Objectives: To examine the importance of synchrony as a mutually regulating process during parent-child interactions, and the implications for children’s social competence.

Hypothesis
Child socio-emotional difficulties will be associated with reduced contingency of supportive socialisation strategies.

Design: A cross-sectional study of children referred by their teachers to the Neurodevelopment Assessment Unit for emotional and behavioural difficulties.

Methods: 70 Parent-child dyads completed an interaction task involving a 3-min interaction with a stranger. Observational micro-level coding (i.e., logging of timing and frequency of behaviours), was chosen as the method of analysis. Contingency (i.e., how closely parent behaviour followed child behaviour) was used to operationalise mutual regulation. The emotional and peer subscales of the Strengths and Difficulties Questionnaire were used to assess child socio-emotional difficulties.

Results: Although children displayed significantly more maladaptive than adaptive self-regulation ($t(66)=5.79, p<.001$); children showed more responsivity to their parent’s use of autonomy-supporting behaviours ($M=3.96, SD=2.61$), whilst parents showed less responsivity ($M=3.16, SD=1.85$) to their child’s positive autonomous behaviour (e.g. talking to the stranger without parent’s prompting). Child socio-emotional problems were significantly correlated with parent’s adaptive regulation strategies (contingently transitioning from autonomy-limiting to autonomy-supporting behaviours) ($r=-0.27, p<.05$); and with parent’s contingent support of their child’s autonomous behaviour ($r=-0.30, p<.05$).

Conclusions: The results point to the importance of autonomy-supportive parenting in facilitating children's positive social behaviour. The results also suggest that reduced contingent responsivity of the parent to children's behavioural cues is associated with more socio-emotional difficulties in children.
Objectives: The self has been implicated in reducing working memory load in tasks, but till date this has not been measured systematically. The present study is the first to test this assumption by investigating the impact of ownership, a form of self-referencing, on children’s visuospatial working memory (VSWM).

Design: The experiment was a within-subjects design, measuring the effect of ownership (self-owned vs. experimenter-owned) on VSWM span.

Method: 94 children (45 female, 49 male) aged 7 to 9 participated in the study. Participants firstly completed a digital sorting task, which was used to elicit self and other ownership. The task involved viewing objects, and, based on a coloured cue, placing objects into the participant’s or experimenter’s box. Next, a Corsi-Block-Tapping Test (CBTT) was administered. This is a commonly used measure of VSWM which involves repeating a presented sequence of up to 9 blocks. An adapted version of the CBTT was created, in which to-be-remembered sequences involved the presentation of self-owned, experimenter-owned and control images to test whether a VSWM span bias would occur under the owned objects condition.

Results: Although VSWM increased across ages, there was no significant difference between participant’s VSWM memory across the ownership conditions.

Conclusions: The findings contradict previous proposed explanations of the influence of self on information processing. The effect, however, could be explained by a weak ownership link. As this is the first study to explore the relationship, the next step is to replicate the study with adaptations to the ownership paradigm methodology before further investigation.
Objectives: Previous research suggests people with ASD have behaviour that is harder to read than typically developing (TD) people. The present study investigated whether being less readable is associated with being perceived less socially favourable among those with ASD.

Design: A within-subjects design was used

Methods: Across two studies; TD perceivers (Study1 n=31, Study2 n=30), viewed 40 videos each featuring a single individual (‘target’). Twenty of these targets had ASD and 20 were TD. Each target reacted to one of four scenarios: they were told a joke, informed about the researcher’s difficult day, paid some compliments, or were kept waiting. Perceivers were not informed which scenario each target was reacting to in Study 1 but were informed in Study 2. Perceivers were asked to rate each target on nine characteristics associated with social favourability.

Results: Targets with ASD were perceived less socially favourable compared with TD targets across two studies. In Study 1, ASD and TD targets were rated equally unfavourably in the waiting scenario, while in Study2,TD targets were rated more favourably than ASD targets. We also assessed the link between social favourability and readability. Readability was operationalised as the number of perceivers who correctly guessed the scenario to which the target was responding. We found a significant positive relationship between social favourability and readability across two studies.

Conclusions: This suggests that there may be a fundamental relation between being unreadable and being perceived as less socially favourable. This may contribute to poor social outcomes for individuals with ASD.
Objectives: Developmental Coordination Disorder (DCD) is characterised by a broad spectrum of difficulties in performing motor tasks, in the absence of any physical or sensory impairment. It has recently been proposed that a selective deficit in sensorimotor prediction and feed-forward planning might underpin these motoric impairments. The purpose of this study was to use a naturalistic object lifting paradigm to investigate whether deficits in sensorimotor prediction might underpin the broad spectrum of difficulties individuals with DCD face when interacting with objects in their environment.

Design: This study was a between-group experimental design.

Methods: We examined perceptions of heaviness and fingertip force application in children aged 8-12 years with DCD (n=48) and without DCD (n=53) in the context of the size-weight illusion, where participants lifted objects which varied in their apparent, but not actual, weight. In typically-developing populations, these stimuli elicit characteristic prediction-driven lifting behaviour and a strong perceptual illusion.

Results: Overall, participants showed the expected perceptual and sensorimotor behaviours – small objects felt heavier, and were initially lifted with lower rates of force, than large objects. We found no evidence for a difference in the magnitude of these perceptual or sensorimotor effects between our groups.

Conclusions: Our results find no evidence to support the proposal that DCD represents a selective deficit in sensorimotor prediction and feed-forward planning, in a task which is appropriate for this population.
Objectives: Despite evidence for the involvement of working memory in written mathematics, the understanding of its components in relation to individual areas of mathematics, and associated age-related changes, is somewhat restricted. This series of studies aims to identify the relative contributions of verbal and visuospatial working memory measures to written mathematics.

Methods: Primary school aged children (N=214, N=111) in the UK were individually administered a battery of working memory tasks alongside a standardised test of mathematics. Confirmatory factor analyses and variance partitioning were then performed on the data to identify the unique variance accounted for by verbal and visuospatial measures.

Results: Results reveal a level of specificity with regard to the component of working memory engaged, depending on the component of mathematics being assessed. Further analysis addresses whether this relationship remains stable throughout primary school. In doing so, it will be possible to identify the components of working memory with the strongest relationship to early mathematics, and hence the most appropriate target for a working memory screening measure for poor future mathematical attainment. Implications for educators and further research are discussed.
Objectives: The objectives of this study were to create a measure of children’s gender stereotyping of occupations in Saudi.

Design: The current government of Saudi has committed itself to increase the occupational participation of women. Some of these goals have already been realized. For example, a number of senior positions in the government are now occupied by women. Also, the military sector is now able to employ women. A central goal of Vision 2030 is increasing the percentage of women’s participation in the labor market. However, there currently exists no measure of gender stereotypes of Saudi children.

Methods: To create this measure, 49 boys and 54 girls (M = 12.89, SD = 1.11, Range = 9 to 15 years) rated the degree to which 33 occupations were gender-stereotyped (1 = only men to 5 = only women). Of these, eight items had a mean score below 2.50 (stereotyped for men) and eight had a stereotyped score above 3.50. The masculine-stereotyped items had a Cronbach’s alpha of .68 and the feminine-stereotyped items had a Cronbach’s alpha of .76.

Results: We conducted regression analyses to predict whether age and gender differed for the masculine or feminine-stereotyped scales, boys were more likely to rate the masculine items as stereotyped for men than were girls, with a follow-up ANOVA, F (1, 103) = 13.87, p < .001. There was no effect of age. In contrast, there was greater stereotypization of feminine-stereotyped occupations with age with a follow-up correlation, r (104) = .20.

Conclusions: These measures will be used to assess interventions to reduce gender stereotypes in Saudi.
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Objectives: This symposium utilises mixed methodology to inform best practices for interviewing children in forensic and legal settings. The first study examined whether “ground rules” instruction - to say “I don’t know”, to tell the truth, and to correct the interviewer when necessary - assisted children in applying those rules during an interview about a past event and whether doing so was associated with more accurate accounts. The second paper examined whether developmental reversals in false memories occur in ways consistent with Fuzzy Trace Theory, and with findings using the Deese-Roediger-McDermott (DRM) paradigm, when children are questioned about a real-life experience. The third study investigated how children with Autism Spectrum Disorder responded to different types of interviewer prompts (e.g., recall vs. recognition) incorporated into a best-practice interview Protocol, and how effectively different types of questions elicited new and accurate event relevant information from children. The fourth paper examined courtroom transcripts to investigate the extent to which 13- to 15-year-olds were questioned by lawyers using techniques not recommended in best-practice guidelines, compared to younger (12-years-old and under) and older children (16- and 17-year-olds), and the effects this had on the completeness and consistency of their testimonial evidence. Finally, these papers will be summarised and discussed together in accordance with their broader implications for forensic questioning practices.
Do children’s grasp and use of conversational rules influence their accuracy in forensic interviews and in response to suggestion?

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Objectives: Children often answer questions when they have insufficient knowledge to do so, or when they do not understand. We examined whether “ground rules” instruction - to say “I don’t know”, to tell the truth, and to correct the interviewer when necessary - assisted children in applying those rules during an interview about a past event and whether doing so was associated with more accurate accounts.

Methods: We tested 99 children’s IQ, their understanding of these three ground rules, use of these rules in an interview, and their accuracy in both recalling a personally experienced event and resisting 16 suggestive questions about the event at the end of the interview.

Results: Intellectual ability related to children’s proficiency in describing the rules. Their understanding of one rule did not relate to a grasp of the others. Children’s use of the rules in the interview was uncommon even though they were encouraged to use them. Regression models showed that developmental level was the best predictor of children’s accuracy when they recounted their experience during the interview and their grasp of the ‘correct me’ rule. Their use of responses consistent with the rules, in conjunction with developmental level, predicted accurate resistance to suggestive questions.

Conclusions: The results raise fundamental questions about the influences of children’s expectations of what an adult’s questions are about and their impact on research outcomes. Future studies should identify how best to prepare children of different ages and cognitive abilities to answer adults’ questions appropriately.
Bridging the gap between the lab and the courtroom: Children’s false memories across different memory paradigms

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Paper 2

Objectives: We examined whether developmental reversals in false memories occur in ways consistent with Fuzzy Trace Theory, and with findings using the Deese-Roediger-McDermott (DRM) paradigm, when children are questioned about a real-life experience.

Design: All children were questioned about both a real experience and DRM word lists (within-subjects factor) and we compared younger and older children’s recall (between-subjects factor).

Methods: Younger (6 years) and older (12 years) children had a health check with a thematically important component missing. They were questioned about the health check using the NICHD Investigative Interview Protocol two days later (Study 1), or three months later (Study 2), and also posed recognition questions about experienced and non-experienced components.

Results: In both studies we replicated the finding of a developmental reversal in false memories with the DRM paradigm, however, we did not observe the predicted reversal when children were questioned about the health check. False memories were relatively infrequent at the short delay, but increased when children were interviewed after three months, and at both time points were more common in response to the recognition questions. Younger children were more likely to make false reports of thematically consistent but non-experienced components of the health check than older children.

Conclusions: Our results indicate that caution is needed when extrapolating the findings from tightly controlled experimental studies of memory that use very constrained and simple stimuli, to settings such as the courtroom.
Paper 3

**Objectives:** We investigated how children with Autism Spectrum Disorder responded to various types of interviewer prompts incorporated into a best-practice interview Protocol and how effectively different types of questions elicited new and accurate event relevant information from children in two interviews.

**Design:** The effects of the interviewer prompts on the amount and accuracy of the information elicited were investigated using a series of mixed design analyses of variance (ANOVA).

**Methods:** Twenty-seven autistic children and 32 typically developing (TD) peers were questioned about an experienced event after a two-week delay and again after a two-month delay, using the Revised National Institute of Child Health and Human Development (NICHD) Investigative Interview Protocol.

**Results:** Recall prompts elicited more detailed and more accurate responses from children than recognition prompts. Autistic children recalled fewer correct narrative details than TD peers when questioned using open invitations, cued invitations, and directive questions. Nonetheless, they were as accurate as TD peers when responding to all types of prompts. The informativeness and accuracy of children's reports remained unchanged over time.

**Conclusions:** Although cognitively and verbally able autistic children may require more prompts than TD children to provide the same amount of information, they can provide meaningful and reliable accounts of their experiences, when appropriately questioned, even after lengthy delays.
Objectives: We examined courtroom transcripts to investigate the extent to which 13- to 15-year-olds were questioned by lawyers using techniques not recommended in best-practice guidelines, compared to younger (12-years-old and under) and older children (16- and 17-year-olds), and the effects this had on the completeness and consistency of their testimonial evidence.

Methods: Transcripts of 56 5- to 17-year-old children questioned in Scottish criminal trials held between 2009 and 2014 were coded. Lawyers’ questions were coded for prompt type, linguistic complexity, repetition, and content. Children’s responses were coded for responsiveness, productivity, consistency, and content. Associations among these variables were analysed in relation to lawyer role and child age.

Results: Very few age differences were found. However, when age differences were observed, they were at the relative disadvantage of 13- to 15-year olds. This group received the highest rates of suggestive confrontation questions (e.g., You’re lying, aren’t you?”), the highest rates of linguistically complex questions, and became the most emotional in response (e.g., tearful, angry).

Conclusions: Adolescents presented as a particularly vulnerable group, but more research is needed to ascertain why. It is possible that lawyers overestimated adolescents’ capabilities, coupled with adolescents wanting to be perceived as capable. Differences in questioning style could also be tactical, since lawyers can argue when cases involve a consenting 13-year-old that the defendant thought the child was 16, whereas if the child was a consenting 12-year-old, legally, the argument that the defendant thought the child was 16 cannot be had.
Objectives: Previous research found that the number of items that can be maintained in imagination is severely capacity limited, and its capacity is lower than that of working memory (Atkin, Guest, Howard, Baguley & Baker, in preparation). However, little is known about how imagination and visual working memory (VWM) performance is influenced by extended presentation time when creating and maintaining items. This study addressed how the time available to build up an imagination or memory of a set of items influences subsequent performance in an imagination and VWM task.

Design: The previous tasks used by Atkin et al. required a gradual build up of the stimuli, with the time for each stage of this build up equivalent across imagery and memory tasks. One possibility is that this limited performance in the imagery task more than in the memory task, as the former may require more top down processing to create and maintain an image. In the current study, the time for each sequential step was manipulated (either 2 seconds or 4 seconds) in the VWM and imagination tasks.

Methods: Participants (N=28) data were analysed using within subjects ANOVAs and paired

Results: Performance was higher in the visual working memory task than the imagination task in both time conditions. However, increasing the length of time in the build up stage had no influence on performance in either task.

Conclusions: The relations between these tasks are discussed alongside the theoretical implications about the mechanisms underpinning imagery and VWM.
Is moral disgust socially learnt? Mother-child talk about disgust

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Objectives: Disgust is a universal emotion elicited by physical objects (e.g., vomit) and socio-moral concerns (e.g., deception) (Danovitch & Bloom, 2009). Researchers agree that certain objects elicit physical disgust but the existence of moral disgust is questioned (Russell & Giner-Sorolla, 2013). Researchers also disagree on the developmental pattern of disgust, with some claiming that disgust appears at age 3 (Bloom, 2004) and others at age 7 (Rozin, Millman, & Nemeroff, 1986). The late appearance of disgust suggests a social component to its development. Given that mother-child talk promotes children’s emotion understanding (Aznar & Tenenbaum, 2013), the present study examined mother-child talk about disgust.

Design: Mother-child dyads were presented with 9 vignettes asking them to rate whether contravening cultural, unhygienic, and religious norms is disgusting.

Methods: 22 mothers and their 4- or 8-year-old children were given 9 vignettes and were asked to discuss how disgusting they were from 1 (not at all disgusting) to 5 (very disgusting).

Results: A 3 (norms) x 3 (vignette) repeated measures ANOVA revealed a significant effect of norm, $F(2, 42) = 83.13, p = .00$. Mother-child dyads rated contravening unhygienic norms ($M = 4.03, SD = .46$), as more disgusting than contravening cultural ($M = 3.28, SD = .84$), and religious ($M = 1.74; SD = .70$) norms.

Conclusions: Mother-child dyads find that contravening unhygienic norms is more disgusting that contravening religious and cultural norms. Mother-child conversations illuminate how families talk about disgust.
Ref: 3280 Empirical Poster Presentation
Topic: Developmental Abstract
Children’s reasoning about peer rejection based on ethnicity

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Objectives: From the age of 5 children make decisions about who to include and exclude in their social groups (Baron & Banaji, 2009). These decisions are often made based on social categories such as gender, religion, socioeconomic status, and ethnicity. Victims of peer rejection are prone to experience anxiety, depression, and poor academic achievement (Ladd, 2006). Therefore, it is important to understand how children reason about peer rejection. The present study examined children’s reasoning about peer rejection based on ethnicity.

Design: Regression analyses were conducted to examine children’s endorsements and reasoning about peer rejection based on ethnicity.

Methods: 367 children aged 8, 11, and 14 years-old were read 6 vignettes in which a group of Black, Asian, or White children rejected a Black, Asian, or White child. For each vignette, participants were asked to state (1) whether it is OK or not for the group to exclude the child from 1 (No a lot) to 5 (Yes a lot), and (2) the reason for their choice.

Results: Participants did not support exclusion based on ethnicity ($M = 1.11; SD = .28$). Regression analyses showed that older children rated exclusion as worse than younger children. When participants condoned exclusion, they appealed to socio conventional reasoning and when participants condemned exclusion, they appealed to moral reasoning.

Conclusions: Findings suggest that children condemn exclusion based on ethnicity and that they are likely to appeal to moral reasoning when they do so.
What emotional centred challenges do children, staff and parents at special schools face over primary-secondary school transition?

Charlotte Bagnall, Claire Fox, Yvonne Skipper

Keele University

Objectives: To date we have a limited understanding of children’s emotional experiences in the lead up and over primary-secondary school transition and how they are supported. This lack is particularly prevalent from the perspective of children with added emotional difficulties, whose voices are unrepresented in the field. Nonetheless, understanding how children with added emotional difficulties are supported and cope with transition, over and above pre-existing emotional problems, has useful implications for emotional-centred support provisions.

Design: An exploratory-explanatory case study was conducted in one special school which supports children with social, emotional and behavioural difficulties (SEBD).

Methods: Using mixed methods, insight from parents, school staff and children was obtained using observations, focus groups, interviews, surveys and document analysis. Data were analysed using thematic analysis.

Results: Four main themes: Conflicting emotions, Time vs. Timing of transfer provision, Balancing children’s short and long-term emotional well-being and Child-centred provision were extracted. While children within the special school share similar emotional conflicts to those in the literature exploring the experience of children in mainstream schools, other conflicts were more specific. For example, needing to sensitively maintain children’s short-term emotional well-being at primary school, but not at a disservice to helping them move on. Thus, the timing of when to initiate primary-secondary school support provision was crucial.

Conclusions: The present study has made a significant contribution to the field by demonstrating the importance of investigating how children with specific SEN difficulties, such as SEBD, cope with primary-secondary school transition and how they are supported.
Talking about school transition (TaST): An intervention to improve children’s emotional well-being over school transition

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**Objectives:** Conceptualised as one of the most difficult transitions in children’s educational careers, primary to secondary school transition is a major life event for eleven-year-old children in the UK, marked by developmental and psychosocial discontinuity and challenge. Emotional centred support provision to support children in schools is minimal and interventions that have been developed to counter the negative outcomes children commonly experience at secondary school transition are limited in number and in terms of their longevity and sustainability.

**Design:** To inform the Talking about School Transition (TaST) intervention, data were collected in both the UK and USA, in mainstream and special schools, obtaining insight from multiple stakeholders, using observations, focus groups, interviews, surveys and document analysis.

**Methods:** Findings from the preliminary research studies were analysed using thematic analysis and informed the design and delivery of the TaST intervention.

**Results:** Data collection for the TaST intervention is still taking place, and so findings from the preliminary studies will be discussed in relation to how they have informed the TaST intervention. For example, findings from the UK student focus groups demonstrated the importance of balancing children’s need for exposure to secondary school provisions, while maintaining consistency.

**Conclusions:** The proposed research has short term implications for present participating Year 6 children’s adjustment and has long-term implications for the field in elucidating the importance of supporting children’s emotional wellbeing over this period, and for educational policy.
Objectives: The study aimed to assess autism knowledge and investigate if it is associated to level of education, autism specific training, and personal experience across different sectors in mainstream schools. Additionally, measures of job satisfaction and perceived barriers were examined.

Design: Inclusion of pupils with autism spectrum disorders (ASD) into mainstream schools is becoming common practice, and staff should have adequate knowledge on teaching and managing classroom behaviour. However it is found that autism knowledge among teaching staff vary across individuals. A mixed methods design was utilised to look at differences between school staff in autism knowledge and what the perceived barriers to inclusion are.

Methods: 120 school teachers and pupil support assistances were recruited from Scottish schools. Knowledge and experience was assessed using the Knowledge about Childhood Autism among Health Workers (KCAHW; Bakare, Ebigbo, Agomoh & Menkiti, 2008). Qualitative measures were used to assess perceived barriers and job satisfaction.

Results: Significant differences in the knowledge of autism scores were shown between school staff, with early years reflecting the most knowledge. Furthermore, themes differed relating to barriers to inclusion, with secondary teachers focused on difficulties with the curriculum and primary school teachers highlighting attitudes of parents. Lastly, results indicate that pupil support assistances are more satisfied compared to teachers in working with children with ASD.

Conclusions: Disparities in the knowledge and awareness of ASD in teaching professionals are highlighted across the different stages in mainstream education. Moreover, the study highlights what staff deem important for successful inclusion of ASD pupils.
Multiple studies now show that in the general population, females on average show higher levels of empathy and males on average show a stronger drive to systemize. Empathy involves both a cognitive element (recognizing another person’s mental state) and an affective element (responding to another person’s mental state with an appropriate emotion). Systemizing is the drive to analyse or build systems (whether these are mechanical, mathematical, musical, natural, abstract, motoric, or collectible). Systems are anything that follows *if-and-then* rules. I present evidence that autistic people score below average on different measures of cognitive empathy and that they are intact and even sometimes superior on measures of systemizing. If one takes the difference (D scores) between one’s scores on empathy and on systemizing then autism can be viewed as an extreme of the typical male brain. Autism is strongly genetic and is diagnosed more often in males than females. This is likely to be true even after taking into account under-diagnosis of females. One candidate biological epigenetic mechanism that might influence typical sex differences and may play a role in ‘masculinizing’ the autistic brain is prenatal sex steroid hormones, that shape brain development, and which themselves are under genetic control. I summarize work from our lab testing whether levels of prenatal sex steroid hormones such as testosterone and estrogen are associated with typical sex differences in empathy and systemizing, and with autism and autistic traits.
Ref: 3373 Empirical Oral Presentation
Topic: Cognitive & Developmental Abstract
Development of mental imagery and working memory alongside characteristics of ADHD: implications for mathematics achievement

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Objectives: Mental imagery (MI) plays an important role in problem-solving, reasoning, sustained attention and working memory (WM), all of which in turn are imperative to mathematics achievement. Despite the vital role of MI, research into typical development (TD) of MI is lacking. Given that children with attention-deficit/hyperactivity disorder (ADHD) are characterised as possessing attention and WM impairments, it is likely that poor MI is also associated with ADHD characteristics. The first aim is to determine the development of MI and VSWM, alongside ADHD characteristics, in TD children for the first time. The second aim is to investigate how MI abilities predict mathematical performance.

Design: This study adopts a mixed (independent sample and repeated measures) design.

Methods: Sample size determined by power analyses: N=92 (age 6-11 years). MI is measured via our novel four-component model assessing the ability to generate an image, maintain an image, shift attention across an image (scanning) and transform an image (rotation). VSWM measures: forward and backward spatial span. ADHD characteristics: Conners 3 Teacher Rating Scale and Go/No-Go task. Mathematics performance: Missing Number Term task.

Results: Data collection will conclude June 2019. Pre-registered analyses will first investigate the development of MI, how this relates to VSWM over development, and how MI presents across the range of ADHD characteristics in TD children. Second, analyses will determine how each component of MI predicts achievement in mathematics.

Conclusions: This research will further elucidate the relationship between MI, VSWM and attention throughout development and how MI might facilitate problem-solving in mathematics.
Exploring metacognitive factors in syllogistic reasoning: The role of task instruction.

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**Objectives:** The dual-strategy model of reasoning proposes qualitatively different reasoning strategies – statistical and counterexample. Reasoning theories must provide a metacognitive account of monitoring and control of reasoning processes, resource allocation and strategy selection. In the current study, metacognitive processes were explored within the context of the dual-strategy model.

**Design:** Individual difference measures using the Rational Experiential Inventory (REI), quantifier interpretation and accuracy-confidence calibration measures for syllogistic reasoning problems were examined under two different instruction types (probability and logical necessity).

**Methods:** A set of 16 syllogistic reasoning problems were presented in an online survey (n=126) under both probabilistic and logical necessity instruction. Confidence measures, response accuracy and response times were recorded. Additionally, a novel measure of quantifier interpretation, the REI, accuracy-confidence calibration and belief-confidence calibration were measured.

**Results:** Results demonstrated that confidence and response accuracy were not strongly correlated, however, differences in confidence were observed between problems completed under logical necessity and probabilistic instruction. Rational scores from the REI correlated with accuracy-confidence calibration whereas experiential scores from the REI correlated with belief-confidence calibration. Quantifier interpretation correlated with increased response times for problems completed under logical necessity instructions.

**Conclusions:** Subjective reports of thinking disposition correlated with calibration measures, suggesting that participants were aware of the strategies employed. These findings showed different patterns based on instruction type. No differences in response time were shown across instruction type, therefore not supporting the proposal that probabilistic instructions increase heuristic responses. Further implications are discussed within the context of current dual-process theories and the meta-reasoning literature.
Objectives: Divergent mechanisms for processing focal and non-focal prospective memory (PM) targets have been reported in adolescents and adults. This study primarily investigated whether such Multiprocess Theory mechanisms are maintained in mid-late adolescence when PM and ongoing task (OT) cognitive loads are systematically varied.

Design: Attentional PM loads (focal [low PM load] versus non-focal [high PM load] targets) and working memory OT loads (2-back versus 3-back) were manipulated across four conditions to determine PM and OT outcomes in a repeated-measures design.

Methods: Using PsychoPy, 22 participants, aged 15–19 years completed practice blocks, followed by four counterbalanced test blocks in a classic PM paradigm employing lexical stimuli. Repeated-measures ANOVA was used to determine effects of PM and OT load on PM and OT accuracy and correct response times (RTC).

Results: PM accuracy was unaffected, whereas PM RTCs were significantly slower with high PM load. OT accuracy was significantly reduced with high OT load (3-back). Weakly significant effects of PM on OT RTC and an interaction indicated faster OT RTC (lower PM cost) when both PM and OT loads were low. Applying age as a covariate revealed a significant interaction with OT accuracy increasing with age under high PM load.

Conclusions: Divergent mechanisms for processing focal and non-focal PM targets appeared to be maintained in these adolescents unless the cognitive demands of the OT were high; strategic monitoring for focal PM targets was then employed. Improved OT accuracy with age at high PM load was suggestive of improving cognitive resource and/or flexibility.
Objectives: Psycholinguistic Grain Size Theory suggests that readers of transparent orthographies use smaller reading unit sizes for reading than readers of opaque scripts. Stronger length effects (reading times increase with word length) for readers of transparent scripts have been considered as evidence supporting this claim. This study explored if this difference between languages was still apparent while taking into account individual differences (ID) in nonword decoding, semantic and orthographic knowledge and reading experience.

Design: Linear mixed-effects modelling was used to estimate effects on word naming RTs. For each ID task, the same participants were split into higher and lower achieving ID groups, resulting in 8 ID groups.

Methods: 104 English and 104 German speakers read aloud 85 cognates, and completed individual differences tasks.

Results: In both languages, participants with strong nonword decoding skills were fastest (E: $M = 462.08$ msec; G: $M = 508.80$ msec), and those with weakest decoding skills were the slowest (E: $M = 501.06$ msec; G: $M = 539.04$ msec). Language emerged as a significant predictor in all eight models, with German speakers naming words significantly slower than English speakers ($p < .05$ to $< .001$). The language x length interaction was modulated by nonword decoding skill in all groups, except when participants were grouped into stronger and weaker decoders. Then the language x decoding x length interaction was no longer significant.

Conclusions: Whilst language differences remained, reading across languages seemed more similar in terms of length effects when taking into account nonword decoding skill.
Early attention abilities in young bilingual and monolingual children

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Objectives: Previous research has suggested that regular use of more than one language benefits early development of cognitive functions such as selective attention and cognitive flexibility. This benefit is observed even for children from disadvantaged backgrounds. The aim of this study was to determine if a bilingual advantage could be observed in young children living in East London.

Design: A between-participants design was used to compare bilingual and monolingual children.

Methods: Sixty-eight children aged 3½ - 6 years were recruited from local Nurseries and Primary Schools. Two tasks measuring selective attention (Visual Search, Flanker task) and a cognitive flexibility task (Balloon sorting) were administered. The British Picture Vocabulary Scale (BPVS-II) was used to measure receptive vocabulary.

Results: No significant difference in performance was observed between Bilingual (N = 47) and monolingual children (N = 21) across the 3 tasks. However, in a sub-group analysis 3 ½ - 4 ½ year-old balanced bilinguals (N = 12) outperformed monolingual children (N = 10) on the flanker task indicating greater ability to focus attention and ignore distracters. Bilingual children aged 4 ½ to 6 years with mixed language proficiency (N = 32) performed similarly to the monolingual children (N = 11) on the Visual Search and Balloon sorting tasks but scored lower on the Flanker task.

Conclusions: The results of this study are in line with previous research suggesting the bilingual advantage may be unstable and depend on sampling and task. Despite these mixed findings greater awareness of the benefits of bilingualism is needed.
Objectives: The current study set out to investigate how the facets of Conscientiousness may differentially manifest in performance within cognitive tasks. The Big Five personality trait of Conscientiousness is associated with the capacity to maintain activation of abstract, non-immediate goals (Fleming, Heintzelman, & Bartholow, 2016). Variation in personality traits has been found to vary with performance in cognitive tasks, e.g. those higher in Conscientiousness tend to respond more consistently and accurately, with stronger set shifting ability suggesting an enhanced capacity to flexibly respond to situational changes in order to maintain performance (e.g. Umemoto & Holroyd, 2016; Fleming et al., 2016).

Design: Further investigation of how facets of each personality dimension, for example Industriousness and Orderliness within Conscientiousness, are differentially associated with performance in cognitive tasks may be key to advancing understanding.

Methods: We created novel, gamified versions of the Eriksen-Flanker/GoNogo-task and a task-switching paradigm as part of a mobile game-based assessment. 383 participants recruited from Prolific Academic completed the assessment and subsequently responded to a self-report Big Five measure (DeYoung, 2007).

Results: The Industriousness facet of Conscientiousness was significantly negatively correlated with intra-individual differences in response latency in task-switching and Flanker tasks, in addition to increased response latency following an error/omission. Additionally, those higher in Industriousness were also somewhat more likely to omit a response, whereas differentially, Orderliness was negatively correlated with omissions and was not significantly associated with increased response latency following error.

Conclusions: The study identifies potential dissociable mechanisms of goal activation and error monitoring associated with the facets of Conscientiousness.
Objectives: The ability to extract statistical information from speech is an important part of language perception. We use this mechanism, statistical learning, to locate word boundaries in speech or determine rules, like grammar. We also acquire rules governing language sounds, its phonology, based on statistical properties (e.g. English words do not end in a /h/ sound). However, in phonology, not all statistical cues seem equally salient suggesting constraints on this learning mechanism. This project explores such constraints.

Design: Artificial languages were developed with statistical hierarchies: at word-level, consonants co-occurred (e.g. /g/ and /p/ appeared frequently together); at single-feature level, words frequently ended in a voiced consonant (using vocal cords); and at multiple-feature level, this voicing bias changed for one manner of articulation (with three groups: plosives – vocal tract occlusion; fricatives – airflow through mouth; nasals – airflow through nose). Single-feature computations, ‘all word-ends are voiced’, contrasted multiple-feature, e.g. ‘fricative word-ends are voiceless’. Two conditions manipulated whether plosives or fricatives carried this multiple-feature bias.

Methods: 54 English adults heard an artificial language for 21-minutes. Participants then selected legal words from pairings and made productions from word-search grids.

Results: Participants’ performance did not mirror between fricative and plosive conditions (e.g. word-level test pairings, U= 253.50, z= -2.02, p= .044, r= -.27, single-feature, U= 225.50, z= -2.42, p= .016, r= -.33, and multiple-feature productions, U= 490.50, z= 2.24, p= .025, r= .30).

Conclusions: This evidence suggests that the level at which we compute statistical information has constraints that apply differently to plosive and fricative words.
Evidence for the impact of taking part in the Daily Mile on children’s cognition and wellbeing: findings from across the UK.

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Objective: The Daily Mile is a short physical activity break from the classroom. Pupils run or walk at a self-determined pace for ~15 minutes each school day. We examined the impact of taking part in the Daily Mile on children’s cognition and subjective wellbeing.

Design: Cross-sectional, natural experimental study.

Method: 7337 pupils from across the UK took part in the study (50% male). Teachers reported whether their class did the Daily Mile or similar activity. Pupils completed computer-based tasks assessing attention/inhibition, visual-spatial and verbal working memory, plus the Children’s Feeling Scale and Felt Arousal Scale to give a measure of subjective wellbeing.

Results: Teachers from 21.8% of classes reported that their pupils did the Daily Mile on at least three days of the week. A greater percentage of schools in Scotland took part than for other areas (44.6%). When controlling for age, gender and SES, pupils whose teacher reported Daily Mile activity had better performance on the visual-spatial working memory task than those who did not, although the effect size was small. No other statistical differences emerged.

Conclusions: Our findings show a small difference on cognition between pupils who have been taking part in short physical activity breaks regularly each week and those who have not. No impact on wellbeing was found though. Acute improvements have been found in both of these areas and the fact we did not find a detrimental impact for longer term participation suggests schools should consider implementing these programmes, as the health benefits are great.
A new measure of children’s polyseme vocabulary: relations to language and literacy skills

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**Objectives:** Between 30-80% of English words are estimated to be polysemous (i.e. have multiple senses), but existing measures of knowledge of the multiple senses of words are limited. Few tests exist, and those that do have incidental demands (e.g. explaining definitions) which likely underestimate children’s abilities. The aim of this research was to validate a receptive measure of children’s knowledge of polysemes, the Receptive Polysemy Vocabulary Test (RPVT).

**Design:** A within-subjects design was used in which children completed the RPVT twice, along with a battery of other measures.

**Methods:** Participants (current N=52) are 5 to 6-year-olds and 8 to 9-year-olds, with the final projected N = 110. Participants completed the new RPVT polyseme test twice, one week apart. The test requires children to select two images corresponding to two different meanings of a polysemous word (e.g. pupil) from six options. Children also completed measures of receptive vocabulary (BPVS), reading comprehension (YARC), and a verbal measure of polyseme knowledge (from the Language Processing Test).

**Results:** The RPVT has excellent test-retest reliability (r=.92, p<.001), and internal consistency (Cronbach’s alpha =0.91). The test correlates highly with receptive vocabulary (r=.87) and the LPT measure of polyseme knowledge (r=.82). In a hierarchical regression analysis, the RPVT was a significant predictor of reading comprehension (β=.711, p<.001) after controlling for age, non-verbal reasoning and receptive vocabulary, explaining an additional 14% of the variance.

**Conclusions:** The Receptive Polysemy Vocabulary Test is a robust measure of children’s knowledge of polysemes and will be a useful tool in future research.
Objectives: Vocabulary is an important predictor of children’s educational success. And yet little is known about factors affecting children’s knowledge of polysemous word (that is, words with multiple senses), despite between 30-80% of words being described as polysemous. The aim of this research was to examine the effects of individual differences and features of words on children’s knowledge of polysemes.

Design: A mixed design was used, with between-subjects factors of age and language status, and within-subjects factors of word features (imageability and relatedness).

Methods: Participants (current N=52) are 5 to 6-year-olds and 8 to 9-year-olds, with the final projected N = 110. Participants completed a multiple-choice receptive measure of knowledge of polysemes, along with measures of receptive vocabulary and IQ. Data on features of words were obtained from adult ratings (N=12), including measures of imageability (how easily words provoke a mental image) and relatedness (how similar the two meanings of the word are).

Results: Preliminary results showed that polysemy knowledge was positively correlated with age (r=.63), receptive vocabulary (r=.87), and years learning English (r=.58). Children with EAL had poorer knowledge of polysemy after controlling for age and IQ (F(1,48)=5.18, p=.027) but this difference was explained by their poorer general vocabulary performance. In terms of word features, imageability was a predictor of the difficulty of polysemous words (B=0.48, t=2.97, p=.006) but relatedness was not.

Conclusions: Both individual differences and psycholinguistic features of words predict knowledge of polysemous words. This has implications for how this kind of vocabulary should be taught.
Purpose: The study investigated the challenges children with characteristics of autism face in key areas of cognition (e.g. hot and cold executive functioning and imagination) that impact on the progress they make in writing.

Design: Sixty-one children participated in the study (Mage = 9 years 7 months, SD = 14 months, 19 female, 43 male) comprising a selected group of children with characteristics of autism (N = 26, Mage = 9 years 5 months, SD = 17 months, 4 female, 22 male) and an age-matched group of typically developing children (N = 35, Mage = 9 years 8 months, SD = 12 months, 14 female, 21 male).

Method: Children undertook assessments of nonverbal cognitive ability, vocabulary knowledge, and perceptual speed. Parents also completed an autism spectrum questionnaire based on the social and behavioural characteristics of their children. Assessment of hot executive functioning included a questionnaire measuring the degree to which children engaged in maladaptive/adaptive emotion regulation strategies. Cold executive functioning skills were measured by performance on inhibition (Flanker, Go/No Go) and cognitive flexibility (attention shifting) tasks. All participants wrote a story.

Results: Regression analyses indicated that the interaction between the cognitive cost of attention shifting and developmental group was a significant predictor of the ability to elaborate imaginatively on a story from the beginning to the end point.

Conclusion: The ability to switch attention between various tasks and sub-goals of writing is an important skill that benefits typically developing children to a greater extent than children with autism.
Objectives: In Corriveau, Kurkul, and Arunachalam (2016) lower SES children preferred to learn from a speaker using active speech (simpler syntax) compared to higher SES children who preferred passive speech (complex syntax). We compare direct versus democratic speech as a more realistic manipulation of complexity.

Design: Children completed a preference task followed by a word disambiguation task. During each preference trial, children learnt of the misbehaviour of a teddy bear. This was followed by a video of two females reprimanding the teddy bear in either a direct (e.g., *stop what you are doing*) or democratic (e.g., *what is wrong with what you’re doing?*) style. The child was asked which style was better. During word disambiguation trials, the same speakers presented different novel labels referring to a novel object. The child was asked to indicate the correct speaker.

Methods: A total of 31 4- to 5-year-olds (15 M, 16 F) attending a local primary school participated. Sixteen children (*M*_{age} = 4;7, *Range* = 4;1 – 5;4) were in receipt of free school meals, and fifteen children (*M*_{age} = 4;10, *Range* = 4;1 – 5;4) were not.

Results: Lower SES children had a significantly higher preference for the direct speaker than higher SES children for both the preference task, *t*(29) = 12.52, *p* < .001, and the word disambiguation task, *t*(29) = 5.13, *p* < .001.

Conclusions: The results further demonstrate how speech complexity influences informant preference and word learning as a function of socioeconomic status.
Objectives: While there is a fair amount of evidence for the beneficial effects of touch-focused interventions on various domains of development in babies born prematurely (Feldman et al, 2014), little is known about how everyday patterns of spontaneous touch provided by caregivers can affect the development of babies born at term. Four-month-old infants, when provided with gentle stroking during presentation of faces with averted gaze learned the identity of these faces, but not without the stimulation (Della Longa et al, 2017). The way in which infants direct their attention towards faces has also been found to be associated with salivary oxytocin (Nishizato et al, 2017), a hormone released when experiencing affective touch (Vittner et al., 2017). The current study asked (1) whether everyday patterns of touch provided by caregivers, (measured with a questionnaire) are related with infants’ attention to faces (measured in an eye-tracking face pop-out task) (Gliga et al, 2009), and (2) whether that putative relation is mediated by infants’ salivary cortisol and oxytocin levels.

Methods: Two groups of infants participated in the study: 6-8-month-olds (n = 40) and 11 – 13-month-olds (n = 32), and their caregivers. Our initial analyses show a negative association between the amount of touch provided by the caregiver and mean salivary oxytocin levels during the lab visit, as well as a positive association with salivary cortisol levels in the younger group.
Examining the creative process of children’s problem-solving abilities

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Objective: Previous research has shown that children younger than 8 years struggle to innovate a new tool to solve a novel problem (e.g., Beck et al., 2011). However, children in these studies were given two materials to use and results only focused on successful tool creations. This study aims to explore whether providing children with a variety of materials influences successful tool creation.

Design: A correlational design was used.

Methods: Fifty-four 4- to 7-year-old children were recruited from a local science museum in Scotland. Children were given a variety of materials (sticks, pipe cleaners) to solve a novel task that required creating a tool (ideally a hook) to retrieve prizes at the bottom of a container. We coded the quantity of tools made, the number of materials used in creation of the tools, and the number of all unsuccessful attempts and successes achieved.

Results: Fourteen children (Mage=6.85 years) manufactured a hook to retrieve prizes using various materials. Five of these children also created a different tool to solve the task. Of those that were not successful (n=38), children created an average of 2.49 unique tools (range 1 – 11 tools). A higher number of unsuccessful attempts correlated with the number of materials used ($p=.04$).

Conclusions: Young children solved this task with a variety of materials. The number of total tools created is noteworthy and is a process not previously examined. Measuring the number and quality of tool creations, regardless of success, may be a way to understand a child’s creative problem-solving process.
Objectives: Laughter can either be an emotional expression of positive internal states (spontaneous) or serve as a communicative signal in social interaction (intentional). Through various social functions such as showing politeness, agreement and affiliation, laughter is crucial to establish and maintain social bonds. A previous neuroimaging study found that neurotypical adults showed greater activation in amPFC during passive listening to intentional versus spontaneous laughter, suggesting that intentional laughter perception automatically engages high-level cognitive skills, such as mentalizing ability, to understand and interpret the intention and meaning behind the laughter. There have been no studies investigating whether autistic adults have a different pattern of laughter perception to neurotypical adults and, if so, whether it is a consequence of their mentalizing difficulties.

Design: The current study aims to investigate the difference in laughter perception between autistic adults and an age-, gender- and IQ-matched control group.

Method: An implicit processing task and an explicit rating task were used to examine the perceptual difference of spontaneous and intentional laughter.

Results: The results demonstrated that, relative to neurotypical adults, autistic adults show a similar pattern of implicit processing of spontaneous and intentional laughter. Additionally, autistic adults were able to discriminate spontaneous and intentional laughter, although not as well as neurotypical adults; specifically, autistic adults appear to show a perceptual difference in the processing of intentional laughter.

Conclusions: Autistic adults with high IQs have only subtle perceptual difficulties in the processing of laughter relative to neurotypical adults.
Ref: 3298 Empirical Oral Presentation
Topic: Cognitive & Developmental Abstract
The role of administrator familiarity in children's eyewitness identification

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**Objectives:** In eyewitness paradigms, young children are as accurate as adult in identifying a ‘suspect’ from a target-present lineup but typically make a false identification on target-absent lineups. The aim of the current study was to determine whether false identifications would be reduced when the lineups were administered by a familiar experimenter.

**Design:** This was a 2 x 2 between design with familiarity of the experimenter (familiar or unfamiliar) and lineup type (target-present and target-absent) as the independent variables and accuracy and confidence as the dependent variables.

**Methods:** 120 children aged 5-7 years took part. Each child watched a short video of a mock theft and then 2-3 days later had to indicate which of the 9 boys in the lineup had committed the theft, say that he was not there or could select the ‘mystery boy’ option if they were unsure. Children also rated confidence in their decision.

**Results:** On both lineups, the children who were familiar with the experimenter were more accurate and more confident, however these differences were not significant. Further analyses of target-absent responses did however show that the familiar participants were more likely to select ‘not there’ than the ‘mystery boy’, indicative of higher certainty in their response.

**Conclusions:** Overall, performance on both lineups was comparable (62% on target-present and 58% on target-absent) which is contrast to previous results. This suggests that perhaps the experience the experimenter had working with children has benefitted both groups regardless of their level of familiarity with the experimenter.
Objectives: Research shows that difficulties in auditory processing are associated with literacy difficulties. However, previous work with children with mild-moderate hearing loss shows that the associations are not necessarily straightforward (Halliday, Tuomainen & Rosen, 2017). Otitis Media (OM), or middle ear infection, can cause transient hearing loss which is associated with later phonological difficulties (Carroll & Breadmore, 2018). We examined the extent to which a history of OM was associated with auditory processing and literacy difficulties.

Design: A direct comparison between children aged 9-11 years with a history of otitis media and children with literacy difficulties, and two types of control groups: typically developing children matched on age and younger literacy level matched controls. There were 21 children in the risk groups and literacy matched controls, and 30 children in the age matched controls.

Method: All children completed language and literacy measures and three auditory processing tasks: speech perception; rise time and frequency discrimination. These tasks used the same methodology as that described in Halliday et al (2017).

Results: Analyses are still ongoing, but preliminary work indicates that children with literacy difficulties show difficulties in frequency discrimination, but no difficulties in rise time or speech perception, and children with a history of OM show no difficulties in any of the auditory processing tasks.

Conclusions: The findings are in line with previous research indicating frequency discrimination being a difficulty in poor readers, but suggest that there is not a direct causal association between auditory processing and phonological difficulties.
Does iconicity affect how children with autism spectrum disorder learn words from pictures?

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Objectives: Many children with autism spectrum disorder (ASD) and concomitant language impairments are taught to communicate using pictures. However, recent research suggests that children with profound language impairments may not understand the symbolic function of pictures. Here, we explore how autism impacts children’s ability to learn words from pictures that vary in iconicity (e.g. photographs vs line drawings).

Design: Participants will learn names for unfamiliar pictures. Retention of words and extension to objects will be assessed after a delay.

Methods: Children with ASD (n ≈ 20) and typically developing (TD) controls (n ≈ 20) matched on receptive vocabulary will map novel words to pictures of unfamiliar objects by applying the ‘mutual exclusivity’ principle. Children’s understanding of how the novel words relate to pictures and objects will be probed after 5 minutes. On different days, children will complete the task using colour photographs and black-and-white line drawings.

Results: We predict that both groups will utilise mutual exclusivity to correctly map new words to unfamiliar pictures in both conditions. For children with ASD, we expect that retention and generalisation of words to objects will be superior when learning from photographs. By contrast, TD children’s delayed test performance will not be influenced by iconicity.

Conclusions: This study will highlight how learning from pictures impacts ‘fast’ and ‘slow’ word learning mechanisms in both typical development and ASD. If word learning in ASD is facilitated by greater iconicity, these findings would provide a data-grounded rationale for using colour photographs when administering picture-based interventions.
Measurement properties of the suicide behaviours questionnaire - revised in autistic adults.

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Objectives: Autistic people are at high risk of experiencing suicidality. However, there are no validated tools to assess suicidality in this group. This study aimed to explore the measurement properties of a suicidality assessment tool developed for the general population (The Suicide Behaviours Questionnaire – Revised; SBQ-R), in autistic adults.

Design: A mixed methods design was employed. First, a between subjects’ design compared the latent structure of the SBQ-R between autistic and general population adults. Second, a single group design explored how autistic adults interpreted the questions in the SBQ-R.

Methods: 188 autistic adults (76 male) and 183 general population adults (62 male) completed the SBQ-R online. Multi-group factorial invariance (MFI) analysis compared the structural equivalence of the SBQ-R between the groups. Cognitive interviews subsequently explored how a sub-group (n = 15) of autistic adults interpreted and responded to the items of the SBQ-R.

Results: MFI analysis of the online survey data found evidence for configural but not metric invariance of the SBQ-R, with significantly different factor loadings between groups for items three (communication of suicide threat to others) and four (future suicidal intent) of the questionnaire. Cognitive interviews revealed that these questions were interpreted differently by autistic adults.

Conclusions: Findings suggest that autistic adults attribute a different meaning to some items on the SBQ-R compared to general population adults, and absence of items which capture the unique presentation of suicidality in autism. These results will be used to adapt the SBQ-R to better capture suicidality in autistic adults.
Ref: 3324 Part of Symposia

Topic: Cognitive & Developmental Abstract

(S) Mobile health (mHealth) technologies to address assessment and intervention gaps in autism in low-resource settings

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**Objectives:** Accelerating detection of autism spectrum conditions can facilitate early interventions, which are associated with the best outcomes. Availability of resources (both clinical and financial) constitutes a primary source of diversity across and within countries. In many low-resource settings, the pipeline from detection to intervention faces a significant barrier. In this proposed panel, we present data from four ongoing projects in low-resource settings in South Asia, where this barrier is targeted using mHealth technologies (gamified assessments, video-recordings, portable EEG & eyetracking) and the involvement of non-specialists (e.g., community health workers, parents) in the pipeline from detection to intervention. At the detection end, START (abstract 1) is an Android app that run on tablet PCs and can be administered by non-specialist workers to assess diverse domains of neurodevelopment, comprising social motivation, sensory sensitivity, and motor function to detect potentially atypical neurodevelopmental patterns. The EIRA and BRAINTOOLS (abstract 2) projects seek to assess the feasibility of using portable eyetracking and brain activity measures using EEG in community settings. At the intervention end, Point OutWords (abstract 3) is an iOS app developed to aid communication skills in children with autism that can be used by parents, caregivers, and teachers with minimal/no training. All projects have been developed and/or currently underway in diverse low-resource settings in South Asia. This panel will present data from these three projects and consolidate their insights.
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Objectives: In many parts of the world with poor access to clinical expertise, large numbers of autistic children remain undetected. To bridge this detection gap, we have developed START (“Screening Tool for Autism Risk using Technology”), a tablet-based battery of tasks that can be administered by minimally trained health workers (HW) in home settings.

Methods: HW tested 127 children in and around Delhi with: autism spectrum disorders (ASD), intellectual disabilities (ID), and typical development (TD), on three dimensions: (1) social motivation, measured using a) preferential looking task: tablet-based eye-tracking to measure overt attention to social over non-social stimuli, and b) choice task: to measure preference for social rewards by pressing one of two buttons; (2) sensory interests: measured by showing a video of a spinning wheel which participants could stop at will; and (3) motor following task: measuring by asking participants to follow the trajectory of a target moving in a predetermined random manner.

Results: In the preferential looking task, children with ASD spend significantly less time looking at the social stimuli than the TD group (p = 0.017). Children with ASD spend significantly longer looking at spinning wheel than TD (p < .001). Children with ASD made greater spatio-temporal errors than TD or ID groups (p < .001).

Conclusions: This expected pattern of ASD-TD differences in diagnostically and phenotypically relevant tasks provides proof of principle for START, and demonstrates feasibility of such mobile, scalable assessment of neurodevelopmental phenotypes by non-specialists in home settings.
Ref: 3317 Part of Symposia
Topic: Cognitive & Developmental Abstract
(2) From the lab to the field: measuring brain activity and eye movements to assess neurodevelopment.

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Objectives: Over 10% of children aged 2-9 years are estimated to have neurodevelopmental disorders; the greatest burden affects low and middle-income countries (LMICs). Direct measurement of brain function may lead to earlier identification of risk and resilience, providing new opportunities for intervention.

Design: We describe two new toolkits (BRAINTOOLS and EIRA) bringing lab-grade electroencephalogram (EEG) and eye-tracking technology to the field in a low and middle income context (LMIC) to measure neurocognitive features associated with mental health outcomes in children.

Methods: Ongoing test-retest reliability and case-control pilot studies in children with typical development, autism spectrum disorders or intellectual disability assess feasibility, acceptability and validity in children aged 3-5 years in community centres around Delhi, India.

Results: Data collection is ongoing: preliminary data suggests that parents and children are at ease with the technology, collection of data is feasible in multiple community settings despite differing challenges, and data collected in field settings are comparable to highly controlled lab settings.

Conclusions: Utilizing these toolkits can improve early identification and help reduce current detection gaps in low and middle income contexts.
Objectives: Point OutWords, a caregiver-delivered, iPad-assisted intervention for minimally verbal or non-verbal children with autism, aims to develop motor and cognitive skills prerequisite to communication. This trial aims to determine whether Point OutWords’ clinical efficacy can be evaluated in an NHS setting.

Design: Pilot work contrasting autistic users with normal controls has been followed by a parallel-groups randomised controlled trial.

Methods: 46 children are being recruited. The intervention group uses Point OutWords half an hour 5 times a week over 8 weeks. The control group has equal iPad/caregiver contact time using a selection of ‘control’ apps (e.g. sensory apps, drawing apps). Communication, motor, and daily living skills are assessed at baseline, immediately post-intervention, and three months post-intervention. Visuomotor targeting error, movement path length efficiency, and variability of movement speed and direction also are measured from interactions with the iPad itself. Parents keep diaries during the intervention period and take part in focus groups when the intervention is completed.

Results: Pilot data show that autistic users' movements are more variable in speed (p=0.0145) and direction (p=0.0065) than non-autistic users', and suggest treatment-related improvements in manual motor and daily living skills in a subset of autistic users. Acceptability to children and their families, fidelity to the intervention regime, suitability of outcome measures, and recruitment and retention rates are also explored.

Conclusions: Point OutWords was co-developed with autistic children and their therapists and caregivers, and targets an underserved subgroup of autism. This feasibility trial will inform the design of a future full-scale RCT.
Objectives: Chambers’ Draw-a-Scientist Test (DAST) has been widely used to investigative children’s stereotypical representation of a scientist. Based on research using Chambers’ DAST, a recent meta-analysis reports that American children’s gender biased view of a scientist has decreased in the past 5 decades. However, the tendency to associate male with scientists is still notable, especially in boys. This study aimed to explore the gender-science stereotypes in British primary school children.

Design: 272 (51.5% female) pupils in Years 4-6 from three different primary schools completed the Draw-a-Scientist Test. The drawing was coded to measure their stereotypical views of a scientist using Chambers’ DAST scheme and a new coding scheme.

Method: British children in the present study showed comparatively lower DAST scores, suggesting a less gendered representation of a scientist with no significant age difference. However, using a more refined coding scheme revealed subtle differences in how a scientist is represented in boys’ and girls’ drawing. Boys in the current study predominately drew a male scientist (81.8%) who was also old (21%) whereas more girls drew a female scientist (55.1%) who was rarely shown as being old (6.6%). Chambers’ DAST coding scheme did not capture significant developmental differences in the way gendered associations of a scientist were represented in the children’s drawings. Many of the drawings showed a lab bench with apparatus such as beakers and test tubes, indicating the child’s attempt to pictorially represent ‘science’.
Objectives: This paper aims to investigate the mechanisms through which economic hardship influences children's behaviour problems, with parental stress and parenting practices as mediators, and children’s Delay of Gratification as a moderator.

Design: A two-wave national study “Singapore Early Childhood Development Longitudinal Study (SGLEADS)” was designed to investigate the factors shaping child development in Singapore, by interviewing 5000 children below 7 years old and their primary caregivers.

Methods: The 759 parent-child pairs (child aged 3-6 years; total n = 2900 by September 2019) in this study were a subset of the nationally representative sample in Wave 1. Children went through a Delay of Gratification task. Economic hardship, parental stress (psychological distress and parenting stress), and children’s externalized and internalized behaviour problems were reported by primary caregivers. Structural Equation Modelling was used to examine the proposed model.

Results: Economic hardship shaped children’s externalized and internalized behaviour problems through increased parental stress; further, increased harsh punishment and decreased parental warmth served as secondary mediators, partially mediating the effects of parental stress on children’s behaviour problems. Child’s Delay of Gratification buffered the impacts of economic hardship on children’s externalized behaviour problems: when children have a higher level of ability to delay gratification, the association between economic hardship and externalized behaviour problems became non-significant.

Conclusions: Parental stress, harsh punishment and parent warmth are key mediators between poverty and early childhood behaviour problems. Delay of gratification can serve as a protective factor for young children growing up in poor families to achieve adaptive behavioural outcomes.
Ref: 3480 Empirical Poster Presentation  
Topic: Cognitive & Developmental Abstract  
How in-home noise may be impacting attention and learning during infancy

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**Objectives:** Previous research has revealed that noise negatively impacts formal educational learning. Our research is focused on understanding how noise may be impacting attention and learning during infancy, when the brain has greater plasticity.

**Design:** We looked at how ecologically chronic auditory noise, versus no noise, effects attention and learning. Additionally, we accounted for how experience within certain environments and noise levels might influence this relationship, as well as sleep quality, which has been linked to both attention and learning.

**Methods:** Sixteen 8-10-month-old infants participated, an age when our visual statistical pattern can be reliably learnt. Eye-tracking was used to measure attentional looking patterns, and learning was established as showing a looking preference for the novel statistical patterns over the familiar ones. The CHAOS questionnaire, a noise questionnaire, and a sleep questionnaire were completed by parents.

**Results:** The current results were compared to Wu et al.’s (2011; Experiment 1) no-noise condition. Unlike Wu et al., t-tests revealed that the infants in our noise condition significantly preferred the familiar patterns in the first block, p < .001, and only began showing a preference for the novel patterns in the second block, p = .001. A regression analysis suggests that increased in-home noise levels significantly predicted decreased infant looking time, r^2= .33, p = .022.

**Conclusions:** The results revealed that noise hinders infant learning, and that experience with noise may play a role in the development of infant attention and learning. Future work is addressing this by directly measuring in-home noise levels.
Objective: Mentalizing is the ability to represent other people’s mental states to predict and understand their behaviour, and is thought to underlie the social symptoms of autism. Understanding deception requires the knowledge that one person intends to instil a false mental state in another person and is an important social skill that allows us to modulate our behaviour (both pro- and anti-socially). Whilst past research shows that production of deception is impaired in children with autism, this study aims to investigate whether highly-able autistic adults, who frequently compensate for their difficulties, still show subtle impairments in producing deception.

Design: A between-subjects design was used to compare lying behaviour (LB) between autistic and neurotypical male adults.

Methods: Novel verbal deception tasks were implemented: participants described pictures and spoke about certain topics, choosing to either lie, double-bluff or be truthful whilst attempting to deceive a ‘partner’. LB was calculated as: deception of the ‘partner’; objective ratings by non-experts; and complexity of the lies by the experimenter. The Frith-Happé animated-triangles task was used to measure mentalizing.

Results: A comparison between autistic and neurotypical adults on the measures of LB showed mixed results. LB was found to correlate with mentalizing ability.

Conclusion: This suggests that there is a relationship between mentalizing and deception even in highly-able autistic adults – the better you can represent other’s mental states, the better you are at deception. Future directions include a comparison between spontaneous and planned deception production, and also deception detection, in highly-able autistic adults.
Ref: 3314 Empirical Oral Presentation
Topic: Cognitive Abstract
Can considerations of survival improve free recall performance after encoding has taken place?

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Objectives: Evidence has consistently shown that survival processing yields significantly higher recall than a number of known memory-enhancing techniques. One explanation of this finding is that memory evolved to facilitate survival. However, this mnemonic benefit is only reported after deliberate survival processing during encoding. The presented studies explored survival memory considering survival at retrieval not during encoding.

Design: Both studies had a 2 x 2 mixed design. The between participants IV was Recall Task (Survival Primed vs. No Prime) and the within participant IV was Stimuli Type (Survival Relevant and Survival Irrelevant). The DV was the number of words recalled.

Methods: Exp 1. asked participants to rate Survival Relevant and Survival Irrelevant items for pleasantness. At test, following a distracter task, participants completed either a free recall task or a recall task primed for survival. Exp 2. had the same design, but items were rated for self-reference.

Results: The results demonstrated no significant effect of Recall Task. However, both Exp 1. and Exp 2. demonstrated a significant effect of Stimuli Type, showing that more Survival Relevant words were recalled than Survival Irrelevant. Exp 1. also revealed a significant Recall Task x Stimuli Type interaction, showing significantly more Survival relevant words than Irrelevant words were recalled in the Survival Primed task.

Conclusions:Whilst these data suggest no main effect of survival priming at retrieval, they do suggest higher recall for Survival relevant items over Survival irrelevant items following an unrelated encoding task, suggesting a mnemonic preference for survival relevant targets.
You need to keep in mind multiple things at once to understand language, solve problems, or plan your day’s activities. I will describe what psychological experiments and brain research tell us about humans’ ability to keep things in mind, or working memory. There are some situations that make it difficult to keep more than a few simple items in working memory, and other situations that allow a surprising amount to be remembered. I will focus on just what the act of paying attention contributes to how much one remembers. I will also discuss investigations into the reasons that working memory capacity increases in childhood, allowing more complex ideas to be understood as children mature. Working memory research should improve our ability to assess what educational materials are appropriate to the child’s cognitive level.
Objectives: Previous research with adults suggests that representations activated during handwriting production code information on morphological structure evidencing decomposition of the root and suffix. The aim of the present study was to extend these findings to children with and without oral language difficulties.


Methods: A dictated spelling task (21 words; 12 with inflectional suffixes, 9 with derivational suffixes) was completed on paper with an inking pen fastened to a graphics tablet. Pause analyses and letter duration analyses were conducted using the handwriting software Eye and Pen.

Results: Children made more frequent but shorter pauses while spelling word roots but less frequent, longer pauses at the boundaries between the root and suffix. Letter durations were significantly longer for the letter immediately prior to the boundary compared to the letter after it. Children with DLD showed longer mean pause durations and letter durations compared to CA controls but were commensurate to their LA matches and showed the same pattern of results.

Conclusion: A morphological decomposition effect has been found whereby processing of the suffix occurs towards the end of the root and in the boundary before the suffix as evidenced by longer mean pauses and letter durations. This effect is present in children with DLD despite their well-established difficulties in spelling morphologically complex words.
Objectives: The Approximate Number System (ANS) is the cognitive system that underlies our ability to nonverbally estimate and represent numerical quantities. A typical task used to measure an individual's ANS acuity involves the presentation of two random displays of dots where the participant chooses whichever display has the larger number of dots.

Design: It has been strongly argued, most notably by Halberda et al (2008), that ANS acuity correlates with mathematical achievement in childhood and later ages, and it has been argued by others that this relationship is in fact causal such that training the ANS leads to improvement in mathematical achievement. However, in all these studies ANS acuity is quantified in terms of a Weber fraction that is calculated solely on the basis of the individual's accuracy. This is despite the fact that the ANS task is a paradigm example of a two alternative forced choice task.

Methods: It is arguable therefore than an improved measure of ANS acuity can be obtained by modelling individuals' performance using sequential sampling model, such as a drift diffusion model, which have been well established as accurate models of speeded decision making.

Results: In this study, we analyse performance on the ANS task using a Hierarchical (multilevel) drift diffusion model and correlate ANS acuity measured by this model with participants' mathematical achievement scores using standardized tests of arithmetic abilities.

Conclusions: Our results provide a more precise measure of ANS acuity and how it relates to general mathematical abilities in adults.
Waiting for the Better Reward: Comparison of Delay of Gratification in Young Children across Two Cultures

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**Background:** Delay of gratification, defined as the ability to forgo a small immediate reward to obtain a larger delayed reward, is an important cognitive ability emerging throughout preschool years. Previous research studying delay of gratification has primarily been conducted with Western populations and has, therefore, provided limited evidence on the universality of its developmental trajectory.

**Design:** Here, we present a novel experimental paradigm featuring a mechanized rotating tray that moves rewards sequentially to investigate the influence of culture, reward type and visibility on pre-schoolers’ delay of gratification ability.

**Methods:** The study compared self-control competencies of British (N = 61) and Chinese (N = 75) pre-schoolers aged 3-5 years using the novel rotating tray task. Additionally, in order to examine whether performance in the rotating tray task correlates with performance in standardised self-control test, we administered three established inhibition tasks and one traditional delayed gratification task to Chinese pre-schoolers.

**Results:** Overall, we found significant age-related improvements in delay of gratification ability in both countries. Specifically, children performed better when they were presented with rewards varying in quality over rewards varying in quantity. Reward visibility had no effect on children’s delay of gratification. Consistent with previous cross-cultural literature, Chinese children showed better overall performance than their British peers. Furthermore, there were significant correlations among the motor inhibition task, the rotating tray task and the traditional delay of gratification task.

**Conclusions:** We concluded that our novel paradigm taps into children’s delay of gratification ability and our results emphasize the importance of sociocultural influences on children’s cognitive development.
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Objectives: This aim was to investigate the effects of task (reading versus writing) and number type on Arabic-speaking children's transcoding of 2-digit numbers.

Design: A repeated-measures design was used.

Method: 40 Arabic-speaking first graders (20 female) from elementary schools in Sakhnin, Israel (mean age 7.36 years) were given two transcoding tasks: (1) reading two-digit numbers aloud and (2) writing two-digit numbers to dictation. Each task included 89 numbers from 10 to 99. They were divided into three categories: 29 Teen numbers between 10-20, 29 Decade numbers (e.g. 60), and 31 Other two-digit numbers. Within each task, the numbers were presented in random order.

Results: The total number of errors was calculated for each task and for each number category within it. A repeated measures analysis of variance was conducted with task types and number categories as within participant variables, and number of errors as outcome measure. The mean error rates for reading numbers and for writing numbers were 6.9 and 4.7. Main effect of task did not reach significance(F [1,85] = 3.03, p = 0.08). Number category had a significant effect on errors(F [2,170] = 24.21, p <0.0001). ‘Other’ 2-digit numbers elicited more errors than Teen numbers, which elicited more errors than Decade numbers.

Conclusions: Decade and teen numbers elicited fewer errors and numbers than other 2-digit numbers. There was little or no difference between performance on reading and writing numbers. Future studies should investigate whether results were influenced by characteristics of the Arabic counting system, such as inversion.
Objectives: “6 + 38 - 55”: how did you solve the problem? Individuals who understand the arithmetic principle of associativity can solve it through a ‘shortcut’, where the subtraction (38 - 35) is performed before the addition (6 + 3). More than any other arithmetic concept, individuals struggle with this principle. The objective of this research was to investigate whether the use of associativity shortcuts could be increased.

Design: We report two pre-registered intervention studies conducted in university classrooms that investigated whether shortcut use could be increased.

Methods: In each study, participants were randomly allocated to an intervention or control condition. In study 1 (N = 109), participants in the intervention condition first solved inversion problems of the form ‘a + b – b’ and ‘a + b – a’ and those in the control condition solved two-term arithmetic problems. In the second study (N = 257), there were three conditions, where participants either solved ‘a + b – b’ problems, or ‘a + b – a’ problems, or two-term arithmetic problems.

Results: Frequentist and Bayesian analyses were conducted. We found that associativity shortcut use was higher in the ‘a + b – b’ condition than either of the other two conditions.

Conclusions: We discuss three cognitive mechanisms through which ‘a + b – b’ inversion problems encourage individuals to use shortcuts on ‘a + b – c’ problems, including a) conceptual knowledge, b) attention, and c) strategy validation. These findings could be used by teachers for designing brief activities to encourage strategic thinking.
Background: Children’s executive function (EFs) development is crucial for children’s success in school and life. Research indicated that approaches such as Tools of the Mind and Montessori are beneficial for children’s EFs. These approaches emphasise child-led activities. Whereas teacher-led activities require children to follow instructions, in child-led activities children have to set goals and regulate behaviour.

Objective: Hence, we explore whether children who spend more time in child-led activities demonstrate more EF growth across the school year compared to children who engage in more teacher-led activities.

Design: Final results will be presented from a study of 211 children from 32 classrooms in 14 low-income UK schools. Children’s EF skills were measured with a comprehensive task battery in the beginning and in the end of the school year. In Spring, one-day classroom observations were conducted.

Methods: The EF task battery included well-established tasks (e.g. DCCS). To understand how children spend their time in the classroom, the instrument Teacher and Child Observation in Preschools (TOPCOP) was applied.

Results: Preliminary analysis has shown that there are differences across the classrooms in the time they allocate to child-led activities. Given the hierarchical structure of the data, multilevel modelling will be used to assess the relationship between the growth of children’s EF skills and classroom characteristics.

Conclusions: There are trends for schools to expose children to more teacher-led learning with direct instruction at an increasingly early age. However, children’s EF development may be impaired if they have fewer opportunities to engage in child-led activities.
Objective: Difficulties across all general and academic domains are noticed in individuals’ born prematurely, with mathematics being the domain most impacted beyond any other domain. We aimed to investigate the performance of very preterm (VP, <32wk gestation) children and their full-term born peers in tasks evaluating both domain-specific number skills, using symbolic and dot (non-symbolic) magnitude comparison tasks, and domain-general skills (IQ, executive functions), and their associations with mathematical achievement.

Design: Cross-sectional study.

Methods: 38 very preterm children and 30 full-term born children aged between 8 and 10 years old participated in standardised assessments evaluating intelligence, processing speed, working memory, attention, planning, inhibition and mathematical achievement and experimental tasks evaluating symbolic and non-symbolic performance.

Results: Overall, preterm children underperformed their term-born peers on all domains tested, with significant differences for standardised tasks measuring intelligence, processing speed, working memory, inhibition and planning. Accuracy, but not reaction time, was significantly different between groups in both experimental tasks. After controlling for intelligence, only non-symbolic acuity remained significantly different between groups. Associations between visual working memory and mathematical achievement were stronger than any other domain, both domain-specific and domain-general, but only for the VP group.

Conclusion: A better understanding of the mechanisms underlying number cognition and their relationship to executive functions might help in the early identification of individuals born prematurely at particular risk of experiencing difficulties with mathematics, and in targeting appropriate interventions for those who struggle at school.
Ref: 3442 Review/ Theoretical & Practice Oral Presentation  
Topic: Cognitive Abstract  
The State of the Creative Art: Novel Methodological Approaches for Studying Artistic Performance and Creative Problem-Solving  

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Purpose: We demonstrate how novel methodological approaches are advancing our understanding of cognitive creativity, creative problem-solving, and creative art and artistic performance.  

Background: Creativity is a broad and multifaceted area, investigating the creative person, the creative process, the creative product, and environmental influences on creativity: research thus tends to focus on discrete areas of study which suffer from a lack of cross-fertilization. It is therefore important to integrate research ideas, methods and findings across multiple domains and disciplines, to encourage the development of novel methodological approaches and increased interdisciplinary discourse. We see three ways by which to achieve such development: 1) employing traditional methodologies to investigate hitherto unresearched domains; 2) utilizing increased accessibility to domain-specific online populations and recent technological advances to cultivate new research methodologies; and 3) juxtaposing methods from multiple domains and disciplines in a novel way.  

Methods: This presentation draws from our recently edited Frontiers in Psychology Research Topic, containing 26 articles covering novel methodological approaches in cognitive creativity (insight problems; divergent thinking tasks; creative problem-solving), visual art (painting; fashion), and performing arts (music; dance). These articles cover a wide range of methodologies reflecting all three approaches mentioned above.  

Conclusions: This presentation will discuss emerging methodological themes, such as the roles of embodied creativity, imagery and insight, the time course of creativity, and creativity in special populations. Creativity research is thriving, and through developing innovative methods and methodological approaches, we are in a strong position to advance our understanding of creativity in all its forms.
Objectives: Within the expertise area there is controversy regarding the development of exceptional performance. There are two main viewpoints: a) deliberate practice and b) aptitude plus practice. This study uses Friedlander & Fine’s Grounded Expertise Components Approach (GECA) to explore these concepts by gaining an in-depth understanding of those who take part in Quizzing as a hobby. Factors being investigated include their cognitive skills, motivation and expertise development, with the aim of uncovering key drivers within the niche population.

Design: Exploratory sequential mixed methods are employed. Here we report on the first stage comprising qualitative interviews with seven expert quizzers. The themes generated will be used to create a wide-ranging survey to be circulated among quizzers, at all levels of performance, with the aim of uncovering key drivers in the quantitative stage of the study (GECA stage one).

Methods: Semi-structured interviews were conducted with seven knowledgeable individuals who are expert and/or immersed in quizzing. Conventional content analysis was used to highlight key aspects and overarching themes regarding the target audience.

Results: Seven themes emerged: Characteristics/Preferences, Thirst for Knowledge, Motivation, Expertise, Strategic Practice, Engagement, Quiz Definition. Each theme has a number of sub-themes which are discussed.

Conclusions: Rich data collection has enabled important factors to emerge regarding individuals who take part in Quizzing, a niche performance activity. The next stage is to create a survey using this data to explore the whole quizzing population, enabling individual characteristics at each level of performance to be identified.
Objectives: Preschoolers build relationships with their friends and make their own groups in their daily life. This study focused on children’s tendencies to build a relationships with others.

Background: According to the social motivation hypothesis (Chevallier, et al., 2012), imitation is important for us to build new relationships. Then, the hypothesis of this study was that children want to build relationships with the others who imitate them.

Methods: Twenty-two preschoolers took part in this study. Their parents applied for the experiment. They participated individually at the preschool they were attending. The human ethical ethics committee for research about human at Shizuoka University approved this study. In the experiment, two puppets which experimenter A operated were shown to the participants for a puppet imitation task. In the puppet imitation task, children were asked to make something with eight blocks. One puppet made the same product as children’s one. On the other hand, the other puppet made different product. After the session, experimenter B asked children which puppet they want to play with in the next game.

Results: Nine children chose the puppet who imitated children in the puppet imitation task. According to Fisher’s exact test, there was no significant difference (n.s.)

Conclusions: This result indicates that children do not have a motivation for becoming friends with people who imitate them. Some children said that they do not like to be imitated. In the further research, we should investigate how people feel when they are imitated.
Purpose: Considerable evidence shows that individuals with chronic pain preferentially attend to pain-related information, over neutral information, in their environment. According to the recent Threat Interpretation Model (TIM, Todd et al., 2015) this only occurs when a stimulus is interpreted as threatening. To investigate this, in the present study we experimentally manipulated threat expectancy information prior to participants taking part in both a visual probe and cold-pressor task.

Methods: That is, healthy participants ($n = 34$) received either threat expectancy or reassuring information about the cold-pressor task, prior to completing: i) an injury-related visual-probe with eye-tracking task; and ii) the cold-pressor task.

Results: Results demonstrated that those who received threatening information were no more likely than participants who received reassuring information to display attentional bias to injury-related images during the early (500ms) or later (1250ms) stages of attentional processing. However, threat manipulation did have an effect on participants pain outcomes as measured via the cold-pressor task. That is, those in the threat expectancy group exhibited a lower pain threshold and shorter tolerance compared to their low-threat informed counterparts.

Conclusions: Taken together, the results of this study suggest that experimentally manipulating threat does not induce attentional bias towards pain-related information, contrary to a key claim of the TIM. That said, experimentally manipulating threat was found to influence participants pain outcomes, indicating that presenting individuals with threatening information regarding an upcoming “painful” procedure can influence the subjective experience of pain. However, to fully substantiate findings replication in a larger sample is warranted.
Objectives: Evidence suggests that, while neurotypical children use inner speech to support goal-directed behaviour after the age of 7, children with Autism Spectrum Condition (ASC) may not. However, it is unknown whether those with ASC use visual-spatial processing instead, or whether their performance can be improved via encouraging speech use, as research so far has provided only inconsistent results. The objective of this study is to test if IQ mediates strategy use in the ASC population, and if this has been the cause of inconsistent findings in the previous literature.

Design: The study adopts a mixed design with ASC diagnosis being the between-subjects independent variable and condition being the within-subjects independent variable. The dependent measure is planning performance, and IQ and symptom severity are covariates.

Methods: Experiment 1 will use 48 children between the ages of 7 and 15 with verbal mental ages above 7. Experiment 2 will use 48 adults. Participants will complete a computerised Tower of London task, under the conditions of silence, private speech (speaking thoughts aloud), articulatory suppression (repeating a two-syllable word) and visual-spatial suppression (repeatedly tapping two points).

Results: The results of the study will be discussed in the context of the previous literature.

Conclusions: This research will increase our understanding of the variation within ASC and help improve teaching methods so they account for this variation. For example the findings could be used to design coping strategies for children with ASC (based on their verbal and non-verbal ability) to use when struggling in school.
Multiple measures of the home numeracy environment are not associated with children’s numeracy skills.

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**Objectives:** Previous studies have found mixed evidence regarding the relationship between measures of the home numeracy environment (HNE) and mathematics achievement. The majority of these studies have used questionnaires to measure the number activities that parents engage in with their children. We investigated whether multiple measures of the HNE were related to each other and to children’s early numeracy skills.

**Design:** Parent-child (age 3-4 years) dyads were recruited and parents completed three measures of the HNE: a well-established HNE questionnaire; responding to daily text message questions about number-related activities for three weeks; observations of parent-child free play. Children’s numeracy skills were also assessed using the WPPSI standardised test.

**Methods:** 68 parent-child dyads took part in the study. The associations among different measures of the HNE and the relationship with child numeracy skills were investigated with Pearson correlations.

**Results:** There was a moderate correlation between the questionnaire and text message measures \( r = .46 \), but neither correlated with parents’ number talk during play \( r = .10, r = .07 \). However, none of these measures were correlated with children’s mathematics performance, which was only related to children’s spontaneous number talk during play \( r = .27 \).

**Conclusions:** The frequency with which parents engage in number-based activities with their children is not associated with children’s early numeracy skills.
Ref: 3391 Part of Symposia  
Topic: Cognitive & Developmental Abstract  
Developing a measure of preschoolers' home numeracy environment

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**Background:** In order to address mixed findings in the home numeracy environment this study aimed to develop a new questionnaire measure of home numeracy environment.

**Design:** A mixed-methods study, including qualitative interviews and questionnaire completion by parents/guardians.

**Methods:** Taking an inductive approach, semi-structured interviews were conducted with parents of preschool-age children to further understand home numeracy environment. These interviews, along with information from established questionnaires, were used to develop a new measure that was rigorously validated with two samples of parents (N = 172; N = 136).

**Results:** This study developed a validated tool to assess home numeracy environment. Construct and content validity was also established through interviews with eight parents.

**Conclusion:** The issues in measurement of this construct and applications of this tool to longitudinal research will be discussed. In addition, further research has assessed the relationship between scores on this measure and early achievement.
Objectives: Early maths skills are a strong predictor of later academic attainment. By school entry, sizeable differences exist in children’s maths skills which coincide with socioeconomic status (SES) and widen throughout school. Little research has examined why this SES attainment gap emerges in young children. A range of factors are likely to play a role and this study focused on home maths activities (HMA) and relatedly, parent’s self-efficacy and beliefs about maths, as well as executive functions. The aim was to investigate how these factors contribute to explaining attainment gaps in early maths skills.

Design: A cross-sectional design was used.

Methods: Preschoolers (N=174) from completed measures of maths, inhibitory control, working memory, vocabulary and processing speed. Parents completed a questionnaire to measure SES, HMA frequency and their self-efficacy and beliefs about maths.

Results: Lower SES preschoolers had poorer maths skills than their higher SES peers ($r=.47**$). Lower SES families engaged in more HMA than higher SES families ($r=-.37**$). SES was positively correlated with inhibitory control ($r=.27*$), but not working memory, parent beliefs or self-efficacy. While parent’s beliefs about maths correlated with HMA ($r=.35**$), HMA and maths skills were not related ($r=.04$). However, children with better inhibitory control ($r=.53**$) and working memory ($r=.36**$) had better maths skills.

Conclusions: The results demonstrate SES attainment gaps in maths skills from age three. The executive function inhibitory control may be a plausible mechanism through which SES attainment gaps arise, whereas HMA do not seem to explain this gap.
Ref: 3398 Part of Symposia
Topic: Developmental Abstract

What factors contribute to the longitudinal relationship between children’s mathematical anxiety and mathematical performance?

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Objectives: Mathematical anxiety is a feeling of worry about dealing with mathematical problems in everyday and educational environments. An understanding of the direction of the relationship between mathematical anxiety and mathematical performance in primary aged children is important as good mathematical skills are important for later life success. According to the Deficit theory (Tobias, 1986) it is poor performance in mathematical tests and tasks that leads to higher anxiety in the individual. In contrast according to the Debilitating Anxiety Model, it is mathematical anxiety that impacts on mathematical performance (Lyons & Beilock, 2012).

Design: This involved a longitudinal (independent measures design) program of investigating the relationship between mathematical anxiety and mathematical performance with children (N=130) in two primary schools. We began measuring mathematical anxiety and mathematical performance in year 1 and 5 as a baseline, and then retested them during year 2 and 6.

Methods: Over the eighteen month period of this study we measured aspects of cognitive ability (Reading, Non-verbal Intelligence and Working Memory) anxiety (Trait, State and Maths) and performance (Mathematical fluency, arithmetic and word problems).

Results: The findings indicated there is a significant negative relationship between mathematical anxiety and mathematical performance over time. Through autoregressive modelling there is some evidence to suggest that previous mathematical performance leads to increased mathematical anxiety.

Conclusions: This negative relationship between mathematical anxiety and mathematical performance in children over time is only recently being explored. It was concluded in line with the Deficit theory, that previous mathematical fluency and problem solving performance predicts subsequent mathematical anxiety.
Ref: 3327 Empirical Oral Presentation

Topic: Cognitive & Developmental Abstract

Collaborative action, embodiment and autistic traits: the influence of technology design in social motor synchrony

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**Objectives:** We investigated 1. How to adapt tablet technology to facilitate synchronous body movements (Social Motor Synchrony: SMS), in a collaborative activity. 2. Whether degree of SMS differs according to autistic traits, type of game and screen arrangement.

**Design:** Participants played a colour-matching game (Colours) on a single tablet before and after a picture categories game (Connect), played on dual, connecting tablets (Holt & Yuill, 2017). The dual-tablets were side-by-side (horizontal condition, as in Holt & Yuill, 2017) or one above the other (vertical condition). Connect constrains for collaboration, supporting awareness of a partner and contingent action. The vertical adjustment was implemented to constrain for SMS to capitalise on the collaborative benefits of Connect, while encouraging movement within a shared space.

**Methods:** 10 adult dyads, recruited through the University’s participant pool, completed the Autism Quotient Questionnaire and were videotaped playing the games.

**Results:** 1. SMS significantly predicted collaboration. 2. Autistic traits were not related to SMS or measures of collaboration, and 3. Collaboration and SMS did not differ by vertical/horizontal conditions. However, the single tablet game (Colours) produced more collaboration and closer SMS than the dual-tablet game (Connect).

**Conclusions:** The strong link between SMS and collaboration highlights the potential for supporting synchrony in collaborative environments. Our findings can inform the design of shared, tablet games to support SMS and collaboration in autistic people. Additionally, the results suggest that autistic traits do not predict SMS in spontaneous interactions.
Objectives: Children’s false belief development has been documented thoroughly, the development of metalinguistic behaviour not receiving similar attention. This longitudinal study explored children’s understanding of two metalinguistic tasks throughout preschool years in relation to general language skills and false belief understanding.

Design: Children undertook a series of false belief, metalinguistic and executive function tasks alongside standardised language measures at 4 times over the course of 34 months to observe emerging skills aged 3.5 until age 6.

Methods: The study started with 77 participants, and was continued at time 3 and 4 with 40 and 32 respectively. Children were part of a preschool language study, follow up was only possible with a smaller group.

Results: The association between false belief and metalinguistic tasks got progressively stronger (p<.05 at time 1 and p<.001 at time 4). General language correlated strongly with false belief (p<.001) and metalinguistic (p<.05) measures at time 1, weaker at time 2 and not at all after. Language emerged as significant predictor across all times only for future language skills in regression analysis. False belief and metalinguistic skills were predicted at time 4 from time 3 measures. The inclusion of executive function and deprivation data did not add significantly to any model.

Conclusion: There is a strong alignment of false belief, metalinguistic skills and general language skills (vocabulary, grammar) at age 3.5, which progressively weakens. An underlying factor between false belief understanding and the understanding of language from a representational perspective emerges then, as indicated through growing metalinguistic skills.
Objectives: Nominal classification systems (gender, classifiers) are a functional means of categorisation that vary enormously across languages. Closely related Oceanic languages of Melanesia show staggering variation in their number and type of classifiers. How does the Iaai language carve up nouns into 23 semantic groups whilst the Merei language uses only two? What implications do these vastly different systems have for the cognitive representations of their related concepts? This ESRC-funded project exploits this variety to reveal the relative cognitive efficiency of gender and classifier systems, as a route to understanding optimal categorisation.

Design: We combine typological enquiry and psycholinguistic experimentation across seven complementary experiments (free listing, card sorting, video vignettes, possessive labelling, eye tracking, storyboards, category training), which compare nominal classification systems in six Oceanic languages of Vanuatu and New Caledonia.

Methods: During the first field trip to Vanuatu and New Caledonia, 132 participants (22 native speakers from each of the six languages) take part in free listing, card sorting and video vignette experiments.

Results: We present initial data from the first three experiments. Free listing establishes central members of a classifier’s semantic domains, which vary across languages. Card sorting reveals how speakers categorise relevant entities and whether conceptual groupings map onto classifiers. Finally video vignettes ascertain whether there is rigid or flexible assignment of nouns to classifiers.

Conclusions: We discuss how these experiments uncover the nature of nominal classification systems, comparing objective data across languages and experimental contexts to reveal a model for optimal categorisation.
Objective: There are around 300-350,000 mobility scooter users in the UK (RICS, 2014) yet scooter users do not have to receive any training on scooter use when they purchase a scooter, with most receiving basic manual handling training. Research on driving has shown that hazard perception is a critical cognitive skill that can improve driving performance yet no research has examined what hazards scooter users may face and how to negotiate these. We explored this across two studies and used the results to develop training material that we evaluated in a final study.

Design and Methods: Study 1 and 2 comprised a large questionnaire study and a study in which mobility scooter users were recorded driving round a pre-defined city centre route that involved negotiating a large number of pedestrian crossings. Aspects of this footage were used to create a training video. The final study used a sample of older adults (with no prior experience of driving a scooter) who were randomly allocated to receive the hazard perception training or an equivalent active control and who then drove on a city centre route and completed a questionnaire.

Results and Conclusion: Preliminary findings suggest that participants found the training video useful, however it made them less confident in their ability to drive a mobility scooter. This is because those who had seen the training video were better able to identify potential hazards, and so were more aware of them and how they negotiated them. The impacts of this training are discussed.
Objectives: Wellbeing is often influenced by children mastering developmentally appropriate tasks and milestones that pave the way for health and success. One of those developmental abilities shown to affect children’s and adolescents’ well-being is emotional competence, particularly the ability to understand and regulate one’s emotions and behaviours.

This symposium includes four studies that explore the relationship between emotional development and well-being in children and adolescents. Paper 1 by Tenenbaum and colleagues investigated 4- to 7-year-old children’s understanding of whether the positive and negative emotions of a helper affects subsequent helping behaviour. Indeed, participants indicated that a person would be more likely to help when in a positive mood, but only when this emotion was caused by the help-seeker. In paper 2, Aznar and colleagues examined the emotion regulation strategies, particularly co-rumination, of adolescent sibling pairs. They found that those siblings more likely to co-ruminate were also more likely to use cognitive re-appraisal emotion regulation strategies. Paper 3 by Gummerum and colleagues investigated how children and adolescents regulated the emotions of victims and perpetrators of social exclusion. The emotion regulation strategies used to change victims’ negative and victimizers’ positive emotions in social exclusion contexts became more cognitively sophisticated with age. In paper 4, Watling and Hayes report on a longitudinal study that assessed 10- and 12-year-old children’s resiliency, well-being and social-emotional difficulties before and after a resiliency intervention programme. Complex relationships between internalizing, externalizing, and prosocial behaviour and resilience emerged which may be related to how children think and feel about themselves.
Objectives: Between 4 and 7 years, children gain an understanding that unobservable factors in people’s minds influence emotions. Not until 10 years do children believe that others are more likely to help when in a happy than angry mood. The current study examines whether 4- to 7-year-olds believe that others will help when experiencing positive compared to negative moods.

Methods: 35 4- to 7-year-olds were told 12 stories that varied with valence (e.g., happy, angry) and whether the emotion was caused by the character in need of help or not. Children were asked whether the story actor would help and completed a measure of emotion understanding (TEC) and vocabulary.

Results: Mixed-design ANOVAs indicated that children were more likely to say that the story character would help after feeling a positive than a negative emotion, $F(1, 34) = 30.05, p < .0001, \eta^2_p = .47$. This effect was qualified by significant interaction effect, $F(1, 34) = 40.38, p < .0001, \eta^2_p = .54$ indicating that children were only more likely to say that the story character would help after feeling a positive than a negative emotion when the other character caused the emotion, $F(1, 34) = 8.71, p < .0001, \eta^2_p = .71$. Regression analyses indicated that age ($p < .05$) predicted the difference in suggested helping behaviour based on emotion, but emotion understanding and vocabulary did not.

Conclusions: The findings indicate that children as young as 4 years have some understanding of the role of emotion in helping behaviour.
(2) Emotion regulation and co-rumination between adolescent siblings

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Objectives: Adolescence is characterized by increased demands to regulate one’s emotions and behaviours (Greene, 1990). The strategies that adolescents use to regulate their emotions have implications for their psychosocial adjustment (Saarni, 1999). One such strategy is co-rumination. Co-rumination is described as extensive problem discussion with others and it is related to depressive symptoms (Smith & Rose, 2011). Even though adolescents report siblings as a source of support (Tucker, McHale, & Crouter, 2001), no research has examined the relation between emotional regulation and co-rumination between siblings. This study examined the relation between emotion regulation and co-rumination between adolescent siblings.

Design: A correlational study examining the relation between emotion regulation and co-rumination.

Methods: 136 adolescents (68 sibling pairs) aged between 11-17 completed two questionnaires: (1) the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) which examines two emotion regulation strategies: Cognitive Reappraisal and Expressive Suppression; and (2) the Co-Rumination Scale (Rose, 2002).

Results: Correlations between ERQ and co-rumination showed a significant relationship between cognitive reappraisal and co-rumination, $r = .19$, $p = .03$. Expressive suppression was not significantly related to co-rumination ($p > .05$).

Conclusions: Siblings who were more likely to use cognitive reappraisal to regulate their emotions, were more likely to co-ruminate. Findings suggest the importance of examining emotional and social functioning together because adolescents’ emotional regulation is likely to influence how emotions are socialized within sibling relations.
Objectives: By the primary-school years, children use different strategies (cognitive, affective, attention) to change others’ emotional experiences, mostly from feeling negative to feeling positive emotions. This study investigated such interpersonal emotion regulation (ER) in the context of social exclusion and assessed age differences (1) in children’s and adolescents’ desire to change victims’ and perpetrators’ emotions; (2) in the interpersonal ER strategies used.

Design: Correlational design

Methods: 30 5-year-olds, 31 9-year-olds, and 30 13-year-olds were presented with three social-exclusion scenarios. Participants were asked about the emotions of the violator and victim and whether and how the violators’ and victims’ emotions could be changed. Participants’ open-ended responses were coded according to different interpersonal ER strategies.

Results: In all age groups and scenarios, participants attributed negative emotions to the victims and indicated that they wanted to change their emotions. Younger children were more likely to attribute positive emotions to the victimizer, whereas older children and adolescents attributed negative emotions. Younger children tended to not change the emotion of the violator, but older children and adolescents did. Children relied on behavioural ER strategies that tried to “undo” the situations; adolescents suggested more sophisticated ER strategies, such as changing the victim’s and violator’s cognition about the situation.

Conclusions: Children and adolescents want and can use strategies to change victims’ negative and victimizers’ positive emotions in social exclusion contexts. The ER strategies used become more cognitively sophisticated with age. Young children’s attribution of positive emotions to and reluctance to change victimizers’ emotions may be related to their moral motivation.
Objectives: Children’s sense of wellbeing and resiliency has become a focus for interventions. To enhance the likelihood of engaging with interventions it is important to demonstrate the wider benefit of enhancing wellbeing and building resiliency in terms of what educators see in the classroom (i.e., internalising, externalising and prosocial behaviour). This work sets out to address this.

Design: We used a longitudinal design, assessing children at time point 1 and then again 6 months later. Within the 6 months children took part in a resiliency building programme (Smart Moves). The same measures where used at both time points.

Methods: 715 ten- to 12-year-olds (365 boys) completed the Kidscreen27 Wellbeing measure, a brief resiliency measure, and the Strengths and Difficulties questionnaire (SDQ). Hierarchical regression analyses were conducted to assess predictors of change (controlling for sex and age) in internalising, externalising, and prosocial behaviours.

Results: We found that having fewer externalising and more internalising behaviours, and becoming more positive in feelings about school, physical self, and friendships predicted greater increases in prosocial scores over time. Further, increasing negative feelings about school and family, being less resilient, becoming less prosocial and exhibiting more internalising behaviours predicted higher externalising behaviours between over time. Finally, increasing negative feelings in mood, family and friends, while becoming more prosocial and having more externalising behaviours predicted higher internalising behaviours between over time.

Conclusions: Findings are discussed in line with understanding how thoughts and feelings of self may impact changes in behaviour.
Objectives: An optimal level of stimulation is known to influence our exploratory behaviours. A point that is often overlooked is that each stimulus is simultaneously processed with its context, so contextual complexity may also play a role. The aim of this project was to study how environmental complexity and mood can influence food exploratory behaviours in toddlers. We hypothesized that lower complexity and positive environment could increase novelty exploration.

Design: A 2 (simple vs complex environment) x 2 (positive vs neutral mood) repeated measure design is conducted.

Methods: The experiment will start with a familiarization test with usual colour (yellow) polenta followed by four randomized experimental conditions (simple-positive, simple-neutral, complex-positive, and complex-neutral). Experimental trials will involve paired-choice tests of the familiar yellow polenta vs an unfamiliar polenta having a different colour (blue, red, green and brown). Each test trial lasted 1 minute. Repeated measures ANOVAs were used to study the effect of complexity and mood on total exploration time and the proportion of time spent exploring the unfamiliar polenta.

Results: Twenty toddlers between 1 and 3 years were recruited. Positive atmosphere impacted the total exploration time, (F(1, 21) = 7.917, p = 0.010, partial $\eta^2 = 0.274$) while complexity decreased the proportion of time exploring the unfamiliar food (F(1, 21) = 8.595, p = 0.008, partial $\eta^2 = 0.290$).

Conclusions: This study shows that a positive attitude and a simple environment will favour food exploration. This may inform future interventions targeting food neophobia or picky/fussy eating.
Objectives: Theory of mind (ToM) involves attributing mental states to others, understanding humans in terms of mental states, and being aware of one’s own and others’ thoughts (Wellman, Cross, & Watson, 2000). Previous work has demonstrated close links between ToM and comprehension of the landscape of consciousness within stories with pre-readers (Pelletier and Astington (2004)). The primary purpose of the current study was to examine the contribution of ToM to the early literacy skills of children aged between 4-7 year-old. “The Early Literacy Assessment Scale” (Karaman, 2013) involving 5 sub-scales and “Theory of Mind Scale” (Wellman ve Liu (2004) involving 6 different tasks were utilized in the study. 100 children attending pre-school institutions participated to this study. The results revealed the close correspondence between early literacy and theory of mind skills of children. The results were discussed in social cognition aspects of reading skills regarding related literature.

Key Words: Theory of Mind, Early Literacy, Pre-School Education
Minding the text: Developmental relations between reading experience, mentalising, and reading comprehension in middle childhood

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Objectives: Recent research indicates both that storybooks are an important vehicle through which information about mental states is transmitted to children, and that individual differences in mentalising skills predict variation in reading comprehension in early childhood and beyond. This study aimed to investigate longitudinal associations between children’s experience of reading fiction, mentalising skills, and reading comprehension.

Design: A two-phase longitudinal design was employed.

Methods: Sixty-one children completed multiple measures of reading experience, mentalising and reading skills at Time 1 (mean age 9;8) and again at Time 2 (mean age 11;00). Experience of reading fiction was measured using a book recognition task, author recognition test, and self-report questionnaire. Children completed the Reading the Mind in the Eyes and Strange Stories tests as indices of mentalising. Word reading, oral language and reading comprehension were assessed using standardised tests.

Results: Children with more cumulative experience of fiction reading showed enhanced mentalising skills one year later, after controlling vocabulary and listening comprehension. The reverse pattern was not observed (i.e., children with better mentalising skills at time 1 did not read more at time 2). Mentalising predicted unique variance in reading comprehension, after controlling oral language and word reading skills, at age 11, but not at the earlier assessment.

Conclusions: These findings are consistent with a cultural evolutionary account of explicit mentalising; fiction is a key context for learning about complex mental states. Further, the ability to infer information about mental states is predictive of reading comprehension later in development when comprehension is less constrained by decoding.
Objectives: To confirm the finding (Hancock, BPS Cog section 2012) that faces that resemble someone already known are better remembered, and see whether being aware of the resemblance at study is important.

Design: a two-part face memory experiment, within subjects. In part 1 at study, Ps were asked about trustworthiness of each face. After a short break, they were asked which of a larger set of identities they saw before, then asked which resemble someone they already know. In part 2, the resemblance question was asked at study.

Methods: Ps were 44 university students, opportunity selected. Faces came from the Glasgow unfamiliar face database, using 24 images at study, 24 different images plus 24 foils at test and counterbalancing male and female sets across the two study parts.

Results: There was a significant effect of resemblance in part 1, when Ps were not prompted to think about it ($d = 0.46$ [95%CI: 0.16, 0.78]). The effect was significantly bigger in part 2, when prompted about resemblance at study ($d = 0.99$ [.55, 1.5]).

Conclusions: If a face resembles one that we already know, we should be able to tap into longer term memories: that person at study looks like X, there is one at test that also looks like X, so I saw them before. The effect in part 1 suggests that this process may not need to be conscious and that we are simply better able to process faces that do look like someone already known.
Objectives: This study investigates whether 5- to 6-year-old children’s behavior of fairness is motivated by the desire to appear fair to observers. Children aged 6 to 8 years behave fairly to appear fair to observers rather than to actually be fair. However, from recent studies even 5- to 6-year-old children care about reputation, suggesting that young children also attempt to appear fair.

Design: A within-participants design was used to compare performance.

Methods: Participants were 35 5- to 6-year-old children in a kindergarten. An experimenter distributed chocolates to a child and a partner. In the control condition, they received two chocolates each. In the windfall condition, the child received one and the partner received two. The experimenter left, and a confederate gave one additional chocolate to the child. In the partner condition, the child received one chocolate and the partner three. The experimenter left, and the partner transferred one chocolate to the child. Thus, both child and partner had the same number of chocolates when the experimenter returned, but in the windfall and partner conditions the experimenter did not know this. The experimenter asked whether he/she should give another chocolate to the child.

Results: Significantly more children took the extra chocolate for themselves in the windfall and partner conditions than in the control condition, but these two conditions did not differ.

Conclusions: Children aged 5 to 6 years probably prefer to appear fair to others irrespective of the situation, indicating that young children care about their reputation in resource distribution.
Ref: 3470 Empirical Oral Presentation

Topic: Developmental Abstract

Children’s awareness of online disclosure and the risks and benefits of social networking site use.

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Background: 26% of 5-11 year-olds reportedly use traditional social networking sites, with 81% communicating via YouTube (SNS; Ofcom, 2017). Children are spending increasingly more time on SNS; research has shown that the more time spent online the greater the possibility of exposure to risks (e.g., cyber bullying, low self-esteem) and potential benefits (e.g. social capital, digital literacy). We aimed to gain an understanding of children’s awareness of online disclosure and how this influences their perceptions of the risks and benefits.

Design: An online questionnaire was administered via Qualtrics including a set of validated scales related to over-disclosure, cyberbullying, self-esteem, self-presentation and social capital. Items related to digital literacy were also included, these were descriptive questions related to the literature in this area.

Method: 901 children (8- to 12-year-olds) from 5 secondary schools across the UK completed the survey within their classroom settings. Scales included self-disclosure (Schouten et al, 2007); social capital (Ellison, Steinfield & Lampe, 2007); self-presentation (Michikyan et al, 2014); self-esteem (Rosenberg, 1965); cyberbullying (Hinduja & Patchin, 2010); digital literacy descriptive questions. All items were answered via Likert scales in accordance with the use of the scales in the literature.

Results: Findings suggest that disclosing online are predicted by likelihood to identifying risks to self-esteem, cyberbullying victimization and private disclosure. This was particularly evident within females.

Conclusions: Findings will be discussed with regards to children’s attitudes to the risks and benefits of social networking site use and the implications for schools and policymakers.
Ref: 3335 Empirical Oral Presentation

Topic: Cognitive & Developmental Abstract

Developmental Differences in Top-Down Control and Reducing Attentional-Capture in Children and Adults

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Objectives: Top-down control is a higher-order process which can help users plan-ahead and reduce attentional-capture by distractions. It is unclear at what age top-down control is acquired and whether this process is beneficial or costly to children who are beginning to use it.

Design: Five-six-, 9-11- and 18-25-year-olds reported the tilt (left/right) of a target-line among two other upright lines. Each line was presented in a coloured patch. Trials were preceded by a coloured cue which matched (predictive) or did not match (unpredictive) the coloured patch of the target-line. The trials in each block were either: Mostly-Predictive, Mostly-Unpredictive (or Neutral – cues unpredictive throughout). A singleton-distracter was presented on 41.67% of trials in each block to measure attentional-capture.

Method: 129 participants were recruited from the University of Nottingham and Derbyshire schools. Median-RTs were analysed using a 2(Block: Mostly-Predictive, Mostly-Unpredictive) x 2(Cue-Guidance: Neutral, Predictive) x 2(Cue-Type: Predictive, Unpredictive) x 2(Distracter-Presence) x 3(Age-Group) mixed-ANOVA.

Results: A four-way interaction (excluding Distracter-Presence) was found ($F(2, 126)=7.47$, $p=0.001$, $\eta^2=0.106$): cue-use in 9-11-year-olds differed from Neutral in the Mostly-Predictive block only but 18-25-year-olds showed this difference from Neutral in both blocks. 5-6-year-olds showed cue-use in the Mostly-Predictive block but this did not differ from Neutral. All participants resisted attentional-capture better on predictive, relative to unpredictive trials ($F(1, 126)=9.43$, $p=0.003$, $\eta^2=0.07$; $t(128)= -2.55$, $p=.012$, two-tailed).

Conclusions: Top-down control is developing in early-childhood (5-6-year-olds) and becomes “adult-like” by late-childhood (9+ years). Top-down control is beneficial as all participants used predictive cues to reduce attentional-capture. Current follow-ups are exploring these findings further in senior populations.
Objective: Sleep has been shown to support language consolidation. Autism is often characterised by sleep and language difficulties, but few studies have explored a connection between the two. Three experiments examined phonological and semantic consolidation in 77 children aged 7-13 years, 30 of whom had autism.

Design: In Experiment 1, children learned real but rare animals; Experiment 2 trained new phonological mappings based on synthesised speech tokens; Experiment 3 chartered neural responses to familiar and novel words. Memory was assessed immediately and 24 hours later (interleaved by a night of polysomnography), and one month later.

Methods: Memory was assessed via definitions, naming and speeded semantic tasks (Experiment 1), phonological repetition of trained and novel speech tokens (Experiment 2), and via the N400 event related potential response to familiar and novel words (Experiment 3).

Results: Children with autism and typical peers showed comparable pre-sleep performance and similar overnight improvements across all tasks. For the sample as a whole, NREM sleep (i.e., sigma power) was associated with overnight changes in new semantic knowledge whilst REM was associated with overnight phonological generalisation. Children with autism showed reduced NREM and sigma power, more general associations with NREM that were not specific to new semantic material, and greater forgetting of novel semantic features one month after learning. They also showed reduced amplitude EEG responses to highly familiar (but not novel) words.

Conclusions: These results point to intact processes of initial vocabulary acquisition but differences in the longer-term NREM-dependent consolidation of semantic material in autism.
Development of a novel parent report measure of Executive Functions suitable for infants aged 10 to 30 months

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Objectives: The Early Executive Functions Questionnaire (EEFQ) aims to bridge the gap between infant temperament measures and ratings of Executive Function difficulties amongst preschoolers: in terms of target age; and by linking temperament-based traits to competency-based behaviours. Here, we present the psychometric properties of the EEFQ.

Design: An initial pool of 57 items was refined using semi-structured interviews (n= 8) and pilot data (n= 107). Methods and Results refer to the cross-sectional validation sample of the final scale.

Methods: The EEFQ (28 items), and Attentional Focus and Attention Shifting scales from the Early Childhood Behavior Questionnaire, were distributed online to participants in a related study (n = 10) and via anonymised Facebook link (n = 145, 74 complete). Data were examined for floor and ceiling effects, internal consistency, and inter-scale correlations.

Results: No infants scored at floor on any scale. 3% of 10- to 16-month-olds scored at ceiling for Working Memory and 4% of 16- to 22-month-olds scored at ceiling for Regulation. For the whole sample, internal consistency of scales ranged from Cronbach’s α = .677 to .833. Inhibitory Control, Response Flexibility, Working Memory, Attentional Focus and Attention Shifting were inter-correlated (r > .5, p < .01). Regulation did not significantly correlate with any other scales.

Conclusions: The EEFQ has good psychometric properties amongst 10- to 30-month-olds. Ongoing research with a larger sample will check for longitudinal stability and factor structure. As a low-cost approach well-suited to reaching geographically-dispersed families, the EEFQ may prove useful in screening for early Executive Function difficulties.
Objectives: Many deaf children have difficulties acquiring literacy that persist into adulthood. A key factor underlying these difficulties is language. Deaf children communicate using spoken or signed language, and some are bilingual (spoken and signed language), and frequently exhibit language delays. Spoken language delays are due to difficulties accessing speech. Delays in sign are prevalent as only a small proportion are native signers with optimal input from deaf signing families. This symposium addresses different aspects of literacy in deaf adults and children using diverse communication preferences, in comparison to hearing controls.

The first paper investigates word recognition in adulthood. Various methodologies (lexical decision, masked priming, visual world and invisible boundary paradigms) explored processes occurring during word recognition in 16 deaf (native/near-native users of British Sign Language) and 16 hearing adults matched for reading level. Findings shed new light on the role of phonological information in deaf adults.

The second paper explores the written narratives of 35 deaf and 47 reading-age matched hearing children, aged 7-9 years. Narratives were compared for length, lexical diversity, quality of composition and grammatical structure, and in relation to word-reading and reading comprehension scores. Similarities and differences between deaf and hearing children’s writing skills are discussed in terms of language abilities.

The third paper reports on a pilot integrated language and literacy intervention delivered to 22 deaf and 110 hearing children in their first school year. Findings are presented on the intervention participants’ phonics, vocabulary and early reading skills compared to those of a control group.
Visual Word Recognition in Deaf Readers: the interplay between orthographic, semantic and phonological information

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**Objectives:** Little is known about the interplay between orthographic, semantic and phonological information in deaf readers during word recognition. Furthermore, as phonological processing is crucial for successful reading, this has been extensively studied in the deaf population with mixed findings. This study aimed to comprehensively investigate orthographic, semantic and phonological processing in deaf, adult readers and to further explore the role of phonology in this population.

**Design:** Several experiments were carried out, using various methodologies including lexical decision, masked priming, visual world and invisible boundary paradigms. A mixture of methods was used to provide a comprehensive picture of the processes that occur during word recognition.

**Methods:** For each of the experiments, 16-20 deaf, native or near native British Sign Language (BSL) signers and 16-20 hearing, English speakers were recruited. The deaf and hearing participants were matched pairwise for reading level to ensure that any differences in processing could not be explained by differences in reading abilities.

**Results:** Results show that deaf readers do make use of phonological information and did so similarly to hearing readers in tasks where they did not need to access meaning e.g. lexical decision. However, deaf readers showed no evidence of phonological activation in tasks requiring semantic activation e.g. sentence reading. This indicates that deaf readers do not need to access phonological information in order to extract semantic information, whereas hearing readers do.

**Conclusions:** These results reconcile previous mixed findings on the role of phonology in deaf readers and give us new insights as to how deaf readers recognise words.
Purpose: Deaf and hard of hearing (DHH) children typically exhibit large delays in their literacy skills. It has been suggested that deaf children’s reading difficulties may hinder their written narrative abilities. Here we present the results of a study comparing written narrative skills in deaf and hearing children.

Methods: Written narrative samples were collected from 35 severely and profoundly deaf children (7-9 year olds) and 47 reading-age matched hearing children. Children also completed assessments of single word reading, reading comprehension and spelling. Written narratives were analysed for length of text, lexical diversity, quality of composition and grammatical structure.

Results: Deaf and hearing children’s written narratives did not differ in overall length. For both groups of children, written narratives were scored more highly in terms of grammatical structure than quality of composition. Deaf children were less likely to use subject-verb-order or noun-verb phrases correctly and used fewer articles. The quality of their composition was also rated lower on specific features such as information about character’s feelings and intent. Surprisingly there was no difference between deaf and hearing children in the lexical diversity of their written narratives. Deaf children used significantly more nouns in their stories than hearing children. In both groups, children with better word reading and reading comprehension skills produced better written narratives.

Conclusion: Overall, deaf children’s written narratives were less proficient than would be expected for their reading comprehension ability. The similarities and differences between deaf and hearing children’s writing skills will be discussed in terms of language abilities.
A pilot integrated language and reading intervention for deaf and hearing children

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Objectives: Previous research shows many deaf children have literacy difficulties due to poor language and phonological skills. Hearing children with weak language also struggle with literacy. The current study piloted an integrated reading intervention, combining systematic phonics teaching and a whole-class approach to developing vocabulary, with a sample of reception-aged deaf and hearing children to address two research questions:

1. Can school staff deliver the integrated programme effectively?
2. Is the integrated programme effective in enhancing deaf and/or hearing children’s phonics, vocabulary and early reading skills compared with standard literacy teaching?

Design: Feasibility trial of an RCT

Methods: Sixteen deaf and 104 hearing children were recruited from 8 primary schools and hearing-impairment resource-bases. Schools were randomly allocated to the intervention or control group. Staff in intervention schools were trained to deliver the integrated programme; staff in control schools continued with their regular literacy teaching. Termly fidelity checks monitored literacy teaching and intervention teachers’ adherence to the programme. Participants were tested at the start and end of the school year by independent testers blind to condition using group and individual-administered non-verbal, language and literacy measures.

Results: The intervention was well received by teachers. Schools required different levels of support to implement the intervention effectively. Data presented will compare deaf and hearing children’s test scores from the intervention/control groups.

Conclusions: The study highlights challenges in training teachers to deliver an intervention effectively. The results will indicate programme effects for deaf and/or hearing children. If positive, a full-scale RCT will be merited.
Ref: 3332 Empirical Poster Presentation
Topic: Cognitive & Developmental Abstract
Exploring the extent of rape myths in the United Kingdom

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Objectives: False-beliefs surrounding rape and abuse are prevalent, and consequently have negative effects on attitudes and behaviour. For example, victims are discouraged from reporting abuse, and lawyers cross-examine alleged-victims using arguments paralleling abuse stereotypes, due to jurors’ widely-held but inaccurate beliefs.

We are investigating beliefs about: 1) what constitutes rape and its perpetrators/victims, and 2) the rape process, and how contextual factors affect culpability. Prevalence, beliefs accuracy/strength, uncertainty, and demographic differences will be investigated, focusing on how beliefs differ with developmental life stage.

Design: The current research will survey, using Qualtrics panelling, a representative sample (N = 1,000) of jury-eligible participants from England and Wales. This main survey is currently collecting data, the results of which will be presented at BPS. The Method/Results reported below are from the pilot survey.

Methods: Respondents (N = 290, mostly highly-educated students) were collected via social media, filled out demographic details, and completed a survey by indicating their level of agreement/disagreement with abuse-related statements.

Results: Overall, mean scores revealed that beliefs were accurate, though SDs for some items were large. Factor analysis showed no strong pattern within factors, but Cronbach’s alpha found scales to be internally consistent.

Conclusions: These pilot results were helpful in refining the main study; written respondent feedback indicated where item refinement was needed. The main study will have important legal implications. If, as predicted, the general population show a trend towards false rape stereotypes, understanding the nuances driving these misconceptions will help to diminish their use in the legal system.
Cognitive load induces maternal approach behaviour to infant vocalisation

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Background: Infants communicate their emotions with their caregivers mainly through vocalisation. Recent research suggests that adaptive parenting requires regulation of intuitive behaviours to infants’ signals. However, little empirical research has examined the cognitive component of maternal responses to infant signals.

Design: Mothers were asked to memorise characters as cognitive load manipulation. Thereafter, mothers’ movement of the centre of pressure (COP), an index of the unconscious approach-avoidance behaviour, was measured as they heard infant vocalisations. We hypothesised that impulsive COP movement to infant sounds would be seen under a high load condition because cognitive load is known to impair behavioural regulation.

Methods: Fifty-five mothers (35.56 ± 5.15 years-old) who were raising infants participated in this study. Twenty-four infant vocalisations (laughter and crying) were presented for six seconds each. Mothers’ COP were recorded using a Wii balance board. Prior to the sound presentation, mothers were asked to memorise meaningless syllables (two letters in the easy condition and eight letters in the difficult condition). The COP data were divided into six bins and treated by repeated measured ANOVA.

Results: The interaction between the cognitive load and Bin was significant ($F (5, 270) = 3.05, p = .045$). In Bin3–Bin6, mothers moved forward toward infant sounds under the difficult condition as compared to the easy condition.

Conclusions: Although maternal prompt responses have been considered appropriate in previous studies, this study argues about the importance of the cognitive regulation system of maternal intuitive behaviour in parenting.
Language competence is the single best predictor of children’s social and school success. Yet, we often pay little attention to how we can foster strong language skills at home and in school. Using the science of learning as our guide, this presentation offers a twist on the way we do traditional science. Rather than asking what we do not yet know about language learning, we ask what we have learned in the past 40 years that could guide us in “languagizing” environments for children. Distilling from the language literature, I present 6 principles of language learning that can help parents and educators build a strong foundation for language learning and hence later reading, math and even executive function skills. Throughout, I review the literature on language development and add research generated in our labs to bridge the gap between what we know and how we can make that knowledge actionable. Our latest studies on evidence-based assessment and intervention demonstrate that using these principles can foster precisely the skills children will need to predict stronger social and academic outcomes.
Margaret Donaldson Award Winner (DEV)
Longitudinal development of executive functions and self-regulation across infancy and toddlerhood: A slow-cooked approach to understanding individual trajectories over time

Karla Holmboe
University of Oxford

To date, my work has broadly focused on the development of executive functions - key skills that we use in everyday life to guide and control our behaviour - as well as related temperament constructs. These are skills that have been repeatedly associated with adaptive life outcomes later in development. My research has revolved around two core themes: (1) trying to assess executive functions (EF) as early as possible and (2) gaining an understanding of individual trajectories in EF and related functions across early development. I strongly believe in a “slow-cooked”, longitudinal approach (time-consuming, but worth it!) that involves tracking EF and other self-regulatory skills from the point at which these first emerge in infancy until key outcomes can be assessed later in childhood (e.g., school performance, social adaptability). With this knowledge, we can begin to establish the main influences on children’s differing EF trajectories and their consequences, which may eventually be useful for supporting children who are on course for less optimal outcomes.

In this talk, I will present some of my work on the very earliest emergence of EF and other self-regulatory skills during the first year of life. This will include the impact of genetically-driven differences in neurotransmitter systems, as well as the impact of environmental factors such as maternal mental health. I will highlight the benefit of using structural equation modelling (wherever possible) to gain a deeper understanding of developmental trajectories and cascades over time. I will also present some of my most recent work, which focuses on the development of a new task battery to assess executive functions in toddlerhood (between 10 and 30 months of age). As only a handful of EF tasks are available for this hard-to-assess age group, it is my hope that these new tasks will enable me and others to track individual trajectories in EF much earlier than has been possible in the past.
The Effect of Semantic Diversity on Serial Recall for Words

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Background: Frequency is a powerful predictor of lexical processing. Recent theoretical accounts have argued that the context in which words are encountered contributes to the frequency effect, not just raw frequency, and findings from lexical decision and naming support this view (Jones, Dye & Johns, 2017).

Objective: In this experiment, we investigated whether semantic diversity influences immediate serial recall for words.

Design: Semantic diversity was calculated using latent semantic analysis to quantify the degree of semantic similarity in the contexts a word appears across a large corpus (Hoffman, Lambon Ralph & Rogers, 2013). Word lists were formed of high vs. low diversity words, with six items per list. Semantic diversity was crossed with imageability, a ‘classic’ semantic variable.

Methods: Words were presented visually in serial order, and participants (40 undergraduates) were asked to recall the list by typing out the words in correct serial order.

Results: There was no main effect of imageability or semantic diversity, but semantic diversity was modulated by list position and imageability. Among high imageability words, more high semantic diversity words were recalled in the first position. In contrast, more low semantic diversity words were recalled in the second half of the list, again only in the high imageability condition.

Conclusions: These findings suggest that the availability of more semantic connections privileges recall for high diversity words in terms of the primacy effect, but induces more competition between items which impacts on performance later on in serial recall.
Background: Autism Spectrum Condition (ASC) symptoms are suggested to be related to emotion dysregulation. However, it is not clear whether the ASC symptoms that are subthreshold for a diagnosis of ASC in general population would be related to the use of maladaptive emotion regulation (ER) strategies. It was hypothesised that ASC traits would predict maladaptive ER strategy use in both adults and children. However, the normative literature suggests that ASC traits may only predict maladaptive ER strategy use in children.

Design: Two cross-sectional online surveys investigating the relationships between ASC traits and ER strategies in adults and children were conducted to test the two hypotheses.

Methods: Study 1 included 172 adults (106 females) with a mean age of 26.41 years (SD = 6.84 years, range = 18 – 40 years) who completed questionnaires on ASC traits and ER strategies. Study 2 included 126 parents (99 mothers, 27 fathers) who had children with a mean age of 4.29 years (SD = 1.06 years, range = 3 – 6 years; 62 girls; 4 unspecified gender) and completed questionnaires on their children’s ASC traits and ER strategies.

Results: Both studies suggested that ASC traits were associated with a maladaptive pattern of ER strategies. Individual ASC traits predicted different patterns of strategy use in both adults and children.

Conclusions: ASC traits predicted maladaptive ER strategy use in both adults and children. These findings may contribute to our understanding of the relationships between ASC traits and further mental health problems in individuals across different age ranges.
Investigating the effects of emotional awareness on risky decision-making and regret responsiveness in children.

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Purpose: We investigated the role of emotional awareness in the development of risky decision-making between the ages of 6-10 years.

Background: In a computerised task (adapted from Brassen et al., 2012 by Feeney et al., 2017) eight boxes were presented in a row. Seven boxes contained a gold coin but one contained the pirate, who stole all the coins collected on that trial. Participants opened boxes from left to right. They could stop and bank the coins collected so far; this revealed the location of the pirate, illustrating the size of the missed opportunity. The larger the missed opportunity, the greater the potential for the counterfactual emotion of regret, which should result in less risk taking in the next trial. This adaptive behaviour is referred to as regret responsiveness. Feeney et al. (2017) found that 8-year-olds were more sensitive than 6-year-olds to regret responsiveness.

Methods: The ‘pirate task’ measured regret responsiveness and risk taking. To measure emotional awareness, children completed the Levels of Emotional Awareness Scale for Children (LEAS-C) that assesses explicit emotional awareness of emotions (anger, fear, sadness and happiness) and parents completed the Toronto Alexithymia Scale (TAS-20) and the Social Responsiveness Scale (SRS).

Results: Data analyses are ongoing to investigate if emotional awareness predicts the development of regret responsiveness and risky-decision making.

Conclusions: If emotional awareness is a predictor and is significantly different across age groups, then this could help to explain the regret responsiveness differences in the different age groups (Feeney et al., 2012).
Objectives: Children with developmental disorders, such as Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD), show impairments in attention and executive functions (EF). This symposium brings together current research exploring new methods of investigating, and perspectives on, these impairments. Alessio highlights the importance of exploring neural mechanisms of attention in individuals with ASD and ADHD, as a large proportion of children with ADHD also present symptoms of ASD. This type of research will shed light on the causes of shared risk, and may lead to interventions that are effective for children with both conditions, as the co-occurrence is associated with poorer long term outcomes and reduced treatment efficacy. Retzler challenges the use of response time and accuracy metrics alone to measure performance on attention tasks, as a response may be mediated by several cognitive processes, and consequently may fail to accurately characterise deficits. Instead, it will demonstrate how drift diffusion modelling can help us characterise specific cognitive processes underlying task performance, and generate improved understanding of the processing impairments affecting clinical groups. Iversen explores recent developments in the EF literature that suggests that young children and children with ASD fail set-shifting tasks because they cannot activate previously irrelevant aspects of the environment, and that this inability may explain some restricted and repetitive behaviours (RRBs) in these populations. In a related paper, Lewis examines whether children can be trained on tasks targeting these activation difficulties, and if this type of training can influence the frequency of their RRBs.
Using drift diffusion modelling to understand inattentive behaviour in preterm and term-born children

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Objective: Children born very preterm are at increased risk of inattention, but it remains unclear whether the underlying processes are the same as in their term-born peers. Drift diffusion modelling (DDM) may better characterise the cognitive processes underlying inattention than standard reaction time (RT) measures. This study used DDM to compare the processes related to inattentive behaviour in preterm and term-born children.

Method: Performance on a cued continuous performance task was compared between 33 children born very preterm (VP; ≤32 weeks’ gestation) and 32 term-born peers (≥37 weeks’ gestation), aged 8-11 years. Both groups included children with a wide spectrum of parent-rated inattention (above average attention to severe inattention). Performance was defined using standard measures (RT, RT variability and accuracy) and modelled using a DDM. A hierarchical regression assessed the extent to which standard or DDM measures explained variance in parent-rated inattention and whether these relationships differed between VP and term-born children.

Results: There were no group differences in performance on standard or DDM measures of task performance. Parent-rated inattention correlated significantly with hit rate, RT variability, and drift rate (a DDM estimate of processing efficiency) in one or both groups. Regression analysis revealed that drift rate was the best predictor of parent-rated inattention. This relationship did not differ significantly between groups.

Conclusions: Findings suggest that less efficient information processing is a common mechanism underlying inattention in both VP and term-born children. This study demonstrates the benefits of using DDM to better characterise atypical cognitive processing in clinical samples.
Ref: 3331 Part of Symposium
Topic: Cognitive & Developmental Abstract
Training preschoolers and children with ASD to grasp rule activation errors: does this influence their repetitive behaviours?

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Objectives: Research suggests that typically developing (TD) preschoolers and children with ASD may fail set shifting tasks because they cannot activate previously irrelevant aspects of the environment. This ability has been linked to the control of repetitive behaviours (RRBs). We examined the effects of training in the rule activation to examine whether pre-schoolers and children with ASD can learn to master set-shifting, and if this training can influence the frequency and nature of their RRBs.

Methods: 20 children with ASD (M= 5.8 years) and 20 TD children (M= 3.2 years) took part. Half of each group were randomly allocated to a training condition, and the other half to a control group that completed unrelated activities (puzzles, construction activities etc.) for the same time period. Training took part one week after a pre-test and consisted of four weekly training sessions. One post-test and a two-month follow-up session followed. Each child’s RRBs were measured in a 30-item parental questionnaire, at the beginning of the study, and at the two-month follow-up.

Results: We found highly significant training effects ($F(2)= 16.99, p < .001$) but no change in set shifting in the control condition. We also found a decline in the RRB scores after training ($F(1)=5.73, p=.025$), but not in the control groups.

Conclusions: The ability to suppress a relevant response seems to be amenable to training, and may have an impact on a child’s reported RRBs. We discuss the clinical implications for children with ASD, as their RRBs and switching difficulties tend to persist.
Do rule activation errors explain the persistence of repetitive behaviours in typical development and ASD?

Rebecca Iversen, Charlie Lewis

*Lancaster University*

**Objectives:** In set shifting tasks, respondents need to suppress a relevant response and attend to previously irrelevant aspects of the environment. Preschoolers tested on the Dimensional Change Card Sort (DCCS) show dramatic change in this ability at age 4, but this does not relate to a similar decline in restricted and repetitive behaviours (RRBs), which peak in this age group and persist in Autism Spectrum Disorder (ASD). We hypothesized that the difficulties with activating previously irrelevant aspects of the environment may play a role in linking set shifting to RRBs. Two studies compare variations on the standard DCCS with a new method in which the relevant response is no longer available.

**Method:** We assessed 177 typically developing (TD) children (m= 3.9 years: Study 1) and 90 children with ASD or developmental delay (DD) (m= 7.7 years: Study 2), on card-sorting tasks and RRBs, measured in a 30-item parental questionnaire.

**Results:** In both studies we found no differences between sorting performance on the tasks, but the expected 3-4 age shift in the TD children \( (1, 167)=11.83, \eta_p^2 = .070, p = .001 \).

In both studies, regressing RRBs onto sorting performance, we found that children with TD \( r=-.41^*, p = .03 \) and ASD or DD \( r=-.39^*, p = .01 \) who struggled to activate a previously irrelevant dimension engaged in more RRBs.

**Conclusions:** We suggest that the child’s problems with activating a previously irrelevant cue (rule activation) may reveal biases of attention that explain the persistence of RRBs in typical and atypical development.
**Objectives:** Distractibility is a core behavioural feature of Attention Deficit Hyperactivity Disorder (ADHD) and yet, one aspect of attention that has not been thoroughly researched in this condition is the automatic orienting of attention. A significant proportion of children with ADHD also show symptoms of co-occurring autism spectrum disorder (ASD) but it is not known whether the symptom overlap arises from overlap in neuro-cognitive mechanisms, such as attention orienting. We investigated automatic orienting to sounds in children with ADHD, and the effect of co-occurring symptoms of ASD.

**Design:** P3a amplitude, an electrophysiological marker of attention orienting, was compared between groups (ADHD, ADHD+ASD, Controls), with Stimulus (Standard vs Deviant) and Condition (Social vs Non-social) as within-subjects factors.

**Methods:** Electroencephalography was recorded in 15 children with ADHD, 17 with ADHD+ASD and 23 controls (TD) (7-15 years old) during a passive auditory oddball task, comprising a series of 500-Hz tones (standard; 80%) alternated by less frequent sounds (deviant; 20%). The deviant tones were either the vowel /e/ (social condition) or a 450-Hz tone (non-social).

**Results:** A significant interaction between Condition, Stimulus and Group (F=3.857; p=0.028; ηp²=0.134) revealed reduced P3a amplitude to social deviants, compared to standards, in ADHD, while increased P3a amplitude to standards in the social compared to standards in the non-social condition, was found in ADHD and ADHD+ASD.

**Conclusions:** Results suggest atypical neural correlates of automatic orienting of attention in children with ADHD and ADHD+ASD but with different profiles between groups. Further analysis is underway to relate these findings to autonomic arousal.
Ref: 3306 Empirical Oral Presentation
Topic: Developmental Abstract
Do autistic people have readable minds?

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Objectives: Previous studies have suggested that people find it difficult to read the minds and behaviours of autistic people. This result persists, despite the fact that faces of both autistic and non-autistic people have been rated equally expressive (Sheppard et. al, 2015). The aim of this study is to further investigate this by looking at differences in readability of spontaneous & natural facial expressions, of people who possess autistic traits and those who don’t. A pilot study was first carried out to ensure the method used was appropriate.

Design: A mixed-subject design was used.

Methods: For the pilot study, 20 Target videos were created by surreptitiously recording facial expressions of people while they wrote about 6 life experiences and rated them. These videos were shown to another group (33 perceivers) who guessed what the targets were thinking. Multi-level logistic regression was used for analysis.

Results: The pilot study suggested that readability in a neurotypical population varied with 12 targets being significantly readable and 2 being significantly unreadable ($p<.05$). The current study is expected to find similar readability scores, however, for the group with autistic traits we expect to find more people being significantly unreadable.

Conclusions: This study has the potential to give further insights into how autistic people are perceived by non-autistic people. Furthermore, the method used in the study allows us to explore the raw signals of expressions that are produced in a non-social context.
**Ref:** 3452 Empirical Oral Presentation  
**Topic:** Cognitive & Developmental Abstract  
**It’ll be alright on the night: bedtime benefits for learning new vocabulary**  

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**Objectives:** Children’s existing vocabulary predicts changes in new word memory between immediate and 24-hour tests, yet no studies have differentiated this influence of prior knowledge on wake and sleep-associated consolidation processes. We test the hypothesis that existing vocabulary supports overnight integration of new words into existing vocabulary.

**Design:** Two pre-registered experiments assessed how children’s performance on standardised vocabulary assessments predicts word memory before and after opportunities for sleep-associated consolidation. Children in Experiment 1 learned new words in the morning or evening, and isolated equivalent sleep/wake periods over 0-, 12- and 24-hour tests. Children in Experiment 2 will encounter new words via a parent-read story either 4-hours or immediately before bedtime, and complete memory activities immediately and the following morning.

**Methods:** Experiment 1 tested 34 good and poor comprehenders aged 8-to-12 years. Each child completed both morning/evening learning conditions, and completed stem-completion, picture-naming, and definitions tasks at each test. Experiment 2 builds on a pilot experiment (n=30), recruiting 100 children aged 3-to-7 years.

**Results:** Word recall improved more after sleep than wake in Experiment 1, and sleeping soon after learning had long-lasting benefits apparent 1-to-2 months later. Existing vocabulary predicted overnight consolidation only for words learned in the morning. Pilot data for Experiment 2 also support this finding: vocabulary more strongly predicts overnight consolidation when there is a delay before bedtime.

**Conclusions:** Opportunities for sleep soon after learning have long-lasting benefits for new word memory, and may be particularly beneficial for children with poor vocabulary who otherwise show weaker language consolidation.
Objectives: Whilst studies exploring the impact of engaging with large sporting events are noticeably lacking, research has suggested that football can play an important part in the lives of some children. The 2018 Football World Cup was a major talking point in England with much attention and media coverage. The current study aimed to explore children’s experiences of the event and any impact it may have had on their lives.

Design: A qualitative design was utilised with children taking part in paired interviews to allow them to feel comfortable in the presence of a peer and encourage discussion between participants.

Methods: 14 children aged 10-11 years (UK School Year 6) who had engaged with the tournament were recruited from a large, city Primary School in the West Midlands UK. The sample consisted of girls and boys who represented a range of interest in football. Transcripts were analysed using thematic analysis.

Results: Thematic Analysis led to the initial identification of five main themes. These included: bringing people together, winning/losing, emotions experienced, views on players, and impact.

Conclusions: Overall findings suggest that the tournament was a positive and enjoyable experience for children who engaged with it, providing an opportunity for them to reflect on topics such as success and failure and feeling mixed emotions. Although the success and the attention the 2018 tournament received in England could be considered fairly unique, the findings may still encourage consideration of the potential impact that major sporting events could have on young people.
Objective: Despite the large number of studies into the difficulties of interviewing child witnesses, studies have focused almost entirely on the power of misleading verbal communication to distort witness reports. Very little research has examined the Gestural Misinformation Effect, in which non-verbal gestures are suggested to corrupt eyewitness memory. For example, when asking an eyewitness to describe a person, if an interviewer inadvertently gestures to their eyes indicating glasses, the witness is more likely to state glasses as a feature, whether or not the person actually wore them. The present study was designed to examine the Gestural Misinformation Effect in children.

Design: Using a misinformation paradigm, research was completed in 5 stages — event video, pre-interview recall, interview, distractor task, and post-interview recall. The interview comprised 12 counterbalanced questions across 3 conditions — no gesture, accurate gesture (gesture consistent with information in the video) and inaccurate gesture (gesture inconsistent with information in the video).

Method: Sixty-three school children were recruited aged 5-6 (n=32) and 7-8 (n=31). All the children were tested individually and took part in each condition.

Results: An effect of gesture type for both correct (F(2,122)=28.31, p<.001) and incorrect (F(2,122)=23.00, p<.001) responses was found, with incorrect responses consistent with misleading gestures produced more than those inconsistent with the gesture. No effect of age was found.

Conclusions: Results support the robustness of the Gestural Misinformation Effect - that information conveyed non-verbally can mislead children’s recall, and that this was not mediated by age. Implications for police interviews with children will be discussed.
Ref: 3497 Review/ Theoretical & Practice Oral Presentation
Topic: Developmental Abstract
From Mind to Picture: A Systematic Review on Children’s and Adolescents’ Understanding of the Link between Artists and Pictures

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Purpose: To present the methodology and findings of a systematic review on children’s and adolescents’ understanding of the relation between artists and pictures. The primary objective was to ascertain their developing understanding of the artist’s intention and other attributes (age, skill, originality and knowledge, mood, style and sentience) from pictures.

Background: Pictorial symbols have multiple layers of meaning: not only do they represent objects, events and ideas about the world, they also indicate the artist’s mind behind the picture. Although children’s developmental milestones of pictorial understanding have been the subject of a long-standing debate, there has been no systematic review of their understanding of the artist-picture relationship.

Methods: The systematic review followed PRISMA guidelines, in which PsycINFO and Web of Science databases were searched for English, Spanish, German, and Italian language empirical studies that examined the understanding of the artist-picture relationships among 2- to 18-year-olds. Forty-two citations (64 studies) from 14 different countries met the inclusion criteria that required the reporting of original quantitative and/or qualitative data relating to drawing and painting. Due to the inconsistencies across methodologies of the articles reviewed, we conducted a narrative synthesis.

Conclusions: The majority of the studies focused on the understanding of the artist’s intention. Although research on children’s and adolescents’ understanding of other attributes is scarce, and there were inconsistencies across the methodologies used, it seems that children first acknowledge intention and only later become more aware of how artists’ attributes are communicated through intention.
Ref: 3397 Empirical Oral Presentation

Topic: Developmental Abstract

Phonological knowledge and its substantive role in children’s early word learning

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Objectives: Learning new words is one of the most important achievements in language acquisition. In this paper we examine four key word level factors that are hypothesised to be central determiners of infant word learning: word length, word frequency, phonotactic probability (the frequency of constituent sound sequences, usually measured as biphone frequency), and neighbourhood density (the number of neighbours a word has, usually defined as the addition/deletion/substitution of one phoneme).

Design: We use corpus analyses of 12 mother-child interactions to examine the effects of word length, word frequency, phonotactic probability, and neighbourhood density on children's early word learning. From the corpora, words that each mother and each child produces are extracted. We also use a computational model that is run once for each mother, learning words incrementally based on accumulated phonological knowledge from the phonemic maternal utterances.

Results: Children’s early word learning contains words that are short, of high frequency, low phonotactic probability and high neighbourhood density. The pattern of words produced for all of these variables is quantitatively different between mothers and children. However, the model - that is trained on the maternal input - is almost identical in its word learning to the child data - not just for the basic findings but for interactions across the variables.

Conclusions: The model matches children's word learning across all four variables and for interactions across them, showing how phonological knowledge may be a primary determiner of early word learning.
**Ref:** 3477 Empirical Oral Presentation  
**Topic:** Cognitive Abstract  
**Glucoregulation and executive functioning: an ERP study**  

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**Objectives:** To investigate the impact of glucoregulation on the underlying neural mechanisms of executive functioning in young and middle-aged adults using event-related potentials (ERPs).

**Design:** A mixed design with two between-participants factors (age: two levels, young and middle-aged; glucoregulation: two levels, poor and good) and one within-participants factor (electrode location: three levels, Fz, Cz and Pz) was used when considering the P3a and P3b ERP components. Behavioural data (percentage of hits, accuracy and reaction time) was considered using a between-subjects design (two factors: age and glucoregulation).

**Methods:** Thirty-six healthy participants [20 young (mean age = 22.95 years old); 16 middle-aged (mean age = 47.00 years old)] were median-split into relatively poor and good glucoregulators based on glycosylated haemoglobin (HbA1c) levels. A computerised three-stimulus oddball task was used to measure executive functioning performance.

**Results:** The results indicated no impact of glucoregulation on either P3a or P3b mean amplitude or peak latency. Significantly higher mean P3a amplitudes at Fz were observed in middle-aged individuals compared to younger adults. Mean P3a peak latency was also faster in younger individuals. The behavioural results indicated no impact of age or glucoregulation on hits or accuracy, but reaction time was significantly faster in younger compared to middle-aged adults.

**Conclusions:** The results indicated no impact of glucoregulation on the underlying neural mechanisms of executive functioning. However, the results did support the posterior-anterior shift hypothesis, indicating that this is evident even in ‘middle-aged’ adults. HbA1c levels may not be the most suitable indicator of glucoregulation in healthy adults.
Objectives: The primary feature of DCD is impaired motor control. Whilst difficulties with inhibition (response inhibition and interference control) have been reported, findings are inconsistent. The aims of this study were to 1) Examine response inhibition and interference control in children with and without DCD, using verbal and motor tasks 2) Examine relationships between inhibition and motor skills.

Design: A matched DCD and Typically Developing (TD) group were recruited. Interference control was measured using an adapted Flanker task with 27 congruent and 21 incongruent trials. Response inhibition was measured using an adapted Verbal and Motor Inhibition (VIMI) task with two copy and two inhibit blocks, each with 20 trials. Tasks were presented on a computer screen. Reaction time (RT) and error rate (ER) were measured and movement time calculated for motor trials.

Methods: The DCD group comprised 6-10 year olds who met DSM-5 diagnostic criteria. The TD group were from the standardisation sample of the Intelligence and Developmental Scales 2nd Edition (IDS-2). Motor skills were assessed using the psychomotor component of the IDS-2 and Movement ABC-2 Test. Preliminary analyses indicate higher ER in the DCD group on the Flanker and VIMI motor trials. RT is faster for the DCD group on the VIMI motor trials, and slower on the VIMI verbal trials. Relationships between inhibition and motor skills are mixed.

Conclusions: Preliminary results indicate potential differences in inhibition skills between TD and DCD groups. Following full data analysis, methodological issues and practical implications of the findings will be discussed.
The role of choice making in the reading comprehension and enjoyment of Year 4 students with broad attention difficulties

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Objectives: Drawing on current literature on the role of motivation in reading and attention, this study tested the hypotheses that choice as a motivational construct improves the reading comprehension and enjoyment of Year 4 children and that this effect is more marked for children with attentional difficulties.

Design: The motivational effects of text choice in reading comprehension and enjoyment were explored using a Repeated-Measures Design with two conditions; Choice and No-choice. Order of choice and story presentation was counter-balanced between participants.

Methods: Year 4 children (N= 102) read two stories and completed questionnaires measuring reading enjoyment. Children’s attention and behavioural inhibition were assessed through parent/teacher rating scales, paper-pencil/computerised tasks and a virtual reality task. A Mixed ANOVA design was conducted to test for main effects of choice and attention and for interactions between choice and attention-related measures.

Results: Children showed significantly higher reading comprehension (M=9.17, SD=3.73 versus M=8.17, SD=3.51) and enjoyment (M=39.09, SD=7.15 versus M=37.69, SD=7.18) in choice compared with no-choice condition, F(1,102)= 7.97, p=.01, η² = .07 for reading comprehension and F(1,101)= 3.82, p=.05, η² = .04 for enjoyment. Findings were inconsistent regarding choice-attention interactions.

Conclusions: Children comprehended and enjoyed their reading better when provided with choice compared with no choice. However, choice effects were complex in regards to the comprehension and enjoyment of children with more attention difficulties (results have not been fully analysed yet). Some of these findings point to simple, cost effective ways for educators to promote optimal reading conditions for children.
Background and Objectives: Temperamental effortful control (EC) and executive function (EF) are two frameworks for investigating self-regulation in children. Despite stemming from different research traditions, they share many conceptual and theoretical similarities and tasks are often used interchangeably. However, little is known about how and whether the two constructs can be distinguished. We hypothesized to find positive associations between different EC and EF measures and that performance in EC and EF tasks was best described by a single factor model.

Design: A cross-sectional study design was used to examine preschool children.

Methods: A sample of 165 children aged 4-7 years were recruited from public kindergartens in urban and rural regions. The assessment included two behavioural EC tasks (Whisper and Puzzle task), an EC questionnaire (CBQ) as well as common measures of the three subcomponents of EF inhibition (Stroop task), working memory (backwards colour span) and shifting (change card sorting task). Data were analysed using correlational analyses and confirmatory factor analyses.

Results: According to our hypothesis, we found significant positive correlations between most EF and EC measures. Furthermore, our EC and EF measures were best described by a single factor model and this latent construct behaved similarly across gender.

Conclusions: Our findings indicate, that the variety of EF and EC tasks all measured similar aspects of self-regulation and therefore an integrated model of self-regulation encompassing EC and EF is supported. The results are further considered to be beneficial for future research regarding the use of different EC and EF tasks.
Objectives: ADHD is a highly heritable disorder. Sensory processing difficulties are commonly reported in children with ADHD, however there is a scarcity of studies looking at the influence of sensory processing on ADHD and attention skills in children younger than school age. This may be particularly relevant to children of parents with ADHD who are already at a higher risk of ADHD diagnosis. The aim of the study was to measure attention and sensory processing in infants of families with high-risk ADHD.

Design: The Children’s Sleep Habits Questionnaire, the Early Childhood Behaviour Questionnaire/Childhood Behaviour Questionnaire (depending on age of the child), and Sensory Experiences Questionnaire were completed by parents in an online questionnaire.

Methods: Fifty five families with high-risk ADHD (at least one parent or sibling has a diagnosis of ADHD) and 61 families without high-risk ADHD (no family history). Parents also answered 6 questions from the World Health Organisation ADHD self-report scale. The sample ranged in age from 2.5-6.92 years (Mean= 4.52, SD= 1.21).

Results: Groups were matched for age, gender, and SES. A significant difference between groups was found in terms of hyperresponsiveness to sensory stimuli (p=0.3). No significant difference was found between the groups for other sensory processing patterns. Groups also differed in terms of olfactory/gustatory processing (p=.014).

Conclusions: The findings of this study can help identify whether sensory processing difficulties could be predictive factors of ADHD before typical diagnosis age. Thus, results can inform best practice for interventions for children at-risk for ADHD.
Purpose: Previous research has examined play styles across cultures. However, how a multicultural pre-school setting may influence children’s play styles and understanding of diversity has been little studied. This study therefore explores teachers’ views of the play preferences and styles of culturally diverse pre-schoolers, and how experience in such a setting might influence their developing knowledge of the world.

Design: The study employed a qualitative design utilising semi-structured interviews.

Methods: Five pre-school teachers were recruited through purposive volunteer sampling.

Findings: Thematic Analysis revealed three themes: ‘Language and socialisation’, illustrating the ways in which the children communicate with each other and incorporate their home languages; ‘Relationships with others’, illustrating playmate preference and culture’s influence on these choices; and, ‘Interaction with play’, illustrating the children’s engagement with specific play styles.

Conclusions: The findings suggest culture to play a role in determining play preferences with regard to playmate choices and styles of play. However, gender and personality were also found to have an influence in shaping these choices. The findings highlight limitations in the opportunity children have to explore culture due to a lack of multicultural resources. This is something that needs to be considered when creating play settings in pre-schools, so that young children can experience associations with different cultures, allowing them to embrace the diversity that is among them in today’s society.
Objectives: The previous studies have exhibited that touch, especially pleasant touch, activates reward-related cortical regions including the anterior prefrontal cortex (APFC) in adults. Although it is known that glucose uptake increases in the dorsal and medial frontal cortices by 10 months, the developmental neural system underlying affective touch during the age is still unclear. The current study used near infrared spectroscopy (NIRS) to examine activation of the APFC by gentle touching of the hand and the waist of infants 3-10 months after birth, who were classified into four groups (3, 6, 8 and 10 months old).

Design: A 2(APFC hemispheres)×4(Infants ages) ×2(Tactile stimulation position) within design was carried out in this experiment in order to examine the critical period of the APFC development by tactile stimulation.

Methods: Twenty infants participated in the experiment (7 girls, 13 boys) when they were 3, 6, 8 and 10 months old. The infants received tactile stimuli in 8 runs, consisting of 30 s resting and 30 s tactile stimulation phases. The hemoglobin concentrations of infants were measured at a sampling rate of 6 Hz using a 2-ch NIRS system (NIRO-200).

Results: Results indicate that 10-month-olds, but not 3- and 6- 8- month-olds, showed activation of the APFC by gentle touching of the palm with a sensuous pleasant material.

Conclusion: The present finding therefore demonstrates that developmental neural system underlying affective touch in infancy is reflected to the activation of the APFC and that the critical point is approximately 10 months after birth.
Ref: 3281 Empirical Oral Presentation
Topic: Cognitive & Developmental Abstract
“Don’t Know” responses in young adults’ inferences about the emotions of self and others

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Objectives: This study investigated how people around 20 years of age make “Don’t Know” (DK) responses in inferring the emotions of self and others in equivocal versus unequivocal (positive or negative) emotional situations.

Methods: Participants were 158 undergraduate and graduate students from one university (Mean age = 21.20 years, SD = 2.39 years). They answered questionnaire described 20 equivocal situations (e.g., go to a haunted house) and 20 unequivocal situations (e.g., lottery ticket is a winner). The instructions were “What is your feeling in the situations below?” (self emotion condition: SEC), and “What is another person’s general feeling in the situations below?” (other emotion condition: OEC). The order of SEC and OEC was manipulated; SEC were made first (Self First Condition; SFC) or OEC were made first (Other First Condition; OFC). Participants judged the emotions using five-point scales; -2 (very bad), -1 (slightly bad), 0 (don’t know), 1 (slightly good), 2 (very good).

Results/Conclusion: Analyzing the frequency of “0” (i.e., DK response), there were four main patterns of results: (1) The frequency of DK responses was greater in equivocal situations than in unequivocal situations. (2) DK responses in OEC were more frequent than DK responses in SEC, although this difference was not found in unequivocal situations. (3) In equivocal situations, DK responses in SFC occurred more frequently than DK response in OFC. (4) In an analysis of response patterns (distributions of DK responses), a lack of correspondence was found between DK responses in SEC and in OEC.
Objective: Humans frequently imitate each other with high fidelity. We test the hypothesis that imitation acts as a social signal, occurring with greater fidelity when a participant is watched by an interaction partner.

Design: 22 pairs of naïve participants played an augmented-reality block-moving game, with brain activity in the temporal lobe and TPJ of both participants recorded using functional near-infrared spectroscopy (fNIRS).

Methods: Participants were randomly assigned roles of Leader and Follower. Following a familiarisation phase, Leaders were secretly instructed to move blocks using exaggerated trajectories in some trials. Followers were instructed to move the blocks in the same order as the Leader. In half the trials the Leaders watched the Followers make their moves; in the other trials the Leaders did not watch the Followers during the latter’s turn. We compared imitation fidelity between the watched and unwatched trials using motion-tracking.

Results: A paired-sample t-test compared the correlation between the Leader’s height and the Follower’s height in the Watched and Unwatched conditions, and the R value was significantly higher \([t(20) = 2.31, p = 0.032]\), for the Watched [mean R value = 0.21, Std. Dev. = 0.38, 95% CI (0.03, 0.38)] than the Unwatched condition [mean R value = 0.08, Std. Dev. = 0.38, 95% CI (-0.1, 0.25)]. Across Followers there was greater activation in the TPJ in the Unwatched condition when compared with the Watched condition.

Conclusions: This suggests that followers spontaneously used imitation as a social signal in a nonverbal interaction task, supporting socio-communicative hypotheses of imitation.
Sotos syndrome is a congenital single-gene disorder associated with overgrowth and intellectual disability, which affects several hundred individuals in the UK. Despite the initial identification of the syndrome in 1964, until recently little was known regarding the associated cognitive and behavioural characteristics. Findings from a recent systematic review identified several common features, including variable intellectual functioning, language difficulties and behavioural problems. However, the generalisability of these findings is limited due to the small samples used in these studies. This talk will provide an overview of research aimed at improving understanding of Sotos syndrome, particularly in relation to characterising the cognitive profile and the relationship between Sotos syndrome and autism. These were assessed in relatively large cohorts, using a combination of standardised assessments and parental report measures. The homogeneity of the cognitive profile and the prevalence of autistic traits will be discussed, as well as the broader implications of identifying syndrome-specific profiles.
Objectives: The aim was to explore whether children would be able to rotate multi-dimensional objects and not just 2D pictures. The study extends previous research which found a near ceiling effect in children when just one 3D cube was rotated unless colour information was removed (Lütke & Lange-Küttner, 2015).

Design: We now investigated mental rotation (MR) in children by systematically varying set size of the cube aggregate, rotation angle, and 2D/3D rotation plane.

Methods: We analysed the results of the variation of (1) the number of cubes from four to six cubes and (2) whether they were flat or had protruding parts. The test was given to eighty 4-12 year olds children who were tested in a newly developed test using an established format (Vandenberg & Kuse, 1978) with a hard copy booklet.

Results: We found several higher-order interactions of the design factors with age and sex of the children. The clearest effect of MR was found for the 4-cube aggregate that proved to be the most economical and best 3D object for children’s mental rotation at all ages. Interestingly, 4- to 5-year old boys showed an early talent in MR of 4-cube aggregates. Moreover, flat 4-cube aggregates showed a clear mental rotation effect as accuracy decreased with increasing angularity of the rotation.

Conclusions: The study shows that the magical number four (Cowan, 2001) is also valid in mental rotation and linked to the ‘Gute Gestalt’ of cube aggregates that we found to be relevant for all age groups and across dimensional rotations.
**Ref:** 3067 Empirical Oral Presentation  
**Topic:** Developmental Abstract  
**High AQ Parents as well as Sons-only Families Maximize Technical Toy Choice But Daughters-only Families Reduce It

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**Objectives:** We investigated whether the personality of the parents had an impact on toy choice. Different to the IQ (intelligence quotient), the AQ (autism quotient) measures sociability versus systematic analyses with the latter more common in men particularly in the STEM professions (science, technology, engineering, mathematics) (Baron-Cohen, Wheelwright, Skinner, Martin, & Clubley, 2001).

**Design:** We investigated the effect of parents’ AQ, their sex and the sex of their children on their toy preference.

**Methods:** From originally 234 participants, a stratified sample of N=160 with 80 male and 80 female adults was selected. Twenty participants of either sex were parents of girls, 20 parents of boys and 20 parents of boys and girls. AQs (high/low) were in the sub-clinical range. In a computerized forced-choice shopping task, adults selected from cuddly and social role-playing toys (social toys), academic, music and sports toys (educational toys) and construction sets as well as cars (technical toys).

**Results:** The standard toy preference of this sample was social toys < educational toys < technical toys. Low AQ women were the only group to make a significantly higher amount of social toy and a lower amount of technical toy choices. The mere presence of just sons increased technical toy choice, while the mere presence of just daughters reduced technical toy choice in men, and high AQ individuals independently of their sex.

**Conclusions:** Toy choice is determined by both personality traits of parents and an incidental factor such as the gender distribution in the family which may shape the social climate.
Ref: 3319 Empirical Oral Presentation
Topic: Cognitive Abstract
Familiar Face Recognition from Video Footage

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Objectives: Previous research has shown that unfamiliar face recognition from CCTV is prone to error, but that familiar face recognition is good even with poor quality imagery. We explored (1) whether viewing CCTV footage repeatedly offers a shortcut to familiarity that can optimise identification and (2) whether viewing a personally familiar face out of context has a cost for accuracy.

Design: Across two experiments participants viewed videos of unfamiliar targets. Each video was either presented once or multiple times (1 vs. 10 times in Experiment 1; 1 vs. 10 vs. 20 times in Experiment 2) before participants completed a face recognition test. They also viewed one video containing a personally familiar individual.

Methods: Participants (Experiment 1 N = 57; Experiment 2 N = 40) viewed videos of male targets. After each video participants viewed images of the target (n = 10) and a foil (n = 10) and indicated whether each image depicted the person from the video. A final video showed a personally familiar lecturer, and both spontaneous recognition (Experiment 1 and 2) and cued recognition (Experiment 2) were measured.

Results: Viewing CCTV footage repeatedly did not improve unfamiliar face recognition performance. Very few participants spontaneously recognised their lecturer, but over half recognised their lecturer when cued.

Conclusions: These findings have implications for legal settings where police officers who view crime scene imagery repeatedly can be considered ad-hoc experts. They also suggest that familiar face recognition is not infallible and may be influenced by expectation and context.
Ref: 3320 Empirical Poster Presentation
Topic: Cognitive & Developmental Abstract
Learning the faces of new people from variable images

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Objectives: Recent work has examined how we learn newly encountered faces by studying exposure to within-person variability in appearance. Several studies have shown that exposure to variability helps adults learn the faces of new people (e.g. Ritchie & Burton, 2017; Murphy et al., 2015; Baker et al., 2017). The present work aimed to replicate and extend previous findings on face learning.

Design: The study used a face learning paradigm similar to Baker et al. (2017). Participants watched a 1-minute video or static images depicting a target on a single day or across three days (showing more variability in appearance). Participants’ ability to recognise the targets from images containing variability in appearance was measured. Unlike in Baker et al., participants also completed a standardised test of face memory (CFMT).

Methods: Adults (n = 60) completed the task in return for course credit.

Results: Participants were better at recognising the target after familiarization (e.g. watching the video/viewing static images) compared to the control condition in which participants were not previously familiarized with the target. There was a positive correlation between the standardised memory test and performance on the face recognition task after participants were familiarized with the target, but not when there was no familiarization phase.

Conclusions: These findings suggest a dissociation between perceptual matching and memory. An ongoing study with children further explores perception vs. memory processes in children and suggests variability and duration of exposure help children learn the faces of new people.
Objective: To assess whether autistic children engage in different types or amounts of social play whilst playing with digital and non-digital toys.

Design: A single-case repeated measures with seven autistic children

Methods: Participants were recruited by convenience sampling from local schools. Inclusion criteria were that children had a diagnosis of autism. Six participants had a learning disability. Social and cognitive development was characterised through standard assessments and teacher-report measures, including the autism diagnostic observation schedule. Participants were video-recorded in pairs for 10 minutes playing with either a digital toy (Code-A-Pillar™) or matched non-digital toy (wooden train). Each participant was observed at least twice in each condition. Social play was rated using the Peer Play Scale.

Results: The percentage of points exceeding the median (PPEM) calculates individual effect sizes. Using non-digital simple social play as baseline, and digital simple social play as the comparison, PPEM for each participant who engaged in simple social play (n = 4) was 100, 80, 60, and 40. Overall, participants show an increase in social play on the digital toy, with an average effect size of .7, range = [.4, 1].

Conclusions: There is no clear pattern which suggests that technology has a negative impact on social play in autistic children, but individual differences are present, in both frequency and level of social play. Results could inform theoretical accounts of autism, such as social motivation theory, and applications of technology in education and clinical settings.
Background: Although children’s engagement in learning is measured as a state, it is generally assumed that individual differences between children also have an important influence on children’s ability to focus and engage with classroom activities.

Design: We investigated the amount of variation in engagement accounted for at the child-level versus the classroom-level, as well as the impact of contextual factors.

Methods: Participants: 49 children in 5 schools in England were observed in their regular Reception or Year 1 classrooms. In order to confirm findings, a further round of data collection is planned. 
Measure: The Leuven Involvement Scale is an instrument to rate children’s engagement on a scale of 1 to 5 based on two-minute observations. We coded 252 observation events. 
Analytical approach: We used hierarchical linear regression to describe the amount of variation in engagement at the child and classroom level compared to variation that can be predicted by contextual factors at the observation level.

Results: The hierarchical linear model showed that a small percentage of variation between observations was attributable to classrooms (4%), but close to none (10⁻¹⁹) was attributable to individuals. However, classroom activity significantly predicted engagement.

Conclusions: The findings suggest that it may be misleading to study engagement as a child-specific characteristic, since no variation could be explained at the child level. Although the classroom level accounted for some of the variance, the largest predictor of variation was the activity the child was involved in at the time of observation.
Objectives: This study aimed to explore the factor structure and provide evidence of reliability and validity for a Korean translation of the Parental Reflective Functioning Questionnaire (PRFQ; Luyten, Mayes, Nijssens, & Fonagy, 2017). The PRFQ consists of three subscales: Pre-mentalising mode, Certainty about mental states, and Interest and curiosity. We investigated whether the same structure held for Korean parents and explored relations between parental reflective functioning and other aspects of parenting.

Design: The Korean version of the PRFQ (K-PRFQ) was created following a three-step process: initial translation, iterative back-translation, and feedback from parents.

Methods: A convenience sample of 163 Korean parents of children aged up to 5 years completed the K-PRFQ online. Participants were recruited via parenting websites and given a link to the questionnaire. A subsample (n=67) also completed the Korean Parents as Social Context Questionnaire (K-PSCQ; Jeong, & Shin 2011) and the Korean Parenting Stress Index-Short Form (K-PSI-SF; Lee, Chung, Park, & Kim, 2008).

Results: Exploratory factor analysis showed 5 factors in the K-PRFQ. Three factors mapped on to the original PRFQ factors, but items from PM clustered into two additional factors. Pre-mentalising scores were associated with greater rejection (r =.40, p<.01) and more parenting distress (r =.33, p<.01). Autonomy supportive parenting style was positively correlated with Interest and curiosity scores (r=.26, p<.05).

Conclusions: There are core similarities between Korean and Western parents’ reflective functioning. The additional K-PRFQ factors apparently reflect collectivistic cultural approaches to parenting. Pre-mentalising representations are associated with less optimal parenting.
Objectives: Several sessions of mindfulness practice can exert positive gains on child executive function (EF). There is some evidence supporting an immediate effect of a mindfulness induction (one off mindfulness practice) on EF in adults but this effect has not been tested in children.

Design: A randomised controlled cross-sectional experimental design compared differences between performance on four measures of executive function in children aged 4-7 years following participation in a 3-minute mindfulness induction or comparison activity. Data was collected in school.

Methods: Participants N = 156 were randomly assigned to a mindfulness induction or dot-to-dot activity before completing four measures of EF: head toes knees shoulders, backwards digit span, delay of gratification, and Tower of Hanoi. A composite score for EF was calculated from summed z scores of the EF measures. Parents reported child behavioural problems on the strengths and difficulties questionnaire.

Results: The mindfulness induction resulted in higher average performance for EF M = .12 compared to the comparison group M = -.05. Behavioural difficulties, which were significantly different between groups at baseline, predicted 5.3% of the variance in EF but participation in the mindfulness or comparison induction did not significantly effect EF.

Conclusions: A mindfulness induction had no immediate effect on EF in children. These results fit within existing evidence reporting mixed effects in similar experiments with adults. The findings are discussed with consideration of the methodological differences in induction studies and in context of broader theoretical and empirical understanding of mindfulness and EF in children and adults.
Objectives: Frustration is an antecedent process to reactive aggressive behaviour. Reactive aggression peaks during adolescence, a period of ongoing development in related processes such as emotional reactivity, emotion regulation, and ongoing brain developments in related areas such as the prefrontal cortex. However, there is a paucity of research in a) the neural bases of the frustration response; b) developmental change in the neural bases of frustration during adolescence, and; c) how developmental changes or individual differences in the frustration response may relate to reactive aggressive behaviour. We investigated these questions.

Design: A cross-sectional within-subjects fMRI design.

Methods: An age-appropriate goal-blocking paradigm was used to experimentally induce frustration in a sample of adolescents (11-18 years; N=35). Data analyses are ongoing.

Results: We predict a) the neural bases of frustration will show some overlap with reactive aggression as they are related processes; b) there will be developmental change in the neural bases of the frustration response, specifically increasing engagement of PFC coupled with decreasing self-reported frustration with age; c) individual differences in the neural activation of the frustration response will be correlated with differences in reactive aggression such that greater frustration responses will be associated with higher levels of reactive aggression.

Conclusions: These findings would suggest development in the ability to manage frustration during adolescence may be underpinned by the continuing maturation of emotion regulation abilities. Additionally, a positive correlation between the frustration response and reactive aggression tendencies suggests frustration is a trigger of aggressive behaviour which may be targeted in interventions e.g. using emotion regulation strategies.
Ref: 3294 Empirical Poster Presentation
Topic: Cognitive & Developmental Abstract
Children, adolescents, and adult listeners give similar ratings of perceived trustworthiness to adult voices

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Objectives: Estimating the trustworthiness of another is an important ability that helps sustain our wellbeing through identifying others’ intentions, avoiding threats, and establishing appropriate relationships. Previous research has shown that, as adults, our judgement of trustworthiness changes as we age, with older adults perceiving more trust in others than younger adults, potentially due to a desire for social inclusion and avoiding isolation. However, little is known about the initial development of how we perceive trustworthiness in others and whether it modulates from childhood into young adulthood.

Design: Focussing on perceived trustworthiness from voices, this study explored in a between-subject design the relationships between ratings of trustworthiness given by participants from three stages of early development: children (5-10 years old); adolescents (11-19 years old); young adults (20-29 years old).

Methods: One hundred eighty-three listeners (59 children; 65 adolescents; 59 young adults) rated the perceived trustworthiness of 15 male and 15 female young adult speakers saying the word 'Hello', using a VAS slider ranging from 'very untrustworthy' to 'very trustworthy'.

Results: A one-way ANOVA revealed no significant group differences in average trustworthiness ratings; all correlations between groups showed strong, positive relationships (all r’s > .8). However, linear mixed effects modelling indicated a small but significant increase of perceived trustworthiness with listener age.

Conclusions: Overall, the findings align with those from other modalities suggesting that our gauge of trustworthiness is established in childhood, remaining relatively stable until early adulthood, but with small modulation perhaps driven by the experience of our own social relationships.
Background: Initial representations of newly learnt words are highly dependent on the episodic system. Over time, these representations may gradually consolidate into pre-existing semantic networks, endowing them with the ability to interact with familiar words (e.g., competition). Previous studies showed that newly learnt words require sleep-related consolidation before they can interact with pre-existing words.

Objective: Two experiments investigated whether contextual diversity and contextual familiarity influence the time-course with which words are learnt and begin to interact with known words.

Methods: In Experiment 1, 45 participants learnt words (banasa) in the context of either a repeated or changing background object. In Experiment 2, 47 participants learnt the words in the context of either a familiar or unfamiliar object. Immediately and 24 hours after learning the novel words, participants completed a categorization task, in which they made semantic judgement on known words (banana). If a novel word (banasa) has been integrated, RTs to known words (banana) should be slowed, indicating that the new word was able to interact with existing words.

Results: Contrary to previous studies, RTs to known words were significantly slowed immediately after learning. This interference, however, is restricted to known words whose novel neighbours were acquired in the repeated and familiar contexts.

Conclusion: Repeated and familiar contexts may help newly learnt words readily establish connections with pre-existing nodes in semantic networks, thereby facilitating integration into semantic memory. Our study suggests that integration can take place rapidly and without sleep-related consolidation if learning takes place in the "right" context.
**Background:** Johns, Dye, and Jones (2016) showed that novel words learnt incidentally in different-themed text passages establish stronger lexical representations than those learnt in same-themed passages, suggesting that words encountered in changing contexts are weighted more strongly in memory. Notably, the themes of the text passages in Johns et al. were quite obscure (e.g., tuberculosis, an Indian author). In the current study, we adopted a similar approach to investigate the effect of semantic diversity on incidental word learning but used passages with more familiar themes.

**Methods:** Forty-five adult participants took part in the study. They read 36 short text passages and answered some comprehension questions. Half of the passages were single-themed (low semantic diversity) while the other half were different-themed (high semantic diversity). Importantly, the themes of all passages were highly familiar to the readers (e.g., Trump, Brexit). After reading the passages, the participants completed a series of surprise tests that measure the quality of the mental representations of the pseudo-words that they encountered in the passages.

**Results:** Contrary to Johns et al., novel words learnt in same-themed passages established more accurate and word-like orthographic and semantic representations, as revealed by differences in word-superiority effect, recognition accuracy, and semantic judgement.

**Conclusions:** Our study suggests that low semantic diversity benefits incidental word learning when the context is familiar. We suggest that novel words encountered in such passages can form stronger and more reliable connections with pre-existing nodes in semantic memory, thereby securing their representations. Network analyses provided support to our interpretations.
Objective: To investigate if spelling proficiency in a second language (English) is correlated with visual statistical learning ability, rote memorisation, and L2 vocabulary size.

Background: Recent studies showed that a person’s visual statistical learning (VSL) ability is positively correlated with L1 and L2 literacy. That is, people who are more adept at detecting implicit regularities in visual inputs tend to be or become better readers. Most if not all studies that examined this link looked only into reading ability, oddly neglecting spelling, and importantly, they relied on relatively small sample sizes.

Methods: We recruited a relatively large sample (64 advanced English learners) to investigate if performance on a commonly adopted VSL task (embedded triplet task) correlates with L2 spelling, as indexed by a spelling test involving rare English words. We also administered a rote memorisation task and an L2 vocabulary size test.

Results: In line with a growing body of literature, we found no evidence that performance on the VSL task correlated with L2 spelling. However, we found clear evidence that L2 learners with a larger L2 vocabulary size are also better spellers.

Conclusions: We argue that while VSL is linked to literacy development, traditional VSL measures may not be suitable for the investigation of individual differences owing to poor sensitivity. Our study, alongside Mak (2016), also demonstrates that false positives may arise due to small sample sizes. We, therefore, urge researchers worldwide, especially those interested in individual differences, to work towards better science by avoiding unjustifiably small sample sizes.
Objectives: Working memory, the ability to keep recently accessed information available for immediate manipulation, has been proposed to rely on two mechanisms that appear difficult to reconcile: self-sustained neural firing, or the opposite — activity-silent synaptic traces. This work aims to show that both phenomena can co-exist within a unified system in which neurons hold information in both activity and synapses.

Methods: Here we considered a highly simplified system of neurons that can perform visual working memory tasks. One memory item is held by persistent activity in an attended or “focused” state, and is thus remembered better than other items. Other, previously attended items can remain in memory but in the background, encoded in activity-silent synaptic traces.

Results: The model accounts for behavioural effects of capacity, serial position, encoding time, retention interval, transpositions, RT, probe interference, and trial-to-trial interference. Neurally, it predicts dynamic neural coding, accounts for the decodability of attended item, the inverted encoding effect, and the effects of delivering an energy pulse.

Conclusion: The plastic attractors in the model provide a common mechanism accounting for a diversity of working memory phenomena that have been hitherto difficult to explain in a single theoretical framework. The mechanism can be viewed as integrating two disparate views of working memory: activated long-term memory accounts on the one hand, and pointer- or slot-models on the other.
**Objectives:** The close relationship between working memory and attention is now well established; Information in the environment that is attended is more likely to be retained in working memory, and vice versa. This optimises the chances of successful and efficient task performance and goal achievement within inherently limited systems. One particular instance of this is the strategic direction of attention to relatively more important or high-value information, with improved immediate memory for stimuli associated with greater ‘value’ alongside concomitant cost for lower value items, in adults (e.g. Hu et al., 2014, 2016; Hitch et al., 2018) and children (Atkinson et al., 2019). Recent work on this topic, and implications for working memory and attention, will be discussed.

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Objectives: Limited research has investigated how similar visual mental imagery and visual memory are in terms of capacity limits. This study aimed to provide estimates of imagery capacity and explore how this relates to the capacity of visual working memory (VWM) and visual short-term memory (VSTM).

Key points: Previous research explored the impact of set size on visual imagery using a binocular rivalry paradigm (Keogh & Pearson, 2017). However, this paradigm does not test what is currently being represented, instead using the degree of interference between the imagined item and a subsequent binocular rivalry task as an indicator of imagery strength. In the current study, participants completed three versions of the same general task that tested what was currently being represented in their imagination, VWM and VSTM. In all tasks participants were tested on their imagination/memory in a two alternative forced choice task. Set size was manipulated similarly in each task enabling modelling of capacity in imagination and visual memory.

Methods: Participants (N=42) data were analysed using within subjects ANOVA and paired samples t tests. Capacity was modelled using WoMMBAT (Working Memory Modeling using Bayesian Analysis Techniques; Morey & Morey, 2011).

Results: Capacity estimates were similar in the two visual memory tasks and higher than that of imagination.

Conclusions: The capacity differences between imagery and visual memory may be due to imagery requiring more top down processing as imagery does not benefit from the utilisation of low level sensory processes during encoding, which can be used to aid retrieval.
Objectives: Visuospatial Bootstrapping is a term we have used previously (see Darling et al, 2017) to describe the now frequently replicated observation that spatial information present when encoding a visually presented string of digits can enhance verbal serial recall of those digits: digits presented in the familiar T9 keypad arrangement are better recalled than digits presented singly or in a random array. This pattern reflects the recruitment of visuospatial short term storage and long term spatial knowledge in a verbal memory task, and hence is consistent with a view of memory structure encompassing dynamic integration between long term and short term storage, and between visuospatial and verbal memory processes.

In this presentation I will outline recent results around visuospatial bootstrapping. These data suggest that verbal memory can support spatial memory, but although this seems to hint at reciprocity, this effect may not be reliant on the same processes as the spatial support for verbal memory. I will also introduce studies showing that the use of visuospatial keypad presentations can also enhance the long term learning of verbal sequences, including the learning of nonword sequences.
Objectives: Such is the consistency by which performance on measures of short-term memory (STM) increase with age that developmental increases in STM capacity are largely accepted as fact. However, our analysis of a robust but almost ignored finding – that span for digit sequences (the traditional measure of STM) increases at a far greater rate than span for other verbal material – fundamentally undermines the assumption that increased performance in STM tasks is underpinned by developmental increases in capacity.

Design: We show that this digit superiority with age effect is explained by the relatively greater linguistic exposure to random sequences of digits versus other stimuli such as words. A simple associative learning process that learns incrementally from exposure to language accounts for the effect, without any need to invoke an STM mechanism, much less one that increases in capacity with age. By extension, using corpus data directed at 2-3 year old children, 4-6 year old children, and adults, we show that age-related performance increases with other types of verbal material are equally driven by the same basic associative learning process operating on the expanding exposure to language experienced by the child.

Results: Our results question the idea that tests such as digit span are measuring a dedicated system for the temporary maintenance and manipulation of verbal material, and as such have implications for our understanding of those aspects of typical and atypical development that are usually accounted for with respect to the operation of such a system.
Objectives: Peg tapping tasks are commonly used as a measure of inhibitory skill in young children. However, differences in the way the task is presented may influence children's performance. For example, if a peg tapping task is presented at regular intervals, children can entrain to the presentation pulse, which may in turn support their performance. This study assessed how different aspects of presentation may support or impair children's results.

Design: An experimenter was filmed delivering the tapping task at two different speeds (120bpm and 150bpm). Additionally, they were filmed delivering the task at regular intervals (ie. the onset of each trial was predictable) or at irregular intervals (the onset of each trial was unpredictable).

Methods: 103 children aged between five and six years old were tested on the task. They completed one block with 20 regular interval trials and another block with 20 irregular interval trials. Block presentation order was randomized. Children who achieved over 90% accuracy on the task were then presented with two more blocks at 150bpm. Children’s response accuracy and reaction times were measured.

Results: During the task, children were observed employing different strategies to support their performance. Preliminary results show a difference in children’s accuracy across all conditions.

Conclusions: Our study demonstrates how speed and regularity of presentation can affect children’s scores on a tapping task used to measure inhibition. Demands on working memory, motor ability and speed of processing are all affected by adjustments in presentation. Entrainment to a pulse is also an important factor to consider in this context.
Objectives: Previous research has reported poor Executive Function (EF) development in deaf children who have hearing parents. This study describes the results of a music-based EF intervention designed for deaf children, carried out with two separate samples.

Design: The activities used in the intervention included adaptations of established activities used in schools, and additional activities specifically designed for the study. The intervention was designed in collaboration with both deaf and hearing professionals, including specialist music instructors for deaf children, and professionals familiar with the use of EF activities with primary school children. A control activity (art classes) was carefully designed involving the same amount of time and adult contact as the EF intervention, but without any EF-loaded activities.

Methods: The intervention employed a single subject crossover design, with a total of 29 deaf children aged 5-11 years who participated in both the EF and a control activity, each lasting 10 hours over 5 weeks. EF skills were assessed at pre-test, at the crossover point, and at post-test. In order to test the reliability of the intervention, it was trialled twice, in two different sets of schools.

Results: Findings indicated that the music-based EF intervention led to an improvement in participants’ working memory and inhibitory skills in comparison to their performance on the same tasks after the control activity.

Conclusions: This is the first study to find that EF in deaf children is sensitive to elements of musical training and supports the idea that auditory deprivation is not an inevitable barrier to EF development.
Ref: 3483 Empirical Oral Presentation

Topic: Cognitive & Developmental Abstract

“I sort of blocked it”. Are better executive functions protective against the impact of classroom noise on school performance?

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Objectives: Classrooms are noisy. When engaged in school tasks, children are exposed to verbal noise (a single person talking), and mixed noise (multiple conversations, overlapping with movement or transportation noise). We investigated whether the impact of verbal and mixed noise on school performance was modulated by executive functions.

Design: Participants performed three school tasks (text recall, reading comprehension, mathematics) twice: once in silence, once with 65dB of noise. Half of the subjects were exposed to verbal noise, half to mixed noise. Executive functions were assessed in silence.

Methods: Sixty-five children, between 8.82 and 11.40 years of age ($M = 10.21; SD = 0.68$) performed individual computerised tests. They were asked to a) recall literal information from a narrative text (text recall); b) draw inferences and summarise key conclusions from a narrative text (reading comprehension); c) answer 12 questions covering the Year 5 mathematics curriculum. Executive functions assessments focused on inhibitory control (Flanker task), and verbal working memory (backward digit span task).

Results: MANOVAs indicated a negative impact of noise on text recall and mathematics performance, but only when the noisy session was presented first. There was no significant difference between the effect of verbal and mixed noise. Inhibitory control was not protective against the impact of noise. However, better working memory was associated with less impairment due to noise, when performing the mathematics task.

Conclusion: The negative impact of noise on performance seemed limited to situations where the noise condition was presented first, and where the task involved memory skills.
Objective: To understand how the presence of emotional symptoms (ES) impacts on frontal alpha asymmetry and how does this manifests differently throughout childhood and adolescence.

Methods: Families with healthy children were recruited by email. The final sample of children consisted of 26 4 to 7 years-olds (children); 35 8 to 11 year-olds (pre-teens); and 33 12 to 15 year-olds (adolescents). Parents filled the Strengths-and-Difficulties Questionnaire (SDQ) and the child’s EEG alpha power was measured with eyes open and closed. The association between the ES scale of SDQ and the absolute power values in both clusters and the asymmetry values was analyzed through regression analysis and group comparisons were calculated to contrast the lower and higher scorers in ES.

Results: Regression analysis pointed to ES as a significant predictor of alpha power in children older than 8 years old, especially on the left side in pre-teens and in both conditions and hemispheres in adolescents. However, when comparing the lower and higher, differences were only found in the pre-teens group, in which the participants with lower scores in ES show significantly higher power on the right hemisphere comparably to the left hemisphere, while high scorers show the reversed pattern.

Conclusions: Emotional symptoms seem to be related to alpha power in frontal sites only in later stages of development, especially during pre-teen years. The impact of this association and limitations will be discussed.
Objectives: The number of adults entering education in midlife has decreased over the last ten years. However, those now enrolling on degree courses aged over 36 are more likely to be female, seeking to follow vocational pursuits. This suggests potential role shifts for women in midlife and indicates a desire to continue to contribute to society. With changing social demographics, it is important therefore, to understand what compels women in midlife to return to education, adding to the paucity of research in this area.

Methods: Semi-structured interviews were conducted with three female participants aged 48-51 years, enrolled on a university degree course.

Findings: Interpretative Phenomenological Analysis (IPA) identified four superordinate themes: A) Identity; B) Being Somebody; C) Generativity; and, D) Self-Reliance. The themes illustrate how the participants were motivated by the desire to be recognised as somebody of value. Their aspirations in midlife demonstrate a revision of their self-concept as they prepare for an end to the parenting era of their lives, initiating their return to education. All communicated generative attitudes, and the need to support others is reflected in their aspirations alongside the quest for personal development. A perceived lack of support from others was, however, revealed, both for past and present ventures.

Conclusions: The participants are part of a pioneering group of women; role models who through their stories highlight the need to recognise the valuable contributions women can make to society, and the subsequent effect further education may have on the well-being of women in midlife.
Ref: 3351 Empirical Oral Presentation
Topic: Developmental Abstract
Will children give up victory for their friends? Pre-schoolers’ fairness preferences with different recipients in a contest

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Objectives: Despite the influence of allocation’s attributes on ultimatum game, for instance, costly allocation results in less fair behaviour, social factors also play a critical role in young children’s inequality aversion. Literature from the WEIRD societies has demonstrated that closeness with the recipients and competition can both affect children’s fairness judgement significantly in an opposite way: Children normally behave fairly with a friend rather than with a stranger while they also prefer to keep more resources to themselves in a competition. This raises the question what are the odds that children can still be fair rather than prioritizing victory when these two social factors occur on the same occasion? How will cost, competition and relation collectively affect children’s fairness allocations? Whether these effects vary for children from different countries, different age groups and different genders? What is the rationale behind these allocations?

Methods: This study examined 104 Chinese children and another 100 British children from two age groups: 3-year-olds and 6-year-olds on their recourse preferences with a friend and an unknown peer in a contest. Their moral judgements in the distribution were also recorded.

Conclusions: Chinese children were generally fairer than British children were as their behaviours were more aligned with normative influences. However, British children displayed a preference of fair contests and this was less valued by Chinese groups. This preference was not affected by relation, although British children were less fair with a friend rather than with an unknown-peer when there was a cost to be fair.
Purpose: The purpose of this study was to examine elementary school children’s responses to insincere praise, and explore the association between these responses and the maturity of their theory of mind.

Design/Methods: In a cross-sectional study, a total of 455 Japanese children aged 6 to 12 years were given a booklet including praise tasks and two second-order false belief tasks. They were divided and assigned to one of the two conditions: outcome praise condition or effort praise condition. The praise tasks included two hypothetical scenarios in which children experienced success and failure on a mathematical question, and a teacher provided praise for their performance (outcome praise condition) or their effort (effort praise condition) in each of the scenarios. After each of the scenarios, questions were posed about the following: emotional response after success/failure, emotional response after teacher praise, motivation for an additional mathematical question, and a memory question.

Results: In both conditions, insincere praise following failure elicited more negative emotion in older children compared to younger children. Additionally, in the outcome praise condition, older children showed less motivation to persevere than did younger children after insincere praise following failure. It was also found that, in the group of younger children, children with a mature theory of mind responded more negatively to insincere praise following failure.

Conclusions: These findings highlight the importance of understanding age differences in responses to insincere praise in failure situations and individual differences in theory of mind when praising children.
The development and stability of social network as a protective factor for the institutionalized children in Japan

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Background: Studies have reported that the ability to form relatively stable close relationships may function as a buffer against harsh circumstances.

Design: The objectives of this study were to understand the development of social network in at-risk children, and to explore its protective effect.

Methods: A total of 43 children (26 boys and 17 girls) aged 7-9 years (Mean= 8.4 years) living in three institutions have been participating in a longitudinal study. About 50% of these children had experienced abuse. The children were individually administered with PART (Picture Affective Relationship Test; Takahashi, 2002). In PART, the respondent is expected to name any significant figures, by assigning figures selected functions, such as emotional support. Caretakers filled out the Child Behavior Checklist (Achenbach, 1991).

Results: A central figure in their social network was identified for about a half of the children. Those with a central figure had lower internalizing problem scores, compared to the children with no central figures. For 30 children, PART data were available from two years before. PART responses were stable in that 75% of the children with a central figure at the age of 8 had a central figure when they were 6, while 72% of the children with no central figures when they were 8 had no central figures two years before (p=.026, Fisher’s exact test).

Conclusions: The results suggest the role that social network may play as a protective factor for institutionalized children. Early intervention is needed for children who show little interest in interpersonal relationships.
Objectives: This study investigated the role of working memory and other cognitive abilities in the understanding of social inference, specifically facial expressions, sarcasm, sincerity and deceit.

Design: Cognitive processes are involved in emotion detection and understanding social inference (i.e. the thoughts, feelings and behaviour of other people). People with dyslexia report issues with working memory and attention, and would therefore be worse at understanding social inference. This cross-sectional experiment investigated the effects of working memory and intelligence as predictors of performance on social inference tasks in both dyslexic and neurotypical participants.

Methods: There were 80 participants aged 19-55 (M= 27.7), 40 of whom had a prior official diagnosis of dyslexia. Participants completed tasks taken from the WAIS and the WMS to measure: verbal working memory, processing speed, verbal comprehension, perceptual reasoning, and visual working memory. They then completed The Awareness of Social Inference Task (TASIT), which measures facial expression recognition, simple sarcasm, paradoxical sarcasm, sincerity and deceit.

Results: Visual and verbal WM played the most significant roles in understanding social inference. Both visual and verbal WM significantly predicted performance on expression recognition and measures of enriched social inference, specifically paradoxical sarcasm and deceit. However, measures of minimal social inference, such as sincerity, were only predicted by visual WM.

Conclusions: WM underpins the understanding of emotional expressions and social inference. Surprisingly, only visual WM predicts minimal social inference abilities, even though language involvement would be expected. WM differences might thus explain social inference difficulties for some people.
Objectives: Many individuals with DP appear to be impaired at face perception and yet achieve typical scores on relevant tests. This may reflect issues with the paradigm or stimuli, or it may be that response times are more sensitive to face perception ability. That is, typical accuracy scores may obscure abnormal feature-matching strategies, and not reveal true face perception abilities. Here, a new face perception test was developed that addresses these issues.

Design: The test follows the design of the Benton Face Recognition Test (BFRT) but uses more ambient greyscale facial images, cropped around the hairline. Accuracy and response times were measured.

Methods: Ten DPs and 60 age-matched controls completed the Cambridge Face Perception Test (CFPT), the BFRT and the new face-matching test. All tests were completed online.

Results: DPs and controls elicited similar response times and accuracy rates on the CFPT. DPs scored poorer than controls on the BFRT and the new matching task, but were not significantly impaired. However, analysis of response times revealed impairment in some DPs. There was no association between face matching scores and diagnostic face memory scores in DP participants.

Conclusions: We present a new face-matching test that addresses the limitations of existing face perception tests. The test is easy to administer and uses cropped but naturalistic facial stimuli. Importantly, data highlight that DPs can achieve typical accuracy scores on face-matching tests but take more time than controls to make a decision. Thus, response time data are more suitable to assess face perception skills.
Another wife: The effects of growing up in Polygynous households on the relationship experiences of adult African Diasporas

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**Purpose:** The practice of polygyny persists in many patriarchal societies around the world, and previous research has suggested such family structures to have detrimental effects on children and adolescents. However, little is known about how polygyny as a complex family system affects the children’s later adult relationship quality. The purpose of this study therefore, was to explore the experiences of African Diasporas who were brought up in polygynous households, and how this may have affected their ability to develop adult relationships.

**Design:** A qualitative design using Interpretative Phenomenological Analysis (IPA) was used to invite personal narratives from the participants.

**Methods:** These were three adults of African descent, who were recruited through purposive volunteer sampling. A semi-structured interview was designed to explore the participants' relationships with their fathers, mothers, fathers’ other wives, and the other children in the family. How they feel the experience of growing up in a polygynous household has affected their adult relationships was also explored.

**Findings:** Four superordinate themes emerged from the data: ‘patriarchal society’, illustrating oppression and power both in the cultural practice of polygyny and the father’s role in the family; ‘appearance versus reality’ illustrating faux displays of family harmony; ‘relationships’ illustrating both bonds and divisions between family members, and feelings of loss; and ‘distance’ illustrating a distant father figure and avoidance in the children’s intimate and social relationships as adults.

**Conclusions:** These findings shed light on a previously unexplored topic and illustrate the lasting effects of polygyny on adult relationship quality, namely avoidance.
Objectives: The ability to associate stimuli displaced over space or time is critical to learning about our environments. Spatially separated stimuli can be rapidly associated and prime repeat presentations (Lloyd-Jones & Nakabayashi, 2009). We investigate whether associative priming occurs for temporally separated stimuli across two experiments.

Design: Each experiment followed an associative repetition priming procedure. During study, pairs of greyscale objects and colour patches (typical or atypical of object colour) were presented as sequences with either a 0 or 1000 ms ISI. For example, a broccoli-green sequence (typical) or a broccoli-pink sequence (atypical). At test, these object-colour pairings were preserved or recombined with a 0 ms ISI (Experiment 1) or 1000 ms ISI (Experiment 2). Additional test trials with new pairs provided a baseline measure.

Methods: Participants in Experiment 1 (N = 36) and Experiment 2 (N = 36) were all undergraduate students with normal colour vision and normal or corrected-to-normal visual acuity.

Results: Analysis of reaction times for Experiment 1 demonstrated significant object priming, $F(1, 34) = 20.04, p < .001, \eta^2 = .37$, but not associative priming. In Experiment 2, a significant colour typicality X test pairing interaction, $F(1,34) = 10.41, p < .01, \eta^2 = .23$, revealed associative priming for typical (e.g., broccoli-green), but not atypical object-colour sequences (e.g., broccoli-pink).

Conclusions: We provide preliminary evidence for the associative repetition priming of temporally separated stimuli. However, in contrast to past research only familiar sequences were primed. Existing knowledge may be necessary to support repetition priming of stimulus sequences.
Ref: 3427 Empirical Poster Presentation
Topic: Developmental Abstract
Effects of infant stable self-regulation on their adjustment during primary school years.

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Objectives: Namba, et al. (BPS 2018) found the existence of two types of child response on self-regulation related to development; stable group (stable from 2.5 to 3.5, 5 and 6 years of age) and unstable group (changing year to year). The unstable group was divided into two groups by the results at six years old (fail or pass). The aim of this study is analyzing the relationships these three groups (stable, unstable/pass and unstable/fail at 6years old) and adjustment behavior at Primary school (1,2,3,4,5, and 6 grade).

Design: The subjects were derived from JCS cohort study started in 2004 in Japan (cf. Yamagata et al. (2010)). Data used in this study were collected during 2007 to 2018 at the Mie Chuo Medical Center.

Methods: 38 boys and 34 girls subject were executed the self-regulatory situation task (see Namba et al., 2018) at 2.5, 3.5, 5 and 6 years of age. The measures used in this study at primary school period were over-adjustment scale (answered by their care givers) and questionnaire for adjustment in primary school (answered by the children).

Results: Only approval score from their friends in the class room (in questionnaire for children) was significantly interacted (F(6,162)=6.44) with the groups. The stable group children were almost accepted from class mate. Contrary to the stable group, unstable/pass/fail children at 6years old showed the increasing pattern from third grade to fifth grade but decreased after that.

Conclusions: Stable self-regulatory behavior during infant may influence to their adjustments at primary school years.
Ref: 3382 Empirical Oral Presentation

Topic: Developmental Abstract

Influences on Emotion Recognition: Individual differences in attention, social anxiety, depression and emotion processing.

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Objectives: Researchers have highlighted that social anxiety (SA), depression and emotion processing may impact facial emotion recognition (FER). Further, researchers have emphasised the importance of facial features, specifically the eyes in the successful decoding of facial emotions. In this study we examine to what extent differences in FER may be understood through differences in attention during FER.

Design: A cross-sectional design was used using behavioural tasks to assess facial emotion recognition, and using eye-tracking to assess attention during FER.

Methods: Adolescents ($N=35$) and adults ($N=36$) completed measures of SA, depression, emotion processing (chimeric face test), and facial emotion recognition (FER). During the FER task exposure time was manipulated and participant’s eyes were tracked. ANCOVA analyses was used to assess if those higher or lower on our measures differed in their FER, and in their scanning of facial features during FER, whilst controlling for other measures (i.e. depression control for SA).

Results: Individuals higher in depression (compared to lower) and those more strongly lateralised to the right hemisphere for emotion processing (compared to bilateral) showed differences in their FER abilities for negative emotions. No differences in FER were found for individuals differing in their level of SA. Differences in attention during FER were observed for depression, social anxiety and emotion processing groups, which differed by emotion and exposure time.

Conclusions: Findings are discussed with consideration that attention may not be able to explain the specific patterns of FER observed in these groups.
Order effects in incidental impression formation

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**Background:** Much is known about impressions based on scant information, for example a face. It is less clearly understood how sequential, potentially contrary, information is processed during impression forming encounters. Order effects could result in primacy, recency or averaging based evaluations. Previous studies have mostly found primacy effects, suggesting initial impressions are resilient to new evidence. We sought to understand whether social judgements and decisions are contingent upon the order in which information is received.

**Design:** Studies have shown that faces displaying valid gaze-cues are rated as more trustworthy than those providing invalid gaze-cues. Extending this literature, the current study employed a gaze-cueing paradigm with a range of gaze-cue validities producing six unique helping behaviour profiles. In a 2*3 within-subject design, faces were categorised as being overall helpful (75% valid) or unhelpful (25% valid) and either increased, decreased or maintained their level of helping behaviour over time.

**Method:** Participants (n=56) completed a gaze-cueing task then, for each face, rated how nice they thought it was (judgement) and chose how much they would invest in a one-shot trust game (decision).

**Results:** Helpful faces were liked and trusted more than unhelpful faces. There was no evidence for primacy or averaging effects. The most parsimonious explanation for our data is recency effects.

**Conclusion:** Despite displaying the same validity overall, faces were perceived differently when the order in which they were encountered was varied. Results contradict previous primacy findings. In a gaze-cueing paradigm, recency is the best predictor of impressions.
Ref: 3449 Empirical Oral Presentation
Topic: Developmental Abstract
Persistent and non-persistent behaviours in kindergarten children

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**Objectives**: Some children persist in the face of a challenge while others do not. The aim of the present study was to understand why this might be. Therefore, we examined not only persistent behaviour but also observed non-persistent behaviours (i.e., cheating and off-task behaviour) to understand persistence more thoroughly.

**Design**: A within-subjects design was used to examine the research question.

**Methods**: The sample consisted of 157 kindergarten children (mean age: 69 months, 48% female). Children were recruited from public kindergartens and were predominately from middle-class families. Childrens’ persistent and non-persistent behaviours was assessed with a puzzle box task. Executive functions, i.e., inhibition, shifting and working memory were assessed with separate tasks. Temperamental characteristics were assessed with the child’s behaviour questionnaire.

**Results**: The analysis for persistence showed that beyond age ($\beta = .01$) and temperament ($\beta = .22$), inhibition ($\beta = .24$) and shifting ($\beta = .17$) predicted persistence. Regression analyses for the two non-persistent behaviours, cheating and off-task showed that while temperament ($\beta = .15$) and weak cognitive skills ($\beta = -.19$) predicted cheating, younger age ($\beta = -.21$) predicted or off-task behaviour.

**Conclusions**: The present results suggest that persistent behaviour seems to be affected by at least three different components; age, temperament and cognition, namely inhibition and switching. Besides, the present study is the first to systematically analyse childrens’ non-persistent behaviours in relation to persistence. While temperament and weak cognitive skills predicted cheating, the likelihood of showing off-task behaviour and abandon the task decreases with age.
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\textbf{Background:} Previous studies have indicated that phonological ability (PA) is an important predictor of early spelling performance. In addition, research indicates that rapid automatized naming ability only affects spelling performance in older more experienced spellers. This study aims to explore predictors of spelling in children using a new interpretive spelling tool consisting of exception and regular words and non-words.

\textbf{Design:} The project is a cross-sectional one using a correlational design.

\textbf{Methods:} It evaluates the association between PA, phonological memory, and rapid automatized naming and spelling in a large representative sample of primary age children (RYr-Yr6, N=479) in the UK.

\textbf{Results:} Regression analysis conducted with all the items in the new spelling assessment (N=106) indicated that PA and rapid naming were significant predictors across the year groups, but phonological memory was not. Similar results were found for exception word spelling (N=36). However, for non-word spelling (N=34) phonological ability and rapid naming were significant predictors for the younger children (RYr-Y3), but not for the older children (Yr4-Yr6). For older children, only phonological ability was significant.

\textbf{Conclusions:} Results indicate that to have a better understanding of the development of spelling ability we need to use reliable spelling tools which assess the different components of spelling, as different processes seem to be associated with the different types of letter string across different levels of spelling experience. We suggest that the new spelling assessment provides a reliable means for identifying specific spelling difficulties experienced by individuals and also to help researchers in their studies.
Objectives: This study aimed to examine sex differences in social-emotional development between children with and without developmental disabilities (DD). We hypothesized that children with DD would have social-emotional difficulties more than typical children, especially girls with DD would show severer social-emotional problems than others.

Design: Two-way ANOVAs were conducted to examine group (children with and without DD) and sex differences.

Methods: The Social-Emotional Development Checklist (SEDC) was developed based on Japanese educational systems by referring to various scales. The questionnaire consists of 59 items and 9 subscales. Higher subscale scores reflect healthier social-emotional development. We collected data of 82 Japanese elementary school students (aged 6-12) including 45 typical children (24 girls) and 37 children with DD (12 girls) according to teacher reports.

Results: The ANOVA revealed a main effect of group on all subscales. Children with DD had greater social-emotional problems than typical children. On ‘group participation’, the main effect of group was qualified by an interaction between group and sex ($F(1,78)=3.96$, $p=.04$). Boys with DD scored significantly higher than girls with DD. A similar pattern was found for ‘expression and regulation of emotion’ ($F(1,78)=6.90$, $p=.01$). There was a main effect of group, no main effect of sex, and an interaction ($F(1,78)=5.83$, $p=.02$) on ‘self-control and executive function’. Typical girls scored significantly higher than typical boys.

Conclusions: Children with DD had social-emotional challenges in all aspects. Sex differences in social-emotional functioning emerge depending on presence/absence of DD. Future work should explore the relationship between social-emotional development and characteristics of DD.
Ref: 3441 Empirical Poster Presentation  
Topic: Cognitive & Developmental Abstract  
The contribution of executive function domains to false belief understanding and academic achievement  

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Objectives: A growing body of evidence from cognitive and developmental research points to executive functioning (EF) as an important cognitive precursor to theory of mind (ToM) development and academic achievement. The aims of this study are to establish the predictive role of each of the different executive function components (working memory, inhibitory control and cognitive flexibility) on false-belief understanding, and to examine the relationship between ToM, EF and school outcomes.  

Design: This is a longitudinal study spanning three school years (Reception to Year 2).  

Methods: Reception-aged children (n=106) were recruited from two primary schools. They completed a battery of three false-belief tasks and four measures of executive function (a digit span task; the Grass-Snow and Day-Night Stroop tasks; and the Dimensional Change Card Sort). Schools supplied secondary data on the children’s academic achievement, including in mathematics, literacy, social-emotional development, and language and communication skills.  

Results: The results show strong links between the scores on false-belief tasks and scores on the measures of the three domains of executive function. These relationships persisted even after controlling for other factors, such as age. False-belief scores were also related to school outcomes (literacy and mathematics), but this relationship was largely mediated by EF and language and communication skills.  

Conclusions: These findings add to the growing literature on academic outcomes associated with individual differences in early theory of mind and cognitive regulatory skills (EF). The findings also reinforce the importance of the different executive function domains in the development of false belief understanding.
Objectives: This study assessed the combined predictive ability of the Theory of Planned Behaviour and Prototype Willingness Model on bystander intervention behaviour among Secondary school pupils. It was hypothesised that positive and negative attitudes, social and control beliefs, and self-efficacy would be mediated by intentions and willingness to intervene. It was also hypothesised that social beliefs would moderate positive and negative attitudes towards intervening.

Design: A prospective correlational design was used (two time points around one month apart). Data were collected from September 2018 to March 2019.

Methods: More than 2000 pupils who attend mainstream secondary schools in Scotland took part. Pupils were in S1-S3 with an age range of 11-14. At Time 1, a 40 minute questionnaire was administered assessing positive and negative attitudes, control and social beliefs, self-efficacy, intentions and willingness to intervene. At Time 2, a 10 minute questionnaire was administered assessing bystanders' opportunities to intervene, and their intervention behaviour. Path analysis will be used to test the hypotheses.

Results: The analysis is expected to reveal that positive and negative attitudes, social and control beliefs, and self-efficacy are significantly mediated by intentions, and willingness, in support of the two theories. Positive and negative attitudes are expected to be significantly moderated by social beliefs.

Conclusions: The results will be discussed in terms of the applicability of the Theory of Planned Behaviour and Prototype Willingness Model on understanding bystander intervention behaviour among Secondary school pupils. The results will help to inform school-based programs aimed at increasing bystander intervention behaviour.
Ref: 3421 Part of Symposia
Topic: Cognitive & Developmental Abstract
(S) Humour in Childhood

Amy Paine
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Objectives: Humour is a universal and integral part of the human experience (Martin 2007) that has received very little empirical study in childhood (Hoicka & Akhtar, 2012). Given that certain uses of humour may have important cognitive and social functions (Fox, Hunter, & Jones, 2016; Martin, 2007), there is a pressing need for more research that determines the role and function of humour in childhood. In this symposium, we will share four projects that address the dearth of research on childhood humour, from different disciplines that harness a variety of research methods.
In Paper 1, we will share observational approaches to the study of humour in sibling relationships that were used to examine patterns and core correlates of humour in early and middle childhood. In Paper 2, we will share findings from a two time point longitudinal study of humour styles assessed using questionnaire data, and the association between combinations of humour styles and wellbeing in childhood. In Paper 3 we will share findings concerning the relationship between humour and understanding of minds in early childhood using parent questionnaires administered longitudinally. Finally, in Paper 4, we will introduce an alternative qualitative method of studying childhood humour in educational settings, through a 'Bakhtinian carnivalesque lens'.
The discussant, Professor Nina Howe of Concordia University, will summarise the different approaches to conceptualising and studying childhood humour and highlight directions for future research. This symposium will provide a platform for discussion and future collaboration that will address an under-studied area of developmental and cognitive psychology.
Objectives: Shared humour is a form of playful, intimate and warm interaction that is an integral part of children’s close relationships, and may reveal a great deal about the quality of children’s relationships and their developing understanding of one another’s minds (Dunn, 1994). In the present study, we aimed to build on limited research by examining the role and function of humour in children’s sibling relationships.

Design: We harnessed data from two observational studies of sibling relationships in early to middle childhood (N = 86 in Study 1 and N = 72 in Study 2, Paine et al., 2019; Howe & Recchia, 2005).

Method: Children’s humour was coded from transcripts and video recordings of siblings during free play, which included: (1) performing incongruities, (2) word play; (3) sound play; (4) banter; (5) taboo; (6) clowning; and (7) preposterous statements. In Study 2, children’s quality of relationship was assessed using a modification of the Sibling Behaviour and Feelings Questionnaire, and aspects of social understanding (e.g., internal state language) were also coded.

Results: Humour was common, and siblings’ production of humour was highly interdependent between play partners. Dyadic humour differed according to structural features of the sibling relationship (age, gender composition), and 7-year-old focal children’s humour varied according to gender. We also describe associations between humour and children’s relationship quality and social understanding.

Conclusions: Our findings contribute to knowledge regarding the types of humorous acts children produce, and draw attention the individual patterns, correlates, and dyadic nature of humour in childhood.
Objectives: Some researchers suggest that to advance our understanding of the relationship between humour styles and wellbeing, it may be useful to consider how individuals use a combination of different styles of humour. Following the identification of humour types in older children, the current research aimed to identify humour types in younger, junior aged children.

Design: A short term longitudinal survey based design was used with data collection taking place at two time points across the school year.

Method: 413 children aged 8-11 years from five UK primary schools completed the Humour Styles Questionnaire for Younger Children (HSQ-Y) alongside several measures of adjustment. The same measures were completed in both the autumn term and the summer term.

Results: Cluster analysis led to the identification of three humour types in junior aged children, adaptive humourists, humour endorsers and humour deniers. Differences between the three humour types were found for several adjustment variables, for example, the humour deniers were found to score significantly higher on a measure of loneliness.

Conclusions: Some children may use maladaptive humour styles in conjunction with adaptive styles of humour. This is important to consider in terms of associations with adjustment and possible intervention work.
Ref: 3430 Part of Symposia
Topic: Cognitive & Developmental Abstract
(3) Humour skills may relate to social cognition in young children

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**Objectives:** The relationship between humour and social cognition in young children from humour’s onset was examined.

**Design:** This study used lab and longitudinal parent report measures.

**Method:** The Early Humour Survey (21 items) and the Early Social Cognition Inventory (22 items) were completed by 516 English-speaking parents of healthy children from birth to 47 months.

**Results:** There was a positive correlation between social cognition and humour, when controlling age (\(r^* = .558, n = 516, p < .001\)). The surveys were repeated by 137 parents 6 months later. Children who scored higher in social cognition at Time 2 also scored higher on social cognition at Time 1 (\(\beta = .635, p < .001\)) and humour at T1 (\(\beta = .249, p < .05\)). However, humour at T2 did not predict social cognition at T1 (\(p > .05\)). In the lab study, 84 healthy children from 3 to 47 months were tested on a humour appreciation/production test (21 jokes/21 normal acts) and 11 social cognition tasks. Social cognition and humour development correlated (\(r = .569, n = 84, p < .01\)), however this relationship did not hold when age was added (\(p > .05\)).

**Conclusions:** There is a positive relationship on the parental surveys, but not in the lab study. The relationship does not look bi-directional over time. While humour may provide a social and emotionally positive environment to practice skills relating to social cognition, shifts in social cognition alone may not lead to better humour understanding (Mayes, Klin & Cohen, 1994).
Ref: 3431 Part of Symposia
Topic: Cognitive & Developmental Abstract
(4) Exploring young children’s carnivalesque humour and laughter in an early childhood setting

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Objectives: This presentation focuses on a small-scale qualitative study offering an alternative framing of children’s humour and laughter in an early childhood education setting.

Design: The study employed a Bakhtinian carnivalesque lens, an approach new to the field of children’s humour research, to explore the nature of children’s humour in an urban nursery and investigate existing views of children’s humour and laughter.

Method: Drawing on several theorists, including Bakhtin more widely, via a Dialogic methodology, the study employed: interviews framed as primary and secondary dialogic encounters with adults and children; a research journal; and a polyphonic video technique to address reasons why humour is not valued, pedagogically, within the English early childhood field. This presentation will address the challenge that children’s humour can present for early childhood practitioners, turning to Bakhtin’s analysis of carnival to frame children’s humour as carnivalesque.

Results: Through highlighting the study’s most significant findings, this conception of children’s humour will be offered as part of a potential explanation for practitioners not having an opportunity to understand children’s humour, proposing that dominating, authoritative discourses within early childhood education play a significant role in this.

Conclusions: Details of the operationalising of Bakhtinian concepts to facilitate the dialogic research methods, and the limitations of this approach, will be discussed. Finally, the suggestion that it is profitable to view young children’s humour in the context of Bakhtinian carnivalesque is offered, and a case for reframing young children’s humour in an ECEC context as ‘carnivality’ will be made.
Objectives: Previous research has demonstrated that differential mechanisms predict Visual Perspective Taking level 2 (VPT2) in neurotypical (NT) and autistic (ASC) children; namely body representation is a stronger predictor in NT children, and mental rotation (MR) is a stronger predictor in autistic children. This study aims to examine whether these differences are present in adulthood using the method of ‘fine cuts’.

Design: A mixed factorial design was used to examine the effect of group (ASC/NT) on accuracy and response time on the MR, EET, VPT2, four mountains, and mentalising tasks.

Methods: Twenty Autistic and twenty NT adults completed tasks to measure: non-social perspective taking (four mountains task), embodied egocentric transformations, mental rotation, VPT2, and mentalising (Frith-Happé Animations), alongside a measure of autistic traits (Autism Quotient) and IQ (WASI-II).

Results: Preliminary analyses suggests that the ASC group are just as accurate as the NT group on the Mental Rotation, EET and VPT2 tasks, but slower. Regression analyses show that performance (accuracy and response time) on the EET task predicts VPT2 performance in the ASC group, however no factors reach significance in the NT group.

Conclusions: The results of this study suggest that mechanisms predicting VPT2 in ASC and NT adults differ from those seen to predict performance in children, and that the more spatially grounded strategy used by ASC children may evolve into a more embodied strategy in adulthood.
Objectives: To understand how emotional symptoms (ES) in children between 4 and 15 years old translate into differences in the processing of facial expressions of emotion.

Design: A task with facial expressions of anger and happiness, with low or high arousal, and expressions of calm and surprise, with pleasant and unpleasant forms, was designed to target differential processing of a specific emotional category or affective dimension.

Methods: Parents of healthy children were recruited by email. The final sample consisted of 26 4 to 7 years-olds; 35 8 to 11 year-olds; and 33 12 to 15 year-olds. Parents filled the Strengths-and-Difficulties Questionnaire (SDQ) as a measure of ES and the child performed the described task, while electroencephalographic activity was recorded. The amplitudes of the VPP and the N170 event-related potentials were extracted, and regression and repeated measures ANOVA analyses were conducted.

Results: The SDQ scale of ES was a significant predictor of VPP amplitudes in all groups and of N170 in the two oldest groups. ANOVA uncovered a main effect of ES, with higher scores being associated with increased amplitudes of both components - curiously, higher amplitudes for low arousal displays in all age groups, for unpleasant valence in the 8-11 group, and increased left compared to right hemisphere amplitudes in children between 8 and 15 years of age.

Conclusions: The present study uncovered the association between the presence of ES and increased amplitudes to facial expressions, with specificities on affective processing and atypical left hemisphere engagement in face processing.
Objectives: While Information and Communication Technologies provide a vast range of opportunities for young people, they can also lead to experiencing and engaging in a range of risks. Research has focused extensively on understanding risk taking at particular developmental stages, however, relatively little is known in terms of the factors that could predict risk taking in the online domain. The aim of this study was to explore the potential for developmental and social factors to predict adolescent online risk taking, focusing specifically on egocentrism (Personal Fable and Imaginary Audience) and Fear of Missing Out (FoMO) in addition to demographic variables gender and age.

Methods: The study utilised a sample of 1184 adolescents aged 12-18 years in South Africa, with data collected in two schools using an online survey.

Results: Results showed that all variables were significant predictors of online risk behaviour. In particular, higher Imaginary Audience, higher FoMO and older age emerged as strongest predictors, and males engaged in more online risks than females. FoMO also correlated significantly with egocentrism constructs. The findings indicate that egocentrism is a relevant developmental construct for understanding adolescent online risk taking along with social factors like FoMO. Collectively, the findings can inform more targeted prevention and intervention strategies to enhance online safety at particular age groups and suggestions are made for future research.
Objectives: The primary objective of the study is to explore whether app content affects creative thinking in 24- to 47-month-old children. Specifically, whether apps that promote problem-solving (PS) or divergent thinking (DT) facilitate performance in a subsequent PS or DT task.

Design: The study consists of two experiments; Experiment 1 examines the effect of apps on PS, Experiment 2 examines their effect on DT. Behavioural tasks are used to measure PS and DT. A between-participants design is used to compare task performance after playing PS and DT apps in each Experiment.

Methods: Fifty-two children for each Experiment will be recruited from the research volunteer list (total n = 104). All children play with a PS app or DT app for 10 minutes. Afterwards, they are video-recorded completing the Great Ape Tool Test Battery (to measure PS in Experiment 1) or the Unusual Box Test (to measure DT in Experiment 2).

Results: Analysis is yet to occur due to ongoing data collection. After coding and establishing agreement, data will be checked for normality and analysed in-line with the study aims, including the use of t-tests. Results will be discussed in the presentation.

Conclusions: The study enhances our understanding of how apps affect creative thinking in preschoolers. Study limitations include the single, short-term app exposure. Despite this, it is a valuable contribution to the debate surrounding children’s technology use as some evidence is limited by correlational design. Therefore, the study has potentially important implications for parents, policy-making and media research.
Ref: 3261 Empirical Poster Presentation

Topic: Cognitive Abstract

Development and Validation of the Student-Educator Negotiated Critical Thinking Dispositions Scale (SENCTDS)

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Objectives: Although many conceptualisations of critical thinking exist, the vast majority acknowledge the importance of both skill-based and disposition-based components. There is, however, a notable lack of agreement regarding what constitutes CT disposition(s) and how best to approach the measurement of CT dispositions. The current study reports on the development and validation of a new student-educator negotiated CT dispositions scale.

Design: Scale items were derived from collective intelligence research conducted with both students and educators and subsequently sent for expert review. From this, a total of 101 items spanning 13 dispositions were retained for analysis. Participants (N=425) were divided into two separate samples for analysis.

Methods: Exploratory (EFA) and confirmatory (CFA) factor analysis was used across two independent samples for factor structure identification. Convergent and predictive validity was tested by examining relationships between CT dispositions and other constructs, including Need for Cognition (NCS), Motivated Strategies for Learning (MSLQ), Real World Outcomes of Critical Thinking (RWO), conspiracy beliefs (Generic Conspiracist Beliefs questionnaire) and paranormal beliefs (Revised Paranormal Beliefs Scale).

Results: EFA (n=250) revealed an 8-factor model. After a series of empirically driven modifications, CFA (n=175) confirmed a 6-factor structure comprising of 21-items. This scale demonstrated good internal consistency, construct and predictive validity.

Conclusions: Overall, the Student Educator Negotiated CT Dispositions scale (SENCTDS) was found to be a valid and reliable measure of CT dispositions. The final scale consisted of six dispositions including intrinsic goal orientation, attentiveness, organisation, perseverance, open-mindedness and reflection. This scale may be of interest to educators and psychologists interested in measuring CT dispositions.
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**Objectives:** Juvenile delinquency has always been a highlighted issue in social research. It refers to the committing of criminal acts by a person who is below the statutory age of majority. Efforts to minimize the delinquency has led various researchers to examine the underlying factors leading to youth engagement in delinquent acts. Researches have suggested that delinquent acts may be due to physiological, psychological or other individual characteristics as well as due to the structure of family and social relations within a society. Therefore, the current study explored the effects of family adaptability and cohesion and social provision on the difficulty in emotion regulation of juvenile delinquents which serves as a risk factor of juvenile crimes.

**Design:** For this purpose, 234 juvenile delinquents with age range of 12-18 years from Central Jails of Punjab, Pakistan completed the Family Adaptability and Cohesion Evaluation Scales (FACES-IV), Social Provision Scale and Difficulties in Emotion Regulation Scale.

**Methods:** Percentage and regression analysis were used to evaluate data.

**Results:** Results showed that the majority of juveniles belonged to a nuclear family system having a low-income profile (48.4%). Most of them were having poor communication and less support from their families and were more prone to the bad social association (81.3%). Findings indicated that lack of cohesiveness of the family and poor social relations leads to the difficulties in emotion regulation of juveniles.

**Conclusions:** It suggests that positive communication and healthy social relationships are important for optimal family functioning and positive emotion regulation in order to prevent juvenile delinquency.
Objectives: Free-play museum exhibits provide opportunities for children to set their own goals and hold multiple solutions to the problems children encounter while engaging with them. Thus, they are more like real world problem solving than many experimental tasks. In the current study, we explore the effect of instruction on parents’ conversational behaviour and children’s experiences during parent-child interactions with a free-play exhibit. We also explore how science capital (an individual’s relationship with science) affects parents’ behaviour during the interaction with their child. This study is in progress and has been registered on the Open Science Framework.

Design: This study adopts an intervention design, with children and their parents, in order to explore the effectiveness of conversational instructions.

Methods: Each child (4-8 years, N=42) will interact with a free-play exhibit with a parent. Dyads will be assigned to one of three conditions: instructions, no-instructions and child-led. Parents in the instruction condition will be given conversational instructions to provide encouragement, ask questions, and make associations. Parents will complete a science capital questionnaire. Parents’ and children’s behaviour will video recorded, to be coded using Datavyu software. Children will be asked questions about their experiences.

Results: Data collection is underway and will conclude in May. Analyses will determine the effect of the conditions, age, gender, and science capital on parents’ and children’s behaviour.

Conclusions: If the instruction condition is effective, we can advocate the use of these strategies to museum educators. Subsequent research would explore what aspect of the instructions drives behaviour change.
Background & Objectives: One previous study (Dowsett & Burton, 2015) showed that working together in a pair improved face matching performance (telling whether two images show the same person) compared to individuals working alone, and that this was particularly pronounced for the poorer performer in each pair. The current work sought to establish whether this pairs training effect lasts after a delay of some days/weeks, as well as testing a number of candidate mechanisms which may explain the effect, such as confidence, baseline performance difference between pair members, and reaction times.

Design & Methods: The design followed that of Dowsett and Burton (2015). Forty participants came to the lab in pairs and completed a face matching test alone, in a pair, then alone again. One week following the lab session, participants were emailed a link to an online version of the task to complete alone. All versions of the face matching test were equal in difficulty. During each face matching task, participants were asked to judge whether pairs of faces showed the same person or not, and record their confidence.

Results: We replicated the pairs training effect and showed that this lasts after a delay. Confidence did not explain the effect, neither did the baseline difference in pair performance.

Conclusions: The pairs training effect is robust and could improve applied face matching performance. We are conducting follow-up studies to investigate the role of reaction times, and the content of the pairs’ discussions, the results of which will also be presented.
Objectives: Although creativity has been studied in adults and older children very little is known about the development of this skill in young children. Our objective was to develop new measures of assessing creativity in young children which do not rely on the child's linguistic abilities.

Design: A new version of the Unusual Box test (Bijvoet-van den Berg & Hoicka, 2014) was completed, in addition to the original version, by 2- and 3-year-old children. Furthermore, a new parent-report measure designed to examine problem solving among 1- to 4-year old children was piloted with 200 parents.

Method: All children and parents were recruited through opportunity sampling. Forty children completed both versions of the Unusual Box tasks at their nursery. Two-hundred parents of 1- to 4-year-old children completed a 19-item questionnaire online. From this 12-items were identified which had high internal consistency. This 12-item scale was completed by a further 37 parents and their 2- or 3-year-old child completed the original Unusual Box test.

Results: Data from the children indicated that the number and novelty of actions each child made on the new, compared to existing, measure were highly similar. Children’s performance on the Unusual Box was moderately to highly correlated with the parents’ responses on the questionnaire.

Conclusion: While the questionnaire will facilitate relatively quick and easy data collection from large groups of parents the existence of two Unusual Box Tasks will facilitate experimental research in this area as they can be used for the purposes of pre- and post-testing.
Ref: 3432 Empirical Poster Presentation
Topic: Cognitive Abstract
Does the availability of verbal labels influence the selection of a response-set?

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**Purpose:** Previous task-switching studies revealed that a verbal task label facilitated the selection of a task-set, suggesting that the effective task-set control is supported by verbal information. To examine whether the availability of meaningful verbal labels influence the selection of a response-set, we used two types of tasks having the same response-keys and manipulated types of association between judgment and response-sets.

**Methods:** One task was a task-set switching in which participants instructed parity or magnitude judgment to numbers and were required to switch between those tasks following sign cues. The other task was a response-set switching where participants were instructed to switch between different response-sets, set X and set Y, while performing either the parity or magnitude judgement. Thus, in task-set switching, the task labels (parity and magnitude) linked to each judgment and encompassed each response-set, while in response-set switching, the set labels (set X and set Y) were arbitrary and meaningless for the judgment and response sets. Thirty-two students participated in each of the two types of tasks and performed 8 blocks of 72 trials. To examine the preparation effect, the lengths of CTI were manipulated within a block.

**Results and Conclusion:** The results showed that in both type of tasks, RTs in switch trials were slower than those in repetition trials and the long CTI made RTs shorter. However, there were no significant difference in RTs between task-set and response-set switching, suggesting that even meaningless but expedient set-labels were useful to select the response-set following a sign cue.
Purpose: A clear positive sense of identity is important for the wellbeing of ethnic minority youths. Literature in the field of ethnic identity has however, largely considered minority youths developing within a broader culture with little consideration given to young people of dual heritage. This study, therefore, aims to explore the experiences of young people of dual heritage and how they navigate their sense of identity.

Design: A qualitative design using semi-structured interviews was employed in order to explore participants’ experiences of identity exploration throughout their childhood, adolescence and young adulthood.

Methods: Six males and females aged 20 to 24 years and of dual heritage from a multitude of ethnicities, were recruited through purposive volunteer sampling.

Findings: Thematic Analysis revealed three key themes: ‘conflict’, illustrating the challenge of navigating opposing identities; ‘acceptance’, illustrating the importance of belonging to one’s heritage; and, ‘identity’, illustrating the emotional connection to being dual heritage. The findings highlight the social influences that impact on the formation of the ethnic self, and the psychological effect the navigation of ethnic identity presents for the young person of dual heritage. Contrary to the vast body of literature provided by the US, which has seen the understanding of mixed heritage ethnicity be heavily influenced by the ‘one drop rule’, these findings present an argument from a European perspective for ethnicity having variation and for dual heritage being an ethnicity in its own right. Such a view may aid in supporting young people as they explore their dual heritage ancestry.
Since the early 1990s, the Japanese government has been increasing the number of full-time daycare facilities based on the philosophy of family-friendly society. Nevertheless, fertility rates and maternal employment rates in Japan are still among the lowest in developed countries. The aim of this study is to investigate the effects of childcare attendance on Japanese family lives to evaluate current family policy. To make causal inferences, 1,084 women aged between 28 and 42 from a nationally representative sample of the Japanese General Social Survey 2009 Life Course Study data will be the focus of this study. Propensity score analysis was employed to reduce the impact of selection bias because families who utilized early childcare for their first child are likely to have different prognostic characteristics from those who didn’t. The results revealed that full-time daycare users do not necessarily have more children than nonusers. However, childcare users were not only able to keep their job as a full-time regular worker, but also were economically better off primarily because they did not have to quit their job years ago. These findings have important implications for developing more effective policy as they suggest that social obstacles inhibit employed mothers from having an additional child. Given that there is a greater demand for Developmental Psychologists to demonstrate immediate solutions to social problems, utilizing publicly available retrospective life history data has a potential.
Objectives: This symposium brings together researchers studying the ability to interpret information from and coordinate with other agents (human or robotic). These interdependent processes (evaluation of/coordination with agents, observation of interaction) depend upon at least (1) the ability of agents to interpret such information, and (2) the quality of signal emanating from agents that lends itself to interpretation by capable perceivers. Typically developing people are surprisingly capable in interpreting interpersonal signals to infer others’ inner states and characteristics. Inferences made by people with neurodevelopmental disorder (especially people with high levels of autistic traits) tend to be less accurate, though, and in turn typically developing people may not be accurate in interpreting signals in those with developmental disorders. Hence, one might say there is a lack of meeting of minds between people with and without neurodevelopmental disorders.

Debbie Riby’s talk discusses real-time social interaction abilities for individuals with neurodevelopmental disorders (Williams Syndrome and Autism). Kami Koldewyn then presents two studies focused on the brain systems involved in the perception of social interactions and how that system develops during childhood. Peter Mitchell explores how neurotypical people perceive people with autism from brief video encounters, and Stefan Schweinberger reports the role of perceiver age, personality and autistic traits in the evaluation of humanoid robots. New knowledge arising from research discussed in this symposium will help to better understand the typical development of social perception, evaluation, and mindreading abilities, as well as vulnerabilities of those with neurodevelopmental disorders, especially in relation to social exclusion.
Objectives: Social atypicalities are associated with a range of neuro-developmental disorders; including but not restricted to Autism (ASD), Williams Syndrome (WS), Fragile X Syndrome (FXS), and ADHD. The aim of this study was to i) understand the profiles of social vulnerability that occur in neurodevelopmental disorders and ii) consider how difficulties interpreting social signals from others might impact on the profile of social vulnerability.

Design: A cross-syndrome, mixed-methods, multi-informant approach was taken to understand profiles of social perception, cognition, behaviour and vulnerability in children with neurodevelopmental disorders.

Methods: Questionnaire were completed by parents regarding social skills and social vulnerabilities of 112 children with neurodevelopmental disorders aged 6-16 years (ASD n=29; WS n=29; FXS n=18; ADHD n=36) and over 150 typically developing children. To illustrate how social vulnerabilities may link to the ability to make judgements about others, social approach behaviours were also measured for 15 children with WS (and matched TD controls) using the stop-distance paradigm.

Results: Parents of children in all neurodevelopmental disorder groups reported significant atypicalities of social behaviour and significantly heightened social vulnerability. Crucially ASD, WS, FXS, and ADHD were all associated with comparable levels of social vulnerability. Social approach behaviours showed that in WS increased and indiscriminate approach to others may contribute to heightened social vulnerability.

Conclusions: Several neurodevelopmental disorders are associated with difficulties deciphering cues from others. Social atypicalities of this nature may make individuals vulnerable in their social environment. These vulnerabilities emphasise the real-world necessity to understand and support atypical social behaviours.
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Objectives: Humans are inherently social and our understanding of the world is shaped from the very beginning by the social interactions we observe. Here, we explore the brain basis of this remarkable ability, in particular looking at developmental change in the response of various structures in the “social brain”.

Design: In two experiments, using fMRI, we probe the brain’s response to observed social interactions. First, we establish a set of regions that are sensitive to the presence and characteristics of social interactions in the adult brain. Then we look across these same regions at developmental changes in their response profiles in children aged 6 – 12.

Methods: Twenty young adults participated in the first study; twenty-nine adults and thirty-one children participated in the second. The response of regions of interest in the “social brain” was examined and compared between age groups.

Results: A region in the superior temporal sulcus responds selectively to interacting dyads compared to two people acting independently. This region becomes more “tuned” to interactions across development, while other regions in the social brain become more involved in social interaction perception in adults than children.

Conclusions: These studies provide evidence that regions in the “social brain” are specifically involved in understanding social interactions, and that tuning of this system is still taking place during adolescence. This tuning may underlie our ability to intuitively understand the structure of our social world and navigate within it, and thus may be a key system to investigate to understand social cognition more broadly.
Objectives: Neurotypical people tend to perceive autistic people negatively (Sasson et al, 2017), which could impact negatively on one’s self concept. This in turn could lead to a sense of thwarted belonging and perhaps to social exclusion.

Design: Forty short videos of neurotypical (n=20) and autistic (n=20) people (targets) being greeted in one of four ways by an experimenter were shown to neurotypical people (perceivers), who rated those targets on social favourability using an adaptation of scales devised by Sasson et al.

Methods: Sixty perceivers watched all forty target videos and rated each target categorically (like or dislike) and also rated them on nine 5-point Likert scales on social favourability.

Results: In replication of Sasson et al., the ratings made by perceivers using the 9 social favourability scales effectively discriminated between neurotypical and autistic targets (who were rated considerably lower): $F(8, 70) = 4.93, p < .0005$. Autistic targets also received far fewer ‘likes’ compared with neurotypical targets: $t(38) = 2.20, p=.03$. Moreover, mean social favourability ratings correlated nearly perfectly with the numbers of ‘likes’ each target received: $r=.97$.

Conclusions: These findings replicate and extend recent research suggesting autistic people tend to be perceived negatively. The findings shed light on the basis of these negative judgments.

Objectives: While research activities with individuals on the autistic spectrum have increased strongly in the past decades, there is a remarkable lack of research on autism and autistic traits in older adults. In a separate field, the role of robotics for older adults is currently being discussed; the present study represents a first attempt to combine these topics.

Design: We assessed young and older (Mean ages = 22 vs. 69 years) neurotypical adults’ evaluations of various humanoid robots presented in video clips. We additionally assessed autistic traits (Autism Spectrum Questionnaire – AQ) as well as Big-Five personality traits.

Method: Sixty participants (50% young, 50% female) rated likeability, companionship, dominance, threat, and human-likeness of eight humanoid robots shown in video clips (two per robot, durations of 22.0 - 33.0 s, using 6-point Likert scales.

Results: Remarkably, older adults evaluated robots as more likeable than young adults overall, $F(1, 56) = 5.05$, $p = .029$. Older adults also showed significantly higher levels of autistic traits (particularly in the AQ social interaction subscale), higher levels of conscientiousness, and lower levels of openness. Across groups, and particularly in participants with high levels of autistic traits, we found strong positive correlations ($r = .72$, $p < .001$) between ratings of likeability and human-likeness of robots.

Conclusions: Overall, we found favourable evaluations of robots by older adults, suggesting potential for older adults on the autistic spectrum to benefit from social robots. In addition, age-related differences in relationships between personality dimensions and autistic traits deserve further attention.
Ref: 3259 Empirical Oral Presentation

Topic: Cognitive Abstract

Evaluating the Role of Emotion Recognition and Biological Motion Processing in Static and Dynamic Face Recognition

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Objectives: Models of face recognition typically propose that facial identity is processed independently of the changeable aspects of a face (e.g. eye gaze, expression and speech). However, recent evidence has found that social cues carried in the motion displayed by a face (i.e. emotional expressions and speech) can benefit the recognition of moving faces when compared to static presentation. This study examined whether the processes that underlie the recognition of moving and static faces are differentially reliant on the ability to perceive emotional expressions and biological motion.

Design: Correlation and multiple linear regression were used to examine the relationship between static and dynamic face recognition, emotion recognition ability and biological motion processing.

Methods: Participants (N = 90) completed five computer-based tasks which assessed: 1) recognition accuracy for static and moving famous faces, 2) emotion discrimination from whole-face stimuli, 3) emotion discrimination from eye-region stimuli, 4) lip-reading ability and 5) discrimination of whole-body movements.

Results: In the face recognition task, accuracy was significantly greater for moving faces compared to static. Recognition accuracy for both static and moving faces was significantly and positively correlated with lip-reading ability and emotion recognition ability from the whole face and eye region. Multiple linear regression revealed that lip-reading ability and emotion recognition ability from the eye region accounted for a significant proportion of the variance in both static and dynamic face recognition.

Conclusions: An individual’s ability to recognise moving and static faces is related to their ability to recognise emotional expressions and facial biological motion.
The relationship between acne and mental health in adolescents: a systematic review and meta-analysis

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Purpose: The study aimed to systematically review and meta-analysis on the relationship between acne and anxiety, depression and suicidal ideation in adolescents.

Background: Acne is a very common inflammatory dermatosis among adolescents and frequently causes disfigurement on the face, which could affect adolescents' self-confidence and self-esteem. Severe cases could lead to depression and suicide. There have been a large number of investigations and experimental studies on the relationship between acne and mental health, but the causal relationship between acne and mental health in adolescents still lacks systematic conclusion.

Methods: The Web of Science, Google Scholar and China National Knowledge Internet (CNKI) databases were searched for literature using the terms “acne”, “adolescents”, “depression” and “anxiety” for literatures published before January 2019. Cross-section services and population-based studies were included. Adolescents ranged in age from 10 to 19. The prevalence of depression and anxiety were calculated. Twenty-eight studies met the inclusion criteria.

Conclusions: This study showed that adolescents with acne are at high risk of anxiety, depression and suicidal ideation, girls are more sensitive than boys to the negative effect of acne. Parents, school and dermatologist should pay more attention to adolescents' mental health during remedy.
**Ref:** 3286 Empirical Oral Presentation  
**Topic:** Cognitive Abstract  
**The concreteness effect in healthy ageing: An attenuation or preservation?**

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**Objectives:** The advantage for processing concrete words has been shown to become attenuated in older age in line with the view that concrete (but not abstract) words are represented through sensorimotor activity. Recent evidence has challenged this demonstrating continued concreteness effects with older adults (65+). The current study assessed if this continued advantage is supported by how concrete and abstract words are processed; either thematically (association) or taxonomically (similarity).

**Design:** Participants completed the odd-one-out task in a mixed-design with age (younger vs older adults) as a between-subjects factor and concept type (concrete vs abstract) and semantic relation (association vs similarity) as within-subjects factors.

**Methods:** Healthy younger (N = 17) and older (N = 17) adults were shown four words on a screen and instructed to identify the odd-one-out as fast as possible. Four item sets were used in which the related words were either concrete or abstract, and related by similarity or association, e.g., Jeep-Taxi-Lorry-Mushroom(concrete-similarity), Crime-Punishment-Theft-Mimic(abstract-association).

**Results:** A significant interaction was found between concept type and semantic relation whereby reaction times were faster for concrete-similarity (M = 3484.62) over concrete-association words (M = 4536.33), and faster for abstract-association (M = 4163.75) over abstract-similarity words (M = 5047.90). No age effects were found in processing concrete or abstract concepts.

**Conclusions:** The concreteness effect was found to be present for both younger and older adults suggesting that, contrary to expectation, older adults still show an advantage in processing concrete over abstract concepts and suggesting implications for Embodied Cognition.
Ref: 3287 Empirical Oral Presentation  
Topic: Cognitive Abstract  
Assessing the stability of thematic and taxonomic preferences across explicit and implicit measures

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**Objectives:** There is some limited evidence that in tasks that rely upon assessing similarity between objects, participants demonstrate cross-task preferences in drawing upon shared features (taxonomic) or shared situations (thematic). The current experiment aimed to examine the reliability of such preferences across an extended range of explicit and implicit measures of similarity.

**Design:** In a within-subjects design, participants completed three established measures to assess processing preferences for taxonomic or thematic relations; a free sort task, a triad task and the Visual World Paradigm. In addition, a further implicit measure was developed based upon the single category Implicit Association Task.

**Method:** Fifty participants (M= 22.27, SD= 7.51) completed all four measures of taxonomic or thematic preference in a randomised order. Preferences were calculated on the basis of choices made on the sorting and triad task, competitor viewing time on the VWP, and response time on the IAT.

**Results:** Consistent preference across each of the tasks was not found. Furthermore, no significant correlations were found between the magnitude of preferences for the four measures including no correlations between the two explicit (r= -.25) or the two implicit measures (r= -.13).

**Conclusions:** In contrast to previous research demonstrating reliable cross-task preferences for thematic and taxonomic processing, performance on the tasks used here argue against a stable individual difference in this preference. The findings, arguably, drive towards a conclusion that, for most people, the use of each processing pathway is flexible and determined by both context and goals.
Objectives: Maths anxiety (MA) is related to maths achievement in older children and adults, with some studies finding evidence of maths anxiety from age 6 years. This project examined maths anxiety prevalence in younger children to investigate the relationships between MA and children’s numeracy skills.

Design: The study was a correlational design, part of a cohort-sequential longitudinal study, comparing numerical mapping skills, numeracy skills and self-reported maths anxiety, of children from different schools.

Methods: Participants (N=201; 52% male, Mean age = 60 months, Min 53 months, Max 69 months) were recruited from 4 local primary schools. Children completed numerical symbolic-to-nonsymbolic (SNS) and nonsymbolic-to-symbolic (NSS) mapping tasks, numeracy and problem-solving tasks, and a maths anxiety questionnaire.

Results: 31.5% of participants self-reported maths anxiety although this was not correlated with school (r = -.01, p = .878), SNS score (r = -.09, p = .234), NSS score (r = .03, p = .642), problem solving abilities (r = -.02, p = .738) or numeracy skills (r = .05, p = .52).

Conclusions: Although maths anxiety at this early stage of formal learning was not related to performance, around one third of participants reported feelings of worry related to numeracy, demonstrating children as young as 4 years old are self-reporting maths anxiety. This is an important finding and may have implications for children’s long term maths achievement.
Objectives: This study aimed to establish the extent to which executive function abilities underpin real-world inattentive behaviours in school-aged children. Specifically, to test the hypothesis that executive function abilities (working memory and sustained attention) contribute to the prediction of parent- and teacher-rated inattentive behaviours (as measured by the Conners-3 Short Form Inattention, Impulsivity/Hyperactivity and Learning Problems/Executive Functioning scales), while controlling for IQ.

Design: A correlational study was used to examine relationships at one-single time point.

Methods: One hundred and four children aged 8-11 years were recruited from a primary school in a suburb of an Irish city. Parents and teachers completed the Conners-3 Parent and Teacher Short Forms, respectively. Children were administered a neuropsychological test battery that included measures of working memory (Digit Span subtest of the WISC-5), sustained attention (Fixed Sustained Attention to Response Task) and IQ (Similarities subtest of the WISC-5). The data were analysed using a series of hierarchical regression analyses.

Results: In total, executive function abilities explained between 18.1 – 28.7% of the variance in inattentive behaviours, as rated by teachers, and between 12.1 – 22.7% of the variance in inattentive behaviours, as rated by parents. In comparison with working memory and IQ, sustained attention was consistently the strongest predictor of both parent- and teacher-rated behaviours.

Conclusions: The assessment of executive function abilities, particularly sustained attention, is important when aiming to understand children’s attentional behaviour in daily home and school life. Limitations include the use of single measures of cognitive abilities and the cross-sectional nature of the data.
Ref: 3504 Empirical Oral Presentation
Topic: Cognitive Abstract
Effects of cognitive anxiety on attention and feature binding in visual working memory

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**Objectives:** Anxiety symptoms are suggested to occupy cognitive resources, diminishing top-down attentional control and increasing automatic capture by external irrelevant stimuli. Meanwhile, binding of sequentially presented visual information in working memory is differentially affected by these attention processes, resulting in fluctuating primacy/recency recall effects. However, impacts of anxiety on binding have yet to be assessed.

**Design:** Study one assessed the extent to which cognitive anxiety symptoms affected participants’ ability to strategically focus attention to facilitate visual working memory binding across 4 positions in sequentially presented memory arrays (via incentives for remembering either the first/last item in the sequence, compared to a control condition). It was expected that reduced volitional control in higher levels of anxiety would be reflected by reduced binding accuracy in positions where the direction of attention was encouraged, but not necessarily overall. Study 2 (data collection ongoing) is intended to assess whether irrelevant visual stimuli disrupt binding to a greater degree in higher symptom levels, and whether this varies by distractor type.

**Methods:** 72 participants completed a computer-based sequential binding task and were divided into three groups via tertiary split of anxiety scores. Data were analysed using a 3x4x3 mixed ANOVA.

**Results:** There were no effects of the prioritisation manipulation or anxiety levels in Study 1. Sequential position data was reflective of previous results in the binding literature (significant primacy and recency effects).

**Conclusions:** A refined paradigm producing reliable strategy effects on performance is required to clarify effects of anxiety on attention and visual working memory.
Objectives: The present paper examined the extent to which human and machine voice processing was impaired by disguise.

Design: Across two studies, human listeners, and machine voice recognition algorithms completed a voice matching task. Voices were presented under either natural disguise (Experiment One) or artificial disguise through temporal reversal (Experiment Two).

Methods: Across both studies, human listeners took part in a sequential same/different task and three machine algorithms completed a voice verification task. In Experiment One, voices were presented speaking normally (baseline), or with purposeful disguise which compromised vocal production through hampering air flow (pinching the nose, muffling the mouth, tape over the lips), tongue movement (speaking whilst eating), jaw movement (pen between teeth), or when whispering. In Experiment Two, voices were presented either normally or temporally reversed - a manipulation which compromised speech intelligibility.

Results: Disguises systematically impaired performance for both humans and machine algorithms. Interestingly, however, whilst whispering had the greatest impact on both humans and machines, the impact of the other disguises differed across humans and machines, with a greater impact on humans when intelligibility was compromised. This result was supported by Experiment Two in which human listeners were substantially impaired by temporal reversal, whilst the machine algorithms were hardly affected at all.

Conclusions: The results suggested that human voice recognition depended on speech intelligibility, and was impaired when intelligibility was compromised. These results thus supported models of human voice processing in which speech comprehension may be prioritised over speaker identification.
Objective: The objective was to determine the effect of background noise and telephone noise on speaker verification by humans and computers.

Methods: In two experiments, human listeners and three computer algorithms completed a voice matching task. Voices were presented to computers with (i) no noise, and (ii) a change created by noise in one sample only. Human listeners additionally heard noise in both samples. In Experiment 1, the noise was either multi-talker babble or white noise, at a signal-to-noise ratio (SNR) of 4 decibels. In Experiment 2, the noise took the form of a band-pass filter to simulate the effect of telephone recording.

Results: The introduction of noise at both study and test impaired human performance. However, a change in noise level between study and test impaired performance more for both humans and computer algorithms irrespective of noise type. For humans, telephone noise was possibly the most subtle noise type, whilst white noise and babble were equally disruptive. However, as might be anticipated, participants felt more confident when listening against white noise than babble given the perceived similarity of the signal against the noise. In contrast, the three computer algorithms were more impaired by multi-talker babble compared to white noise and telephone noise.

Conclusions: These findings demonstrated an impairment in both human and computer voice recognition given sub-optimal listening conditions. As such, these findings informed ongoing consideration of the conditions under which human and computer voice matching may be considered reliable and those in which they are unreliable.
Emotional voice tone congruence robustly facilitates voice line-up accuracy irrespective of voice sex and verbal overshadowing.

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Objectives: Voice target line-up accuracy is better when the emotional tone (angry or neutral) of the line-up voices is congruent with target voice tone, especially when the voices contain high emotion. Here we compared all-male and all-female line-ups (Experiment 1) to test sex differences, and (Experiment 2) the effect of a voice overshadowing task to see how robust the effect of congruence was with overshadowing.

Methods: In both (independent measures) experiments participants listened to a message (concerning a missed meeting) delivered in an angry voice tone. After a 5-minute distractor task delay, the participants were asked to identify the previous heard speaker from a 6-person target-present line-up. The line-ups were either congruent (angry) or incongruent (neutral) with the target voice tone. Experiment 1 compared all-male or all-female line-ups, and used a Sudoku distractor task. Experiment 2 (all-male line-up) used either a Sudoku, or a podcast distractor task. In all cases target voice position in the line-up was randomised. The message content was identical at encoding and test, but the voice line-up used a different recording of the target speaker.

Results: Performance was always better for congruent tone conditions (no difference between male and female line-ups). The overshadowing task was only effective in reducing accuracy where the line-up tone was incongruent.

Conclusions: Congruent emotional tone appears to be a robustly useful feature for identifying voices in these line-ups. Unique emotional characteristics in the vocal signal may enrich the original memory trace allowing better recall when line-up tone is emotionally congruent.
Objectives: The study examined whether 'super-recognition' status generalises from face to voice modes, and whether dissociations found in face memory and matching tests would transfer. It was hypothesised that participants with exceptional face memory ability (superior-face-recognisers) would outperform typical-range ability participants at voice memory tests; and participants with exceptional face matching ability (superior-face-matchers) would outperform typical-range ability participants at voice-matching. Superior-face-identifiers, exceptional at both skills were expected to excel at voice memory and matching.

Design: A between-subjects design was employed, with the three groups above and typical-ability controls based on previous Cambridge Face Memory Test: Enhanced, and Glasgow Face Matching Test scores. Participants (n = 535) completed one voice matching and two voice memory tests.

Methods: All participants completed the Bangor Voice Matching Test (BVMT), Glasgow Voice Memory Test (GVMT) containing voices and bells stimuli, and a bespoke Famous Voice Recognition Test online. Data was analysed via signal detection theory (hit rates, correct rejections, sensitivity (d’) and response bias (C)) using a series of one-way and two-way mixed ANOVAs.

Results: The results supported hypotheses, as domain-specific excellent face processing participants (memory vs. matching) tended to outperform typical-range participants at the voice tests tapping into their domain. An interesting dissociation between voices and bells on the GVMT suggest voice-specific effects.

Conclusions: Performance patterns in this study support suggestions that underlying cross-modal (voices vs. faces) and cross-domain (memory vs. matching) identity-specific mechanisms drive superior human identification processes. Significant effects however were weak and future research requires more discriminatory voice tests.
Do musicians show an advantage for voice recognition?

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University of the West of Scotland

**Objectives:** It is much harder for us to recognise people we know from their voice than their face. There is also a high tendency to make a false identification when presented with a target-absent voice lineup. The aim of the current study was to determine whether musicians would show an advantage for recognising voices and it was hypothesised that they would have a lower rate of false identifications on target-absent lineups than non-musicians.

**Design:** This was a 2 x 2 between design with musician status (musician and non-musician) and lineup type (target-present and target-absent) as the independent variables and accuracy and confidence as the dependent variables.

**Methods:** There were 176 participants divided equally into musicians and non-musicians. The task involved listening to a short audio clip followed by a 6 person voice lineup. After listening to the lineup twice, participants indicated whether the original voice matched one of the six voices in the lineup or whether the person was not in the lineup. They also rated confidence in their decision.

**Results:** The results showed no advantage for musicians on either lineup – both groups were more likely to correctly identify the target in target-present lineups and make a false identification in target-absent lineups. Musicians were more confident when they were correct but this difference was not significant.

**Conclusions:** The results highlight the difficulties experienced when recognising voices and suggest that musicians show no advantage in a voice lineup task.
Emotionally-charged, personally-significant events are remembered better than mundane ones. Our understanding of human memory will only be complete if it accounts for memories that have personal significance. However, at present, we know relatively little about how emotion modulates the cognitive mechanisms that encode, maintain and retrieve memories. This is an important gap in knowledge because emotional memories contribute to maladaptive decision-making and to mental ill-health. To resolve this gap, we propose the Emotional Context Maintenance and Retrieval (eCMR) model, a formal theory of emotionally-enhanced memory. The eCMR model posits specific information-processing mechanisms by which emotion privileges certain memories. In so doing, it reveals the crucial role of the interplay between encoding and retrieval to emotional memory enhancement, and explains key available data, including the emotional list-composition effect, the emotional oddball effect, and the effect of emotion on forgetting rates. eCMR is the first and currently only cognitive-computational account of emotional memory.
Objective: Working memory (WM) is the ability to store and manipulate information in the mind for brief periods of time. Electrophysiological studies demonstrated that contralateral delayed activation (CDA) is a physiological indicator of visual WM capacity, its amplitude increases according to the number of objects maintained in visual WM. Three experiments are presented that investigated the difference between preschool children and adults in CDA pattern and WM capacity.

Design: A 4 (set sizes: 1, 2, 3, and 4 items) by 3 (test item groups: attended side, non-attended side, and neutral) within-subjects design was used in experiment 1. Experiment 2 only set sizes 2 and 4, test item groups was discarded in experiment 3. CDA amplitude (at the P3/P4 and P7/P8 electrodes) and WM capacity (k-score) were the dependent variables in all experiments.

Methods: Ten college students (experiment 1 and experiment 2, respectively) and 10 preschool children (experiment 3) participated in the arrow-colour task (derived from cued change detection paradigm) that subjects have to retain a variable amount of coloured cars containing in a memory array and to compare the representation of the memory array to a test item which colour has or hasn't been altered.

Results: Data collection is in progress.

Conclusions: Grouping the sources of test items may lead to strategic exclusions that affect the measurement of visual WM. The results of these experiments may provide important information for the research method of visual WM of preschool children.
Objectives: The purpose of the current study was to gain a detailed insight into post-error slowing (PES), an indicator of ongoing error-monitoring in the context of executive functioning. We expected reaction times (RTs) adjustments after having committed an error. PES was expected to be positively associated with task performance to address its relevance as a monitoring skill.

Design: A cross-sectional study design was used to examine age-related developmental trajectories in RTs and accuracies.

Methods: Participants (N = 203) of three different age groups (4th-, 6th-, and 8th- school grade) were recruited from primary and secondary schools situated in urban and rural regions. PES was assessed in a computerized spatial two-choice conflict task called Simon task, which allowed to collect data of trial by trial RTs as well as accuracies. To analyse the empirical data, mixed analysis of variance and Pearson-correlations were conducted.

Results: Results revealed substantial PES in all age groups, suggesting that older children as well as young adolescents realized when they had committed an error by showing reliably longer mean RTs after incorrect than after correct trials. Further, its magnitude was positively associated with task performance in all age groups, indicating efficient error-monitoring. Results further indicated a discrimination between mean RTs in pre-error and post-error trials as well as the effect of impulsive errors in all age groups.

Conclusions: The current study highlighted trial-adjustments after committing an error and its efficacy as an implicit strategy of cognitive control. Furthermore, findings are discussed with respect to an improved accuracy-speed trade-off over child development.
Background/Objectives: Adolescents actively use social media, which engage them cognitively, emotionally and behaviourally. However, the underlying psychological mechanisms of engagement have not been adequately addressed. The present study examined adolescents’ psychological processes as these develop in their everyday interactions via social media. The purpose of the study was to identify the key mechanisms underlying their engagement and communication patterns of everyday life online.

Design: The study was qualitative and Grounded Theory was employed to enable a theoretical framework to conceptualise the psychological processes occurring in everyday interactions on social media.

Methods: The sample comprised six focus groups with 42 adolescents aged 12-16 years ($M=13.5$ years, $SD=2.3$) in UK schools. Data were analysed using a Constructivist epistemological approach until theoretical saturation was achieved.

Results: The resulting concepts ‘controlling engagement’, ‘determining relational closeness’ and ‘hunting and hooking’, related to individual, social, and structurally-related processes. Findings highlight an interaction and a synergy between the processes, conceptualized in the ‘control model’ of engagement. The model posits an interplay between the processes, which take on different power positions depending on the relation between the parameters and the level of engagement. The individual and socially-induced processes are reinforced by habituation and induced by processes embedded in the platforms, promoting a compulsive engagement and a negotiation of the individual’s control over use.

Conclusions: The findings highlight a controlling aspect in engagement and recommendations are provided for examining control as a main emotional, cognitive and behavioural mechanism in social media and smartphone use.
Objective: The development of theory of mind has been associated with the development of executive functions (EFs) from early preschool years onwards. From concurrent relationships based on cross-sectional data it is hard to clarify the direction of such relationships. It is unknown how these developments contribute to social outcomes such as conversational competence. To understand the developmental picture, a longitudinal study was conducted.

Design: This study involved two time-point measurements over a one-year period.

Methods/Conclusions: 213 four-year-old children (Mage=4.5, SDage=.55) participated in this study. Measurements taken included EFs: (digit span, stroop, and dimensional change card sorting), FB: false-belief, and receptive language at time1 and time 2. Communicative competence was measured by the teachers’ rating at time 2.

Results: The relationships between EFs, FB and communicative competence with language and age as controlling variables were analysed. The model (CFI=.96, RSMEA=.077) indicated that the latent EFstime1 had significant effect on both EFstime2 (b=.60) and FBtime1 (b=.20). FBtime1 also had an independent effect on EFstime2 (b=.21). EFstime2 had significant effects on both FBtime2 (b=.74) and communicative competence (b=.77).

Conclusion: Children’s communicative competence was explained by both EFs and FB. However, this longitudinal study suggests a more complex picture in that early FB performance influenced the subsequent development of EFs and EFs further predicted communicative competence. Although a previous study indicated a concurrent relationship between communicative competence and FB, the present study revealed that EFs are key in the development of children’s social conversational competence.
Ref: 3411 Empirical Poster Presentation
Topic: Developmental Abstract
Some type of linear representations and counting array in young children.

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Objectives: I investigate the relationship between certain kinds of linear representation and counting array.

Design: Numerical representations often use number-to-position (NP) tasks, which involve estimating a number on a number line. Bouwmeester and Verkoeijen (2012) suggest that children show various kinds of estimation patterns. Uragami and Sugimura (2015) found that the low slope and the slope divided linear representation by using the SSD (Sum of Squared Difference) approach. In addition, they found that many children chose a counting strategy that counts the presented number from 0 with the index finger on the number line.

Methods: Twenty-one middle preschoolers (mean age = 4 years and 8 months) and forty-one older preschoolers (mean age = 5 years and 9 months) received a NP task (0–10) and a counting task which involved counting the number of blocks from 1 to 10 while aligning the blocks on a board.

Results: First, I analyzed data using SSD and categorized the types of representations. Six children were categorized as performing linear representations with near 1 (lin=1), eight children were categorized as performing linear representations with the low slope (lin<1), twenty-seven children were categorized as performing two separate linear representations (lin/2).
Second, I classified the counting pattern and counted the kinds of strategy. Half of lin=1 chose more than three different array pattern but lin<1 and lin/2 only about 30% chose three different array.

Conclusions: Lin=1 can use some kinds of array for counting and operate their numerical representation forms.
Objectives: Activities running in community-based-settings offer a method of delivering multimodal interventions to older adults beyond cognitive training programmes. This systematic review and meta-analysis investigated the impact of randomised controlled trials (RCTs) of ‘real-world’ interventions on the cognitive abilities of healthy older adults.

Methods: Forty-four RCTs were eligible for inclusion with 2,730 intervention participants and 2,259 controls. Interventions consisted of participation in activities that were physical (n = 21), cognitive (n = 9) or mixed (physical and cognitive; n = 11). Three studies used other interventions that compared physical against cognitive activities, for example.

Results/Conclusions: Meta-analysis revealed that Trail Making Test (TMT) A, Digit Symbol Substitution and Verbal Fluency were the only outcomes that improved when comparing specific types of interventions against the different types of control groups (which were either active, wait-list, or passive controls). When comparing physical activity interventions against all control groups, TMT A was the only outcome that significantly improved. Results remained non-significant for all outcomes when comparing cognitive activity interventions against all control groups. Results suggest that healthy older adults are more likely to see cognitive improvements when involved in physical activity interventions. In addition, TMT A was the only measure that consistently showed significant improvements following physical activity interventions. Visuospatial abilities (as measured by TMT A) may be more susceptible to improvement following physical activity participation, and TMT A may be a useful tool for detecting differences in that domain.
Objectives: In two studies, we examined whether 4-year-olds and 6-year-olds can view pictures as both literal and non-literal when they are presented with different contextual cues, which would indicate representational flexibility.

Design: Although previous research revealed children acknowledge that a picture can represent more than one entity, children’s flexible interpretations of literal and non-literal pictures (e.g., a crown picture can also mean ‘queen’) deserves further consideration. Furthermore, we examined the effects of using tasks where children could provide either a verbal or behavioural response.

Methods: In study one, 40 4-year-olds and 40 6-year-olds were asked to name iconic pictures after hearing stories where they were used either in literal or in non-literal contexts. In study two, 20 4-year-olds and 20 6-year-olds were presented with a game in which children were asked to select a suitable picture to represent a non-literal referent.

Results: In study one, 6-year-old provided 81% of non-literal responses when pictures were described non-literally and 17% when pictures were described literally; this differed from 4-year-olds’ performance (24% and 63%; chi-square, \( p < .001 \)). In study two, both age groups selected the correct picture above chance (4 year-olds: 75%; \( t(19) = 10.8, p < .001, d = 2.41 \); 6-year-olds: 82%; \( t(19) = 12.78, p < .001, d = 2.86 \)).

Conclusions: Six-year-olds were successful at both versions of the task while 4-year-olds only were so at the game version, suggesting the conditions under which representational flexibility is elicited influence the developmental progression observed.
Ref: 3164 Empirical Oral Presentation
Topic: Developmental Abstract
Exposure to Healthy Food Advertising and Children’s Healthy Food Intake

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Objectives: Almost all food advertising aimed at children is for unhealthy foods. Advertisements for healthy foods are rare, and the effects of such advertisements have not been investigated with very young children. The present study was designed to find out if healthy food advertisements would beneficially affect young children’s food intake.

Design: At Time 1 children viewed a 7 minute children’s television programme and then, individually, selected foods from a buffet. At Time 2 half the children saw a similar programme with an advertisement for healthy eating (repeated three times). The other half of the children saw the programme with a non-food advertisement repeated three times. Then the children chose from the buffet. We predicted that, at Time 2, children who saw the healthy food advertisement would consume more healthy food.

Methods: The programme and advertisements were screened to 150 preschool children. Children then picked foods (pieces of apple, orange, pepper, cucumber, cherry tomato, wholegrain toast) from a buffet.

Results: At Time 2, children who saw the healthy food advertisement consumed more healthy food than children who saw the non-food advertisement. This supported the prediction. In addition, the children who saw the healthy food advertisement at Time 2 consumed more healthy food at Time 2 than Time 1. The children who saw the non-food advertisement at Time 2 did not consume more healthy food at Time 2 than Time 1.

Conclusion: Healthy food advertising can have a positive effect on pre-schoolers’ healthy food choices. This has implications for early interventions to improve young children’s diet.
Objectives: We investigated word-picture-referent learning in children with autism spectrum condition (ASC): the aim was to determine if providing a three-dimensional context to images facilitated symbolic understanding and whether engagement (visual attention and communication) was associated with learning.

Design and Methods: Children with ASC (N=48) and a sample of typically developing (TD) children matched for receptive language ability (N=48) completed a word learning task on an iPad. They viewed coloured pictures of a novel object in two trials under one of three conditions: static 2D image; automatic rotation and manual rotation. The rotating images (automatic and manual) provided increased iconicity through three-dimensional context. In each condition, the target image was named with a novel word by the experimenter.

Results: A high level of symbolic understanding was found in this study, with no significant difference in learning across groups and conditions. In terms of engagement, both groups in the manual rotation condition had greater on-screen looking time compared to the 2D and automatic conditions (p < .001). However, greater visual attention was a significant predictor of symbol learning for children with ASC only (p = .01).

Conclusions: The high level of performance for the children with ASC across conditions suggests that increasing iconicity to a ‘transparent’ (Fuller, 1997) level through two-dimensional colour photographs may be sufficient to elicit the maximum benefit to their symbolic learning. Interactive iPad tasks may increase visual attention in both typical and atypical populations and greater visual attention may benefit learning, but only for children with ASC.
Mentalizing and Local Bias in the Broader Autism Phenotype and Fragile X Premutation females

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Objectives: Fragile-X Syndrome (FXS) is the most common known genetic cause of autism. Relatives of autistic individuals exhibit subtle autistic traits and similar cognitive differences to autistic individuals. Mothers of children with FXS carry the FX premutation (FXP) themselves and show subtle autistic traits. Here, we investigate whether mothers with the FXP share a similar cognitive profile to mothers of autistic children.

Design: This is a between-group design involving mothers of autistic children (M-ASD), mothers of children with FXS (M-FXP) and mothers of neurotypical children (M-NT).

Methods: Participants took part in a multi-trial implicit mentalizing eye-tracking task, a traditional explicit mentalizing task, and a local processing task. They also completed questionnaires concerning their autistic traits.

Results: M-ASD displayed a weaker tendency than M-NT to look at the belief-congruent area-of-interest (AOI) on the implicit mentalizing task, whilst showing no impairment on the explicit task; M-FXP showed a similar pattern of results. The groups did not differ on the other measures.

Conclusions: M-ASD and M-FXP show a similar implicit mentalizing impairment; these individuals may be experts at camouflaging their autistic cognitive profile. The FXP provides a model for autistic traits with a known genetic aetiology that is useful in disentangling genetic and environmental contributions to the cognitive profile of the female Broader Autism Phenotype. Having a better understanding of FXP therefore provides the potential to improve the support available to these groups of women.
Objectives: It is no revelation to discover that realism artists excel in various cognitive skills such as detection of embedded figures and geometrical reasoning. To expand current literature, the present study investigated whether visual short-term memory is another cognitive skill important for realism artists.

Design: To investigate the importance of visual short-term memory, a delayed to matching sample task (DMS) from CANTAB was facilitated to assess visual short-term memory ability along with a drawing realism task.

Methods: Thirty-one students from the University of Lincoln with a wide range of drawing realism abilities took part in this study which took approximately an hour to complete.

Results: It was found that realism artists had significant higher accuracy scores on the DMS task in comparison to novices, especially as performance values were more pronounced in the novice group between simultaneous and delay trials (novices = 14.82%, SE = 1.93%; realism artists = 7.95%, SE = 2.27%). In addition, there was a negative correlation between realism scores and reaction times ($r = -.41, n = 31, p = .024$).

Conclusions: The results indicate that visual short-term memory is an important cognitive skill for realism artists. Realism artists also had faster reaction times in the DMS task indicating that they may encode visual information more efficiently, future research could further investigate the visual encoding process for realism artists.
The role of variability in linguistic generalization: Evidence from a computerized language training game with 7-year-olds

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Objectives: Language learning involves generalizing linguistic constructions to unattested vocabulary. According to discriminative learning (Ramscar et al 2010), this depends on the linguistic input: Generalization is more likely following exposure to more varied instances, since this allows structures to be disassociated from trained instances. We test this hypothesis in a language learning experiment with children.

Design: Children are exposed to two novel constructions in an unfamiliar language (Japanese). Input-variability was manipulated between-participants: half received high-variability-training (each exposure utterance is unique), half low-variability-training (small number of repeated examples; overall frequency-matched). Training was followed by a generalization test.

Methods: Participants: 86 7-8-year-olds from UK schools. Materials: Training uses a computerized game where participants (i) hear sentences in Japanese (instructions such as: “move banana above chocolate”), (ii) move pictures within a grid, (iii) receive feedback (was the “move” was correct?). Variability of the instruction-sentences (the exposure-set) is manipulated. Generalization-Test uses the same game with novel vocabulary (without feedback). Data: Performance in training and at test is scored as to whether the participant’s “move” showed understanding of the novel sentence constructions. Analyses: logistic mixed effect models.

Results: Training-data: low-variability group show stronger performance (LV: 72%; HV 47% (chance 25%); beta=0.93, SE= 0.09, p<.001). Generalization-Test: high-variability group show stronger performance (HV:40%; LV:50%; beta=0.45, SE= 0.14, p<.005).

Conclusions: Although low-variability exposure results in stronger performance during training (presumably due to repeated practice with identical items) generalization is greater following high-variability exposure. This supports the hypothesis that exemplar variability is key in linguistic generalization.
Objective: How do we characterise complex patterns of multilingualism in infancy?

Background: Singapore has 4 official languages: English (the main language of education) along with Mandarin Chinese, Malay and Tamil (known as ‘Mother Tongues’). More than 90% of Singaporean youths are multilingual (2010 Census), but most multilingual research does not investigate differences in subtypes of multilingualism.

Methods: In a longitudinal study, caregivers estimated the proportion of time infants heard each of their languages at 6m (N=444) and 18m (N=365), and completed a vocabulary inventory at 24m (N=345). To establish a model of multilingual exposure in Singapore, we computed language input matrixes and ran K-means clustering. Cluster membership over time was tracked, and we tested which of cluster membership or exposure rates would be a better predictor of vocabulary size for a language.

Results: At both time-points, language inputs were best characterised as 4 clusters: English-Dominant, Mother Tongue-Dominant, Balanced-Bilingual, and Other. Each cluster-centroid established mean exposure rates. 40% of the children changed clusters over time, in line with common attitudes about language utility for educational and economic outcomes. Both clusters and precise input rate were significant predictors of vocabulary size (p<.0005), but cluster membership predicted more variance (R²=.11).

Conclusions: Exposure rates for a given language predict vocabulary size in that language. However, individual differences in early vocabulary sizes are large, meaning that the coarse-grained estimation of exposure via clusters has somewhat more predictive power. We propose using data-driven clusters to identify subtypes of multilingualism in communities where multilingualism is the norm.
The Trajectory of New L2 Written Word Learning

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**Objectives:** The aim was to examine the potential role of RIF in the early stages second language early word learning.

**Design:** The Welsh Government (2017) set a target of 1 million Welsh speakers by 2050. This also involves supporting adult non-Welsh speakers in developing Welsh language skills. Research has proposed RIF as a mechanism which may influence language selection and production in established bilinguals (Levy, McVeigh, Marful & Anderson, 2007; Runnqvist & Costa, 2011). Little is known about the role RIF may play during the early stages of learning a new language.

**Methods/Conclusions:** In a between-subjects experimental design 30 participants, with no prior knowledge of Welsh, were randomly assigned to either the Welsh or English group. Both groups performed a study phase and retrieval practice phase – in English or Welsh – across 3 training sessions. Recall for both groups was in English.

**Results/Conclusions:** A RIF-like effect was observed in the English group across the three sessions. In the Welsh group, the pattern of responses shifted. By the third session, practicing new L2 items lead to facilitated recall of unpracticed L1 items from the same categories.

**Conclusions:** The results suggested that for L2 learners, L2 items activate the related concepts in lexical memory, and this activation spreads to associated items during L1 retrieval, with this effect becoming more pronounced across the training sessions. Further research will explore potential reasons for this contrasting findings.
Objectives: In autism, implicit mentalizing impairment is a promising explanation of the social communication and interaction difficulties. Although some autistic individuals do acquire the capacity to explicitly mentalize, they still struggle to implicitly attribute those states. Autism is highly heritable, and the Broader Autism Phenotype (BAP) is often found in the relatives of autistic individuals. Considering the BAP from a camouflaging perspective may allow for better insight into missed or late diagnosis, especially in females. Members of the BAP may therefore be camouflaging experts who still experience difficulties due to their autistic characteristics, but can appear neurotypical in more explicit tasks.

Design: This is the first study to compare differences in anticipatory saccades during matched implicit and explicit mentalizing tasks, using a multi-trial paradigm with matched true and false belief conditions.

Methods: Autistic traits, camouflaging, implicit and explicit mentalizing are measured in two separate samples. One consists of 60 neurotypical adults; the other of 25 mothers of autistic children, who have elevated autistic traits but do not meet diagnostic criteria, and 25 mothers of neurotypical children.

Results: Our pilot data shows that the BAP is characterised by poor implicit but good explicit mentalizing task performance. Those with higher camouflaging levels report more autistic traits and are expected to show a larger discrepancy between implicit and explicit mentalizing performance.

Conclusions: The impairment in implicit mentalizing plays a central role in autism and autistic traits. The discrepancy between implicit and explicit mentalizing is likely to indicate camouflaging. Camouflaging experts may circumvent diagnosis.
Objectives: Recent decades have witnessed a growth of interest in emerging executive function (EF) as a mediator of family influences on young children’s academic ability (e.g., Devine & Hughes, 2016). To date, however, research in this field has largely focused on Western preschoolers. The primary aim of this cross-cultural study was therefore to extend the cultural and developmental scope of existing work by investigating whether EF might mediate the associations between three distinct aspects of parenting (i.e., autonomy support, provision of structure, and inconsistent parenting) and both British and Chinese children’s academic outcomes in late childhood.

Design and Methods: 487 children (Mage = 11.87 years; 245 boys) in the United Kingdom and 321 children (Mage = 11.91 years; 160 boys) in China, split equally across school years 5, 6, and 7, completed a questionnaire booklet, a battery of tasks designed to measure academic ability, and four computerised EF tasks (providing measures of inhibition, shifting, working memory and planning).

Results: Our analyses revealed that British children’s EF mediated the relation between autonomy-supportive parenting and their academic ability, while in the Chinese group, children’s EF mediated the relation between parental provision of structure and their academic ability.

Conclusions: Supporting a multi-faceted model of parenting (e.g., Hughes & Devine, 2017), our findings indicated that distinct aspects of parenting showed unique patterns of contribution to academic ability in late childhood. In both cultural groups, parenting influences children’s academic outcomes by shaping children’s developing EF skills, which sets the stage for potential interventions.
Do children’s expressions change according to the interpretation of their drawings by others?

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**Objectives & Design:** Previous studies have revealed that children pay attention to the contents of their drawings. If children paid attention to the content of the drawing, they would change their drawings when they were informed of another’s interpretation of the drawing. By providing children with others’ interpretations of their drawings, we investigated whether children’s expression changed.

**Methods:** Sixty-five children (3- to 5-year-olds) participated in this study, where there were two conditions to a drawing task. In the miscommunication condition, children were first asked to draw a figure (e.g. a red circle) as an object (e.g. a red apple) by experimenter A (the first drawing). Then, experimenter B attributed a different name (e.g. a red light) to the children’s drawings. Finally, children were asked to draw the red apple again by experimenter A (the second drawing). In the acceptance condition, the first and third steps were the same, but instead of attributing a different name to the drawing, experimenter B accepted the children’s naming. Children’s first and second drawings were then compared.

**Results:** More improvement was made in the miscommunication condition than in the acceptance condition ($t (64)=4.64, p<.00$). There was a tendency that 3-year-olds made significantly fewer improvements in their drawings than 4- and 5-year-olds ($\chi^2 (2)= 5.24, p<0.06$).

**Conclusion:** Results indicated that children over 4 years voluntarily improved their expression by noticing another’s interpretation of their drawings. It was suggested that there were various levels of communication that lead children to change their expression.
Objectives: Cognitive control can take several different forms. Popular constructs often implicated in the literature include ‘shifting’ and ‘inhibition’. Shifting can refer to the ability to shift attention between different objects or spaces, or it can also refer to the ability to switch between different mental sets (e.g., task-set switching). Inhibition refers to a deliberate suppression of prepotent cognitive processes or responses. Although these two constructs have been shown to be separable to some extent, they also share commonalities. For example, one of the major theories of task switching postulates that the cost of switching tasks involves a continued suppression of a previously competing task-set. The involvement of inhibition in task switching has been supported by the finding, known as backward inhibition, which shows prolonged responses when the current task is the same as the one from which the actor has shifted on the preceding trial. An explanation is that a previous task-set is inhibited to shift to another task, which delays shifting back to the inhibited task on the current trial. Also, the benefit of repeating the same task disappears when a response is inhibited on a previous trial, which is shown by using a go/nogo paradigm. This is often taken as evidence for a close relationship between shifting and inhibition. The present symposium explores further issues in these two paradigms of task switching in which inhibition has been implicated as a key construct to explain the major findings.
Objectives: The study examined how pairs of actors share a task and what cognitive processes and representations are involved in task sharing. It addressed the question of whether co-acting individuals share a mental representation of the shared task (co-representation).

Design: In a series of go/nogo experiments, pairs of participants performed two types of tasks that were intermixed randomly, either with their partner (joint task) or by themselves (individual task). Response times (RT) and accuracy were measured.

Methods: Participants were undergraduate students at a UK university. The number of participants per experiment ranged between 50 and 100. The method was a popular cued task switching procedure with an additional go/nogo decision, which was indicated by an additional cue.

Results: There was significant slowing of responding when the task on the current trial differed from the one on the preceding trial (i.e., task switching cost) only when the preceding trial involved actual responding (go trial) but not when it required refraining response (nogo trial). When performing in a pair, there was no switching cost when the preceding trial was performed by another actor either, indicating that participants differentiated between their own task context and their partners’. However, switching cost was reinstated after the partner’s trial when the two actors shared the same “action effects.”

Conclusions: Co-acting individuals do not always share the task context (no co-representation) when they perform the tasks together and had a common ‘task’ goal. However, they can share the task context when they had a common ‘action’ goal.
Objective: We set out to determine whether a subsequent switch cost is first established and then abolished on prepared nogo trials.

Design: RTs from short-preparation “go” trials (cue, followed by target with high tone and response) were converted to switch costs ([mean RT task-switch] – [mean RT task-repeat]), following both long-preparation “cue-only” trials and long-preparation “nogo” trials (cue, followed by target with low tone and 2000 ms delay).

Methods: Data from 40 participants were analysed. Tasks were colour- and shape-judgements. Verbal cues (two per task) were presented on all trials, with a long (300 ms) and short (1000 ms) preparation interval occurring before either the target/tone stimuli (on go and nogo trials) or the next trial’s cue (on cue-only trials). Of the long-preparation trials, 15% were cue-only trials, and 15% were nogo trials.

Results: As predicted, switch costs were present following cue-only trials (mean 71 ms), $t(39) = 4.51, p < .001; BF_{10} = 811$, and smaller following nogo than following cue-only trials (mean difference 86 ms), $t(39) = 3.46, p < .001; BF_{10} = 48$. However, our prediction that switch costs following nogo trials would be completely abolished (less than 10 ms) was not supported statistically (mean -16 ms), $t(39) = 1.52, p = .068; BF_{10} = 0.91$. (N.B., all tests were one-tailed.)

Conclusions: On prepared nogo trials, the conditions for a subsequent switch cost are initially set up by processing of the task-cue and then substantially overcome (but not necessarily completely abolished) during the remainder of the trial.
Ref: 3338 Part of Symposia
Topic: Cognitive Abstract
(3) The effect of episodic retrieval on inhibition in task switching: A diffusion model analysis

Jim Grange, Agnieszka Kowalczyk
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Objectives: Inhibition in task-switching is inferred from n–2 repetition costs: slower and less accurate responses for ABA sequences compared to CBA sequences, thought to reflect the persisting inhibition of task A across an ABA sequence. Recent work fitting the diffusion model showed the n–2 repetition cost is reflected by a reduced drift rate, suggesting inhibition impairs information processing during response selection. However, work from our lab has shown that much of the n–2 repetition cost is caused by interference during automatic episodic retrieval, not inhibition. The current work applies diffusion modelling to data from a paradigm that controls for episodic interference to establish the veracity of previous findings.

Design: An experimental task-switching paradigm was used controlling for interference effects during episodic retrieval.

Methods: Across 4 experiments, 191 participants were recruited from Keele University. The experimental paradigm allowed quantification of n–2 repetition costs under conditions of episodic interference and without episodic interference. All data were analysed using Bayesian multilevel regression.

Results: The behavioural results showed n–2 repetition costs only under conditions of episodic interference, being absent when this interference is controlled. The diffusion modelling showed reduced drift rate for n–2 repetitions, but only under conditions of episodic interference; no effect was found when episodic interference was absent.

Conclusions: Our work suggests that the reduced drift rate for n–2 repetitions is caused by episodic interference, not inhibition. The work provides converging evidence questioning whether task switching requires an active inhibitory mechanism.
(4) The effect of response sharing on the n – 2 repetition cost

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Objectives: Previous research has suggested that the n – 2 repetition cost (considered to be caused at least in part by backward inhibition) is produced by response related processes, such as response selection. Specifically, it has been suggested that response sharing between tasks influences the n – 2 repetition cost. This current research aimed to determine what effect response sharing has on the n – 2 repetition cost and whether response sharing is necessary for an n – 2 repetition cost to be present.

Design: Colour, shape and line orientation judgement tasks were used in a task-switching paradigm (repetitions of task were not allowed), where responses were either shared between the tasks or separate.

Methods: Experiment 1 involved a between subject manipulation of response sharing, n = 33 and 37. Experiment 2 contained no response sharing, n = 36.

Results: The n – 2 repetition cost was reduced, not increased, by response sharing (25ms vs 66ms, p < .001). Furthermore, the n – 2 repetition cost was present when there was no response conflict (mean = 11ms, p = .014).

Conclusions: The current studies found that response sharing did not increase the size of the n – 2 repetition cost and was not necessary for the n – 2 repetition cost to be present. Combined, this suggests that response sharing is not the sole source of the n – 2 repetition cost.
Ref: 3361 Empirical Oral Presentation

Topic: Cognitive & Developmental Abstract

How Does Cognitive Flexibility Emerge in Early Childhood? Insights from a New Fine-Grained Switching Task

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Objectives: Cognitive flexibility (CF) is the ability to adjust behaviour in response to changes in our goals. CF is usually assessed by rule-switching tasks with only two response options, allowing children to make only one type of sorting error. Children can either make perseverative errors where they continued to sort by the previous rule, or they can make distraction errors where they forget both the old and the new rules. CF is typically thought to emerge at age 3 and to involve only overcoming perseverative errors. In the current study, we aimed to better characterize the emergence of CF through a novel task with multiple response options, allowing children to respond in a variety of ways: they could switch rules successfully, make perseverative errors or make distraction errors.

Methods: Two- to four-year-olds (N = 183) completed the CF task, where they decided which of four colourful shapes matched a prompt image on the relevant rule (colour or shape). Children sorted by one rule for 12 trials, then by a new rule for 10 trials.

Results: All children sorted successfully by the initial rule, but when the rule changed, there were significant differences. Two-year-olds randomly selected all response options (made distraction errors). Three-year-olds either continued to sort by the previous rule (made perseverative errors), or alternated between the old and the new rules. Four-year-olds switched the rules successfully.

Conclusions: The results suggest that CF emerges a year earlier than previously thought, and it involves overcoming both the distraction and the perseverative errors.
Ref: 3469 Empirical Oral Presentation
Topic: Cognitive & Developmental Abstract
Economic Hardship and Early Childhood Academic Achievement: The Role of Parenting, Cognitive Function and Delay of Gratification

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Objectives: This paper aimed to examine how economic hardship influences children’s cognitive function and academic performance through parental emotional and cognitive ability, parenting practices and Delay of Gratification (DoG).

Design: A two-wave national study “Singapore Early Childhood Development Longitudinal Study (SGLEADS)” was designed to investigate the factors shaping child development in Singapore, by interviewing 5000 children below 7 years old and their primary caregivers.

Methods: A subset of the nationally representative sample, 759 children (n = 2700 by September 2019) aged 3-6 years completed a DoG task, Working Memory (WM) Tasks, and Woodcock-Johnson Tests of Achievement on Reading and Math. Parental cognitive ability was assessed by a passage comprehension test. Economic hardship, psychological distress, harsh punishment, parents’ rules and cognitive stimulation were self-reported. Structural Equation Modelling was used to test the proposed model.

Results: Economic hardship negatively affected children’s academic performance through primary caregiver’s increased psychological distress and decreased cognitive ability. Increased harsh punishment and fewer enforced rules reduced children’s ability to delay gratification, through which further lowered children’s WM and Math scores. Moreover, worse WM predicted worse performance in Reading and Math. In the cognitive path, cognitive stimulation provided by parents partially mediated the positive influence of parental cognitive ability on children’s WM, which further improves children’s Math and Reading.

Conclusions: Economic hardship affects children’s academic performance and cognitive functions through parental stress and cognitive stimulations. They were also associated with children’s delay of gratification, which can be enhanced by enforced rules set by parents and reduced harsh punishment.
Objectives: Shared reading has a valuable role in children’s social and language development. There is evidence that interactional synchrony, the meshing of conversational turns and of physical movements, accompanies more positive interactions. Some evidence suggests that children with autism experience lower levels of synchrony than neurotypical children in interactions. There is mixed evidence as to whether genre (fact vs. fiction) and medium (paper or digital book) affects learning from shared reading interactions.

Design: This exploratory study investigated whether shared reading interactions between parents and their autistic child showed evidence of synchrony, and whether synchrony and children’s text comprehension differed according to text genre (fact, fiction) and reading medium (paper, digital).

Methods: 7 boys and 1 girl, all with an autism spectrum condition (ages 6-14 years) were videotaped at home reading 2 age-appropriate books (1 fact, 1 fiction) with a parent. Half of each book was read on paper, and the other half on a tablet. Order and allocation of medium by book was varied. After reading each book part, children answered comprehension questions. Videos were rated for interactional synchrony using an adapted version of Ausherman’s (2014) coding.

Results: Pairs showed no differences in synchrony by text genre for paper, but greater synchrony using digital than paper for the fiction book. Children’s comprehension of fact and fiction did not differ for paper books, but was significantly higher for fiction than fact in the digital condition only.

Conclusions: We consider the possible influence of interactional synchrony in relation to text genre, medium and children’s listening preferences.