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Symposia Abstracts - Wednesday 15th September

Sleep and sleep disordered breathing and its relationships with cognition and behaviour in children with neurodevelopmental disorders/with developmental risk factors

Convenor: **Dr Jayne Trickett**, *Loughborough University*
Discussant: **Dr Dagmara Dimitriou**, *UCL Institute of Education*

This symposium describes studies of sleep and sleep-disordered breathing in children with neurodevelopmental disorders or children born extremely preterm (EP). The first presentation by Trickett and colleagues describes parent reported sleep disturbance and snoring in children born ≤ 26 weeks' gestation at age 11 compared to children born at term. Night waking mediated the relationship between EP birth and behavioural and emotional problems. Presentation 2 by Hamilton and colleagues assessed sleep duration and quality using polysomnography (PSG) and actigraphy and showed that children with ADHD (aged 7-12 years) had shorter sleep duration and poorer sleep quality than children without ADHD. For children with ADHD only PSG-assessed sleep duration was positively correlated with errors on a spatial working memory task and there was a negative relationship between actigraphy-assessed night waking and verbal working memory. Presentation 3 by Joyce and colleagues assessed children with Down syndrome (aged 36-71 months) for obstructive sleep apnoea (OSA) using cardio-respiratory polygraphy, which indicated OSA in 59% of children. The BRIEF-P indicated poorer executive functioning relative to normative data. OSA explained some of the variance in children's working memory, emotional control and shifting.

Together, these presentations describe the extent to which sleep disturbance/OSA confers additional risk for poorer behavioural, emotional and executive function in children with existing risk for poorer behavioural emotional and cognitive outcomes due to their neurodevelopmental disorder or EP birth.

Structured discussion:

Are there specific/common sleep problems across different neurodevelopmental disorder groups?
Sleep as a target of intervention with hypothesised transfer to behavioural, emotional/cognitive outcomes



Disturbed sleep in children born extremely preterm is associated with behavioural and emotional symptoms

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Objectives: To determine whether children born extremely preterm are at increased risk for sleep disturbances and to explore relationships between extremely preterm birth, sleep and Attention Deficit and Hyperactivity Disorder (ADHD) and emotional symptoms.

Methods: Children in the EPICure2 cohort of babies born ≤ 26 weeks of gestation in 2006 in the UK were followed up at age 11. Parents of 165 children born ≤ 26 weeks' gestation (53% male) and 121 children born at term (43% male) completed the Children's Sleep Habits Questionnaire, sleep disordered breathing subscale of the Pediatric Sleep Questionnaire, the emotional problems scale of the Strengths and Difficulties Questionnaire and the ADHD Rating Scale-5.

Results: Extremely preterm children had greater habitual snoring (adjusted odd ratio 6.8; 95% confidence interval 2.3, 20.3), longer sleep onset latency (Cohen's d 0.33), more severe night waking (d 0.44) and more daytime sleepiness (d 0.40) than term-born children; there was no between-group difference in sleep duration. Among children without severe disability, night waking partially mediated the relationship between preterm birth and inattention (additional 5% of variance explained), hyperactivity/impulsivity (13%) and emotional problems (9%). Snoring partially mediated the relationship between preterm birth, hyperactivity/impulsivity and inattention (additional 1-5% of variance).

Conclusions: Children born extremely preterm are at increased risk of disturbed sleep compared to term-born children. As night waking partially mediated the relationship between preterm birth and ADHD symptoms and emotional problems, reducing sleep disturbance may improve sleep and reduce attention and emotional problems in this population.



Investigating sleep and cognitive function in children with ADHD

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Objectives: To investigate differences in sleep and cognitive function between children with ADHD and matched controls.

Methods: Sleep and cognitive measures were collected from 30 children aged 7-12 years, 15 with ADHD (12 males, 3 females, $M = 10.3$ years, $SD = 1.5$) and 15 typically developing matched controls (12 males, 3 females, $M = 10.1$ years, $SD = 1.6$). Sleep was measured using home-polysomnography (PSG), actigraphy and the Children's Sleep Habits Questionnaire (CSHQ). A comprehensive cognitive assessment included the Cambridge Automated Neurological Testing Battery (CANTAB) and the Working Memory Test Battery for Children (WMTB-C).

Results: Sleep differences were observed across all three of the administered measures. Polysomnography showed children with ADHD had shorter sleep duration and duration spent in REM sleep, lower sleep efficiency, and greater sleep onset. Subjective measures demonstrated that children with ADHD had more behavioural sleep problems than controls. Results from the cognitive assessment found poorer working memory, sustained attention and problem solving skills in the ADHD group. For children with ADHD only, total sleep time as measured by PSG positively correlated with errors on a task of spatial working memory ($r = .523$, $p = .045$). Wake after sleep onset, as measured by actigraphy, negatively correlated with performance on the backwards digit recall task ($r = -.609$, $p = .016$).

Conclusions: Children with ADHD have greater sleep disturbance and poorer working executive functioning than matched controls. Sleep and working memory are associated in children with ADHD, when sleep is measured objectively by PSG and actigraphy.



Obstructive sleep apnoea contributes to executive function impairment in young children with Down syndrome

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Objectives: Children with Down syndrome (DS) commonly experience difficulties with executive function (EF). They are also vulnerable to obstructive sleep apnoea (OSA). In typically developing children OSA is associated with EF deficits. We aimed to assess sleep and EF in young children with DS, predicting that OSA would be associated with poorer EF.

Methods: Parents of 80 children with DS (50 male) aged 36 to 71 months ($M = 56.90$, $SD = 10.19$ months) completed the Behavior Rating Inventory of Executive Function - Preschool Version (BRIEF-P). Of these, 69 were successfully studied overnight with domiciliary cardiorespiratory polygraphy to diagnose OSA.

Results: Obstructive apnoea/hypopnoea index was in the normal range (0-1.49/h) for 28 children but indicated OSA ($\geq 1.5/h$) in 41 children. Relative to normative data, children showed significantly poorer EF on all measures of the BRIEF-P. Consistent with previous research, children experienced particular weaknesses in working memory, planning and organising, whilst emotional control was a relative strength. OSA was associated with poorer EF and explained 5% of the variance in scores for working memory, 4% for emotional control, and 6% for shifting.

Conclusions: Findings suggest that known EF difficulties in DS are already evident at this young age. Children with DS already have limited cognitive reserve and can ill afford additional EF deficit associated with OSA. OSA is amenable to treatment and should be actively treated in these children to promote optimal cognitive development.



Benefits and issues in cross-national research on bullying: what and how can we improve?

Convenor: **Dr Leyla De Amicis**, *University of Glasgow*
Discussant: **Dr Sian Jones**, *Queen Margaret University*

Bullying is a widespread phenomenon which dramatically affects children's lives and their social environments. Vast literature on bullying has now been carried out across all the world and cross-country investigation on bullying has become more and more popular. However, when conducting cross-national research, one should be mindful of what factors might affect the results of this research in different countries. This symposium consisting of four presentations and a discussant's contribution will try to answer the question: how can we carry out research on bullying across nations, effectively, maximizing the strengths of this type of investigation?

The first presentation will focus on the EQUIP for Educators program (EfE, DiBiase et al., 2005) aimed at discouraging the use of self-serving cognitive distortions in bullying, successfully implemented in Canada and in the Netherlands, and here presented as successfully carried out in Italy. The second paper will present the results emerged in three European countries when implementing the GATEBULL intervention, a program aimed at increasing bystander intervention in school children. Potential explanations of the difference of results across countries will be discussed. The third contribution will review pre-existing research on bullying across different nations, highlighting similarities and differences of this phenomenon across different cultural contexts.

The discussant will encourage a reflection on cultural, methodological, practical, and ethical issues encountered by cross-national research on bullying, highlighting how the presented contributions fit and expand knowledge in this area of investigation, suggesting future research directions.



The EQUIP for Educators Program to prevent school bullying: A contribution from Italy

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EQUIP for Educators (EfE; DiBiase et al., 2005) is an educational program whose aim is to equip youth in thinking and acting responsibly by correcting their use of self-serving cognitive distortions (CDs). Its efficacy in reducing self-serving CDs has been tested in previous studies conducted in Canada (Di Biase, 2010) and the Netherlands (Van der Velden et al., 2010). In this contribution we present an experimentation of the EfE in the Italian context and its effect on preventing school bullying. The moderating role of individuals' environmental sensitivity was also tested.

A quasi-experimental pre-/post-test with control group design involved 354 Italian students (51.7% males; $M_{age} = 14.86$, $SD = 2.54$) who completed: the How I think Questionnaire (Barriga et al., 2001), the Florence Bullying and Victimization scales (Palladino et al., 2016) and the Highly Sensitive Child scale (Pluess et al., 2018), pre- and post-intervention. Based on the 30/40/30 split approach (Pluess et al., 2018), three 'sensitivity' groups were identified: low vs. medium vs. high.

Structural equation modeling revealed a significant moderated mediation ($b = -.46$, $p < .05$, 90% C.I. [-.86, -.07]) with highly sensitive boys participating in EfE decrease their engagement in bullying through the reduction of CDs, compared with females and those with low- and medium- sensitivity.

These findings support the cross-country efficacy of EfE in decreasing CDs and provide practical implications suggesting that the correction of CDs effectively works to counteract school bullying in adolescence. The individual environmental sensitivity might explain "for whom" EfE could work better.

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Do interventions on defending behaviour work in different countries? Cross-national findings from the GATEBULL project Intervention Phase

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Background: Prejudice based bullying has dramatically increased in recent years across the world. The EU funded GATE BULL project, building on literature on bystander intervention in bullying and theories on intergroup contact and intergroup relations, consists in a serious game, classroom lesson plan and teachers' training to encourage defending behaviour in weight-, ethnicity-, and religion-based bullying situations.

Methods: The GATEBULL intervention consisted in a 4-week school-based programme to encourage bystander intervention in weight-, ethnicity-, and religion-based bullying situations, targeting five hundreds and seventy eight 9–13-year-olds pupils from The Netherlands, Scotland and Greece. In the quasi-experimental designed study, participants were asked pre and post intervention to fill in scales of self-efficacy, intention to intervene, intergroup anxiety and attitudes, moral disengagement, and peer norms.

Findings: In the Netherlands young participants in the 'intervention' group reported more positive peer norms; minority group children reported to be significantly more confident to defend other minority group children; and majority group children declared to be significantly less anxious towards Muslim children. In Scotland, participants reported higher intention to defend overweight children. In Greece, we did not find any significant effect due to this intervention.

Discussion: The intervention had a relevant impact on factors affecting bystander behaviour. However, stronger results emerged in The Netherlands in which mixed-ethnicity rather than mainly majority- ethnic group schools participated in the intervention. Strengths and limitations of conducting cross-national research on the GATEBULL intervention will be considered and future direction of investigation will be suggested.

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Cultural Factors and Bullying

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Bullying has been mostly studied in Western countries; however, research in other parts of the world has been catching up in recent years. The phenomenon of bullying is present worldwide as demonstrated by cross-national surveys. In this paper, we review the cultural aspects of bullying mainly reflected as cross-national differences in the research evidence. We describe the emergence of bullying research with a focus on cross-national differences and similarities. Then we briefly touch on the cross-national differences in prevalence rates as well as on the similarities in characteristics and consequences. We then examine cross-national differences in specific aspects of bullying and present a theoretical framework applying a socio-ecological perspective to identify different factors that may contribute to the cross-national differences in prevalence. Lastly, we acknowledge some methodological challenges that highlight where cross-national research findings for bullying need to be considered with caution.

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A developmental Intergroup Perspective on Immigrant Victimization and Discrimination

Convenors: **Seçil Gönültaş¹, Adam Rutland¹**

¹*University of Exeter*

Recent research documents that minoritized youth (e.g., immigrant, refugees, international adoptees) experience victimization rooted in discrimination (Brown et al, 2017; Gönültaş & Mulvey, 2019). Considering the negative consequences of victimization, it is important to explore the bystander reactions of witnesses who can prevent victimization and victims' perceptions of discrimination and related negative psychological outcomes.

Our symposium presents four recent international studies investigating the role of intergroup factors (e.g., group membership, intergroup context, and family-related factors in bystanders' responses), as well as victims' psychosocial adjustment to discrimination. The first study examined how British children and adolescents react as bystanders to the intergroup exclusion of immigrant peers from different status groups. Developmental differences were found in reactions with adolescents' showing more awareness than children of the intergroup context. The second study examined the role of parental norms towards refugees as a micro-level factor, demonstrating that parents' negative attitudes shape Turkish youth's bystander responses to victimization of Syrian refugees through discrimination. The third study investigated British children's and adolescents' bystanders' reasoning towards intergroup or intragroup exclusion. It showed developmental and contextual differences in the attribution to fairness and focus on peer group dynamics. The last paper extended the symposium to the victims' perspective and to the negative psychosocial effects of victimization of international adoptees in Italy, by demonstrating the moderation effect of intergroup factors (e.g., adoptive identity and minority categorization).

Together, these studies identify developmental and intergroup processes that facilitate prosocial bystander responses to victimization of immigrants and positive psychological outcomes for victimized immigrants.



Developmental trends in prosocial bystander reactions to peer exclusion depend on the group membership of the victim

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One way to reduce intergroup discrimination is to encourage bystander reactions which challenge prejudice-based social exclusion (Palmer & Abbot, 2018). Developmental research suggests from middle childhood into adolescence, individuals increasingly consider group membership and discrimination when evaluating intergroup exclusion (Killen et al., 2013). The present study examined whether this developmental trend was apparent in how children react as bystander to the intergroup exclusion of stigmatized and non-stigmatized immigrants.

British children (8-11 years) and adolescents (12-15 years) were presented with one of three scenarios where a newcomer wants to join a group of British peers (n = 332) and the group always excludes the newcomer. In two experimental conditions the newcomer was either British or a member of an immigrant group perceived be 'similar' to British (i.e., Australian). In the final experimental condition, the newcomer was a member of an immigrant group perceived to be 'different' to British (i.e., Turkish) and one that commonly experiences stigmatization in Europe (British Youth Council, 2016). Participants indicated their bystander reactions. Children were more likely to challenge the exclusion of a British or 'similar' (Australian) newcomer than a 'different' Turkish newcomer. In contrast, adolescents were equally likely to challenge exclusion regardless of the newcomer's immigrant group. Adolescents were also more likely to challenge the social exclusion of a 'different' Turkish newcomer than children were. Findings suggest that children's reactions are driven by a preference for supporting 'similar' peers, whereas adolescents' reactions are driven by an awareness of the intergroup context and the potential for discrimination.



Do Perceived Parental Norms Shape Adolescents' Bystander Responses towards Syrian Refugees through Discrimination and Prejudice?

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Parents' attitudes and norms towards immigrants and refugees are related to their children's outgroup relations in these contexts (Miklikowska, 2016). Parents are also influential actors in shaping children's bystander responses to bullying (Banks et al., 2020). Bringing together these two research areas, we examined to what extent adolescents' bystander responses to bias-based bullying of refugee peers are shaped by perceived parental norms about refugees through discrimination and prejudice.

Participants included 587 Turkish middle (Mage = 12.19) and high (Mage = 14.81) school students who were presented with a hypothetical story in which a Syrian refugee peer is bullied due to refugee status. Participants evaluated how likely they would be to respond by either explicitly challenging the bully or explicitly supporting the bully. Participants' perceived parental norms towards refugees were assessed as a possible predictors of their children's bystander responses. Further, participants' prejudice and discrimination towards Syrian refugees were examined as intergroup related mediators and their school (middle or high) categorization was used as possible moderator.

Results showed that positive perceived parental norms were related to higher bystanders' challenging responses through lower discrimination. Further, the more positive perceived parental norms adolescents reported, the less these norms contributed to prejudice and discrimination, which in turn would together lead to less explicit support for the bully. Lastly, the indirect effects (parental norms → prejudice → challenging; parental norms → prejudice → supporting; parental norms → discrimination → challenging, parental norms → discrimination → supporting) were stronger for older participants.

Findings provide important implications about how parental norms can shape intergroup attitudes towards Syrian refugees during adolescence.



Children's and Adolescents' Evaluations of Social Exclusion and Social Moral Reasoning in Different Group Contexts

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¹University of Exeter

Young people experience different forms of social exclusion resulting in negative outcomes. Intragroup exclusion is someone being left out of a group by another member of that group. Intergroup exclusion is when someone from one group excludes someone from an outgroup. Research showed that young people evaluate social exclusion more acceptable with age and children typically make straightforward moral judgements to condemn exclusion, whereas adolescents make more nuanced judgements involving moral and social-conventional reasoning. This study examined children's and adolescents' evaluations and reasoning about social exclusion in different contexts. 340 British children (Mage=8.96) and adolescents (Mage=13.23) were presented with a scenario in which either a British or an immigrant peer being excluded from an activity by either British or immigrant peer group. Participants completed items that assessed their individual judgement of and individual support of group's exclusion act and justified their answers in open-ended 'why' questions.

Results revealed that although participants in both age groups judged the act negatively, there were developmental and contextual differences in their reasoning to justify their judgements. Children were more likely to justify their judgements with reference to welfare regardless of the group context while adolescents made significantly greater reference to equality/fairness, and group dynamics especially when it was an intergroup context. Adolescents were also more likely to justify their evaluations with reference to welfare when it was an intragroup context compared to an intergroup context. The findings and their implications for the development of educational strategies to reduce group-based exclusion will be discussed.



Internationally Adopted Adolescents Facing with Bullying Victimization: Psychosocial Adjustment and Moderating Factors

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Bullying constitutes a serious risk factor for the psychosocial adjustment in both the general population and minority groups. Among minorities, international adoptees are likely to show a specific vulnerability to the experience of being bullied, moderated by specific risk and protective factors. International adoptees must confront multiple specific challenges related to their adoptive status and ethnic difference, which gives visibility to the history of adoption, with subsequent negative influence on peer relationships. These factors might expose them to high risk of peer bullying as well as increase their vulnerability to the experience of being bullied. These possible associations are still inadequately investigated.

This study aimed to investigate the association between the adoptees' experience of bullying victimization and their psychosocial adjustment, and to explore the moderating role of adoptive identity and reflected ethnic minority categorization (the perception to be perceived by others as ethnic minority members). A self-report questionnaire was completed by 140 adolescents (13-17 years), who were internationally adopted by Italian families. In moderation analyses being victimized was associated with higher levels of emotional and behavioral problems, but that the strength of this relation varied by the levels of adoptive identity (interaction: $b=2.64^{**}$) and reflected minority categorization (interaction: $b=-1.77^*$). Victimization had a more detrimental and negative impact on psychological adjustment for adoptees who were highly identified with the adoptive group, and reported to be less perceived by others as members of the minority group.

Results will be discussed with the attention to the implications for theory, practice, and future research.



The development of speciesism: Early findings from the field

Convenor: **Dr Luke McGuire**, *University of Exeter*

Discussant: **Prof Melanie Killen**, *University of Maryland*

When Lawrence Kohlberg's four-year-old son "joined the... vegetarian movement and refused to eat meat because... it is bad to kill animals" Kohlberg persuaded his son that killing animals for food was justified compared to the unjustifiable killing of a human (Adams, 2015). This anecdote captures the dilemma children face when their desire to behave in line with moral principles (i.e. not to harm other living beings) conflicts with social conventions (i.e. most people eat meat). Adults use a variety of psychological mechanisms to overcome this conflict, including granting moral concern based on species membership, also known as speciesism (Caviola et al., 2019). So far, very little is known about the emergence of speciesism and its correlates.

This symposium brings together three papers representing some of the first empirical examinations of children's speciesism. In the first paper, the authors demonstrate that children (9 – 11-years-old), as compared to adults, score lower on a standardised speciesism measure, and reason about eating meat and animal products differently from adults. A second paper reveals developmental differences in the key appraisals that children (6 – 10-years-old) and adults use to determine whether an animal is worthy of moral concern. Finally, a third paper demonstrates that in moral dilemmas, children (5 – 9-years-old) are less likely to prioritise human lives over animal lives. Together these three papers cohere to demonstrate that speciesism, rather than being an innate tendency, has not yet fully emerged by late childhood.



Loving some animals, eating others: Developmental differences in speciesism

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Objectives: Humans care for the wellbeing of some animals (e.g. dogs), yet tacitly endorse the maltreatment of others (e.g. pigs). What treatment is deemed morally appropriate for an animal depends on whether the animal is characterised as "pet" or "food". How such categorisation of animals emerges, and how and when a moral hierarchy of beings depending on their species-membership (speciesism) develops is poorly understood.

Methods: In a pre-registered study we compared samples of children (9-11-years-old), young adults (18-21-years-old), and adults (29-59-years-old; total N=479) on speciesism, animal treatment and animal categorisation measures. We also took measures of social-moral reasoning (i.e. “why is it morally okay or not okay to eat animals?”)

Results: Compared to young adults and adults, children a) show less speciesism, b) are less likely to categorise farm animals as food than pets, c) think farm animals ought to be treated better, and d) deem eating meat and animal products less morally acceptable. Children, as compared to young adults and adults, make greater use of moral domain reasoning as compared to social-conventional reasoning when thinking about eating.

Conclusions: Our findings imply that our moral view of animal worth is not innate but instead develops over the lifespan in our specific societal context. Children, compared to adults, reason about how we ought to treat animals with reference to concern for animal welfare, which gives way in adulthood to concerns for societal conventions and hierarchies of moral concern.



How children and adults value different animal lives

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¹*Lancaster University*

Objectives: The study aimed to model which attributions impact on how children and adults value animal lives from school age to adulthood.

Methods: Two-hundred and forty-one children between 6 and 10, and 152 adults, living in the UK, were asked to appraise a range of animals (19 targets) on seven perceptual dimensions and rank the animals within a life-saving, medicine allocation task.

Results: The most developmentally stable dimensions predictive of moral concern were the animal’s perceived similarity to humans, aesthetic qualities, and intelligence. As age increased, more weight was placed on human similarity and less on aesthetics. Only younger children valued the benevolence of the animal. Edibility emerged as a relevant factor only in older children and adults, whereas younger children struggled to identify which animals are eaten. Both younger and older children associated animal sentience with body size, rather than intelligence, and did not factor sentience into their value judgments, like adults did. Children construed similarity with humans less mentalistically than adults.

Conclusion: The results show that children and adults value animal lives differently. There is a developmental shift away from a primarily biophilic/biophobic lens to a more speciesist orientation, valuing animals similar to humans in their intelligence and those that provide humans utility as food. Future studies should expand both the set of appraisals explored and the range of animal targets.



Children prioritize humans over animals less than adults do

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¹*Yale University*, ²*Harvard University*, ³*University of Oxford*

Objectives: Adults value the lives of humans much more than animals. This is sometimes referred to as speciesism (granting moral status on species grounds). In this study we examined how children vs. adults value the lives of humans and animals. We predicted that children would value humans over animals less than adults do.

Methods: We conducted two preregistered experiments (N = 622) with US-based adults and children aged 5-9 years. We asked participants to respond to dilemmas where they chose to save varying numbers of humans or animals (dogs, pigs). In Experiment 1, we asked children who they would choose to save. In Experiment 2, we introduced children to a character who “always does the right thing” and asked who the character would save. This enabled us to see if children’s preferences aligned with what they thought was morally right.

Results: Across both experiments children were much less speciesist than adults. To put it in numbers, while children valued the life of a human about 1.5 times as much as the lives of dogs and about 6 times as much as the lives of pigs, adults valued the life of a human at least 100 times as much as the lives of dogs and pigs.

Conclusions: These data indicate that our speciesist tendencies are not a natural default and, instead, emerge over the course of development. Tentatively, this could indicate that speciesism is socially learned. This has implications for our understanding of moral development broadly, our intuitions about animals, and human-animal relationships.

The Effects of Social Distancing Policies on Infants' Early Cognitive Development

Convenor: **Dr Nayeli Gonzalez-Gomez**, *Oxford Brookes University*

Discussant: **Sally Hogg**, *Parent Infant Foundation*

The environments that children grow up in heavily influence key elements of cognitive development such as language and executive functions, which in turn associate with later educational and occupational attainment as well as health and wellbeing. The COVID-19 pandemic is a unique, once-in-a-lifetime situation that has dramatically changed the daily lives of millions of families. Using longitudinal data from a diverse, UK-wide cohort of 8- to 36-month-old children enrolled in an online study at the onset of the UK national lockdown in March 2020, this symposium will analyse the effects that social distancing measures had on infants' cognitive development.

Paper 1 will look at the effects of the lockdowns on infants' executive functions. Paper 2 will explore the effects on language development. Paper 3 will analyse the effects of restricted access to early childhood education and care (ECEC) on infants' language and executive functions. Acting as practitioner discussant Sally Hogg from the Parent Infant Foundation will reflect on the research findings and their implications for professional practice.

Exploring how socio-economic status, parental attitudes, and parent-child activities affect early Executive Functions, in the context of the Covid-19 pandemic

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Executive Functions are the skills that enable us to resist acting on impulse, adjust our actions during a changing situation, and work towards goals. In this online study of 575 UK-based 8- to 36-month-olds (218 followed longitudinally), we consider how multiple facets of the home environment before and during the 2020 COVID-19 pandemic relate to children's emerging executive functions, captured using the Early Executive Functions Questionnaire (Hendry and Holmboe, 2020).

Parent-reported Cognitive Executive Function scores (encompassing inhibitory control, working memory and cognitive flexibility) are positively associated with: Socio-Economic Status (SES) ($\beta=.195, p<.01$); parental attitudes to learning and emotional engagement ($\beta=.168, p<.05$); parent-child engagement in enriching activities ($\beta=.281, p<.001$), and negatively associated with infant screen use ($\beta=-.179, p<.01$). Parent-reported Regulation scores are positively associated with: SES ($\beta=.231, p<.01$); parental attitudes to learning and emotional engagement ($\beta=.161, p<.05$); and negatively associated with infant screen use ($\beta=-.208, p<.001$)

During the first, most-restrictive UK lockdown of 2020 – but not prior to the pandemic, or during the winter lockdown – parents with lower SES were less likely to engage in enriching activities with their child, particularly activities requiring outdoor space, and access to books. Infant screen use fully mediates the effect of SES on Cognitive Executive Function scores, and partially mediates the effect of SES on Regulation.

Taken together, these results will be useful in identifying and redressing disparities in early child development which have emerged during the COVID-19 pandemic and understanding the role of parenting in early cognitive development more generally.

How caregiver-child interactions affect the development of early language during the COVID-19 pandemic

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Sensitive-responsive parenting supports language development by providing children with opportunities for joint attentional interaction and a secure base for exploration (Madigan et al., 2019). Indeed, children whose primary caregiver responds promptly, contingently, and appropriately to their vocalisations and other behaviours make greater gains in lexical and syntactic skills in the first two years of life (Tamis-LeMonda et al., 2001). Although the supportive role of sensitive-responsive parenting is well documented in pre-pandemic times, it is not yet known how this association plays out during the COVID-19 lockdowns, when severe disruption to adult, child, and social support routines, and risks to caregiver mental health may threaten this link.

Using the Global Ratings Scales of Mother-Infant Interaction (Murray, Fiori-Cowley, Hooper, & Cooper, 1996), a video-based assessment of sensitivity and interaction quality adapted for our sample (N = 155, M_{age} = 594 days, SD = 211 days) and the Oxford-CDI parent-reported measure of expressive and receptive vocabulary (Hamilton, Plunkett, & Schafer, 2000), we found that caregiver sensitivity predicted expressive vocabulary growth between Spring and Winter 2020 ($\beta = -.118$, $p < .01$). This relationship was not mediated by caregiver depression ($\beta = .000$, $p = .97$), anxiety ($\beta = -.011$, $p = .34$), or stress, ($\beta = .001$, $p = .87$), as measured by the DASS-21. These preliminary analyses suggest that the COVID-19 lockdown did not disrupt the positive relationship between sensitive-responsive parenting and early language growth. Ongoing analyses will investigate the role of social support during lockdown on parenting and how interaction quality may relate to the activities that caregivers engaged in with their children during the pandemic.



Investigating how access to Early Childhood Education and Care (ECEC) affect the development of early language and executive functions during the COVID-19 pandemic.

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High-quality, centre-based education and care during the early years benefits cognitive development, especially in children from disadvantaged backgrounds. 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 investigate how this period affected the developmental advantages typically offered by ECEC. Using parent-report data from 189 families living in the UK, we explore 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 ($\beta = .245$, $p < .01$), 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. Likewise, children who attended more ECEC during the pandemic showed greater growth in their cognitive executive functions ($\beta = .255$, $p < .01$). We found that all children benefited from ECEC in terms of their thinking skills, regardless of socioeconomic background. Our findings highlight the importance of high-quality ECEC for the development of key skills and for levelling socioeconomic inequalities.



Analysing how sleep changes affect the development of early executive functions during the COVID-19 pandemic

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The amount of night or day sleep has been previously associated with growth in executive functions (Bernier et al., 2013) and vocabulary, respectively (Horvath & Plunkett, 2016). In a longitudinal population cohort of 575 preschoolers (218 followed longitudinally) we observed that, during the 2020 pandemic, many children's routines were disturbed, with some parents reporting increases and others decreases in sleep duration. This larger variability in sleep patterns offers an opportunity to investigate the (specific) links between night/day sleep, executive functions and vocabulary, in the same cohort.

Using the Early Executive Functions Questionnaire (Hendry & Holmboe, 2020), we find that longer parent-report night sleep, but not nap duration, associates with concurrent Cognitive Executive Functions ($\beta = 0.09$, $p < .05$) while better Regulatory Functions associate only with shorter sleep onset latencies ($\beta = -1.96$, $p < .05$), when age and SES are considered. However, sleep at the first time point did not associate with changes to 5 months later in either Cognitive or Regulatory Functions, when age, SES and time passed between observations were accounted for. Similar analyses will be reported for productive and expressive vocabulary, measured with the Oxford CDI (Hamilton, Plunkett, & Schafer, 2000), at the same time points. These findings will shed light on whether sleep has an immediate effect on daytime functioning (as seems to be the case for executive functions) or a cumulative effect on the development of cognitive skills (as previously shown for vocabulary).



Designing and Evaluating Educational Maths Apps for Young Children: Current Evidence and Future Directions

Convenor: **Dr Jo Van Herwegen**, *UCL Institute of Education*

Discussant: **Dr Christothea Herodotou**, *Open University*

Educational maths applications (apps) are an emerging trend in children's learning environments aiming to raise achievement. 94% of children in the UK own or have access to touchscreen tablet devices with parents of preschool aged children most likely to download educational apps and 41% of teachers use maths apps in early primary school. Policy makers are also increasingly advocating for and investing in the use of educational apps to support early learning in school and at home.

However, alongside this growth, interest, and use of educational maths apps, there is also concern regarding young children's screen time and the impact it has on early learning and development. It is also currently unclear what the active ingredients of successful maths apps are and how they link to current theories of mathematical development and learning science. This makes determining whether or what kind of maths apps provide a high-quality learning experience a significant challenge.

This symposium presents current research on the design and evaluation of educational maths apps for young children. Paper 1 reports a systematic review synthesising the current evidence evaluating maths apps, followed by Paper 2, which presents a content analysis of the design features of these identified apps. Paper 3 presents a further application of this content analysis in the context of an on-going collaboration with a maths app industry partner, as well as examination of large-scale user data. Finally, Paper 4 discusses the co-design of a new parent-based maths app that encourages off-screen parental engagement with early maths.



Can Maths Apps Add Value to Learning? A Systematic Review

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¹*UCL Institute of Education*, ²*Open University*

Since touchscreen tablet devices were introduced in 2010, research evaluating the use of educational maths apps has grown significantly. To gain a critical overview of the research field to date, Paper 1 presents a systematic review synthesising studies examining the impact of educational maths apps used at home or at school for supporting young children's mathematical learning and development.

A systematic search of 11 databases including, PsycINFO, PubMed and ERIC, as well as unpublished and grey literature, identified 5,812 records. Studies were eligible for inclusion if the sample population were in the first three years of compulsory school, relevant to the in-country context, and with a minimum age of 4 years. Included studies needed to have evaluated a named downloadable/accessible maths app(s). An educational app was defined as interactive software primarily used on a hand-held touch-screen tablet or smartphone devices. To reflect the staged development of maths app evaluations, the review did not place any restrictions on the study design; qualitative, mixed methods, RCTs and quasi-experimental studies were all eligible for inclusion. Included studies also needed to have measured mathematical attainment and/or affective (e.g., maths enjoyment) outcomes.

In total, 47 studies met the inclusion criteria. Initial findings from the narrative synthesis demonstrated an emerging but fragmented evidence base. For example, in terms of mathematical attainment outcomes, studies mostly demonstrated positive impacts of the evaluated maths apps. But large variation in the quality of evidence, including reporting standards was observed. Implications for future research and policy and practice decisions are discussed.



How do Educational Maths Apps Support Learning? A Content Analysis

Dr Laura Outhwaite¹, Dr Erin Early¹, Dr Christothea Herodotou², Dr Jo Van Herwegen¹

¹*UCL Institute of Education*, ²*Open University*

Recent studies demonstrate the benefits of different maths apps for young children. However, there are mixed results and often findings are limited to the specific maths app evaluated. To examine the mechanisms underpinning how maths apps might work, the underpinning pedagogy, including app content and design features, needs to be examined. In response, Paper 2 presents a content analysis of the educational maths apps identified in the systematic review reported in Paper 1.

In the current study, a coding framework has been developed based on current theories of mathematical learning and development. The first part of the coding scheme examines 10 mathematical skills covered in the identified apps: number representation, counting, number relations, addition, subtraction, advanced mathematical operations, shape, patterning, comparison, and mathematical vocabulary. The presence of these maths skills are dichotomously coded (1 = yes; 0 = no).

The second part of the coding scheme covers eight components of app design: verbal instructions, virtual manipulatives, visual demonstrations, practice opportunities, feedback on performance, extrinsic rewards, scaffolding at the level of the individual task and at the whole game level. The quality and quantity of each component is assessed using a 5-point Likert scale. This coding process then generates an overall 'learning features score' for each app, with higher scores indicating better quality maths apps according to current learning theories. A narrative synthesis explored whether these 'learning features' scores are associated with intervention outcomes reported in Paper 1. As this is ongoing work, initial findings and implications are discussed.



Creating Evidence Based Educational Maths Apps: The Importance of Theory and Individual Differences

Zahra Siddiqui¹, Dr Laura Outhwaite¹ & Dr Jo Van Herwegen¹

¹*UCL Institute of Education*

To further support the development of high-quality and evidence-based maths interventions for young children, close collaboration is required between academic researchers and educational maths app industry partners. Paper 3 will discuss one such collaborative project between UCL Institute of Education and Funexpected Maths, which aims to identify specific learning pathways within mathematical development that can be translated into educational maths apps for young children.

Building on Paper 2, the current study applies the same content analysis framework to the Funexpected maths app to examine the domain-specific mathematical content covered and learning science principles incorporated. Due to the design and focus of the Funexpected apps, this framework was also expanded to include domain-general factors associated with mathematical development. This analysis enabled the identification of gaps in the delivery of mathematical learning within the Funexpected maths apps and contributed to dialogues with the industry partner to inform further app design and development.

Concurrently, large-scale user data collected by the Funexpected maths app was examined to identify which games and which maths content areas within the app were being played by children across different age ranges, how much time children spent on each game, and the classification of errors made by children during play. This initial evidence, combined with the narrative synthesis reported in Paper 1 has helped inform the co-design of a mixed-methods intervention study evaluating the efficacy of the Funexpected maths app with young children. Overall lessons learnt through such collaborations with industry partners are critically discussed.



The Development of the ‘Maths@Home’ App for Parents of Children Aged 2-6 Years

Erica Ranzato^{1*}, Dr Laura Outhwaite¹ **Dr Jo Van Herwegen¹**

¹*UCL Institute of Education*

Informal learning experiences, particularly in the early years are vital for children’s mathematical development. But evidence suggests parents only engage in maths activities at home once a week, compared to every day for reading. As such, high-quality interventions are needed to support parental engagement with early maths at home. The prevalence and accessibility of mobile technologies, make parent-based apps a potential innovative solution. Paper 4 reports the current development of the ‘Maths@Home’ app, which has been co-created with parents.

The ‘Maths@Home’ app includes age-appropriate maths activities based on recent research in mathematical development. The learning activities are designed to support a broad range of mathematical abilities in children aged 2-6 years or those with mathematical learning difficulties who are working at this ability level. The games are designed to encourage off-screen engagement between parent(s) and their child, using resources easily accessible in the home. The app also includes links to the underpinning research in the format of accessible blogs explaining key areas of mathematical development in easy-to-understand language to further empower parents.

During the first iteration of development, we conducted focus groups with parents of young children. The first focus group aimed to understand their needs and priorities within the proposed design. These findings were then used to inform the design process in collaboration with the app developers when creating the minimum viable product. The second focus group involved the collection of end-user feedback on the minimum viable product and steer future design iterations. Initial findings and reflections are discussed.



Oral Presentation Abstracts - Wednesday 15th September

Personal characteristics and motivations to foster: Exploring the recruitment and retention crisis

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Objectives - This research investigated the role of fostering motivation, trait hope and empathy on the likelihood of fostering cessation. The aim of this study was to establish whether self and society-oriented motivation to foster significantly related to intent to discontinue. It was hypothesised that individuals with child-centred motivation would report higher levels of trait hope and empathy and be less likely to consider cessation.

Methods - Survey data was collected from 105 existing foster carers, recruited via social media and online fostering forums. Factor analysis of the Motivations for Foster Parenting Inventory revealed four motivation styles: family growth, family extension, personal reward and society-oriented motivation.

Results - Correlational and mediational analyses were conducted to investigate the strengths of relationships between fostering motivation, hope (pathways and agency thinking), empathy (cognitive and affective), and fostering cessation. Preliminary correlational analyses did not reveal any significant associations between fostering motivation and cessation, and neither hope or empathy mediated the relationships. Exploratory analyses revealed a negative, indirect-only mediation of pathways hope on the relationship between society-oriented motivation and likelihood of fostering cessation in the near future. Foster carers motivated by personal reward were significantly more likely to report intentions to discontinue fostering in the next 5-10 years, when controlling for hope (pathways thinking).

Conclusions – The present study proposes a protective aspect of trait hope, that may support local authorities with the future retention of foster carers.



Predictors of treatment choice in children with Autism Spectrum Disorder: demographic and autism-specific characteristics

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Autism is a heterogenous disorder and symptoms present in different ways. There is a variety of available treatments, however little is known about why specific treatments are chosen. We aimed to explore treatment prevalence and to examine which demographic and/or autism-specific characteristics predict treatment use. This study used data from the Netherlands Autism Register, an open longitudinal register.

Data was gathered through yearly online questionnaires completed by (parents of) children with autism (N=1464) between 2013 and 2019. Findings suggested that most children had received some type of intervention at some point(s), and about half had received medication. Analysis of the demographic factors revealed that children who attend special education or have a co-occurring diagnosis receive more treatment. Moreover, age, IQ, sex and maternal education level were related to treatment choice.

From the autism-specific characteristics only sensory issues were predictive of treatment use; more severe issues decreased the chance of medication use. Results from this study show potential shortcomings of autism treatment such as the lack of transdiagnostic treatment options and treatment choice being guided by demographic characteristics rather than autism-specific characteristics.



Diagnosis, Coping and Misconceptions: Mothers' and Autistic Women's Perspectives of the Female Autistic Phenotype

Carrie Ballantyne¹, Ms Janie Lauglan¹, Dr Karri Gillespie-Smith², Dr Doug McConachie²

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Objective: The understanding of autism spectrum condition (ASC) is based on a male-centered phenotype with the male to female ratio at 3 to 1 (Loomes et al., 2017). Females are also believed to mask their social difficulties and behavioural problems, which can take place during clinical assessments (Ratto, et al., 2018). They are more at risk of being undiagnosed, as their difficulties are either mislabelled, or missed entirely (Lai & Baron-Cohen, 2015), even when experiencing the same level of difficulties (Rynkiewicz et al., 2016). Consequently many females are undiagnosed, so miss out on interventions and support (McBride, 2020). The current study aimed to investigate the experiences of girls and women who have undergone an ASC diagnosis.

Methods: A qualitative methodology was used. A sample of 6 mothers of autistic female adolescents and 6 autistic women participated in individual semi – structured interviews.

Results: Using a thematic analysis, three different themes emerged from the mothers and women: Diagnosis, Female ASC Phenotype, and Misconceptions.

Conclusions: This study shows the importance of understanding the lived experience of the individual and the unique challenges of being an autistic female or parenting/supporting an autistic female adolescent and it encapsulates the coping strategies used. It highlights the lack of knowledge on how females present differently from males and the struggle for diagnosis. More training programs for doctors, teachers, and health visitors, so they can gain adequate awareness while providing the opportunity for early interventions are suggested.



Compensatory motor behaviour in children with limb differences

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Objectives: How flexible are body representations and motor skills during development? To answer this question we study compensatory motor strategies in children with congenital upper limb differences.

Methods: Participants were 17 children (2 years 11 months – 10 years) with one functional hand, whereby 'function' is defined as the ability to perform a pincer grip. Children were filmed completing 14 semi-ecological tasks including undoing buttons, opening a Velcro bookbag, and pulling apart Lego bricks. Compensatory motor strategies were coded offline.

Results: We observed children use a variety of effectors including the mouth, legs, and torso, to substitute for their missing hand. Use of the residual limb was consistently higher than use of other effectors (78% of task time compared to 18%, 2%, 37%, and 8%, $p < .001$ for each comparison). Whilst the balance of effectors used was highly variable between participants, from around 5-6 years we observed a marginally significant reduction in foot use as a proportion of task time (13% compared to 1.3%, $p = .054$).

Discussion: Children with limb differences not only rely on their residual limb, but flexibly adapt their behaviour using alternative effectors. Our data suggest that social factors may play a role in developmental changes in effector use: at 5-6 years when foot use declines, children's seated school environment may physically inhibit foot use and raise awareness that foot use is not common among peers. More work is needed on how effector use changes with age, and how it may be supported by the developing brain.



Young adolescents' inference making: The effect of reader characteristics on inference from narrative and expository texts

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Objectives: Inference is considered essential for successful reading comprehension. Inferential skills are particularly important in sixth grade and beyond as students are required to read and understand increasingly complex text. We examine how different reader characteristics at this age relate to inference generation from narrative and expository text.

Methods: Seventy-one monolingual English-speaking children and 81 bilingual children who entered pre-kindergarten as Spanish speakers participated when they were in grade 6. Participants read narrative and expository texts, sentence by sentence. Each text required an inference in order to integrate two sentences, and memory load was manipulated by placing the critical sentences adjacent or apart. At the end of each text, participants answered a yes/no question that assessed the inference. Question answering accuracy, question response time, and sentence reading times were recorded. Vocabulary, background knowledge, knowledge of reading strategies, and word reading ability were assessed.

Results: Linear mixed effects models for question answering accuracy, question response time, and sentence reading time estimated the influence of reader characteristics (conceptual knowledge - a composite of vocabulary and background knowledge; reading strategy knowledge; word reading) and text characteristics (narrative/expository; memory load) on performance. Inferential questions were more likely to be answered correctly for narrative texts. Conceptual knowledge was a key predictor of accuracy and reading times. The nature of this critical role for conceptual knowledge in both the process and product of inference generation will be discussed.

Conclusions: Conceptual knowledge is a critical determinant of sixth graders' inference generation for both narrative and expository texts.

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Body representation in children: the effects of movement and form on the embodiment of virtual hands

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Objectives: Representations of the body are driven by the integration of multisensory signals (vision, touch, proprioception) and top-down information about the body. Together these facilitate feelings of ownership and control (agency) over one's body. Yet relatively little is known about how these factors constrain own-body representation in children. We examined the effects of movement, touch, and form (appearance) on children's embodiment of a virtual hand, indicated by ratings of ownership, agency, and location.

Methods: In two experiments a total of 197 children aged 4-14 years played a bubble-popping game in virtual reality using a hand that moved synchronously or asynchronously with their own movements. In Experiment 1 only, participants either received congruent haptic feedback, delayed feedback, or no feedback upon hitting each bubble. In Experiment 2 only, participants used either a virtual hand or non-human virtual block in the same task.

Results: Movement synchrony influenced feelings of embodiment at all ages in both experiments. In Experiment 1, haptic feedback did not influence embodiment ratings. In Experiment 2, participants embodied both virtual forms to some degree, provided visuomotor signals were synchronous. However, only the virtual hand during synchronous movement was described as feeling like the participant's own body rather than like a tool (e.g., controller).

Conclusions: Together, these findings highlight the overall dominance of visuomotor synchrony for children's own-body representation. Children embody a non-human virtual form to some degree, yet this is also constrained by prior expectations about body form. Therefore, both top-down and bottom-up processes drive body representations in childhood.

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Scaffolding Features Benefit Children’s Reading Comprehension of Digital Texts

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Objectives: The present work examined the effectiveness of scaffolding features in promoting children’s understanding of short digital texts. The scaffolding features were hypertext glosses that provided auditory and visual support for the pronunciation and meaning of target words presented in short vignettes. We hypothesized that use of the hypertext glosses would benefit children’s comprehension of the texts.

Methods: A representative sample (~50000) of US school children in grades K, 1, 2, and 3 performed the gamified reading comprehension task on a tablet or PC, as part of supplementary reading support. Students acted as newspaper editors and judged whether the vignette matched the written description. Throughout the game, children could select hypertext glosses in the text to get auditory and visual support for the pronunciation and meaning of the target words. A logistic GLMM to predict comprehension accuracy as a function of scaffold usage was conducted, controlling for child grade level, early literacy skills, and the random effect of each item.

Results: The use of scaffolds increased students’ likelihood of getting the associated item correct.

Conclusion: Hypertext glosses benefit children’s understanding of short digital texts.



Coherence monitoring and Inference generation in children with Childhood Epilepsy with Centro-Temporal Spikes (CECTS)/Rolandic epilepsy (RE)

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Objectives: Although CECTS is considered a ‘benign’ form of epilepsy, word reading and reading comprehension difficulties have been reported. We examined two core skills for reading comprehension; coherence monitoring and inference generation, in children with CECTS and compared performance with typically developing controls. We used listening comprehension tasks to control for variation in word reading ability.

Method: Children with CECTS (n=22; 9 females; mean age 9y 5m) and typically developing controls (n=37; 14 females; mean age 9y 11m) completed two tasks: to assess coherence monitoring they heard 24 narrative texts, 16 containing two inconsistent sentences, and responded to a yes/no question assessing identification of the inconsistency after each one; to assess inference making they heard 16 texts designed to elicit a target inference by integrating information in two sentences and responded to a yes/no question assessing generation of the inference. In both tasks there was a near condition, in which critical sentences were adjacent, and a far condition in which they were separated by filler sentences. Accuracy to the question and the processing time for critical sentences in the text were measured.

Results: Mixed effects analyses for each task revealed that although children with CECTS were not significantly less accurate on the inconsistency detection and inference questions, for correct responses they took significantly longer to process critical sentences.

Conclusions: Whilst achieving comparable levels of accuracy in two tasks tapping core reading comprehension skills, children with CECTS take longer to process texts requiring detection of inconsistencies or generation of inferences.



Risky Decisions: Exploring eye gaze patterns during social and non-social risk judgements in autistic children.

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Objectives: Autistic children are reported to be at higher risk of victimization and bullying. Little research has examined the links between attention and social risk decision-making in autism. The current study aims to address this knowledge gap by using eye-tracking methodology to record eye gaze patterns during social and non-social risk judgements.

Methods: Eye-tracking methodology was used to record gaze during social and non-social risk judgement conditions. 15 autistic children (mean age = 8.22 years) were individually matched to typically developing (TD) children based on chronological age (CA) and verbal ability (VA).

Results: Social risk judgment condition – the autistic children showed lower accuracy compared to the CA and VA groups and they also looked less at the face and body areas when making these risk judgments.

Non-Social risk judgment condition – there were no significant differences in judgment accuracy and eye gaze patterns between the autistic children and their typical matches during the non-social risk condition.

Correlation results – There was a significant relationship between social communication levels and time spent looking at the face and bodies within the social risk judgement scenes.

Conclusions: Autistic children look and perform typically during non-social risk judgement conditions however they show different gaze patterns and lower performance during social risk judgements compared to the typical groups. This may suggest that risk decision-making is related to their ability to attend and process social cues within a social environment. In addition, gaze patterns and judgements were related to overall socio-communicative ability.



Relationships between atypical autonomic arousal and cognitive function in children with ADHD and/or autism diagnoses

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Objectives: To compare heart rate variability (HRV) and cognitive function in ADHD, autism, comorbid ADHD and autism (ADHD+autism) and neurotypical (NT) children. To measure relationships between HRV and cognitive performance.

Methods: Children aged 7 to 15 years with diagnosis of ADHD (n=19), autism (n=14), ADHD+autism (n=24) and NT children (n=21) completed a visual cued inhibitory control task while heart rate was recorded. The task required a left/right button-press response to a target stimulus (left/right arrow). A pre-target cue signalled whether response should be congruent or incongruent with target direction. Response times and accuracy were recorded. Increases and decreases in the inter-beat interval (IBI) were measured to stimulus and response onsets. ADHD and autism were modelled as between-subjects factors.

Results: A significant ADHD*IBI interaction ($F_{1,74} = 4.399$; $p = .039$) reflected a decrease in cue-locked IBI (HR acceleration) in children without ADHD (autism, NT groups) ($p < .05$) which was non-significant in those with ADHD (ADHD, ADHD+autism groups). A significant ADHD*Congruence interaction ($F_{1,74} = 4.835$; $p = .031$) was found for response-locked IBIs; which were significantly shorter on incongruent than congruent trials in children without ADHD (NT and autism groups) ($p < .05$) but did not differ significantly in children with ADHD (ADHD, ADHD+autism) ($p > .1$). Children with ADHD had significantly longer RT than those without ($F_{1,74} = 4.383$; $p = .040$; $\eta^2 p = .056$); this was mediated by reduced cue-locked HR acceleration.

Conclusions: Autonomic arousal, reflected in HRV, is atypical in children with ADHD, with and without comorbid autism, and contributes to cognitive control difficulties.



Sensory features of the classroom affect task-behaviour especially for autistic children

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The ability to pay attention and stay on-task is fundamental for learning in the classroom. In order to do this, children must filter out and ignore various sensory inputs (e.g. noise from peers, visual displays on walls). Some children find this very difficult, especially autistic children, many of whom experience significant sensory differences compared to neurotypical children (NT) (Jones et al., 2020). In the current study, the impact of classroom sensory inputs on task behaviour was investigated in children with and without autism. Twenty six autistic children (mean age 9.62 years) and 22 NT children (mean age 8.35 years), matched on verbal mental age, completed reading comprehension tasks in a bespoke mini-classroom. Participants completed 4 reading comprehension tasks, under different sensory conditions: baseline (no visual/auditory input); auditory (classroom noise played in background); visual (visual displays on walls); and auditory and visual together. Using video recordings, behaviour was coded as on or off-task (with sub-categories for fine-grained analyses). Autistic children spent a significantly greater percentage of time off-task compared to NT peers. However, the pattern of off-task behaviour was the same for the groups in terms of impact of condition – it was greatest for both groups in the visual and auditory-visual conditions, and significantly more off-task behaviour was found in these compared to auditory and baseline conditions. Off-task behaviour as driven by the physical environment, meaning looking at/engaging with visual displays. This study has implications for understanding attention in action for learning in the classroom, as well as classroom design.



Are ‘educational’ apps truly educational? A comparison of pre-schoolers’ letter-sound learning following interactions with an app versus a content-matched book

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Objectives: Apps are widely marketed as ‘educational’, yet little research has evidenced this claim. This study investigated whether children could learn letter-sound mappings from an app, and how this compared to learning from a matched book.

Methods: 31 2-4-year-olds (M=39.67 months, SD=5.60 months) were recruited from nurseries and pre-schools in England. All children were introduced to eight letter-sound mappings over two 15-minute sessions: four through an app; four through a book (repeated-measures design). Children’s letter-sound knowledge was assessed before and after engaging with the app and book. Verbalisations were also coded during the sessions.

Results: Mixed-effects models showed that children learnt letters following exposure, but that this varied according to the media type (app vs. book) used to teach the letter. Children learned more letter-sound mappings from the book than the app. Exploratory analyses indicated that children repeated letter-sounds spontaneously and frequently in the book condition, but not in the app condition.

Conclusions: Apps can be educational: children did learn letter-sound mappings from the app. However, books may promote greater learning. Greater learning from books may be driven by more social engagement.



Individual Difference in Internal State Attributions and Children’s Sharing Behaviour following Prosocial Stories

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Objectives: Previous research suggested that moral stories depicting realistic characters may better facilitate children’s prosocial behaviour than those containing anthropomorphized animal characters. However, this influence appears to be attenuated by capacities to associate anthropomorphic protagonists with human characteristics. We tested the reproducibility of these findings with a UK sample.

Methods: A scale designed to measure children's internal state attributions for humans, real animals, and anthropomorphised animals was administered to 179 typically developing 3- to 7-year-olds. Subsequently, children heard one of four versions of an illustrated story that varied by character (human or animal) and theme (sharing or busyness). Children's sticker sharing was measured pre- and post-story. The relationship between story character realism, book theme, internal state attributions for realistic (human) and unrealistic (animal) characters and sticker allocation was examined.

Results: Children rated internal states at significantly higher levels for humans compared with animal characters. Human internal state attributions were predictive of sticker donation, but animal internal state attributions were not. There was no influence of theme or character realism on sticker sharing and no interactions between either internal state score and story theme on donation responses.

Conclusions: Children who were more aware of the thoughts and feelings of people were more likely to share than children with lower awareness, across all conditions. However, there was no additional influence of the story theme on children's donations. Methodological influences on our findings and further work concerning optimizing educational resources are discussed.



Symposia Presentations - Thursday 16th September

STEM gender stereotypes in childhood and adolescence: Consequences and challenges

Convenors: Fidelia Law¹ & Luke McGuire¹

¹University of Exeter

Women are underrepresented in many science, technology, engineering and mathematics (STEM) fields (WISE, 2020). Harmful gender stereotypes are one influential factor contributing to the gender gap in STEM. This symposium brings together four studies conducted across Singapore, UK and the United States to present international data illustrating the development of gender stereotypes, along with some of the consequences and potential methods to challenge these stereotypes.

A first study demonstrates the consequences of gender stereotypes, with Singaporean children's gender brilliance stereotypes being negatively associated with girls' career aspirations. Specifically, the more girls associate men with brilliance, the less they aspire to prestigious STEM careers. A second paper examines stereotype endorsement among US adolescents with results demonstrating stereotypes that boys are better at math negatively affect girls' interest in math. With nationally representative US data, a third study demonstrates that advanced STEM coursework is related to the transition from egalitarian or female favouring beliefs in 9th grade to traditional gender stereotypes in 11th grade.

A final paper demonstrates the potential benefits of a growth mindset intervention in a science museum in the UK. Here, gender stereotype responses of children in a growth mindset intervention condition were more equitable than those of children in the control condition. Collectively, this symposium converges to first document the global consequences of harmful gender stereotypes about STEM ability in relation to career aspirations and STEM interests. Second, this symposium provides promising avenues for future research examining methods to challenge STEM gender stereotypes among children and adolescents.



Exploring the Roots of Gender Gaps in Prestigious Careers: Can Children's "Brilliance = Men" Stereotype Predict Career Aspirations?

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¹Nanyang Technological University, ²University of Denver, ³New York University

Objectives: Worldwide, women are underrepresented in many prestigious careers (e.g., STEM). In this study, we investigated the possibility that gender inequities in work have roots in development: stereotypes about "brilliance = men" (e.g., Storage et al. 2020) may suppress girls' aspirations to pursue fields where brilliance is viewed as the key to success (Leslie, Cimpian, et al., 2015). Whereas prior work suggests that the gender-brilliance stereotype predicts differences in girls' vs. boys' interest in games (Bian et al., 2017), here we examined for the first time the association between children's gender-brilliance stereotype and career aspirations.

Methods: 342 Chinese Singaporean children aged 8 to 12 years participated (171 girls, Mage = 10.11 years). Children completed a gender-brilliance Implicit Association Test (previously validated on U.S. children). To assess aspirations, we asked children: "What do you want to be after you grow up?" The careers mentioned were then coded by adults (N = 151) to represent the extent to which each child's aspirations were brilliance-oriented.

Results: Singaporean children, like U.S. children, exhibited the gender-brilliance stereotype. Moreover, regression analysis revealed a negative association between girls' (vs. boys') stereotypes and aspirations, but only among younger children. The more younger girls associated men with brilliance, the less they aspired to brilliance-oriented careers (e.g., scientist).

Conclusions: Our finding is consistent with the gender-brilliance stereotype's role in the process that diverts women away from prestigious careers. However, the link between stereotype and aspiration was absent among older children, suggesting some caution in interpreting the result.



How Endorsement of Gender Stereotypes Predicts Adolescents' Interest in Math

Taylor Alexander¹ Andrew N. Meltzoff², Sapna Cheryan², Allison Master¹

¹University of Houston, ²University of Washington

Objectives: Societal stereotypes send messages to students that math and science are for boys (Kurtz-Costes et al., 2014). Many studies indicate that both boys and girls tend to view boys as better at math than girls. Consequently, endorsement of stereotypes about girls' lower math ability may contribute to their underrepresentation in STEM by reducing girls' interest in math. Therefore, we hypothesized that there will be an interaction between gender and stereotypes, with a negative effect of stereotype endorsement on math interest among girls and a positive effect among boys.

Methods: Participants were 552 (278 male, 262 female) students in 9th-12th grades who passed an attention check. The average age was 16.6 years old (SD= 1.21). Participants completed an online survey, with all items on a Likert scale from 1-6. For stereotype endorsement, children rated, "how good are most girls/boys at math?" Difference scores were calculated with higher values indicating stereotypes favoring boys. Interest was measured with 2 items ($\alpha=.81$; e.g., "I like to do math").

Results: Our analysis found a significant interaction between gender and stereotypes on math interest, $F(5, 532)=-.53, p<.001$. As predicted, there was a negative effect for girls' $F(2, 257)= -.19, p=.014$ endorsement of ability stereotypes on math interest, while there was a positive effect for boys $F(2, 275)= .14, p=.032$.

Conclusions: Beliefs in stereotypes that boys are better at math negatively affect girls' interest in math. Implications for targeted interventions to counteract stereotypes will be discussed.



Factors related to changes in math and science gender stereotypes from 9th to 11th grade in a large U.S. sample

Christine R. Starr¹, Sandra D. Simpkins¹

¹University of California

Objectives: We examined factors related to changes in students' answers to the question "who is better at math/science: males or females?"

Methods: We used nationally representative data from the U.S. High School Longitudinal Study ($n = 22,190$, 50% girls, 53% White, 22% Latinx, 13% Black) of adolescents and their parents.

Results: Paired t-tests suggest that both boys and girls were more likely to say males are better at math and science in 11th grade compared to 9th grade (t 's = 8.28-20.47, p 's < .001). By 11th grade roughly twice as many students believed males are better at math (28%) and science (24%) compared to females. T-tests indicated that switching from holding egalitarian beliefs or believing females are better in 9th grade to believing males are better at math/science in 11th grade was significantly related to taking advanced STEM coursework (e.g., pre-calculus and physics) and parent gender stereotypes. Although on average, students more often switched to believing males are better, some students switched from believing males were better or gender egalitarianism to believing females were better in 11th. This was related to remedial STEM coursework (e.g., geometry and biology) (all p 's < .001) and parent stereotypes. Teacher gender and stereotypes were not significantly related.

Conclusions: Results compliment prior qualitative work (e.g., Musto, 2019) indicating that traditional gender stereotype endorsement may be related to advanced course work. Future directions might explore whether this may be due to teacher classroom practices or related to gender stereotypes about brilliance vs. hard work.



Children's gender stereotypes beliefs about STEM ability following a growth mindset intervention in a science museum

Fidelia Law¹, Luke McGuire¹, Mark Winterbottom², Adam Rutland¹

¹University of Exeter, ²University of Cambridge

Objectives: The current study investigates how a one-shot growth mindsets intervention in a space science show is associated with children's gender stereotypes in STEM ability.

Methods: Participants (n =147, female n = 77, 5 – 12-years-old; Mage= 8.60, SD= 1.70) were visitors to a science museum. Half of the sample experienced the growth mindset intervention in the space science show and the other half experienced the show without intervention (control condition). Gender stereotypes awareness and flexibility were assessed by asking participants about boys' and girls' abilities (e.g. "I think boys can do well in space science" 0 = not true at all, 100= very true).

Results: The results shows that participants in the growth mindset intervention condition, compared to the participants in the control condition, responded equitably in the stereotype awareness measure. However, participants in the control condition responded in favour of boys' over girl's ability. Further, children between 5 and 8-years-old responded more in favour of boys' ability over girls' in both stereotype awareness and stereotype flexibility measures compared to children between 9 and 12-years-old. Lastly, children demonstrated in-group gender bias in space science ability.

Conclusions: Together these findings demonstrate interesting developmental trends and document promise for growth mindset intervention to act as a buffer against STEM gender stereotyping amongst children who visit informal science sites.



A Comprehensive Look at Children's Academic Skills: The Role of Cognition, Socio-economic Factors and the Learning Environment

Convenor: **Emma Blakey**, *University of Sheffield*

Discussant: **Gaia Scerif**, *University of Oxford*

Education is one of the most important predictors of life outcomes (Easterbrook et al., 2016). The UK has large inequalities in educational attainment which emerge in the early years (UNICEF, 2018). In order to narrow disparities and reduce cycles of inequality, it is essential that we have a comprehensive model of the factors that support academic attainment. However, gaining a full understanding of all of these factors is challenging given the broad range of child, family, and environment-level variables that will interact to shape learning, but that are often examined in isolation.

This symposium brings together four talks that have examined a broad array of factors that support children's academic achievement using a range of study designs (cross sectional, longitudinal and randomised controlled trials). Study one examines the role of executive functions, language and the home learning environment in explaining early attainment gaps in mathematical skills. Study two elucidates the cognitive and home-level factors that underpin trajectories in early mathematical development over time.

Study three examines a wide array of child-level and family-level factors in explaining educational outcomes, with a focus on how some children are resilient to the impact of poverty on outcomes. Study four reports on a novel randomized controlled trial that examined whether incorporating pretend play into children's learning environments could improve language outcomes. The symposium will finish with a discussion of this research and future directions by Professor Gaia Scerif.



How do Socioeconomic Attainment Gaps in Early Maths Ability Arise?

Ella James-Brabham¹, Emma Blakey

¹*University of Sheffield*

Early maths skills are a strong predictor of later academic attainment. By school entry, socioeconomic attainment gaps are apparent in maths ability and these gaps widen over the duration of school. However, little is known about the mechanisms by which this attainment gap emerges. The aim of the research was to investigate whether working memory, inhibitory control, verbal ability, and frequency of home maths activities are mechanisms by which socioeconomic attainment gaps in maths ability emerge. These factors were chosen as previous studies – which tend to look at them in isolation – found that they show socioeconomic gradients, and support children's maths skills. Two studies were conducted in 3- and 4-year-olds (study 1: $N = 159$, study 2: $N = 145$). Children completed measures of maths, inhibitory control, working memory, verbal ability, and processing speed. Parents completed a questionnaire to measure socioeconomic status (SES) and frequency of home mathematical activities. Both studies showed socioeconomic attainment gaps in early maths, with children from lower socioeconomic households, on average, having lower maths skills than their peers from higher socioeconomic households. Inhibitory control and verbal ability mediated the relation between socioeconomic status and early maths ability. Working memory predicted maths ability but neither working memory nor home maths activities explained the attainment gap. The results demonstrate SES attainment gaps in maths ability prior to the start of formal education. Inhibitory control and verbal ability may be important targets for interventions to close the attainment gap.

Developmental Pathways of Early Numerical Skills During the Preschool to School Transition

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¹*Ulster University*, ²*Loughborough University*

Most longitudinal evidence explores the average level of development, suggesting that the relationships between a limited number of variables applies to all learners in the same way. This is the first longitudinal study that investigates multiple component numeric skills within a preschool population using a person-centered approach (i.e., a latent transition analysis), thus allowing for an investigation of different subgroup learning pathways of mathematical skills over time. 128 children aged 43–54 months (at Time 1) were tracked at three time points over 8 months encompassing the transition from preschool through to their first year of primary education.

Findings suggest that there are five developmental pathways of mathematical learning with some groups of children making more rapid progress on entry to school than other groups. Those children in the low number skill pathway have a lower rate of growth than more advanced pathways, possibly due to a lack of understanding in cardinality. Findings highlighted the potential importance of language and working memory abilities on mathematical skills development over time.

Tracking the Cascade of Factors that Drive Resilience to Socio-economic Disadvantage from Birth to Early Adolescence

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¹*MRC Cognition and Brain Sciences Unit, University of Cambridge*

The socio-economic status (SES) in which children grow up is known to impact developmental outcomes, and particularly SES' impact on educational outcomes shapes future opportunities to break the trans-generational cycle. While effective long-term policy should aim to lift families out of poverty, in the short term it is important to understand and capitalise on the factors that drive poverty resilience. In a small ($N=600$) but highly detailed cross-sectional study, we examined relationships between SES (affluence and deprivation) and educationally relevant outcomes (reading and maths fluency) within a wider network of factors. We found that SES had direct relationships with attitude, cognition, and mental health variables; and that indirect connections within this network mainly existed through cognition.

We then turned to the Millennium Cohort Study, a large ($N=19k$) longitudinal study of children from 9 months to 14 years of age. Here, we employed linear regression with elastic net regularisation to predict poverty resilience, quantified as residual scores after accounting for SES effects on teacher-rated educational progress.

We also developed a multi-layer mediation approach that allowed us to track the cascade of effects of a wide variety of variables from birth to adolescence.

We found that poverty resilience could be predicted as early as 9 months of age, with early developmental milestones and sex predicting educational resilience, and parental mental health and relationship quality predicting better internalising and externalising resilience. We identified two mostly independent developmental pathways through cognition and mental health that gave rise to the identified poverty resilience.



Guided pretend play and preschoolers' language and self-regulation skills: Is it efficacious?

Tanya Paes¹, Michelle Ellefson¹
Purdue University¹, University of Cambridge²

This study examines the efficacy of a guided pretend play intervention on the language and self-regulation skills of four- to five-year-olds with English as an Additional Language, an under-researched population. Engagement in pretend play was hypothesized to relieve the pressure of the learning environment and allow for children's development. The intervention included sixteen 30-minute sessions in groups of five children. Each session consisted of three 10-minute components: (1) shared storybook reading; (2) role-playing; and (3) review. 151 children from schools in deprived neighbourhoods in a city in the east of England were randomized into two groups: (a) Pretend play; (b) Art activities. A third untreated controlled group was also included in the study. During storybook reading, explicit phonological awareness (PA) and vocabulary instruction were provided for target words. While role-playing, the children were provided with props that were related to the storybook and were able to engage in guided play. During the review component, the PA and the vocabulary for the target words were revised. The children in the art activities group participated in art activities unrelated to the book instead of engaging in role-play. The children were assessed on standardized self-regulation and language measures pre- and post-intervention. Using hierarchical regression, children in the pretend play group had significantly higher post-test phonological awareness scores than children who were exposed to typical curriculum ($\beta = -20.43, p < .001$). The study contributes to a better understanding of the use of systematic interventions in educational settings.



Mental health of children with developmental language disorders (DLD): implications for practice.

Convenor: Dr Sarah Griffiths, University College London

Children with developmental language disorder (DLD) are at increased risk of poor social, emotional and mental health outcomes. This symposium provides insight into the developmental relationship between language and mental health from recent longitudinal studies and recommendations for mental health practitioners working with children with DLD. The first talk will provide a narrative review of research in this area, drawing out implications for adapting cognitive behavioural therapy with children with DLD. The second talk presents recent findings from a longitudinal study that has identified predictors of mental health difficulties in teenagers with DLD. The third talk presents recent evidence for a longitudinal relationship between early language difficulties and the capacity to use cognitive emotion regulation strategies that are common in psychological therapies. The final talk provides insight into families' experiences of mental health provision currently offered for children with a DLD. This symposium aim to bridge the research-practice gap by bringing together cutting-edge research focusing on the nature of mental health difficulties in children with DLD and the perspectives of families and practitioners. The discussion will identify avenues for future research that will improve mental health outcomes for children with DLD.



Can observation inform intervention: Improving mental health among children with developmental language disorder (DLD)

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Background: Multiple large cohort studies have reported poorer socio-emotional mental health (SEMH) outcomes for children with developmental language disorder (DLD). However, less is known about the processes which explain these SEMH outcomes, with even less known on SEMH interventions for DLD children.

Purpose: To provide a narrative review of what is known about the prospective relation between DLD and SEMH, provide an update to the language-and-third factors model with recent mediational findings, and present a proposal for adapting cognitive behavioural therapy for children with DLD.

Methods: A narrative review across three bodies of work; (1) The prospective relation between DLD and SEMH, (2) Mediational findings between language and SEMH, (3) Cognitive Behavioural Therapy and Language ability

Conclusions: A virtuous cycle between prediction, explanation and intervention is a promising basis to achieve better socio-emotional mental health outcomes among children with developmental language disorder.

Emotional competence as a mediator between communication problems and psychosocial problems in children with developmental language disorder (DLD)

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Objectives: Children and adolescents with Developmental Language Disorder (DLD) are at increased risk for the development of psychosocial problems compared to their peers without DLD. However, there is no systematic relationship between the severity of children's communication problems and their psychosocial problems. Emotional competence is gained through social interactions, in which language plays an important role. In children without DLD, problems in emotional competence are important risk factors for the development of different psychosocial problems, which may also be the case in children with DLD. Therefore, we aimed to examine the extent to which emotional competence might explain these individual differences in psychosocial problems and mediate the relationship between communication problems and psychosocial problems.

Method: We examined these relationships in children with (n = 114) and without DLD (n = 214) between 8 and 16 years old. Children and their parents filled out questionnaires three times across 18 months on various psychosocial problems (social, internalizing and externalizing), emotional competence (emotion understanding, emotion regulation and empathy) and communication problems (structural and pragmatic).

Results: Overall, the results indicate that emotional competence is an important predictor of psychosocial problems and mediates the relationships between communication problems and internalizing and externalizing problems. These relationships are stronger in children with DLD compared to children without DLD.

Conclusion: These results indicate that emotional competence should receive extensive attention in interventions for children with DLD in addition to language interventions.

Relationship between early language competence and cognitive emotion regulation in adolescence in children with and without developmental language disorder (DLD)

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¹*Psychology and Language Sciences, University College London*, ²*Department of Psychology, Royal Holloway*, ³*Department of Special Needs Education, University of Oslo*

Objectives Effective use of cognitive reappraisal strategies for emotion regulation improves throughout adolescence and promotes good mental health. Language skills may partially drive improvements in reappraisal efficacy, meaning children with neurodevelopmental conditions that affect language may not learn to regulate emotions as effectively as their peers.

Method Data are from the Surrey Communication and Language in Education Study (SCALES); a large, population derived cohort of children with diverse language and cognitive skills. We tested whether language skills at school entry predicted success in regulating negative emotions using a temporal distancing strategy, in a task that utilised hypothetical distressing scenarios. We additionally compared children that met the criteria for Language Disorder (LD) in Year 1 to children with typical language, on their temporal distancing performance.

Results Across the whole sample, language skills at school entry predicted emotion regulation success in Year 6, over and above the concurrent association between language and regulation success. A quarter of children with LD were unable to complete the temporal distancing task. These children had more severe language difficulties, lower non-verbal IQ and more comorbid conditions.

Conclusions Language skills may help children learn how to effectively regulate their emotions. That many children with LD were unable to participate in the task has implications for clinicians addressing mental health needs for children with neurodevelopmental conditions that effect language, as conversations about emotions and emotion regulation are an integral part of therapy.



Mental health support for children with SLCN and DLD: the perspectives of parents

Dr Hannah Hobson¹, Ms Mya Kalsi¹, Dr Louise Cotton² & Dr Umar Toseeb³

¹*Department of Psychology, University of York*, ²*Faculty of Education, Health and Human Sciences*, ³*Department of Education, University of York*

Objectives: Children with speech, language and communication needs (SLCN) are overrepresented in mental health settings and at greater risk of poor mental health outcomes. Little is known about how mental health interventions are received and accessed by children with SLCN. We investigated the experience of parents getting help for their children’s mental health, focusing particularly on children with Developmental Language Disorder (DLD).

Methods: Our project had two stages. We first conducted a survey of parents of children with SLCN about support they had sought for their child’s mental health. 67 parents responded to our survey, including parents of children with DLD, Autism Spectrum Disorder, hearing problems, verbal dyspraxia and global intellectual difficulties. We then conducted semi-structured interviews with 9 parents of children with DLD, drawn from our survey sample.

Results: Over half of parents in our survey reported being very concerned about their child’s mental health. Content analysis revealed recurrent reports of experiencing inappropriate interventions, and lack of professional knowledge about their child’s communication needs. Thematic analysis of our interviews of DLD parents developed themes of: the effect of language problems on presentations of mental health problems; the role of the school environment; the role of professionals; typical approaches and interventions may not be appropriate; and the role of and impact on parents.

Conclusions: Many parents of children with SLCNs report worrying about their children’s mental health, and also report negative experiences seeking and receiving help. We outline suggestions for improving mental health support for children with SLCN and DLD.



Oral Presentation Abstracts - Thursday 16th September

Can self-cues support children's verbal working memory?

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Objectives: Working memory (WM) is a limited-capacity cognitive system responsible for temporary storage and manipulation of information. It is argued that the successful execution of WM tasks is dependent on attentional control. As self-cues have been associated with cognitive biases, particularly attention, the present study aimed to explore, for the first time, whether self-cues impact children's verbal WM capacity.

Methods: 71 participants between 7 to 9 years. A listening sentence span task was administered to examine WM performance under Self-referent (containing the child's name), Other-referent (an unknown referent) and Control (no referent) conditions. Both span and number of attempts per trial (out of three) were compared. Children also completed attention tasks to explore whether individual differences in attention predicted WM performance.

Results: Verbal WM span was significantly higher in the Self-referent condition than both Other-referent and Control conditions. The number of trial attempts was also significantly lower number in the Self-referent condition. No differences were found for span and attempts between the Other and Control conditions. There were no associations between attention and self-advantage scores.

Conclusion: The study is the first to directly explore the relationship between Self and WM in children. The findings suggest that incorporating self-cues into verbal WM tasks increases span and facilitates performance. This has implications for the use of self-cues in educational tasks that rely on verbal WM processes.



Lessons learned from the COVID-19 pandemic: investigating the association between anxiety and cognitive function in older adolescents

Meg Attwood¹, Professor Chris Jarrold¹
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Objectives: This study investigated the impact of the COVID-19 pandemic on older adolescents' psychological wellbeing and cognitive function. The pandemic coincides with rising rates of prevalence of emotional disorders (particularly anxiety) in this age group, and both clinical and subclinical levels of anxiety are associated with cognitive impairment and academic underachievement.

Methods: 625 young people (403 girls, M = 17.60 years) completed an online survey during a period of school closures in June and July 2020. The survey assessed subjective impacts of the pandemic on anxiety, wellbeing, and cognitive function, as well as trait vulnerability to anxiety.

Results: The majority of participants reported COVID-19-related decreases in wellbeing (62%) and increases in anxiety (57%). Girls were more likely to experience increased anxiety on account of the pandemic and had significantly higher anxiety scores ($t(603)=6.056, p<.001$), and lower wellbeing scores ($t(606)=-5.466, p<.001$) than boys. Heightened anxiety was associated with subjective difficulties with motivation, mood, and focus and concentration. Further analyses demonstrated that the nature and extent of these difficulties could be used to predict the focus of adolescents' worries (e.g., increased difficulty with planning and prioritisation predicted greater likelihood of concerns regarding schoolwork).

Conclusions: This study demonstrates the detrimental impact of the pandemic on older adolescents' psychological wellbeing. Findings will be discussed with reference to key contributors to COVID-19-related anxiety, the role of anxiety in shaping both psychological and cognitive functioning in older adolescents, and the need for targeted intervention for vulnerable young people, both now and beyond-COVID-19.



A longitudinal study of picture comprehension in late talking and typically developing children

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Objectives: We aimed to test whether late talking (LT) children (<10th percentile on expressive vocabulary at ~2-years-old) demonstrate delays in picture comprehension, as although research shows typically developing (TD) children rely on language to understand how pictures and objects relate, no studies have tested this in LT.

Methods: TD (n = 38) and LT (n = 21) children at 2.0 – 2.4-years-old and 3.5 – 3.9-years-old were tested on expressive and receptive vocabulary, social ability, and a picture comprehension task that manipulated label availability. The task tested how children related a picture to two choice objects with the same label (e.g. two types of dog), where language could not aid object selection, compared to two objects with different labels (e.g. cat and rabbit), where language could aid object selection. We used general linear mixed effects models predicting task accuracy (fixed effects of vocabulary and condition; random effects of participant and target).

Results: Both populations could use labels to match pictures to referring objects, but LT children showed impaired picture comprehension overall (p = 0.25). Across all participants, higher task accuracy was predicted by larger receptive vocabulary at ~2-years-old (p = .040), mediated by social ability (p = .020). At ~3.5-years-old, higher task accuracy was predicted by larger expressive vocabulary (p <.001).

Conclusions: LT children can use labels to aid picture comprehension, but show broader delays in picture comprehension ability. Receptive and expressive vocabulary may scaffold picture comprehension differently at certain stages of development, subject to mediating effects of social ability.



Chinese Parents' Views on Bullying and Their Children's Defending Behaviour in Traditional and Stigma Bullying

Leyla De Amicis¹, Ms Yuqing Xue¹

¹*University Of Glasgow*

School bullying is a widespread phenomenon in China. Besides traditional bullying, other types of bullying have also emerged in this country, such as weight bullying and prejudice-based bullying against left behind children. Children's bystander intervention is a good strategy for decreasing bullying, but little is known about parents' views about this behavior. This study examined the views about parents' and their children's supposed defending behavior in unspecific bullying and prejudice based bullying contexts in Chinese parents of 9-11 years old pupils attending two primary schools of a central province of China. A sample of 261 parents (F= 183) filled it an online survey exploring their views and knowledge about school bullying.

Participants were presented with three scenarios in which a child was bullied 1. in a generic context 2. because of their weight, 3. because of their status as left behind child. Parents were asked their intentions to intervene and their expectations about their children's bystander intervention in these contexts. Results showed that parents felt different emotions and perceived different consequences for the victims of the three presented scenarios and showed more compassion in the weight stigma bullying scenario. Participants preferred their children to ask for help to an adult rather than intervening by their own. In the unspecified scenario, parents attributed the bullying to victims' individual characteristics rather than to bullies' prejudice.

These findings showed the importance of disseminating the importance of bystander intervention among children. Knowledge about prejudice based bullying should also be increased.



Being bullied by friend: A retrospective study on childhood and adolescence friend bullying and resilience factors to survive to it

Leyla De Amicis¹, Ms Amy Lavery¹

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Research on bullying by friends is still scarce but the in depth exploration of adults' experiences of when they were bullied by their friends in their childhood or adolescence, could provide more information on how this type of bullying is different from traditional bullying and what resilience factors can be in place to cope with bullying and their long-lasting effects.

A retrospective mixed-methods study was carried out to explore adults perceptions of past bullying experiences in-depth. Fifty participants, UK citizens or residents in the UK, took part an online survey including close and opened ended questions, and were mostly female (86%), White (67%) and British (65%) with friend-bullies of the same background in age, ethnicity, religion and nationality. Eight participants took part in one on one semi-structured interviews. Results showed that these negative friendships were maintained due to similarity, proximity and fear of social exclusion. Bullying by a friend was reported as more difficult than non-friend bullying and more difficult to recognise. Friend-bully's actions could be influenced by a high status group of non-friends. Personality was reported as a cause of victimisation in both friend and non-friend. Socio-ecological factors such as cultural norms and family beliefs were associated with prejudiced-based bullying in friendship. Prevalent outcomes in adulthood of friend bullying was social anxiety and increased empathy to defend others.

This study adds to the scarce literature on bullying in friendships and the differences between non-friend bullying but further research is suggested in this area and practical implications are also highlighted.



Children's street play in Britain: Results of a nationally representative survey

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Objectives. Children playing in the streets close to their home is thought to bring benefits for children's physical and mental wellbeing (Tranter, 2016), contribute to a sense of community (Stenning, 2020), and be an indicator of the quality of urban habitats (Gill, 2021). Despite this, street play is reported to have declined considerably in Britain in the last few decades (Playday, 2007). We investigated how frequently children in Britain engage in street play and what socio-demographic and geographic factors predict street play.

Method. Here, we describe the results of the British Children's Play Survey (Dodd et al., 2021) with regards to children's play on the street. We analyse data from a nationally representative sample of 1919 parents/caregivers with a child aged 5–11 years who answered questions about their child's play and independent mobility in April 2020.

Results. We found that 36% of children in Britain never play on the street, but among those who did play on the street, the mean frequency was once per week. We found a number of socio-demographic and geographic factors that predicted children's engagement in and frequency of street play. However, these factors explained very little of the overall variance.

Conclusion. Socio-demographic and geographic factors were significant predictors of engagement and frequency of children's street play. However, it is likely that local-level features, such as street design and traffic, as well as the families' access to private outdoor space, contribute to the variance in both engagement and frequency that we observed.



The Memory Span Spin-the-Pots: a new working memory task for toddlers

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The study presents a new working memory (WM) measure for toddlers (Memory Span Spin-the-Pots, MSSP), inspired by the Spin-the-Pots task (Hughes & Ensor, 2005), requiring to retrieve objects hidden in little boxes. The MSSP includes a smaller numbers of targets and a systematical manipulation of WM load by covering or not the display, and by rotating it or not. The goals were examining the effects of covering and rotation on toddlers' WM through MSSP, and validating the MSSP as a WM measure by comparing it with the Imitation Sorting Task (Alp, 1994).

Two experiments were carried out by assessing 18-to 36-month toddlers. Experiment 1: children performed the MSSP task in four conditions (no covering, no rotation; covering and rotation; rotation, no covering; covering, no rotation), following a Latin square order. Experiment 2: children were administered two conditions of the MPSPS (no covering, no rotation; covering and rotation) and the IST task.

Experiment 1: the results showed that covering [$F(1,15) = 16.43, p < .001, \eta^2 = .52,$] or rotating [$F(1,15) = 32.72, p < .001, \eta^2 = .69$] hindered toddlers' performance, and combining both transformations yielded an under-additive interaction [$F(1,15) = 10.45, p < .01, \eta^2 = .41$]. Experiment 2: the findings displayed that the MSSP correlated with the IST [$r(24) = .61, p < .01$], also partialling out age [$r(24) = .65, p < .001$], although the IST was easier.

These results shed light on some variables that affect toddlers' performance on the MSSP, and shows that it can be used as a valid WM measure for toddlers.



A Novel Approach to Measuring the Developmental Interactions Between Working Memory and Inhibitory Control in Young Children

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Objectives: One potential definition of executive control is that it reflects the combination of goal representation in working memory and the inhibition of goal-irrelevant responses. Previous studies in children have therefore attempted to measure each of these constructs using separate tasks but this raises task-specificity and task-impurity issues.

Methods: In this pre-registered study (<http://dx.doi.org/10.23668/psycharchives.4588>) we tested two novel tasks - a choice response task (CRT) and a selective response task (SRT). The conditions of each task orthogonally manipulated a) memory load, by varying the number of stimulus-response associations, and b) inhibitory load. These were given to a total of 144 children in three age groups (3-4, 4-5, 5-6).

Results: Bayesian ANOVAs examined accuracy and reaction time (RT) in each task. These showed overwhelming evidence for the effects of age, memory load, and inhibitory load (except for CRT accuracy where the best fitting model including age and memory load was preferred over one including inhibitory load by a factor of 12.6). The interaction between memory and inhibitory loads was included in the best fitting model for SRT RT. Adding this interaction to the best fitting models for SRT accuracy and CRT RT decreased fit by factors of 10.1 and 1.5 respectively.

Conclusions: These novel tasks successfully captured the development of executive control in young children. Although evidence for an interaction between working memory and inhibition was mixed, the fact that it was seen in some analyses implies that they may draw on a shared pool of executive resources.



Perceived Barriers and Facilitators of Adventurous Play in Schools: A qualitative systematic review

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Purpose: The purpose of this review is to synthesise findings on the perceived barriers and facilitators of adventurous play in schools.

Background: Adventurous play, defined as exciting, thrilling play where children are able to take age-appropriate risks has been associated with a wide range of positive outcomes. Despite this, adventurous play is often not supported in school contexts. Our aim is to bring together findings from qualitative research providing insights into the perceived barriers and facilitators of adventurous play in schools.

Methods: Prior to conducting the search, the search protocol was published on the OSF (<https://osf.io/34hfp/>). To be included, research had to concern play for school-aged children, reference attitudes, perceptions, feelings, beliefs, experiences, barriers or facilitators towards adventurous/risky play within the school context and had to be qualitative in design. To analyse the findings, we utilised two review methodologies. Papers that meet a pre-specified quality threshold were analysed via meta-aggregative synthesis and papers that met our inclusion criteria but did not meet the quality criteria were analysed via narrative synthesis.

Conclusions: A total of nine studies were included in the final synthesis. Findings were similar across the two syntheses, highlighting adult's perceptions of children, adult's attitudes and beliefs about adventurous play and concerns pertaining to health and safety and legislative concerns as key barriers and facilitators. Based on the findings of the review, recommendations for policy and practice are provided to support adventurous play opportunities in schools.



Science with Duplo: Multistep goal management in preschoolers' toy house construction

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Action sequence planning develops over preschool years. Five-year-olds execute action sequences based on all levels of the goal hierarchy, while 3- and 4-year-olds have problems in following the highest goal (Yanaoka & Saito, 2017; 2019). This study investigated whether a) improvements in executive functioning could underpin improvements in action planning, and b) motion capture could detect implicit markers of hierarchical action sequence planning.

Three-, 4- and 5-year-olds (N = 69) built a Duplo house with several subgoals and a main goal. The ability to follow the key goal and subgoals, response inhibition, working memory updating and task switching were all measured within each participant.

The results showed that 5-year-olds were more often successful at finishing building the house than 3-year-olds, indicating that they were better at keeping track of the goal hierarchy. Furthermore, children who followed the correct subgoal order had a higher updating score compared to children who mixed up the actions.

Motion capture was used to investigate reaching movement during which children switched from one subgoal to another. Previous work has found that reaching at these decision points was often slowed in adults (Ruh et al., 2010; Arnold et al, 2017). We found that children who managed to follow the correct subgoal order showed more movement with their non-reaching hand at these decision points ($t(57) = -2.068$, $p = .043$, Cohen's $d = 0.548$), suggesting an increased cognitive focus on executing action within a subgoal. This effect was enhanced in children with better inhibition skills, suggesting greater focus.



Project Real: Co-creating an intervention to help young people recognise fake news

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Background: Fake news spreads six times faster than the truth (Science, 2018) and is believed around 75% of the time (Silveman & Singer-Vine, 2016). It is therefore vital to equip young people with the skills to recognise fake news. While fake news interventions exist, they are often aimed at adults and designed by adults. This project used co-creation between young people, social media influencers, academics and teachers to design an engaging intervention to give young people the skills to recognise fake news and tested its' efficacy.

Methods: The project was co-created online by N=18, pupils aged 13, N=6 social media influencers, N=3 teachers, N=4 academics. They developed five hour-long sessions which make up 'Project Real'. These sessions were then delivered by teachers to young people aged 11-13 (N= approx. 300). To test the project's efficacy, participants completed a questionnaire before, after and six weeks following the programme. Measures included ability and confidence in identifying fake news. Teacher and pupil interviews will also be conducted to qualitatively understand the impact of the project and improve it for the future.

Findings: The co-creators enjoyed the co-creation and felt that working with influencers had enhanced the project. The quantitative data from the post-tests are currently being collected. However, it is expected that participating in 'Project Real' will enhance participants' confidence and ability in recognising fake news.

Discussion: The project provides evidence of the efficacy of co-created interventions and how they can be used to enhance young people's ability to recognise fake news.



The Effectiveness of Feuerstein’s Instrumental Enrichment Programme: A Systematic Review

Miss Pippa Harris¹, Dr Petri Partanen², **Dr Jo Van Herwegen**¹

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Background: Feuerstein’s Instrumental Enrichment (FIE) programme is designed to improve cognitive functions thus raising academic achievement and improving related behaviours. The evidence as to the effectiveness of FIE is mixed and therefore a systematic review was undertaken to present an updated evaluation of the existing research and the efficacy of FIE.

Methods and Procedures: In total 57 studies from 55 papers were identified via the search process of a systematic review following PRISMA guidance. The protocol of which was preregistered: <https://osf.io/g9x5b>.

Results: Overall, the most beneficial effect was found in the cognitive domain, both on general cognitive ability and cognitive specific measures such as reasoning and spatial abilities with effects ranging from small to substantial. The effects of FIE on academic achievement and affective measures was less pronounced and more inconsistent. Mathematical ability proved more susceptible to improvement than other academic areas, whilst impulsivity was substantially reduced in a number of studies. However, several methodological issues were identified in the body of research that made it difficult to fully evaluate both the effectiveness of FIE and the determination of moderator variables.

Conclusion: FIE appears to be effective to raise cognitive abilities. However, there is a need for more robust research to fully determine its effect on academic achievement and affective domains.



Parent Perceived Barriers and Facilitators of Children’s Adventurous Play in Britain

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¹*University of Reading, Reading, UK*

Currently unable to share abstract.

Symposia Abstracts – Friday 17th September

Traditions, stereotypes, and pronouns: Concepts of gender across development

Convenor: **Harriet Tenenbaum**, *University of Surrey*
Discussant: **Lindsey Cameron**, *University of Kent*

This symposium reports on young people's knowledge and endorsement of gender-related marriage traditions, young children's and parents' perceptions of pronouns, and an intervention designed to reduce gender stereotypes in primary school children. The first talk found that young people (aged 11 to 22 years) are aware of gender-related marriage traditions with the majority (64%) of young people endorsing these traditions.

When reading passages about children using different gendered pronouns, the second talk found that parents were more likely to attribute low-activity descriptors in response to 'She' compared to 'He' and 'They' and high-agency descriptors in response to 'He' compared to 'She' and 'They'. In the third talk, 3- to 4-year-olds referenced fewer masculine words after hearing "They" than "He" and fewer feminine words than "She". "He" prompted more masculine words than feminine words and "She" more feminine words than masculine words.

The final talk reports on an intervention designed to reduce gender stereotypes in a school-based intervention study. After controlling for baseline scores, the intervention group felt more similar to the other gender and reported that they could do a wider range of occupations in the future compared to the control group. Using a wide range of methods and theories, these four talks converge in indicating that implicit and explicit gendered behaviours and stereotypes exist in a wide range of ages. The discussant will examine how these talks extend previous research in the developmental psychology of gender.



Shall I change my surname?

Rose Brett¹, Harriet Tenenbaum¹, Aife Hopkins-Doyle¹, Rachael Robnett², Nila Watson¹, Cherie Cheung¹,
¹*University of Surrey*, ²*UNLV*

Objectives: Our objectives were to understand adolescents' perceptions of marriage traditions.

Methods: In this study, 176 (61 boys; 108 girls; 7 declined to report) young people from 11 to 22 years reported on their perceptions of marriage traditions in individual interviews. Thematic analysis was used to examine patterns.

Results: Our findings suggest that young people are aware of heterosexist marriage traditions with 77.84% reporting that after marriage, women adopt the man's name. The unity of the family (36.93%) and tradition (35.83%) were the most frequent justifications for this decision. Heterosexist naming traditions may be on the decline with 24% reporting that they do not want the same surname as their spouse and 12.47% reporting that they would double barrel their surname. Reasons provided for their decisions included that it was their preference (26.54%), heritage (16.67%), and identity (8.64%).

Conclusion: Overt hostile sexism has declined. In older age groups, heterosexist marriage traditions and norms continue (Duncan et al., 2020). Given that 89% of women in the UK changed their surname to their husbands' name after marriage (Yougov, 2016), heterosexist marriage traditions may be on the decline in this younger population, but at the same time, they have not disappeared. Young people suggested reason related to benevolent sexism for their choices suggesting relations between benevolent sexism and heterosexist marriage traditions.



She tries, he wins, they achieve: the effects of pronouns and stereotypes in children's literature on parental gender talk

Georgina Grange-Bennett¹, Alexandra Grandison¹
¹*University of Surrey*

Objectives: Gender stereotypes form early in development and research suggests links between gender stereotyping in children's literature, parental gender talk, and children's conceptualisation of gender. Here we explore parents' responses to gendered and gender-neutral pronouns presented in congruous and incongruous contexts to reveal the relative contributions of pronouns and gendered activities on parental gender talk.

Methods: Parents (N=172) read vignettes featuring characters prefixed by 'He' 'She' or 'They' participating in activities that were either congruous or incongruous with the gender pronoun. Parents wrote descriptions of the characters, which were coded according to gender, activity, agency and stereotype domain. A content analysis was conducted, giving insight into the effects of pronouns and stereotypes on parental gender talk.

Results: The results suggest that gendered imagery is predominantly guided by the activities that characters engage in rather than their pronoun. However, covert gender stereotyping was more pronounced in response to gendered compared to gender-neutral pronouns, as parents attributed different agency levels, activity levels and stereotype domains to each pronoun. Parents utilised more low-activity descriptors in response to 'She' compared to 'He' and 'They' and more high-agency descriptors in response to 'He' compared to 'She' and 'They'.

Conclusion: The findings indicate that both gender-neutral pronouns and counter-stereotypically gendered activities may reduce stereotyping in parental gender talk. This demonstrates that interpretations of gender can be guided by language, highlighting the need for literature to present girls and boys as equally active, agentic and social and for this to be reflected in parental gender talk.



Understanding children's interpretation of pronouns through drawing

Mafalda Batista Da Costa¹, Madeline Simmons¹, Alexandra Grandison¹, Harriet Tenenbaum¹

¹University of Surrey

Objectives: Gender impacts our understanding of the world and is a prominent feature of identity and language. However, conceptualisation of gender pronouns ("He", "She", "They") has been found to have changed over time and the developmental trajectory of this understanding is not fully understood. Here we explore children's interpretation of gendered and gender-neutral pronouns to reveal how these concepts develop and how they map on to gendered and gender-neutral language.

Methods: Children aged three to four years (N = 27) were read passages featuring characters participating in a gender-neutral activity, identified by "He", "She" or "They". Children were asked to draw the character presented in the passage and provide a verbal description of their drawing. Drawings were coded by specific features such as colour and descriptions were coded into different gender categories and domains.

Results: Analyses revealed an effect of pronoun on the type of words children produced in their descriptions, as well as the colours used in their drawings. "They" prompted fewer masculine words than "He" and fewer feminine words than "She". "He" prompted more masculine words than feminine words and "She" more feminine words and colours than masculine words and colours.

Conclusion: Children as young as three years appear to interpret "He" and "She" as gendered pronouns but it remains unclear whether they interpret "They" as gender neutral. This suggests an impact of gender-stereotypes at a very young age. The findings have implications for how children are educated about gender, stereotypes, and identity.



A school-based intervention to reduce gender stereotyping

Lauren Spinner¹, Harriet Tenenbaum², Lindsey Cameron³, Anna-Stiina Wallinheimo², Lydia Jamieson²

¹Tavistock & Portman NHS Foundation Trust, ²University of Surrey, ³University of Kent

Objectives: Children's adherence to gender stereotypes can be detrimental, yet interventions to tackle stereotyping have achieved mixed success. This study examined an intervention developed collaboratively by educators and researchers to increase children's perceived similarities between genders.

Methods: The present study evaluated an intervention among 6- to 10-year-old British children (47 boys; 37 girls) in one school compared to a control group in another school (61 boys; 47 girls). Led by their class teacher via weekly 30-minute lessons, over a four-month period, children learned to identify and challenge stereotypes, and explored similarities between genders and diversity within gender (e.g., not all girls like pink). Key measures of gender flexibility in relation to toy play, occupations, and perceived similarity to gender groups were utilised.

Results: After controlling for baseline scores, the intervention group felt more similar to the other gender and reported that they could do a wider range of occupations in the future. Those who showed less flexibility around toy play at baseline were more flexible after the intervention. Boys in the intervention group reported that gender stereotypes were more unfair than did the control group. The intervention did not increase gender knowledge nor did it decrease gender contentedness.

Conclusions: The intervention suggests that we can increase children's perceptions of similarity to the other gender without decreasing their gender contentedness.

Intellectual disability and cognition

Convenor: **Prof Lucy Henry**, *Division of Speech and Language Science, City, University of London*

Discussant: **Prof David Messer**, *Division of Speech and Language Science, City, University of London & Centre for Research in Education and Educational Technology, The Open University*

Chair: **Prof Henrik Danielsson**, *Department of Behavioural Sciences and Learning, Linköping University, Linköping, Sweden*

Research on cognitive skills in children and young people with intellectual disability (ID) often focuses on deficits, with less emphasis on the implications of research findings for interventions. This symposium highlights studies that have looked at different cognitive skills in children and young people with ID, drawing out the implications of the findings for practice. In the first paper (Nilsson et al.), we see that although the Simple View of Reading is not sufficient in explaining reading comprehension difficulties in adolescents with non-specific ID, the findings of a 'delayed' pattern of development indicate that reading instruction and interventions developed for typically developing children may be adapted successfully to ID groups.

In the second paper (Lanfranchi et al.), relationships between executive skills and adaptive functioning are identified, indicating the role of executive skills in everyday life, and providing important specific information that can contribute to targeted interventions. In the third paper (Henry et al.), young people with ID are found to have preserved implicit long-term serial-order learning for repeated information, underlining the potential benefits in using repetition in educational contexts for children and young people with ID. The fourth paper (Socher et al.) presents findings that semantic networks of adolescents with ID are less developed, noting the possible influence of different language environments and curricula on language/semantic development.

The current symposium presents evidence that children and young people with ID have a range of cognitive strengths and challenges, and that deeper understanding of these will contribute to more effective support.

Reading comprehension in adolescents with intellectual disability – Evaluating the Simple View of Reading

Karin Nilsson¹, Henrik Danielsson¹, Åsa Elwér¹, David Messer², Lucy Henry² & Stefan Samuelsson¹

¹*Department of Behavioural Sciences and Learning, Linköping University,* ²*Division of Language and Communication Science*

Objectives: Reading comprehension difficulties are common in individuals with intellectual disabilities (ID), but research addressing individual differences in reading comprehension in this group is sparse. This study evaluated the applicability of the Simple View of Reading (SVR) as a theoretical framework to understand the development of reading comprehension in adolescents with ID.

Methods: 136 adolescents with non-specific ID between 12-19 years of age were assessed on reading comprehension, listening comprehension, decoding, a range of linguistic and cognitive measures, and home literacy. Data were analysed with structural equation modelling.

Results: Several models with good fit to the data were evaluated. In the best model, vocabulary and phonological working memory were the only significant predictors of reading comprehension beyond decoding and listening comprehension. The best model was not in line with the SVR.

Conclusions: The SVR is not sufficient in explaining reading comprehension difficulties in adolescents with non-specific ID, since vocabulary and phonological working memory exhibit a direct effect on reading comprehension.

These variables are also significantly related to reading comprehension in typically developing children, which indicates that reading comprehension development in ID is delayed, not different. The delayed pattern of development indicates that reading instruction and interventions developed for typically developing children may be adapted successfully to the ID group.

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Executive function and adaptive behaviours in individuals with Down syndrome

Silvia Lanfranchi¹, Sara Onnivello¹, Francesca Pulina¹

¹*Department of Developmental and Socialization Psychology, University of Padova*

Objectives: Executive Function (EF) consists of interactive cognitive processes that shape adaptive, organized actions across many contexts. Several studies have demonstrated specific EF deficits in individuals with Down Syndrome (DS), but their link with everyday life behaviors it is less clear. Our work aims to shed light on the EF and adaptive behavior (AB) profile in DS, exploring the differences by age and investigating the relationship between these two domains.

Methods: Parents of 100 individuals with DS from 3 to 16 years old filled the BRIEF (to assess EF) and took part to an interview with the Vineland II (to assess AB). The sample was divided into preschool (3-6;11 years old) and school-age (7-16 years old) according to age and school attended.

Results: Findings suggest that individuals with DS have overall difficulties, but also patterns of strength and weakness in EF and AB. Partially different profiles of EF and AB emerged in preschool and school-age. When the relationship between EF and AB was explored, it emerged that Working Memory was associated with Communication in the younger group, while in the older group the associated variables varied, depending on the adaptive domains: Communication was associated with Working Memory, Daily Living Skills with Inhibit, and Socialization with Inhibit and Shift.

Conclusions: As well as elucidating the EF profiles and adaptive behavior of individuals with DS by age, this study points to the role of EF in everyday life, providing important information for targeted interventions.

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Hebb repetition learning in children and adolescents with intellectual disabilities

Lucy Henry¹, David Messer¹, Sebastian Poloczek², Rachel Dennan¹, Elisa Mattiauda¹ & Henrik Danielsson³

¹*Division of Language and Communication Science, City, University of London*

Objectives: Hebb repetition learning is a form of long-term serial order learning that occurs when sequences of items in an immediate serial recall task are repeated. Repetition improves performance because of the gradual integration of serial order information from short-term memory into a more stable long-term memory trace. The purpose of the current study was to assess whether children and adolescents with intellectual disabilities showed Hebb repetition effects for verbal and visuospatial materials, and whether their degree of Hebb repetition learning would be equivalent in magnitude to that of children with typical development, matched for mental age.

Methods: Two immediate serial recall Hebb repetition learning tasks (a verbal task using easily nameable pictures; a visuospatial task using nonsense pictures) were presented to 47 children and young people with intellectual disabilities (age range 11-15 years) and 47 individually mental age-matched typically developing children (age range 4-10 years).

Results: Children and young people with intellectual disabilities and typically developing children showed significant Hebb repetition learning effects. The magnitude of the Hebb effect was comparable between the groups, albeit with some uncertainty. Hebb repetition learning was found for both verbal and visuospatial materials, but, contrary to expectations, the effects were larger for verbal than visuospatial materials.

Conclusions: The findings suggested that young people with intellectual disabilities show preserved implicit long-term serial-order learning, the core learning mechanism believed to underpin the Hebb repetition effect. There could, therefore, be benefits in using repetition in educational contexts for children and young people with intellectual disabilities.

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Structural differences of the semantic network in adolescents with intellectual disability

Michaela Socher¹, Lisa Palmqvist ¹, Magnus Ivarsson ¹, Anna Levén ¹, Marie Annell ¹, Daniel Schöld ¹, Henrik Danielsson ¹, & Karin Nilsson¹

¹*Department of Behavioural Sciences and Learning, Linköping University*

Objectives: Persons with intellectual disability (ID) have been found to perform significantly more poorly than age-matched typically developing (TD) peers on verbal fluency tasks. However, the reasons for this are currently unclear. This study investigated whether the structure of the semantic network in adolescents with ID and TD children differs using network analysis.

Methods: The semantic networks of the participants ($n_{ID} = 66$; $n_{TD} = 49$) were estimated with the pathfinder method using a semantic verbal fluency task. The groups were matched on the number of produced words. The average shortest path length (ASPL), the clustering coefficient (CC), and the network's modularity (Q) of the two groups were compared.

Results: A significantly smaller ASPL and Q, as well as a significantly higher CC were found for the adolescents with ID in comparison to the TD children. The network of the adolescents with ID was denser and included fewer sub-clusters.

Conclusion: The semantic network of the adolescents with ID was found to be less developed than the semantic network of the TD group. Reasons for this might be differences in the language environment and differences in cognitive skills. The quality and quantity of the language input might differ for adolescents with ID due to differences in school curricula and because persons with ID tend to engage in different out-of-school activities compared to TD peers. Future studies should investigate the influence of different language environments on the language development of persons with ID.



Oral Presentation Abstracts - Friday 17th September

Home-schooling during COVID-19 lockdown: Effects of coping style, home space, and everyday creativity on stress and home-schooling outcomes.

Ana Aznar¹, Professor Paul Sowden, Dr Sarah Bayless, Dr Kirsty Ross, Dr Amy Warhurst, Dr Dimitra Pachi
¹*University Of Winchester*

The present study examined parents' experiences of home-schooling their children during the first COVID-19 lockdown in the UK. A total of 322 parents completed an online survey between the 1st May and the 24th July 2020.

Relationships were explored between predictor variables (coping mechanisms, household income, adequacy of space, access to 'green' space) and outcome variables (parenting self-efficacy, discipline, home-schooling relationships) mediated by stress and moderated by creativity and parenting dimensions. Moderated mediation analyses showed that inadequate space at home and negative coping mechanisms resulted in elevated stress and worse outcomes in terms of parents approaches to discipline and their experience of home-schooling their children.

Negative outcomes were more pronounced for parents who used high levels of behavioural control. In turn, negative outcomes were reduced when parents had higher levels of self-perceived everyday creativity and outcomes were improved by positive coping strategies. Our findings suggest that interventions focused on developing creative self-efficacy and positive coping strategies may be effective routes to help parents deal with the stress of supporting their children with periods of schooling at home during the COVID-19 pandemic.



Primary-secondary school transition and Covid-19: exploring the perceptions and experiences of children, parents/guardians and teachers

Charlotte Bagnall¹, Dr Yvonne Skipper, Dr Claire Fox
¹*University Of Exeter, Exeter, UK*

Objectives: Primary-secondary school transition is a major life event, where children face simultaneous changes. Following the outbreak of Covid-19, transfer children face additional uncertainty. Negotiation of the multiple challenges, combined with the reduced support associated with Covid-19, have the potential to negatively impact children's school adjustment and mental health. Given the rapidity of changes associated with Covid-19, there are key empirical and practical gaps on how best to support children as they negotiate these two key events. To date, there is no published research which has explored the lived experiences of transfer children, and that of their parents/guardians and teachers during this time. The present research aimed to narrow this research gap.

Methods: This research used a mixed-methods UK wide survey to gather data from 101 Year 7 children, 88 Year 7 parents/guardians, 26 primary school teachers and 40 secondary school teachers.

Results: Findings have been analysed using Thematic Framework Analysis, taking an inductive approach. All three stakeholders reported negative impacts of Covid-19 on the transition, such as missed opportunities. There were also many comments about the emotional impact of Covid-19 on children, parents/guardians, and teachers. Numerous strategies were reported to meet children's need pre and post-transition, highlighting areas of good practice, along with practical suggestions for how to approach transition in the future.

Conclusions: The study has identified ways that transition can be managed more effectively, thus, having short term implications in providing an evidence base to support transfer children this year, and long-term implications for future transition years.



Misinformation about violations of COVID-19 rules: The development of ingroup bias in moral evaluations of misinformers

Miss Aqsa Farooq¹, Dr Adam Rutland, Dr Anna Adlam

¹*University Of Exeter, Exeter, UK*

Previous developmental research has shown that young children are more likely to believe information from an ingroup member than an outgroup member – even information that is false. What remains to be explored is how from late childhood into adolescence individuals respond to peers who spread misinformation. This can inform our understanding of whether children and adolescents will challenge misinformers.

This study explored whether children and adolescents respond differently to a misinformer spreading false claims about a peer breaking COVID-19 rules, depending on a.) whether the misinformer was a fellow ingroup member or not and b.) whether the ingroup had a ‘sceptical’ norm that values questioning information before believing it. Participants (N = 355; children aged 8-11 and adolescents aged 12-16) completed an online survey featuring a competitive fictional intergroup scenario in which a peer spreads misinformation on WhatsApp about a competitor. Participants then made moral evaluations, which asked them to judge and decide whether or not to include and punish the misinformer. While the ingroup norm did not have an impact on moral evaluations, results showed that children and adolescents accept ingroup members even when they spread misinformation, judging them positively and still including them in the group. Compared to children, adolescents were more willing to punish the outgroup misinformer relative to the ingroup misinformer.

These results highlight a developmental shift with regards to children and adolescents’ moral evaluations of group members who misinform, which is particularly important in the context of COVID-19 where misinformation can have significant consequences.



The Emotional and Behavioural Basis of Child-Dog Attachment and Associations with Psychological Wellbeing

Roxanne Hawkins¹, Dr Charlotte Robinson, Dr Nicola McGuigan

¹*The University of the West of Scotland, Paisley, UK*

Objectives: Child-pet relationships have gained increasing public, scientific, and clinical attention over recent years, with research showing that the formation, nature, and consequences of such relationships can often result in positive social, emotional, and cognitive developmental outcomes for young pet owners. Child-dog attachment may be particularly pertinent, yet there remains a lack of evidence of such importance for psychological wellbeing. This study presents findings from ‘The Child-Dog Bond Project’ which aims to substantiate the positive benefits of child-dog attachment through examining child-dog behaviours, and potential associations between child-dog attachment and child self-reported and parent-reported child health, happiness, and wellbeing.

Methods: Data collection is ongoing. Children aged 7-13 years and their caregivers, 80% from the UK, have completed a cross-sectional online survey comprised of parent-reported and child self-reported measures of dog care practices, dog attachment, and child psychological wellbeing outcomes. A sub-sample of families provided video data of child-dog interactions at home for behavioural analysis. Data has been collected during the COVID-19 pandemic.

Results: Explorative pre-liminary analyses point to significant positive associations between child-dog attachment and self-reported child happiness, parent reported child general health, and point to a negative association with loneliness and social dissatisfaction. Features of the bond are observed largely through child-dog play behaviour, proximity, talking, and physical touch. The final results will be presented at the conference.

Conclusions: Childhood attachments may extend to companion animals within the home who could be promoting (or even hindering) child psychological wellbeing in ways in which we still do not fully understand.



Doing it for the ‘gram: The impact of social media and selfies on pre-adolescent body image, wellbeing and problem behaviour

Sabrina Meechem¹, Dr Yvette Morey², Dr Emma Halliwell¹, Dr Isabelle Bray³, Dr Amy Slater¹

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Introduction: The impact of social media use has been evaluated in older adolescents and suggests, in line with social comparison theory, that social media can highlight unhelpful ideals leading to a number of negative outcomes. However, this has not been evaluated in pre-adolescents. The aim of this study was to evaluate the relationship between social media use and body image, wellbeing, and problem behaviour in pre-adolescents.

Method: 199 participants (55.78% female) with a mean age of 10.78 years (SD=0.41) from 11 primary schools in the South West of England took part in this cross-sectional study. Participants completed a questionnaire of validated measures of social media use, body image, wellbeing (mood, self-esteem, and loneliness) and offline problem behaviours.

Results: Of the sample, 120 participants (67.5% female) used at least one form of imaged-focused social media (Instagram, TikTok, Facebook or Snapchat). Linear regression analyses suggested higher levels of photo manipulation, selfie taking, and social media usage were associated with higher levels of body image concerns for girls. Higher level of photo manipulation was associated with lower levels of wellbeing for both boys and girls. Increased time on social media and usage were associated with higher levels of problem behaviour for girls only.

Conclusion: This study found various aspects of social media use were associated with body image concerns problem behaviour, and wellbeing for pre-adolescents. These findings demonstrate the importance of teaching social media literacy in primary schools.



“It needed to be there, or we wouldn’t have been able to cope”: Adolescents experiences of lockdown and social media

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Objectives: Social media is widely used to connect with others online, with past research suggesting both positive and negative influences on adolescent wellbeing. The current COVID-19 pandemic enforced restrictions on physical contact for most people. This study aimed to explore young adolescents’ feelings about lockdown restrictions and wellbeing generally, and specifically about their use of social media during this time.

Methods: In this qualitative study, 32 adolescents (43.75% female), mean age 13.41 years (SD = 0.76), took part in a mixture of online open-ended questionnaires (26 participants) and one-to-one interviews (six participants). The interview schedule for the two methods was similar, with additional probing during the interviews. Participants were asked questions relating to their experience of lockdown, how this affected them, and the role of social media in their lives during lockdown.

Results: Three themes were generated from the thematic analysis: ‘Experience of lockdown’, ‘Connections’, and ‘Social media: content and consequences’. These themes explored: the difficulties adolescents experienced during lockdown and they ways this negatively impacted them; how distance from some and enforced proximity to others affected them; and how changes in online content influenced them and shifted their perceptions of themselves, and the world.

Conclusions: Social media was vitally important for adolescents during lockdown however it was not able to fully compensate for the lack of physical interactions during the pandemic. Adolescents highlighted media awareness an essential tool in helping them navigate the online world, emphasizing the importance of media literacy interventions.



Maths anxiety, SES, and early years maths achievement: How Covid-19 affected young school children

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Objectives: Before Covid-19, research showed that children from different SES backgrounds had divergent maths attainment; low SES tend to show lower attainment. The reasons for this are complex. However, Maths Anxiety (MA) also shows strong associations with attainment and this can be affected by schooling. This study investigated the effects of virtual schooling on maths attainment and MA of high and low SES children.

Method: Two cohorts of participants (Cohort 1= 205, Cohort 2= 199, Mean age 60 months) were recruited from high and low SES state schools. Participants completed Child Maths Anxiety Questionnaire (CMAQ) (Ramirez et al., 2013) and WIAT-iiiUK numeracy and problem-solving subscales (Wechsler, 2009) at the beginning of Year 1 and Year 2. Cohort 1 completed both testing times pre-pandemic; Cohort 2 completed Time 1 testing pre- and Time 2 testing post-pandemic.

Results: At Time 1, the levels of MA and attainment was similar for both Cohorts. At Time 2, Cohort 1 (pre-Covid-19) showed MA levels similar to Time 1. High SES children had higher maths attainment than low SES children, and the attainment gap remained constant. However, Cohort 2 (post-Covid-19) showed increased levels of MA for low SES children. The attainment gap also increased. At both time points, high MA was related to lower maths attainment.

Conclusions: Following virtual learning, the attainment gap for maths attainment increased. Virtual schooling had a greater impact on low SES children; one explanation being their increased MA. This evidence strengthens the link between MA and attainment from a young age.



The impact of lockdown 3 on anxiety and worries for families of individuals with Special Education Needs and Disabilities

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Background: Over the past year researchers have examined the effects of COVID-19 on mental health, including for individuals with Special Education Needs and Disabilities (SEND) and their families. Previous research has suggested that the wellbeing of individuals with SEND differed significantly from their typically developing (TD) siblings, especially for predictors of anxiety and impact of school closures (Sideropoulos et al., 2021). The current study examined anxiety and wellbeing during the third lockdown in the UK.

Participants: Parents of 146 individuals with SEND completed the survey by Sideropoulos et al (2021), and data for 66 TD siblings was obtained.

Methods: In addition to Sideropoulos et al (2021), the survey included questions about the trust in government, use of vaccines as well as the access to and usage of green spaces. Respondents answered questions about anxiety and worries for three key periods: prior the pandemic (T1), start of the pandemic (T2) and during lockdown 3 (T3).

Results: Preliminary findings showed anxiety levels significantly increased for both groups that over time (T1, T2, T3) but there was no significant difference between individuals with SEND and TD siblings. Using multiple regressions, we tested for associations between SEND/TD's anxiety and COVID-19 awareness, vaccine perception, anxiety diagnosis, health problems, parental anxiety, and demographic factors. Outcomes showed that the above predictors can act as risk factors for anxiety levels of those with SEND and their TD siblings.

Discussion: The potential effects of adjustment and habituation related to wellbeing and anxiety throughout the global pandemic will be discussed.



Workshop Abstracts

A whistle-stop intro to Bayesian stats: adjust your posteriors

Dr Nick Garnett¹, Dr Kathryn Francis¹

¹*Keele University*

This session will provide you with a whistle-stop tour around the key concepts of Bayesian statistics. Including an introduction to why NHST might be problematic, how Bayesian stats can be useful for developmental psychologists, and a quick look at software you can use to bring Bayesian stats into your research.



Decolonising Developmental Psychology

Dr Louise Taylor Bunce¹

¹*Principal Lecturer Student Experience, Oxford Brookes University*

Universities have had a long-standing statutory duty to 'eliminate unlawful racial discrimination' (Race Relations Amendment Act, 2000). It is concerning, therefore, that the poorer experiences and degree outcomes for students who endure racism have only recently become 'mainstream' (Gillborn & Gillborn, 2021). In this session, we will consider some practical ways that you can gain confidence to address racism and develop anti-racist pedagogy that supports learning for all students.



Poster abstracts

More overirregularisations after all

Katie Alcock¹

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Debates around irregular and regular past tense acquisition are long standing (1). Very few irregularisations found in early language data (2) but some data (3), including anecdotal data suggests that older children use these, at ages that are rarely represented in the early language datasets.

We used the UK-CDI Words and Gestures to assess the use of irregularisations in children (N = 28) aged 3 to 5 years learning British English. Examples from the author and colleagues, as well as those from the literature, were collated, and parents were asked to think about mistakes their child may make when using a verb to explain something that had already happened, such as saying “My brother and I fit yesterday” instead of “My brother and I fought yesterday”.

Out of the sample, 12 children were reported to make between 1 and 7 irregularisation errors out of 22 examples given. The most common were “brang” for “brought” and “flawn” for “flew” (though it is possible that the latter is a reading error). 5 of the errors were made by 1 child only.

It is also possible, however, that some of the irregularisations are correct irregular past tense usages from some dialects (e.g. bring – brang; treat – tret). The paper speculates on how these may evolve but also concludes that irregularisations may be missed if only very young children are studied.

1. Maratsos, J. *Child Lang.* 27, (2000).

2. Xu, J. *Child Lang.* 22, (2008).

3. Marchman, *Cog. Sci.* 21, (1997).

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The relation of school achievement and wellbeing in Chilean children

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Objectives: School socioemotional characteristics (classroom climate, peer and teacher relationships) and children’s development of academic skills and learning outcomes are known to be related. However, only a few studies have investigated this topic in Latin America, and specifically in Chile (Berger et al., 2014). This study investigated the relations between achievement and wellbeing indicators of primary school children in Chile. Specifically, we examined how were children’s math and language skills, school marks, and children’s report of their school self-esteem and climate related.

Methods: Participants were 8382 children attending primary education in 2017, enrolled in the Early Childhood Longitudinal Survey. The sample was representative of the population of children born between 2006 and 2009. Measures included math and language skills, school marks, school self-esteem, school climate, and children’s perceptions about their education.

Results: Correlation analysis showed significant relations between math and language skills, and each of them with school marks. Children’s perception of their school performance related to their school marks, the value they gave to their education, their enjoyment of going to school and their self-esteem. School self-esteem had similar correlations as school performance perception, and it was the only measure related to school climate.

Conclusions: Findings suggest that children’s learning and their thoughts and feelings about their experience at school are connected. It points to the importance of considering the context and different relationships that are part of attending school. This study provides useful information for the design of interventions promoting both children’s achievement and mental health.

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Emotion regulation in emerging adults: Do parenting and parents' own emotion regulation matter?

Ana Aznar¹, Freya Battams

¹University Of Winchester

Effective emotion regulation (ER) strategies are linked with healthy psychosocial functioning. Parenting behaviours and parents' own ER have been linked to the development of their children's own ER. The present study examined the relation between perceived and self-reported parenting dimensions (warmth, psychological control, and behavioural control), and caregivers' own ER, with emerging adults' ER. Participants included 466 emerging adults, and a subsample of 102 emerging adult-primary caregiver dyads, and 51 emerging adult-secondary caregiver dyads. Findings from analyses on emerging adults suggest that only perceived caregivers' warmth predicted emerging adults' use of successful ER strategies. In contrast, findings from analyses on emerging adults-caregiver dyads, suggest that caregivers' reported parenting did not predict emerging adults' ER strategies. In addition, caregivers' reported use of ER strategies did not predict emerging adults' own use of ER strategies. These findings suggest that it is the perception of parenting rather than what caregivers report doing that influences emerging adults' ER. Limitations and directions for future research are considered.

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Testing the specificity of environmental risk factors for developmental outcomes

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Developmental theories often assume that specific kinds of environmental risks lead to specific outcomes. Canonical Correlation Analysis was used to test whether 28 developmental outcomes (measured at 11-15 years) share the same early environmental risk factors (measured at 0-3 years), or whether specific outcomes are associated with specific risks. Data from the UK Millennium Cohort Study (N = 10,376, 51% Female, 84% White) were used. A single environment component was mostly sufficient for explaining cognition and parent-rated behavior outcomes. In contrast, adolescents' alcohol and tobacco consumption were specifically associated with their parents', and child-rated mental health was weakly associated with all risks. These findings suggest that with some exceptions, many different developmental outcomes share the same early environmental risk factors.

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Parent-child Relationships and Developing Peer Acceptance Through Social Competence at 3 Years of Age

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Objectives: Peer acceptance predicts psychological wellbeing and academic success. However, the developmental predictors of peer problems are not yet fully understood. We hypothesise that positive parent-child relationships at 3 years may reduce peer-problems by promoting social competence.

Methods: Secondary data analysis of the Millennium Cohort Study (MCS) was used to explore the predictors of peer problems in 15590 3-year-old children. The MCS provides a representative sample of children across the UK born in the year 2000-2001. The Strengths and Difficulties Questionnaire assessed; emotional problems, conduct problems, hyperactivity, prosociality and peer problems. The Child-Social-Behaviour Questionnaire assessed self-regulation, and the Parent-Child Relationship questionnaire assessed relationship quality.

Results: Positive parent-child relationships were associated with reduced emotional problems, $r = -.30$, conduct problems, $r = -.52$, hyperactivity, $r = -.428$, and peer problems, $r = -.29$; and increased self-regulation, $r = .32$, and prosociality, $r = .32$. Structural equation modelling confirmed that warm parent-child relationships were predictive of reduced peer-problems at 3 years, directly, and through the mediation of decreased emotional-problems and increased prosociality, $X^2(1) = 610$, $p = .435$, $CFI = 1.000$, $RMSEA < .001$. Pathways through increased self-regulation were non-significant; whereas pathways through decreased conduct problems and hyperactivity were significant, but reduced model fit.

Conclusions: These results support the hypothesis that positive parent-child relationships promote peer acceptance, in part due to their association with reduced emotional problems and increased prosocial behaviour. We cannot infer causality from cross-sectional data, but longitudinal modelling linking further sweeps from the MCS to the development of peer acceptance is underway.

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Isolating the critical ingredients used for training motor skills within early intervention studies for young autistic children: A systematic review

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Purpose: The aim of the systematic literature review (SR) is to identify the critical ingredients used in early intervention (EI) programmes to train motor skills in young autistic children.

Background: Autistic individuals show sensorimotor processing difficulties when executing and learning motor skills. Currently, only a limited number of EIs contain tasks/activities designed to improve certain motor skills in autistic children. The aim of the systematic review is to identify the critical ingredients used within EIs programmes to train motor skills in young autistic children.

Methods: The SR is guided by the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) standards. Search terms used are autism, early intervention, early years and (sensory)motor. Included studies will be RCTs and N-RCTs focusing on autistic children, or children at-risk of autism, from birth to the first year of primary school. Data extracted is the name of EI, theoretical framework, study design, population (number of participants, age range, diagnosis condition, diagnosis method), comparison (type of control group, random allocation to group, matched groups at baseline), and motor skill (types of motor skill, task, training frequency, measurement tool, group means and standard deviations, instructor, setting, effectiveness). The overall body of evidence is assessed using the GRADE framework. A narrative synthesis is presented from the evidence.

Conclusions: The narrative synthesis will highlight the main critical ingredients used to train motor skills across the selected EIs. These critical ingredients will be synthesised and appraised in order to develop a novel motor-based EI for young autistic children.

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The link between mind-wandering and learning in children

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Objectives: Mind wandering is a common everyday experience during which attention shifts from the here and now. In adults, higher frequency of mind wandering during learning activities has been associated with poorer task performance. However, despite its relevance for education, mind wandering is largely unexplored in children. This study is the first to directly assess the impact of mind wandering on memory retention in primary schoolers.

Methods: The sample included 86 children aged between 6 and 11 years. The frequency of mind wandering was measured during a listening activity containing intermittent thought probes. Subsequently, children completed a multiple-choice test assessing their memory for the content of the story.

Results: Consistent with the extant literature, children reported mind wandering on 25% of the thought probes. A hierarchical regression analysis was conducted to examine the unique contribution of mind wandering to task performance. When controlling for the impact of age and vocabulary skills, mind-wandering frequency accounted for a large and significant portion of variance (42%) in memory test scores.

Conclusions: We found that the frequency of mind-wandering during a listening activity negatively predicts subsequent memory performance. This is the first study to demonstrate that the important link between mind wandering and learning found in adults is also present in developmental samples. Future work should endeavour to extend the current findings to school settings.

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An Examination of the Gendered Behaviours Displayed by Disney Protagonists

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Objectives: Previous research demonstrates that gendered representations in Disney Princess films have improved over time. However, male characters have not been examined in similar detail. This research assessed differences in the masculine/feminine traits of Disney protagonists over time, utilising more male characters and including recent Disney releases.

Methods: A content coding analysis of 38 Disney protagonists across 17 Disney animated feature films was conducted. The films included were either Disney Princess animations or had a central human adult male protagonist and had made \$200 million worldwide. A framework of 52 behaviours was designed. Each time a character displayed a behaviour, it was counted, and the timestamp was recorded. Two coders coded each film, with high inter-rater reliability.

Results: Independent and paired-sample t-tests showed that a) male characters are significantly more masculine than female characters and b) while female characters displayed significantly less masculine characteristics than feminine characteristics, there was no significant difference in the levels of masculine and feminine characteristics displayed by male characters. Two one-way independent ANOVA's revealed that the percentage of masculine behaviour displayed by female characters significantly increased over time, whereas masculine behaviour displayed by male characters did not.

Conclusions: Disney have consistently presented balanced male Disney characters, and have more recently represented female characters to be less stereotyped. Future research should examine the impact of male Disney characters' complex gender profiles on young boys, to ascertain whether Disney is a force for good or evil in the socialisation of male gender roles.

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An investigation into factors that predict mainstream, primary school teachers' and classroom support staffs' understanding of Autism Spectrum Disorder

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Objectives: To gain a better understanding of factors which predict mainstream primary school teachers' and classroom support staffs' understanding of Autism Spectrum Disorder (ASD). This research is necessary as the prevalence of ASD is increasing, meaning more autistic children are being educated in mainstream school.

Methods: Three hundred and forty-eight teachers and classroom support staff completed an online questionnaire. They provided information on their age, gender, professional role, number of years working in a classroom, training and professional and personal experience with ASD, and then completed the Autism Awareness Survey (Tipton & Blacher, 2014).

Results: Significant positive associations between professional and personal experience and understanding of ASD were found. A multiple regression indicated that the variables predict approximately 7% of variance in understanding of ASD, and that personal experience with ASD was the only variable that significantly contributed to the model. An additional important finding was that in this study, the Autism Awareness Survey had low internal consistency, $\alpha = 0.50$.

Conclusions: Generally, the findings on experience support previous research but the importance of personal experience with ASD gave a unique insight into predictors of ASD understanding. However, the most noteworthy finding is the need for a new scale measuring understanding of ASD. Although the Autism Awareness Survey is widely used, both this study and Gillespie-Lynch et al. (2015) found it had low internal consistency. It would be beneficial for future researchers to develop a new scale that reliably measures understanding of ASD.

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Mathematics in Pre-term Pre-schoolers

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Purpose: The current pilot study forms one of four phases of a larger project informing a case-control study with parents of pre-schoolers born very preterm (VP, at <32 weeks' gestation). The aims of this pilot study will be to assess if an online parent-child interaction observation paradigm is appropriate, feasible and will produce data with sufficient variation.

Background: There are numerous reasons why a child may struggle with mathematics, including living in a lower socioeconomic environment or not having English as your first language. Another risk factor for poor mathematical attainment is being born very preterm. Comparing VP children with full term peers, the most substantial identified educational difficulty is consistently in mathematics. The time spent learning in the home environment before entering school is a critical period for typically born children and currently there is a lack of research focusing on the underlying mechanisms that may account for the difficulties that VP children experience in mathematics, such as environmental influences.

Method: This pilot study will use virtual observation methodology to assess parent-child interactions in the home environment whilst playing with mathematics related toys. These observations will be coded for three major aspects of scaffolding that predict academic skills in mathematics: specifically, parents cognitive, emotional and autonomy support towards their child. Participants will be 10 (N=10) 3–4-year-old typically developing full-term pre-schoolers and their parent/guardian.

Conclusions: Available at the time of the conference.

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The correlations between social perspective-taking abilities and behavioral standards and their development in elementary and middle school students in Japan

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The development of morality is often measured in Japan using two scales: Araki's social perspective-taking test (Araki and Matsuo, 2017) based on Kohlberg's theory of moral development, and Sugawara et al.'s scale for public behavioral standards (2006). Sugawara et al.'s instrument comprises five subscales: egocentric peer-standards, regional-standards, care for others, and public values. These subscales are also sequentially related to Kohlberg's moral developmental stages. However, no study has yet examined these scales and their associations.

This study evaluated the relationship between social perspective-taking abilities and behavioral standards and aimed to elucidate the development of these attributes in elementary and middle school students. The study participants comprised 77 sixth-grade elementary school students and 399 middle school students. The questionnaire was administered during relevant lessons after obtaining due consent. Analyses of variance were performed by grade for the social perspective-taking ability and for each subscale. Significant differences were found in egocentricity, peer-standards, and social perspective-taking (egocentricity: $F(3)=4.9$, $p<.01$; peer-standards: $F(3)=2.8$, $p<.05$; social perspective-taking: $F(3)=12.0$, $p<.001$). The Bonfferoni method was applied to affect the comparisons.

The results revealed that ninth grade students were higher in egocentricity than sixth and seventh grade participants; eighth grade respondents were higher in peer-standards than seventh grade students. Sixth-grade participants were lower in social perspective-taking than all other grades, and seventh and eighth grade respondents were lower in this measure than ninth grade students. Consequently, grade-based correlations were performed for all variables. Social perspective-taking was not found to be correlated with any variable except in the eighth grade.

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Investigating the influence of self-referential pronouns on children's close reading performance

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Objectives: Thinking about yourself whilst encoding information enhances memory and attracts attention in comparison to thinking about other people or contexts, a bias known as the 'self-reference effect'. Whilst this effect has been robustly established in the laboratory, its educational applications are only just being investigated. This study examined the efficacy of self-referencing manipulations on a text reading task, hypothesising that attention and memory biases would increase reading speed and task engagement, and boost text memory.

Methods: Sixty-eight children aged 7-11 categorised as either 'younger than 9' (N = 26) or '9 or older' (N = 42) read three prose passages written in 1st, 2nd (self-pronouns "I" and "you") and 3rd (other) pronoun and matched for passage length and difficulty. Each passage was followed by a summary question and five memory questions.

Results: Findings showed that the length and accuracy of older children's responses did not differ according to pronoun type for neither the summary nor memory questions, although younger children produced longer responses in the 3rd than 1st pronoun passages. Older children spent longer reading the 2nd than 1st pronoun passages, but there were no other effects of pronoun type on reading time.

Conclusions: We found mixed evidence regarding the impact of the self-reference effect in this reproduction of a classroom literacy activity. Future studies will further examine the self-reference effect in alternative classroom activities.

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Anger affects altruistic punishment and compensation in children, adolescents, and adults

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¹University Of Warwick, ²Liverpool Hope University, ³Leiden University

Background: Third parties' observations of injustices can either lead to punishing the violator or restoring the harm done by compensating the victim. Previous research has shown that emotions, such as moral outrage, anger, or empathic concern, motivate third-party punishment and compensation in adults. While a number of studies have investigated whether children as third-party observers punish and compensate, little is known how emotions, particularly anger, affects altruistic third-party punishment and compensation in children and adolescents.

Method: 142 9-year-old children, 146 13-year-old adolescents, and 144 adults were induced to either a neutral or an angry emotion. Then, participants observed seven allocations between anonymous Persons A and B, which B could only accept. Participants decided whether to pay some of their endowment to punish Person A (i.e., decreasing their pay-off) or compensate Person B (increasing their pay-off).

Results and Discussion: Manipulation checks showed that, across ages, participants in the angry condition experienced significantly more anger and less happiness than those in the neutral condition.

Across ages, third-party punishment decreased with increasing offers. Angry participants punished more than those in a neutral emotion, particularly unequal distributions. This is in line with previous research with adults, which showed anger being associated with unfairness and punishment.

Third parties compensated significantly less the more equal the distribution. Compared to the neutral condition, children and adolescents in the anger condition compensated more, but the effect of emotion on compensation was reversed for adults. Children, adolescents, and adults may thus appraise incidental anger differently in third-party compensation situations.

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The quest for acceptance: a blog-based study of autistic females' experiences and well-being during identification and diagnosis of their autism

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Objectives: Mental wellbeing and the female experience are important research topics in the field of autism, and appear to interact, with autistic women showing poorer outcomes in their wellbeing compared to men. This study aimed to explore, through blog-based thematic analysis, the impact that identification/diagnosis have on autistic women's mental health, and the impact that mental health has on women's diagnosis and identification.

Methods: Blogs written by twenty adult, autistic women were submitted to a reflexive thematic analysis, whereby we: initially coded the blogs, reviewed coding and re-read blogs to ensure all data was coded, and then grouped and developed the codes into themes.

Results: The issue of acceptance was a strong central issue, under which we developed themes of self-understanding and self-acceptance, being understood and accepted by others, and exhaustion resulting from trying to be accepted and be understood. These reflexive themes ran along a diagnostic timeline from misunderstood difficulties to self-identification or diagnosis, and beyond.

Conclusions: This study highlights the central role that acceptance plays in autistic women's wellbeing throughout the diagnostic journey. Our findings suggest that the extent to which diagnosis positively impacts autistic women's wellbeing depends on the level of acceptance, both personally and by others. The study has clinical implications, namely: recognition that the diagnosis process is stressful for women, autistic women's presentation may be filtered through a highly developed mask, and the need for acknowledgement of the fatigue resulting from coping in a neurotypical world without appropriate support for many years.

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The relationship between self-efficacy and mindsets in autistic children

Gemma Haywood, Dr Yvonne Skipper, Dr Kara Makara

¹University Of Glasgow,

Objectives: Autism affects approximately 1 in 100 children in the UK (The British Medical Society, 2020). Both autistic adults and children are more likely than neurotypical individuals to experience, mental health issues, for example, depression (e.g. Mayes, Gorman, Hillwig-Garcia & Syed, 2013). It is therefore important that we understand why this might be. One explanation may be that autistic children may have low self-efficacy in various domains (e.g. academic and social) and may not feel that they can improve i.e. may have a fixed mindset. Accordingly, the primary objectives of this study are to explore the relationship between self-efficacy and mindsets in autistic children.

Methods: SEND schools will be recruited to participate in a quantitative survey assessing autistic children's self-reported levels of self-efficacy and mindsets. Then approximately 10 students will be recruited to participate in semi-structured interviews to explore the reasoning behind self-reports.

Results: We predict that autistic children will report low self-efficacy in varied domains and a fixed mindset.

Conclusions: By exploring and addressing such gaps in the literature, this study will provide a novel and potentially fruitful avenue for interventions to improve the wellbeing of autistic people from a young age, by enhancing self-efficacy and promoting growth mindsets.

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Effects of an intervention designed to promote the transfer of parents' language supporting skills

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Objectives: The quality of parents' linguistic input plays a critical role in shaping children's language skills. However, there is variability in the language support parents provide. Shared reading interventions increase parents' use of language supporting strategies. Nevertheless, parents' improved skills rarely transfer to other contexts. To address this, we designed and tested a programme to support the transfer of parents' language supporting skills.

Methods: 8 parents of 3–4-year-olds were assigned to an intervention group and 6 to a control group. In weeks 1-6, intervention parents practiced language supporting strategies during wordless picture book reading. In weeks 7-8, parents practiced these strategies when talking about shared experiences. Examples of the language supporting strategies were compared across both contexts to highlight the common language supporting skill. Before and after the intervention, parents took audio recordings with their child, while reading a wordless picture book (near transfer), reading a 'picture-and-text book' (intermediate transfer), and completing a toy play activity (far transfer).

Results: Results showed that parents in the intervention group used significantly more decontextualised (abstract) language during the toy activity. There were also non-significant mean differences favouring the intervention group in: open-ended prompts for both book activities; extensions for the picture-and-text activity; and, decontextualised language for the wordless picture book activity.

Conclusions: These preliminary findings suggest it is possible to support parents to transfer their language supporting skills to new contexts. This has future potential educational implications in terms of increasing the effect of parent-delivered interventions on children's language skills.

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The Effect of Preschool Language on Early Literacy Development: A Meta-analysis

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Purpose: This meta-analysis aims to establish the size of the effect of preschool oral language skills on early literacy development. Preschool oral language skills impact reading accuracy and comprehension development throughout school.

Background: Much of the research focussing on the relationship oral language skills and literacy development has reported on concurrent data analyses. Less is known about this effect across early childhood and the role different aspects of early oral language play on later reading skills.

Methods: The PRISMA protocol for this meta-analysis has been registered on PROSPERO. This protocol includes the research aims, planned hypotheses and methods for conducting the meta-analysis. This analysis focusses on three research aims. Research aim 1: to establish the overall effect size of the influence of preschool oral language on early literacy development. Research aim 2: to examine the relationship between specific oral language skills and different reading-related measures, such as letter knowledge and phonological awareness. Research aim 3: to examine the effect of formal literacy onset timing on the influence of oral language skills on literacy development. The systematic literature searches have been completed and the screening of titles and abstracts is underway. After removing duplicates, 11,704 unique records have been identified. Studies that include both a preschool measure of oral language skills and an early school-age measure of literacy development will be included in the analyses.

Conclusions: The results will highlight which aspects of early oral language (word comprehension, word production, and grammatical skills) affect early reading development.

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Fundamental development for the emergence of pointing in children with general learning difficulties

Tadashi Koyama¹

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Objectives: The role of early communicative ability was focused in the process of children's language learning. Joint attention behavior and pointing were important for child language acquisition in recent researches. However, for the cases of the children with general learning difficulties, the emergence of pointing delayed. This study examined prerequisite and fundamental cognitive base for emergence of pointing in children with general learning difficulties.

Methods: 24 children with general learning difficulties participated in this study longitudinally. The author asked their parents to check the questionnaire on children's cognitive and play development at home and Japanese MacArthur Communicative Development Inventory (CDI: Words and Gesture). And the author conducted consultations with their parents. The pointing gesture emerged in 6 children during this study. The author examined their results of the questionnaire on children's cognitive and play development at home in the period that pointing emerged. Analysis was conducted from the viewpoint of 5 factors extracted through factor analysis on the answers of that questionnaire with typical development.

Results: Understanding of others' inner states, comprehension of emotional words, pretended play to self and dolls, playing with dolls, and solving puzzles with up to 10 pieces were observed at home in parallel with emergence of pointing for children with general learning difficulties.

Conclusions: Results in this study suggested that children's understanding of internal states of a parent, representation of others' behavior, and relating the parts to the whole as fitting puzzle pieces at home related to development of pointing for children with general learning difficulties.

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Neurorehabilitation and Neuroeducation with Older Adults: Digital Tools For Lifelong Learning

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Social isolation, especially in the elderly, often leads to drastic consequences. Both physical and mental health is affected by sensory, emotional and social deprivation. In this work we consider new ways of social inclusion.

Many older adults in our digital era use various means of digital communication. Messenger, social networks and engagement on various internet sites is only one fraction of the opportunities new technologies may offer to a socially restricted, if not totally isolated, person. Online psychological therapies may be expensive, but there exist interactive sites where one can get social support completely free of charge or for a symbolic price. New social tools appear every day, including various health apps. More specialized neuropsychological apps are also on the rise, even though they still reach only a fraction of their potentially vast audience. Completely unmanned psychotherapy systems are being developed, even though it's hard to imagine the effectiveness of a therapeutic intervention with an automated service powered by artificial intelligence. Internet has been classically used for educational needs, even though learning as a therapeutic tool has often been disregarded. Learning or educational tools can be effectively used by older adults for improving their cognitive functions, mood and social abilities. Even taking Coursera courses may induce positive emotions and fight the feeling of loneliness which is unavoidable in situations of social exclusion.

This review compares effects of neuroeducation, learning, neurorehabilitation, social networking and other digital tools for social integration of older adults. Risks such as cybercrime are also discussed.

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Association between autism spectrum traits and cognitive reappraisal strategies in emotion regulation in typically developing individuals

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Objectives: Previous studies pointed out that individuals with autism spectrum disorder had difficulty in regulating their negative emotion. However, the association between ASD traits and emotion regulation in typically developing individuals have not been examined. The aim of this study is to examine the association between ASD traits and cognitive reappraisal strategies in emotion regulation in TD individuals.

Methods: Participants were 148 Japanese undergraduates without ASD. They completed the Japanese version of the Social Responsiveness Scale 2, Adult-Self and the Japanese version of the Cognitive Emotion Regulation Questionnaire.

Results: The results showed that a) social motivation in ASD traits influenced positive reappraisal strategy and positive refocusing strategy; b) repetitive/restricted interests in ASD traits influenced rumination or focus on thought strategy and acceptance strategy; c) social information processing in ASD traits influenced self-blame strategy. d) capacity for reciprocal social communication in ASD traits influenced catastrophizing strategy and refocusing on planning.

Conclusion: These results suggested that each trait of the ASD had a different effect on the use of cognitive reappraisal strategies in emotion regulation. These findings can help develop interventions to enhance adaptive emotion regulation strategies in individuals with high ASD traits.

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Personality traits associated with pathological features among contemporary Japanese Adolescents

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Objectives: Researchers have stated that contemporary Japanese adolescents are eager to maintain harmonious and hyperthymic friendships. Some adolescents behave as if they have many friends to socialize with even if they are alone; termed “lunch-mate syndrome.” Other adolescents withdraw from their peer group keeping an emotional distance from their friends; termed “commu-phobic tendency.”

According to the “alternative DSM-5 model for personality disorders,” Okada (2019) discovered that hypervigilant narcissistic adolescents display features of internalizing pathology. Therefore, present study examines the structures of friendship, lunch-mate syndrome, and commu-phobic tendency on public self-consciousness and personality traits associated with internalizing or externalizing pathology, including a reanalysis of Okada’s (2019) data.

Method: We examined online questionnaires answered by 716 Japanese college students to measure the Big Five personality traits, public self-awareness, present-day adolescent friendships, lunch-mate syndrome tendency, and commu-phobic tendency.

Results: A cluster analysis based on the personality traits yielded the following three major clusters: (1) adolescents who exhibited low extroversion and high neuroticism; (2) adolescents who exhibited low neuroticism and high agreeableness; and (3) adolescents who exhibited high extroversion and low agreeableness. Cluster 1 had significantly higher scores on commu-phobic tendency traits than other clusters; however, cluster 3 had a higher score in hyperthymia-like tendency among their friends. Cluster 2 scored lower in public self-awareness and lunch-mate syndrome tendency.

Conclusions: These results suggest that hyperthymia-like adolescents display features of externalizing pathology, and commu-phobic adolescents demonstrate features of internalizing pathology; however, well-adapted adolescents do not mention how they are seen by others.

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Socio-cognitive correlates of school-aged children's second-order lying behavior

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Objective: This ongoing study relates children's second-order lying (i.e., alternating between truth-telling and lie-telling to deceive convincingly) to theory of mind (ToM; second-order ToM and second-order ignorance) and executive functioning (EF: inhibition, shifting, and working memory).

Methods: Second-order lying was assessed using the hide-and-seek game by Sai and collab. (2018) in which children had to hide a coin in one of their hands to prevent the experimenter from finding it. The task had 6 rounds, in which the confederate was systematically choosing or not the hand indicated by the child across a maximum of 42 trials.

62 8 to-10 years-olds were assigned to one of the two experimental groups: Group 1 (n = 31, 13 girls): telling the truth to deceive; Group 2 (n = 31, 17 girls): telling a lie to deceive. ToM was assessed using the strange stories (White et al., 2009). As for EF, we used the Inhibition and Shifting task (NEPSY; Korkman et al., 1998) and the Backward Digit Span task (Wechsler, 2003).

Results: Second-order lie-tellers outperformed truth-tellers on second-order false belief understanding: $U = 130.5$, $z = -5.13$, $p = .000$, second-order ignorance - $U = 289.5$, $z = -2.7$, $p = .000$, verbal working memory - $U = 10.7.5$, $z = -4.5$, $p = .000$, and inhibitory control - $U = 64$, $z = -5.17$, $p = .000$ measures.

Conclusions: Second-order lie-telling behavior is associated with children's cognitive development as it requires higher cognitive functions to be successful.

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Development of a clinical screening instrument for depression symptoms in children and adolescents with autism spectrum disorder

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Depression is common in children and young people (CYP) with autism spectrum disorder (ASD). Currently available measures to screen for depression symptoms have been developed for, and validated with, typically developing CYP. Mental health difficulties may present differently in ASD and important features of depression may not be identified using traditional tools. We aimed to develop a brief screening tool to enable clinicians from diverse backgrounds to identify depression symptoms more accurately in CYP with ASD.

Items from 11 existing depression measures were extracted. An expert panel (developmental and clinical psychologists, psychiatrists, speech and language therapist) utilised clinical and research knowledge relating to depression and autism to identify a pool of 25 individual items for further consultation with autism professionals, CYP with ASD and their parents. Interviews were conducted with young people with ASD (aged 9-18 years) without co-occurring intellectual disability and their parents (N=16 dyads), and ASD practitioners (N=18) to ascertain the content validity, necessary adaptations, acceptability and readability of the items using a co-production model.

Those items deemed to have greatest face validity, acceptability and readability following triangulation of findings from interviews with the three informant groups comprise the final item scale. To ensure multi-informant integration, child and parent report versions of the depression screener were developed.

This Neurodevelopmental Depression Inventory is a novel depression symptom screening tool we hope will have direct impact in routine clinical services and help advance research. We aim to validate the tool and to ascertain suitability for CYP with other Neurodevelopmental Disorders.

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The Quality of Everyday Eye Contact in Williams Syndrome: Insights from Cross Syndrome Comparisons

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Past research shows that individuals with Williams syndrome (WS) have heightened and prolonged eye contact. Using parent report measures, we examined not only the presence of eye contact but also its qualitative features. Study 1 included individuals with WS (n=22, age 6.0–36.3). Study 2 included children with different neurodevelopmental (ND) conditions (WS, Autism spectrum disorder, Fragile X syndrome, Attention deficit hyperactivity disorder) and children with neurotypical development (NT) (n=262, age 4.0–17.11). Unusual eye contact features, including staring, were found in approximately half of the WS samples. However, other features such as brief glances were frequently found in WS and in all ND conditions, but not NT. Future research in ND conditions should focus on qualitative as well as quantitative features of eye contact.

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Science with Duplo: Embodied planning of action sequences in preschoolers

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Preschooler's ability to plan hierarchical action sequences improves with age and this can be examined via embodied markers of planning (Schröer et al., 2021). For example, children who followed the correct subgoal order on a building task showed relative freezing of their non-reaching hand when executing a subgoal.

The current study uses existing video materials to identify possible markers of embodied planning in preschoolers. Data of a hierarchical action sequence planning task from 40 3- and 5-year-olds was re-coded for the presence of potential embodied planning markers, such as hesitation.

Results showed that good planners, who were able to follow the main goal and the subgoals, showed less hesitation and looked less often at the experimenter than children who did not finish the main goal or mixed up the order of the action steps. Furthermore, younger children showed more hesitation, looked more often at the experimenter, and showed more missing hand support when constructing the Duplo house compared to older children.

Hesitation was more likely to occur at key decision points (i.e. branch points) where children switched from one subgoal to another. This effect was stronger in older children compared to younger children, in children who followed the subgoal order compared to children who mixed up the action steps, and in children who were able to follow the key goal compared to children who were not. This data demonstrates that hierarchical action sequence planning develops over early childhood and embodied markers can be used to investigate this development.

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The relationship between explicit synchronised movement, displayed pro-social sharing and reported perceived similarity in children

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Objectives: Previous research has shown that synchronous movement between individuals can heighten feelings of prosociality and similarity. However, research using virtually-induced synchrony with children has not been studied. The current study explored the effect of virtually-induced motor synchrony, on prosocial generosity and perceived similarity in young children.

Methods: This study used a 3x2x2 between-subjects design, with three independent variables [synchrony condition (3), gender (2), year group (2)] and two dependent variables [generosity and perceived similarity]. Eighty-two 4.5- to 6.5-year-olds [40 girls] participated. Children tapped on a drum with either 1) a same sex virtual peer bouncing a ball in a movie, or 2) a ball bouncing on its own. In a control condition, children watched a tiger playing with a ball and then drew a picture. . Generosity was measured using a toy distribution, a task, Perceived Similarity was established by a similarity inventory.

Results: There were no significant effects of gender, age or condition on either generosity or perceived similarity. However, planned post-hoc tests revealed that children in the social synchrony condition (with the virtual peer) reported higher perceived similarity to their virtual peer than those in the non-social synchrony condition (the ball bouncing alone) - $t(54)=2.230, p<.03$. Also, pairwise comparison showed younger children (4.5-5.5) scored higher levels of similarity $F(1.70)=6.632, p<.012$.

Conclusions: Results showed that virtually induced synchrony is not as useful in altering the generosity choice of young children. However, more interestingly, results indicated that children felt more similar to an unfamiliar peer following conscious movement synchrony.

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Investigating the development of the forward model system in children

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Objectives: The objective of the current paper was to establish the development of the forward model system in children. The forward model system controls and monitors action execution. Previous research has shown that children are less accurate in using their forward model system to control the timing of their movements compared to adults. However, limited research has investigated how use of the forward model system changes as children grow. It was hypothesized that successful use of the forward model system would be predicted by age with older children showing better performance than younger children.

Methods: 43 children were recruited (26 male, 16 female, 1 preferred not to say). Participants' ages ranged from 4.25 to 12.95 years ($M=9.11, SD=2.48$). Participants completed an online computer task where they were presented with two race-cars and a set of traffic lights, which moved from red to green throughout each trial. Participants had to click the screen as soon as the green light was visible. Reaction time was recorded relative to the green light's onset. Responses were classified as anticipatory or reactive using an equation based on participants' reaction time.

Results: The likelihood of participants making an anticipatory response was significantly predicted by age ($Beta=.36, SE=.03, p=.03$). This was not predicted by gender or parent-reported impulsivity (all $p>.05$). The overall model fit was $R^2 = .13$.

Conclusions: The findings suggest that successful use of the forward model system improves as children age. These results improve our understanding of how the motor system develops in childhood.

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Engage with Developmental Language Disorder: A new project to facilitate research into Developmental Language Disorder

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Conducting research on Developmental Language Disorder (DLD) is hard. The lack of public awareness of DLD (Thordardottir et al., 2021) contributes to the well-known difficulty recruiting into research studies. The difficulty in conducting DLD research in turn may contribute to the finding that DLD research is underfunded (Bishop, 2010) and under-researched, given DLD's prevalence and impact (Bishop, 2010; McGregor, 2020). The Engage with Developmental Language Disorder (or E-DLD) project aims to help address the difficulties in recruiting individuals to take part in DLD research. E-DLD is an international database of individuals and families affected by DLD. E-DLD members are regularly informed about DLD research projects and given the opportunity to take part in these studies.

Currently, 85 parents and five adults with DLD have signed up. Average age of the children is 8.4 years, 83.5% are monolingual, 86% have siblings and 69% are from the UK. Nine non-UK countries are represented. Expressive language problems are experienced by 94% of the children, with 73% experiencing receptive language difficulties and 80% word finding difficulties. Approximately 30.6% of the children have parent-reported anxiety problems. Initial results from the integrated research study indicate that these children, as a whole, have elevated rates of emotional, hyperactivity and peer problems as measured by the SDQ. The means for hyperactivity and peer problems were above the "slightly raised" normative cutoff, with the mean for emotional problems above the "high" normative cutoff. The E-DLD project holds enormous potential to close the gap in this under-researched field.

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Uncertain World - Can curiosity and Intolerance of Uncertainty (IU) in children be differentiated at the behavioural and emotional level?

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Curiosity (a thirst for knowledge) and intolerance of uncertainty (IU - an aversion to not knowing) are both thought to drive information seeking but have very different affective profiles. Curiosity is associated with positive affective responses to uncertainty and improved learning outcomes. In contrast, IU is associated with negative affective responses and anxiety. These traits have not previously been examined together in children but may be key to understanding how uncertainty is related to both learning and wellbeing.

Our research aims to examine how individual differences in curiosity and IU are associated with behavioural and emotional responses to uncertainty. It is hypothesised that children's information seeking will be related to curiosity and IU, curiosity will be associated with positive emotional responses to uncertainty and IU will be associated with the negative emotional responses to uncertainty.

Children completed an online game where each button in an array plays either a neutral or an aversive sound (adapted from Hsee & Ruan, 2016). Uncertainty was manipulated by varying button labels. Affective responses were measured by recording facial expressions during an anticipation period, and by self-report. Additionally, parents completed measures of trait curiosity and IU. Completion of data collection is estimated for mid-May.

Complete datasets for 132 participants will be analysed in advance of the conference using multi-level regression according to our pre-registration on OSF (<https://osf.io/56jg4>). Findings will elucidate behavioural and affective profiles of individual differences in curiosity and IU, potentially informing future interventions to reduce childhood anxiety and improve educational outcomes.

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The influence of parenting styles and attributions of pre-schoolers' behaviour on their self-regulation and problem behaviours: Analysis with dyadic data

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Objective: Parenting styles in early childhood influence children's self-regulation and problem behaviours. Additionally, parents who jointly raise their children share an interdependent two-party relationship, and similarity within the pair is assumed. Therefore, we examined a model in which the attribution of children's behaviour influence parenting styles, which in turn influences children's problem behaviours and self-regulation at the individual and parental levels.

Method: A questionnaire survey was administered to 345 pairs of parents of children aged two to six years. The questionnaire assessed the attribution of children's behaviour, parenting styles (Scolding, Consultation and Positive Rearing), and children's problem behaviours and self-regulation.

Results: Multilevel structural equation modelling was used to examine the hypothetical model, and the goodness of model fit was acceptable (CFI=.898, RMSEA=.070). At the within-level, from attribution to parenting style, there was a significant positive path to Consultation and Positive Rearing, and a significant negative path to Scolding. Concerning self-regulation, there was a significant positive path from all parenting styles. Additionally, at the between-level, the path from attribution to parenting style was similar to the within-level. Concerning self-regulation, there was a significant negative path from Scolding.

Conclusion: Therefore, scolding at the parental level reduced children's self-regulation; however, scolding at the individual level was beneficial. This suggests that the parenting style required for children differs between individual and parental levels.

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Early arithmetic: the role of domain specific and domain general skills

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Objectives: Previous studies demonstrated that children calculation abilities depend on the arithmetic task format (e.g. non-verbal problem) and it has been suggested that diverse formats may require diverse abilities. Nevertheless, few studies investigate concurrently the domain specific, and domain general abilities requested in solving diverse calculations. The current study aims to compare the performance on diverse problem formats and to investigate the relationship of the diverse problem format performance with domain specific and domain general skills.

Methods: 145 typically developing children of five-year of age were administered the same additions proposed on diverse format (non-verbal problem, number fact problem, story problem) and number sense, fluid intelligence, language, visuo-constructive skills, inhibition and working memory tasks; age and mother education were also considered.

Results: As expected, children performed differently on the diverse problems. The order of difficulty was: non-verbal problems, story problems, number fact problems. More interestingly, the performance on the diverse problems were differently associated to the other variables. Specifically, when the diverse problem format performances were considered as dependent variables in multiple linear regression analysis (stepwise method), the results revealed that diverse factors entered as significant predictors and working memory and inhibition accounted for the most difficult problem format.

Conclusions: Children arithmetic performance vary according to the problem format and not to the calculation requested. Additionally, domain specific and domain general factors are differently related to the diverse problem format.

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Early Inhibitory control skills and emergent literacy skills: A longitudinal study

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The current study aims to investigate the longitudinal relationship between early inhibitory control skills, assessed in 50 typical monolingual Italian toddlers aged 28 to 36 months (Time 1) and subsequent emergent literacy, assessed between the ages of 4 and 6 (Time 2). At Time 1 toddlers were individually assessed in their day-care center on expressive vocabulary and two inhibitory measures, tapping response inhibition and interference suppression skills; at Time 2 children were individually re-assessed in their preschool on a battery of emergent literacy tasks including three phonological awareness tasks and an orthographic knowledge task. Multiple hierarchical linear regression analyses allowed to identify a model that accounted for 37% of variance in the phonological awareness score [$F(5;40) = 5.63, p = .001$] and a model that accounted for 24% of variance in early orthographic knowledge [$F(5;41) = 3.57, p = .010$]. In both the models interference suppression measure evaluated at Time 1 was a significant predictor of the subsequent emergent literacy skills, even when children's early expressive vocabulary was included in the analyses. These results suggest that interference suppression is a key process in the acquisition of emergent literacy skills. Finally, given the inclusion of very young children, this study allows us to explore the developmental antecedents of two important precursors of reading and writing abilities.

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How well do parents understand their children's theory of mind? A Japanese adaptation of Theory of Mind Inventory-2

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Objectives: This study examined the Japanese adaptation of Theory of mind inventory 2 (TOMI2-J). Although the development of children's theory of mind has been studied using false-belief tasks, parental reports provide an additional tool to assess the theory of mind development from wider perspectives. To test the validity of TOMI2-J, its results are compared with parental reports on the Strength and Difficulty Questionnaires: SDQ, and the test scores from the false-belief (FB) and executive function (EF) tasks.

Method: Parents of 141 children aged between 3 and 6 years-old, who have been a part of a longitudinal project related to TOM agreed to participate in this study. The original TOMI2 (Hutchins, Prelock, & Bouyea, 2016) was adapted into the Japanese language adhering to the International Test Commission (2010). Parents filled in the TOMI2-J and SDQ and each child was tested on FB and EF tasks.

Results: Following the original method of scoring, TOMI2-J yielded three sub-scores: early, basic and advanced levels, and three sub-scales of emotion recognition, mental state language and pragmatics. All subscales of TOMI2-J correlated significantly with SDQ (attention/ hyperactivity, peer relations, and prosocial subscales). Similarly, the sub-scores correlated significantly with the child's test scores for EFs and FBs. The internal consistency ranged between 0.81 and 0.83, indicating stability across measures.

Conclusions: Significant associations across measurements suggest that the Japanese adaptation of TOMI2 has demonstrated validity and internal consistency. Future use of this scale is discussed, including standardization with a wider age range.

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Investigating associations between adoption circumstances, emotional and behavioural difficulties, and self-esteem in primary school aged children

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Objectives: Children adopted from care are more likely to experience adjustment problems related to their complex histories of adversity (Paine et al., 2020; Palacios et al., 2014). Adoptees' early experiences may be associated with their self-esteem (Smith et al., 2000), which is considered a vital indicator of psychological functioning (McCauley et al., 2017). In this study, we examined relationships between children's pre-adoptive experiences, their self-esteem, and mental health.

Method: Forty-three adopted children (M age = 79.05, SD = 11.74) and their parents were invited to the Neurodevelopment Assessment Unit for assessment. Children's pre-adoptive experiences were retrieved from social worker records (number of adverse childhood experiences, number of days with birth family and in care). Children's self-esteem was assessed using the Self-Perception Profile for Children (Harter, 1985). Mental health was reported by teachers and parents using the SDQ (Goodman, 1997).

Results: When controlling for age and gender, child reported maternal self-esteem (statements regarding relationship with mother) was significantly lower for children who experienced more ACEs ($r_s = -.489$, $p = .002$), and the association between maternal self-esteem and teacher reported prosocial scores approached significance ($r_s = .325$, $p = .053$). These effects were specific to maternal self-esteem.

Conclusions: We found that adopted children's maternal self-esteem was associated with their pre-adoptive experiences and their mental health. Although our small sample means our results should be taken tentatively, this study has implications for interventions to support adopted children's self-esteem; such interventions may particularly benefit adoptees who experience greater adversity in their early life.

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Can Mentalizing Measures be Unsusceptible to Compensation?

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Objectives: Anticipatory looking (AL) paradigms that measure mentalizing have been increasingly challenged for their reliability and validity, because of the mixed results in replication studies. This study attempts to advance an AL paradigm by adding a prompted instruction to trigger action prediction, using a multi-trial paradigm and matched false-belief and true-belief conditions.

Notably, we prompted participants to predict actions, but not mentalize beliefs, which remained the mentalizing implicit. Through comparing the prompted AL paradigm with a well-established explicit mentalizing task, we aim to investigate if it can reliably trigger action prediction. Since compensation is one of the factors that may influence mentalizing performance, our second aim is to explore its relationship with individual differences in compensatory and autistic traits.

Methods: Mentalizing abilities of 62 adults were measured by the aforementioned tasks. Individual differences in compensatory behavioural and autistic traits were assessed with questionnaires.

Results: All the false-belief and true-belief conditions were able to trigger action prediction in the AL task. Although the false-belief reasoning in the AL task and the self-reported compensatory behavioural traits were not related, they were both significantly correlated with the explicit mentalizing performance.

Conclusions: Both mentalizing tasks therefore seems to tap into the same underlying cognitive mechanism, supporting the prompted AL task as a mentalizing test. Only the explicit mentalizing task appears to involve compensation, possibly triggering alternative strategies to reason logically about mental states, whilst the prompted AL task was not susceptible to compensation, so it seems to be a purer measure of mentalizing.



The Relationship between Student's schoolwork motivation and Parental involvement from a weekly diary perspective

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Objectives: Parental support plays an important role in schoolwork motivation. Schoolwork was completed at home during the COVID-19 pandemic lockdown, potentially increasing the importance of interactions between parents and children. However, these associations have rarely been tested at between-person and within-person level. Here, the present study aimed to investigate how children's schoolwork motivation fluctuated during the UK Covid-19 school lockdown. Besides, this study examined the bidirectional effects of parental schoolwork support and schoolwork motivation at the between-person and within-person level by applying multilevel modelling approach.

Methods: Ninety and eight UK secondary school students in school Years 7-9 and one of their parents participated in the 5-week weekly diary study.

Results: Schoolwork motivation was high during the lockdown. More parental support did not predict subsequent increases in motivation. Higher motivation (assessed as higher expectations of success) predicted more support from parents.

Conclusions: Child-driven effects appear to be especially important in eliciting parental support.

