was a significant predictor of externalizing problems. Conclusions: Findings suggest that mothers' cognitive skills and personality are related to their preschool children's receptive vocabulary and behavioural and emotional problems. Neuroticism is related to mothers' perceiving their child as having more behavioural problems, suggesting a potential risk factor that early childhood professionals need to consider. Mothers' increased vocabulary could decrease the likelihood of internalizing problems and promote children's vocabulary development. We highlight the importance of main caregivers' characteristics when planning interventions focusing on young children's vocabulary and behavioural development.

B22 Early childhood executive function: Contributions of maternal education on the development of executive function from 30 to 54 months.

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Executive function (EF) is a set of cognitive skills involving an integrated neurocognitive system underlying attention shifting, working memory, and inhibitory control processes (Miyake et al., 2000). EF has been widely studied from infancy to adulthood as an area of great interest due to its relation to academic and behavioural outcomes. EF has been correlated with academic achievement (Alloway, Banner, & Smith, 2011; Blair & Razza, 2007). Low EF is predictive of poor academic outcomes (Bull et al., 2008) and EF deficits are associated with disorders such as attention-deficit/hyper-activity disorder and disruptive behaviour disorder (Schoemaker et al., 2012). As such, it is important to investigate how EF develops over time and any risk factors that may affect this development. To investigate this, we conducted a longitudinal study following infants from 30 months to 54 months (n = 76). We used the Minnesota executive function scale (MEFS) as our index of EF. Results show an effect of maternal education on MEFS performance at 30 months (F(1, 137) = 4.88, p=.028): infants with mothers obtaining a higher education level had a significantly higher total score than infants with mothers from a lower education level. This effect of maternal education on MEFS total score increased from 30 to 54 months of age (X^2 (2, 204) = .8735, p =.032). Furthermore, there was an effect of gender on MEFS performance at 30 months (F(1, 137) = 5.83, p=.0171), with girls attaining a significantly higher total score than boys. This longitudinal data will be further analysed alongside fNIRS and eye-tracking data in several working memory and attention tasks to further track the developmental trajectories of executive function.

B23 Feeding practice, childhood stimulation, and cognitive development among Indian toddlers

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Background: The medical benefits of breastfeeding on the child are well documented, however, the cognitive benefits of breastfeeding have been debated. Limited evidence is available from developing countries. The present study aimed to examine the relative contribution of duration of exclusive breastfeeding and maternal stimulation on cognitive development of toddlers. Methodology: Eighty-three toddlers aged 12 to 30 months (*M*=21.71, *SD*= 5.44, Boys= 46.3%) were recruited from the anganwadis (public health care and pre-school centres) of Chandigarh, a North Indian city. The inclusion criteria were a chronological age of 30 months or less at the time of assessment, and absence of any chronic illness or sensory impairment. Information regarding breastfeeding initiation and duration was obtained retrospectively using a semi-structured questionnaire. Specifically, information was sought on two breastfeeding variables: duration of exclusive breastfeeding and how old was the baby when he/she completely stopped breastfeeding. Home learning environment was assessed using the Stim Q questionnaire (toddler version) which measures cognitive stimulation at home. The study was approved by the ethics board of the Institute. Results: Breastfeeding was a near universal practice and 95.6% mothers breastfed their children exclusively for a mean duration of 5.59 months (*SD*=1.70). A little less than two-third of the mothers (61%) exclusively breastfed their children for a period of 6 months as per the WHO recommendations. There was a significant positive correlation between duration of exclusive breastfeeding and mental development quotients (r=.24, p<.05). Multiple step wise regression analysis revealed that age of the child, parental involvement in developmental advance, and duration of exclusive breastfeeding explained 37% of the variance in the mental development quotient of the child (F=11.50, P=.0001). Conclusion: Exclusive breastfeeding and parental stimulation are both important contributors in the early cognitive functioning of the child and need to be emphasized in primary care visits.

B24 Infant Motor Development and Parental Beliefs from pregnancy to 10 months of age: a longitudinal cross-cultural comparison

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Infants display large variation in early motor development (Karasik & Robinson, 2022) which is associated with improvements in other developmental domains (Adolph & Hoch, 2019). To increase understanding of the complex interplay of genetic and environmental factors shaping motor development, we focused on parental beliefs regarding motor development and investigated whether they predict motor development at age 10-months. Dutch and Israeli parents were included in the study, as these two cultural contexts were found to differ in parental beliefs, practices, and motor development (van Schaik, et al., 2018; Oudgenoeg-Paz et al., 2020). Parents of first-born infants (38 Dutch, 43 Israeli) filled in the Parental Beliefs about Motor Development questionnaire (Atun-Einy et al., 2017) in 2 time points: the last trimester of pregnancy (t1) and when infants were 2 months old (t2). At age 10-months (t3), motor development was assessed using the Ages and Stages Questionnaire filled in by parents and by observers and parental reports about motor milestone (Squires et al., 1999). Results show that t1 and t2 parental beliefs predict motor skills at t3. Specifically, parents who attributed greater importance to stimulating motor development, following motor development in a set order and obtaining professional advice about motor development had infants who were more likely to attain “active” motor milestones such as crawling and independent sitting and less likely to attain “passive” milestones such as supported sitting and standing when put in position. The belief that infants should following their own pace showed a reverse pattern. Correlations are small to medium (range is .21-.42). The findings show that parental beliefs during pregnancy and shortly after birth predicted at least to some degree infant motor outcomes at age 10 months. Discussion will also relate to qualitative data to further interpret parents’ perceptions of their role in infant motor development.

B25 How preschool quality relates to children's learning outcomes

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Background: Previous research has consistently shown that preschools can significantly influence academic and social development during childhood. High quality preschools can be especially beneficial for children from disadvantaged backgrounds. While preschool quality has been shown to be an important factor for positive outcomes, the question of which aspects of preschool quality that are the most important is less explored. With both high attendance (94% of 4–5-year-olds) and overall high quality preschools, Sweden provides an opportunity to explore the potential impact of preschools. In the Preschool Quality for Equal Learning (PreQuEL) project we will conduct a large-scale examination of the impact of different aspects of preschool quality on early language and math skills with the aim to: (1) Explore what aspects of preschool quality are the most important for positive child outcomes. (2) Investigate under what circumstances preschool quality can reinforce or compensate for individual differences in background circumstances. Methods: The current study will include all children born between 2016-2018 attending municipal preschools in Uppsala County, Sweden, ($n \approx 5000$). Background demographics and data on individual early health, development and social environment at age 2.5-3y will be collected through registry data from Statistics Sweden and Swedish child healthcare services. Preschool quality will be assessed by structured observations using the ECERS-3, complemented with measures of structural quality such as staff education level, group sizes and staff to child ratio. Individual outcomes will be collected from standardized mandatory assessments of language knowledge and mathematical thinking conducted at the start of school (6y). Outcomes: The planned study will strengthen evidence-based practices and inform both researchers and preschool practitioners of what aspects of preschool quality are the most impactful for positive learning outcomes. It will also highlight the circumstances under which preschool quality can reinforce or compensate for individual differences in background.

B26 Children's Social Learning under Conditions of Uncertainty from Own- and Other-Race Informants

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Children's predominant exposure to adults of their own race during the first year leads to an increased ability to distinguish 'own-race' compared to 'other-race' faces (Kelly et al., 2007). Little research in young children has investigated the cognitive and social consequences of this 'other-race effect'. How do an adult's race and accuracy interact to affect whether young children choose to learn from them? White and Black 3-year-olds participated in a virtual social learning task. The Demonstration phase established an adult's degree of accuracy; on successive trials, the adult pointed to 1 of 3 different coloured cups and a bear was revealed under one of the cups. The adult was either 100% or 55% accurate and either White or Black. During the Test phase, children viewed the adult from the Demonstration phase and a new adult of a different race point to different cups and were asked to point to the bear. Children were expected to trust an own-race adult more than an other-race adult, specifically under conditions of 55% accuracy, potentially indicating that young children integrate statistical predictions about behaviour with outward cues like race to make social judgements. Investigating the downstream consequences of the 'other-race effect' and understanding the various ways it may play a role in young children's learning is critically important to understand - and potentially intervene in - the early emergence of racial biases. This research could serve as a tool to improve the education and quality of life of all Canadians.

B27 Joint Attention Episodes during Interactions with Fathers but not Mothers at Age Two is Associated with Expressive Language at Age Three

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This study explores Joint Attention (JA) episodes during interactions with mothers and fathers separately, and longitudinal associations with language outcomes during toddlerhood. Thirty-one toddlers (18 girls) and their parents (31 cohabiting mothers and fathers) participated in the study at child age two (M_{age} = 24.07 months, SD = 1.45) and again at three years (M^{age} = 37.44 months, *SD* = 1.72). JA episodes in interaction were observed during dyadic free play sessions with mothers and fathers in a semi-naturalistic lab environment at child age two and coded as in Koşkulu et al. (2021) using Mangold's INTERACT software (Mangold, 2020). Receptive and expressive language skills were measured by Bayley-III Scales (Bayley, 2006) at both child age two and three. No significant differences in either the quantity or the quality of JA episodes were found between mother-toddler and father-toddler dyads. However, JA duration and relative frequency of parent-followed JA during interaction with fathers (but not mothers) at child age two were associated with expressive language outcomes at child age three, $r(26) = .38$, $p = .047$, $r(26) = .43$, $p = .022$ (two-tailed), respectively; after controlling for paternal education, JA with mothers, and expressive language at child age two. Results suggest that JA during interactions with fathers might contribute to toddlers' expressive language development.

B28 Affective correlates of joint attention in parent-infant dyads

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In Western, post-industrial contexts, joint attention between parents and children is often accompanied by positive emotion. Adamson and Bakeman (1985) characterised affective exchanges between parents and infant children as a foundational interactive platform for the accretion of triadic engagement routines, as infants develop. Relatively few researchers have explored the affective accompaniments to deictic gestures by parents during triadic engagements with their infants. Leavens and his colleagues (2014) reported that parents synchronised their own smiles with the peak extensions of their gestures, when pointing for their infants, aged 6 to 18 months. Moreover, there was no apparent influence of infant age on parents' smiling frequency. We had two specific aims: (1) to determine whether the results of Leavens et al., collected in a laboratory, generalised to homes of parent-infant dyads, and (2) to explore the feasibility of data collection with videoconferencing software. We recruited 59 parent-infant dyads (34 female children) with infants at one of three ages: six months (n = 20), 12 months (n = 19), and 18 months (n = 21). With parents holding children in their laps, we presented two classes of stimuli, twice each: (1) images of Peppa Pig, and (2) images of a spider, asking the parents to point to each image when it appeared on their screens. As in Leavens et al. (2014), parents' peak smiling behaviour was coordinated with the maximum extents of their pointing hands. We found no evidence of an influence of infant age on parents' propensity to smile. We found no influence of stimulus type on parental smiling. Finally, we found that this protocol was successfully administered via off-the-shelf videoconferencing software. Thus, a positively valenced, affective envelope of joint attention, previously reported from a laboratory study, also appears in the joint attention of parent-infant dyads in their home environments.

B29 A prospective longitudinal study: Social responsiveness in infancy as early marker of social development in early childhood in typically developing infants and infant siblings

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Prospective studies of autism assess infants with a familial history of autism, typically an older sibling (1). Despite empirical study (e.g., 2, 3) reliable later predictors of autism remain elusive in the first year of life. Keemink et al. (2021) used a gaze-contingent paradigm with typically developing (TD) and infant sibling (IS) groups in which engaging in eye contact with on-screen actors would trigger the stimulus to produce a facial expression. In addition to eye movements, the infant's response (e.g., a smile) to the stimulus was recorded. Eye movements were comparable between groups, but the infant sibling group showed reduced behavioural responsiveness. We are currently conducting follow-up work with infants tested by Keemink et al. to assess whether reduced social responsiveness is related to later outcomes via a parent-child free-play task and standardised tests. Data collection is ongoing for IS participants, with 45 TD infants (21 - 56-months) and 6 IS children (42 – 60 months) tested to date. Using a task modelled on the Parent-Child Free Play procedure (e.g., 5-7), parents and children were recorded while engaging in free-play. Following previous research (e.g., 8-10) a coding scheme evaluated five measures of social interactivity including social vocalisations, smiling and engagement in play. Parental-reports, the RBQ-2, ASQ-3 and LUI were completed online separately. Questionnaire data collection is ongoing, but free-play results indicate that IS siblings on average scored lower on all child behaviour measures with significant differences in frequency of low engagement in play (X^2 (1,51) = 11.243, p =.006). Parent and child social interactivity measures were also highly correlated. Currently, no relationship between reduced responsiveness in infancy (4) and later outcomes have been identified however. These findings contribute to existing prospective studies of autism and also highlight the challenge of identifying first year of life predictors.

B30 Investigating individual differences and the role of SES in infant-initiated social interactions in 18-month-old Turkish infants

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Infants engage with their social partners in diverse manners and use different strategies to do so. In this study, we investigated what types of social interactions with caregivers were initiated by 18-month-old infants in their natural environments, and whether infant gender and family socio-economic status influence the frequency of infant-initiated interactions. The data included 43 infants (23 females) recruited from a diverse SES sample in Turkey. An-hour-long video recordings were collected when infants were at home as the families went along their daily routines. We applied a novel coding scheme accounting for a wide range of infant-initiated communicative goals: needs-based (e.g., biological such as feeding, or socio-emotional such as cuddling) and non-needs based (e.g., requesting an object, sharing interest or asking for information). Infant's successful communicative bids (i.e., where their bids are responded to appropriately within 3 seconds following an infant-initiated interaction) towards caregivers were coded. Infants initiated 2049 events, on average initiating 47.6 events per hour (Range = 10 - 215). Infants initiated non-need based events (M = 42.02, SD = 5.46) such as requesting an object or seeking information significantly more often than need based events such as being fed (M = 5.40, SE = 0.76), $t(42) = -6.644$, $p < .001$. There was no effect of gender on the number of infant-initiated interactions (M = 47.6 for females, M = 47.7 for males, $p = .99$). We also did not find an effect of SES indices on the number of events initiated by the infants (monthly expenditure $p = .15$; maternal education $p = .43$); maternal occupation $p = .078$). These findings suggest that that children's active communicate bids are not related to the socio-economic status of their families and their gender.

B31 Young children's selectivity in teaching: Pitting self-discovered information against instructed information

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Children effectively acquire information from their immediate environment in two main ways: learning through self-exploration and learning from others. They also reason differently about the information they learn through exploration and other's instruction. The current study asked whether 24-month-old toddlers and 5-year-old children distinguish between these two types of information when they themselves transmit information. Toddlers and children (planned *N*=68, current *n*=50) were presented with simple novel boxes that were perceptually identical except for the orientation of a different-coloured button on each box. Pressing a button played different but similar tunes or turned on different coloured light bulbs. In the learning phase, children were instructed how to operate one of the novel boxes in one trial and were given an opportunity to independently explore the other box in another trial (counterbalanced, in two blocks). After children learned the functions of both boxes, they were presented with a teaching phase, where they were asked to demonstrate how the boxes worked to a naïve adult. Preliminary findings showed that toddlers and children behave differently both when learning and teaching. When learning, toddlers engage with both boxes equally, whereas children engage more with the box that they self-explored. When teaching, toddlers prefer to teach what they have been previously taught; whereas children do not show selectivity between these two types of information suggesting that toddlers prioritize transmission of the instructed function, but this preference is not reflected in children. If this is the case, toddlers might have an early-emerging sensitivity to preferentially share deliberately taught information in social learning contexts, especially when it is directly pitted against the opportunity to share information discovered independently. However, this tendency disappears as toddlers get older perhaps due to a combined influence of exposure to formal educational contexts and overall developmental maturity.

B32 Investigating Sensitivity to Social Stimuli In Utero

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Research indicates that language is distinguished from other auditory stimuli before birth. Using FHR as a measure, foetuses in the third trimester have been found to discriminate their native and non-native language and attend more to speech. At birth, infants show increased sucking rate to infant directed speech (IDS) than adult-directed speech (ADS) suggesting particular preference for effective communication before postnatal experience. However, we have little understanding of how this preference is developing before birth and there are inherent confounds when comparing IDS with ADS. The former has much more variation, is pronounced at a slower pace, at a higher volume, and is thus likely more interesting than the latter (Fernald et al., 1989). Conclusions about the early preference for social communication, therefore, need to be taken with caution. Thus, the current study addresses this confound with the addition of a control condition in which IDS is played backwards. This interferes with the structure of the stream so that pitch and frequency remain the same, yet this is no longer recognisable as IDS. Further, the current study sheds light on the development of IDS preference before birth by measuring physiological and behavioural responses of foetuses at 34 weeks gestational age (GA). This directly assesses prenatal response to social stimuli before postnatal experience using methods that are akin to postnatal developmental research for effective comparison. Preliminary analysis indicates differences in physiological response to IDS compared to ADS and reverse ADS. This indicates the preference for IDS begins long before postnatal experience.

B33 The Stability of Temperament During the First Four Years of Life

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Temperament is commonly thought of as being based on constitutional differences in reactivity and self-control (Rothbart & Derryberry, 1981) and has been found to be relatively stable across infancy and early childhood (Bornstein et al., 2015). This study investigates the stability of temperament during the first four years of life as measured by three related instruments relying on parental report. The aim of this work is to both replicate previous findings regarding the longitudinal relations within individual scales of Rothbart's questionnaires, as well as to assess the stability of their established factor structure, consisting of Positive Affect (or Surgency), Negative Affect and Effortful Control (e.g. Putnam et al., 2008), in a German sample. Additionally, the trajectories of change over time are examined via mixed effects models. To this end, 165 German low-risk parent-child dyads were investigated a total of five times across the ages of six months through four years. Temperament was assessed with the Infant Behavior Questionnaire Revised (IBQ-R) at the ages of 6 and 12 months, the Early Childhood Behavior Questionnaire (ECBQ) at the age of 18 months and finally the Childhood Behavior Questionnaire (CBQ) at the ages of 3 and 4 years. All questionnaires were filled out by the parents. Preliminary results indicate low to high degrees of stability within scales depending on the distance between individual measurements, with higher correlations between adjacent time points. Further analyses of the factor structure and mixed effect models are on-going.

B34 18-month-old infants can extract the gist of a scene

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Adults can extract the gist of scenes (e.g., office vs. playground) in periods as short as 20 ms before encoding all their constituent elements. However, little is known about scene processing early in development when limited conceptual knowledge is available. Here, we investigate whether infants can recognise the gist of scenes - whether they form scene categories for visual environments that they encounter daily. In two eye-tracking experiments, we used a preferential looking task to investigate whether 12- (*N*=24) and 18-month-olds (*N*=20) can extract the gist of playtime and mealtime scenes from real-world images. After exposure to one type of scene, we expected infants to look longer at the category with a different gist. In Experiment1, we briefly familiarised 12-month-olds with three different exemplars of a specific scene (1 sec each) across 12 trials. Following familiarization, in each trial, two novel test pictures, one from the same and the other from a novel category, were presented simultaneously for 5 sec. We computed a ratio of total fixation length to the novel scene in the test. In 12-month-olds, we found no preference for the novel scene category (*M* = 0.49; *SD* = 0.05; t-test against 0.5: *t*(23) = -0.06, *p* =.951). In Experiment2 with 18-month-olds, we used a similar procedure, except that during familiarization, a pseudo-word was played for each scene category to test whether language would aid scene-gist extraction, similarly to how it aids object categorization. Preliminary results show that 18-month-olds have a novelty effect (*M* = 0.54; *SD* = 0.05; t-test against 0.5: *t*(19) = 3.15, *p* =.005), suggesting that when labels are used, 18-month-olds can differentiate scenes with a different gist. On-going and follow-up experiments will investigate different scene categories and test whether labels aid scene-gist extraction in younger age groups as well.

B35 Parents' Perceived Social Support Moderates the Relation Between Parenting Stress and Children's Effortful Control

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Self-regulation is a crucial predictor of later social and cognitive outcomes and shows rapid development in early childhood (Rothbart et al., 2011). One of the fundamental aspects of self-regulation is effortful control, defined as the ability to suppress a dominant response to execute a subdominant one (Rothbart et al., 2003). Studies show that higher parenting stress is associated with lower effortful control in children (e.g., Benzies et al., 2004). Given that greater social support perceived by parents is likely to impact parenting by reducing stress (e.g., Bonds et al., 2002; Quittner et al., 1990), it is important to understand the role of social support in the relationship between parenting stress and children's effortful control. In this first study testing the moderating role of perceived social support, we collected data from 199 mothers in Turkey having children aged between 3 and 6. Mothers completed the Parenting Stress Scale (Özmen & Özmen, 2012), the Perceived Social Support Scale (Zimet et al., 1988), and the Child Behavior Questionnaire as a measure of effortful control (Rothbart et al., 2001). Results showed that controlling for socioeconomic status, perceived social support (M= 4.2, SD= 1.58) moderated the relationship between parenting stress (M= 29.1, SD= 6.03) and children's effortful control (M= 5.03, SD= .68), $F(4,192)= 10.38$, $R^2= .18$, $p< .001$. Specifically, perceived social support weakens the relation between parenting stress and children's effortful control, and this buffering effect becomes larger as the level of social support increases. Considering the effects of parental stress on infants' cognitive and socioemotional development from pregnancy onward (Lin et al., 2017), our findings suggest an important role for parental perceived support for child development.

B36 Social exclusion modulates infants' behavior and neural processing of emotional faces

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Social exclusion is a very aversive feeling that threatens important psychological needs such as self-esteem and belongingness (Williams & Nida, 2011). It has been shown that social exclusion often induces considerable physiological (Bass et al., 2014), cognitive (Kawamoto et al., 2014) and behavioral (Bourgeois & Hess, 2008) changes in adults. However, little is known about children and infants' response to self-experienced social exclusion. The aim of the study is to explore whether the condition of being included or excluded during a ball tossing game can influence 13- to 14-month-old infants' behavior during the game and their neural processing of emotional faces. To do so, we implemented a live version of the Cyberball Game (Williams et al., 2000) in which 28 infants participated being either included (*N*=14) or excluded (*N*=14) while playing with two experimenters. The Cyberball phase was videorecorded to assess whether infants' behavior was affected by being excluded as compared to included. After the exposure to the Cyberball game, event-related potentials (ERPs) were recorded in response to the observation of faces dynamically expressing anger, fear and happiness. Results exploring behavioral reactions revealed that social exclusion influences infants' involvement and behavior during the Cyberball game. Furthermore, analyses on ERP data revealed a faster P1 to happy faces in the exclusion vs the inclusion condition. In addition, in the inclusion condition angry and fearful faces elicited faster responses compared to happy expressions, while no significant differences emerged in the exclusion condition. Data collection and analyses are currently ongoing, however, current preliminary findings demonstrate that social exclusion has a direct impact on infants' behavior and also influences their neural processing of emotional faces. The implications of the current findings for our understanding of the role of early social interactions shaping the processing of emotional faces will be further discussed.

B37 The Effects of Social Exclusion on Preschoolers' Over-imitation Behaviors

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Social exclusion, the experience of being kept apart from others physically or emotionally, has significant effects on cognitive (Kawamoto et al., 2014), affective (Abrams et al., 2011), and behavioral (Carter et al., 2008) processes throughout the lifespan. However, little is known about the impact of social exclusion on imitative behaviors early in life. The few existing studies found that the experience of being excluded increased 5-year-old children's imitative behaviors, a result that can be interpreted as an attempt to be re-included through affiliative imitation (e.g., Over & Carpenter, 2009). The aim of the current study is to investigate whether first-person experiences of social exclusion can modulate imitative behaviors in preschool-aged children. Preschool-age, 3- to 5-year-old children (*N*=60) participate in a live version of the Cyberball paradigm (Williams et al., 2000) in which participants can be either included or excluded from a ball-tossing game. This phase is video recorded to assess children's behaviors while being included or excluded. Then, children observe a model performing several causally relevant and irrelevant actions to retrieve an object inside a transparent box; children's imitative behaviors are scored in their attempt to retrieve the object as well. Parents are asked to complete the Children Behavior Questionnaire (CBQ; Rothbart et al., 2001) in order to explore the possible moderating role of temperament on imitative behaviors. Data collection is currently ongoing and will be completed by June. We expect that social exclusion and inclusion will modulate preschoolers' over-imitation behaviors; we also expect that age and individual differences will have an impact on the experience of social inclusion/exclusion and on the over-imitation behaviors. Obtained results will shed light on the developmental and social factors influencing imitative behaviors in preschool age and will lay the foundations for investigating these aspects even earlier in life

B38 "Studying the Values of Arab Children: Development of an App for the Picture-Based Values Survey and Comparison of Palestinian and Israeli Jewish children."

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Suppose you count all the varieties of today's Arabic together. In that case, you can safely estimate that there are around 467 million Arabic speakers worldwide, making it the fifth most spoken language globally. Yet only a minuscule fraction of developmental science research studies children in the Middle East (Thalmayer et al., 2021). As values are a core component of culture (Hofstede,2001), understanding how values develop is key to understanding development across cultures. Little is known about early age Arab children's values. We develop an Arabic version of the Picture-Based Value Survey of Children (PBVS-C) and investigate the values of Arab children from different religions (Christianity, Islam, Druze), comparing them to Jewish Israeli children. We developed a multi-lingual app version of the PBVS-C for studying young children using recorded instructions and value items starting from 5 years. 400 children will participate in the study (50% in Arabic, 50% in Hebrew), reporting their values with the app. Multidimensional Scaling analyses are expected to reveal structural patterns that closely correspond to ' 'Schwartz's theory in both languages, including universalism correlating positively with benevolence and negatively with power and tradition correlating negatively with hedonism and positively with conformity. In replication of past findings, we expect power values to show lower importance than benevolence values in both cultural groups, gender differences in which girls are higher in self-transcendence values and lower in self-enhancement values than boys, and religiosity correlating positively with tradition and negatively with hedonism. A pilot study (N=63) provides preliminary support. Cultural differences in value importance will be explored. Specifically, studying both Israeli and Palestinian children can be conducive to understanding how values develop in world regions in which different cultures experience a conflict. We will discuss the findings, potentials, and limitations of the computerized PBVS-C concerning future directions of values research.

B39 Neural correlates of infant social attention are linked to qualitative aspects of parent-infant interaction in 8-month-old infants at elevated likelihood for autism

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Reduced eye contact and social communication and interaction delays are among the core symptoms of autism, emerging in behaviour after 12 months of age. However, brain function measures have been able to identify subtle differences in social attention, such as eye gaze and face processing in the first year of life. Differences in the neural basis of social attention are thought to relate to behavioural social attention and alter the child's interactions with their caregivers. Here, we examine the relation between brain function and parent-infant interaction (PII) in infants with and without a family history of autism. Using Structural Equation Modelling, we tested whether the amplitude and latency of infant brain responses (Event-related potentials, ERPs) to visual stimuli (P1, P400 and N290) were associated with specific features of PII in 243 8-month-old infants with (at Elevated Likelihood, EL) and without (Typical Likelihood, TL) family history of autism. ERP responses to faces with direct vs/or averted gaze/non-faces were linked with PII aspects (infant attentiveness, parent sensitivity: parent sensitive responsiveness and non-directiveness). Findings revealed a relationship between face processing amplitude and parent sensitivity, mediated by infant attentiveness to parent in the EL group, while faster brain responses to social and non-social stimuli were linked to greater attentiveness to parent in the TL group. These results may reflect diverging neurodevelopmental pathways of visual social attention that relate to social attention in play interaction between the EL and TL groups, specific to the magnitude and the timing of brain response in EL and TL infants, respectively. They provide evidence that infants who are more attentive to their parent exhibit greater coupling between neural processing of faces and parent sensitivity. Further work employing a longitudinal design is needed to better understand the possible causal mechanisms between brain and caregiver-infant interaction processes leading to autism outcome.

B40 Social Economy Status Specific Risk on IQ of 5-Year-Old Children with Attention Problems and Developmental Disabilities

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This study investigated the effect socioeconomic status (SES) has on cognitive function of 5-year-old children who have developmental disabilities (DD) alone or DD with concurrent attention problems. Few studies have explored effects of attention problems and DD on children's cognitive development, particularly within low SES populations. A sample of 154 mother and their children, ages 5 (M_{age} = 5, *SD* = 3.22) was recruited from a cohort of 350 mothers. Mothers reported children's DD during a structural psychiatric interview and current attention problems with the Behavior Assessment System for Children; children's IQ was assessed with the Wechsler Preschool and Primary Scale of Intelligence – Fourth Edition. Two-by-two Factorial ANOVA was conducted to compare the main and interaction effects of having attention problems and developmental disabilities on full-scale IQ; data was then stratified by SES. Only after stratifying by SES did those with low SES reveal a significant interaction between attention problems and developmental disabilities, F (1, 52) = 4.70, p = .04. Children with DD and attention problems had lower IQ for high and average SES while the opposite was true for low SES. Findings reflect the importance of considering attentional difficulties and SES when implementing interventions for DD populations.

B41 Do autistic children find it easier to learn names of things they are interested in?

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The success of word-learning depends on attentional mechanisms, as attention during identification of a correct word-referent association influences later retention. However, autistic children often display restricted and repetitive behaviours and interests, meaning they fixate on particular stimuli. This may limit their ability to flexibly engage with the environment and utilise stimuli and cues required for effective word-learning. This study investigates the relationship between children's interests and attentional mechanisms, alongside word-identification and retention. Sixteen neurotypical children and fifteen autistic children, matched on receptive vocabulary (autistic *M* = 53.27 months, neurotypical *M* = 60.31 months), were taught novel word meanings via a touchscreen computer task in a within-subjects study design. Retention was tested after 5-minutes and 24-hours. In the 'high-interest' condition, children learned names for four unfamiliar animals. In the 'neutral-interest' condition, novel names were for four unfamiliar non-animal objects. Neurotypical and autistic children identified the meanings of novel words in both conditions with similar accuracy at referent selection and 5-minute retention. However, autistic children took longer to correctly identify the meanings of novel objects and animals during training, and recall their meanings after 5-minutes. After 24-hours, for both conditions, autistic children retained more novel word-referent mappings than neurotypical children. Autistic children responded equally as quickly as neurotypical children after 24-hours, although response times were influenced by autism severity. These data reveal that although heightened interest in an object category may not influence word-learning, word-learning mechanisms, and relationships between them, are not qualitatively atypical in autism. Under controlled conditions, autistic children can learn words as accurately as neurotypical peers with similar receptive vocabularies. However, the longer response times of autistic children suggest that the processing of word-learning mechanisms may be less efficient in the early stages of novel word acquisition, but these differences diminish once a word is retrieved after sleep consolidation.

B42 Under which conditions can children with autism spectrum disorder identify the meaning of novel words, in comparison to typically developing children? A meta-analysis.

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Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder defined by deficits in social communication, social interaction, and restrictive, repetitive behaviours. A frequent characteristic of ASD is atypical language development; children's first word utterances are often delayed and around 25% of the population are minimally verbal throughout childhood. Yet, experimental findings relating to the word learning abilities of children with ASD, in comparison to typically developing (TD) children, are highly inconsistent. Some studies report that children with ASD are significantly less accurate in their word learning compared to TD children whereas other studies show that children with ASD can learn new words similarly to TD children. The present meta-analysis aims to profile the word learning abilities of children with ASD and identify the conditions under which they can and cannot learn new words accurately. An extensive search identified 1899 articles and theses, of which 55 met inclusion criteria. Included studies investigated the word learning abilities of children aged 1 to 11 years and yielded 257 effect sizes. The planned analyses will complete a comprehensive evaluation of the disparities in findings across the literature. A moderator analysis will analyse how group differences in word learning are moderated by experimental features of word learning tasks (provision of cues, number of words taught, number of objects present etc.), sample characteristics (chronological age, receptive vocabulary, non-verbal intelligence etc.) and matching of samples. The results of this research will identify favourable word learning conditions for children with ASD which may inform effective language interventions. Further, the present research will advance our understanding of the mechanisms that underlie language acquisition in children with ASD, and thus highlight areas which require additional research to further understand why some children with ASD experience atypical language acquisition.

Notes

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