Developmental Section
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Abstracts

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KEYNOTE
Developmental effects of ‘mind-blindness’ in Autism Spectrum Disorder
Professor Francesa Happe, Institute of Psychiatry, Kinds College

Many of the social and communication difficulties that define autism spectrum disorder (ASD) can be well understood as reflecting impairment in theory of mind or 'mentalising'. For example, delays or deficits in attributing mental states would make it hard to comprehend deception, keep secrets, track others' pretend play, and interpret irony. There have been numerous studies assessing the ability of people with ASD, and other conditions, to attribute mental states to others. While debates continue concerning the primacy, universality and specificity of 'mindblindness' in ASD, the theory of mind account has been useful in both practice and research. The notion of mind-blindness has helped teachers and parents understand otherwise puzzling behaviour, suggested new interventions and educational approaches, and made possible functional neuroimaging investigations of the brain basis of typical and atypical mentalising.

However, beyond these 'on-line' effects, the downstream consequences of deficits or delays in mentalising have attracted less attention. This talk presents on-going and past research on the developmental effects of mind-blindness in ASD, including impact on measured intelligence, language, and self-awareness. Mentalising can be seen as a gatekeeper, opening the way to skills and knowledge acquired through social osmosis. Importantly, gatekeepers also keep things out; I will suggest that mentalising is obligatory in neurotypical (non-autistic) people, and that mind-blindness in ASD may also carry some benefits.

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INVITED SYMPOSIUM
Intergroup Attitudes: prosocial helping, Social Eclusion and Group Dynamics
Melanie Killen, University of Maryland

The origin of intergroup attitudes is a pressing topic in today’s global society. Intergroup tensions emerge in childhood and continue throughout life, contributing to large-scale cultural conflict. Understanding where and how intergroup attitudes begin is essential. To facilitate change, interventions have to be implemented early in development, prior to adulthood, when prejudicial attitudes and stereotyping are deeply entrenched. The field of developmental intergroup attitudes has expanded greatly over the past 15 years, due in large part to integrative approaches that draw on developmental, social, and comparative psychology. Developmental psychology, addressing the origins of prejudice, how it emerges, changes, and evolves from infancy to adulthood, has drawn on social psychology regarding the formation of social and group identity as well as implicit biases. Further comparative psychology provides theories about the origins of intergroup cooperation and conflict. In this panel, four speakers from different perspectives will discuss their research on the origins of intergroup attitudes, with a focus on intergroup helping and intergroup exclusion, followed by a discussant. New avenues of research have been designed to focus on both the positive factors that reduce bias (prosocial and
moral orientations) and those that contribute to it (implicit bias, conventional reasoning, ingroup preference).

First, Yarrow Dunham will discuss his research on intergroup social cognition with a focus on how group membership affects children’s preferences for and beliefs about others. He will review research which has examined automatic and implicit attitudes in the context of group belonging, and specifically in a cross-cultural context. His research reveals that young children are sensitive to perceptions of social status.

Second, Harriet Over, will describe two experiments on young children’s commitment to the group. She examines this issue by determining when children experience collective guilt and loyalty to the ingroup. She theorizes that this commitment to the group facilitates successful group cooperation. Third, Melanie Killen will discuss her research on intergroup social exclusion and inclusion, reporting on studies which have examined how group loyalty changes as a function of the types of group norms held by a group, as well as form of group membership. Further, she and her colleagues have revealed the contexts in which children use conventional reasoning to justify social exclusion and moral reasoning to reject exclusion based on group membership.

Fourth, Maykel Verkuyten and his colleagues discuss their research on intergroup helping intentions. The experiments they will report were designed to vary whether children’s intentions to help national in-group or out-group peers differ in public or private contexts. They found that children’s empathic tendencies were related to their intentions to help in these two contexts. Further they examined intergroup helping in low and high need situations, and found that when the need was relatively high empathy did outweigh children’s reputational considerations. This research provides a new angle on how empathy is related to intergroup attitudes.

Finally, Adam Rutland, who has studied intergroup attitudes in childhood from both social and developmental psychological viewpoints, will serve as the discussant and highlight the central themes of the symposium.

**PAPER 1**

**Automatic and implicit attitudes regarding group belonging and social status**

_Yarrow Dunham, Yale University_

Automatic or “implicit” evaluations of social groups can support both inclusion and exclusion by affecting how potential interaction partners are perceived. How do such evaluations emerge, and when do they reliably affect behavior? I first discuss results from several cross-cultural investigations of implicit group attitudes in children between ages 3 and 15 years. These studies demonstrate that even quite young children are sensitive to perceptions of group belonging and social status. I then consider when those evaluations do (and do not) affect children’s behavior towards others. Results suggest that the path from evaluation to behavior is determined by both the group evaluation and the salience of the groups in the immediate context, raising several possible avenues to positive intervention.

**PAPER 2**

**Intergroup attitudes and Children’s commitment to groups**

_Harriet Over, University of York_

This talk describes two studies investigating young children’s commitment to the group. One experiment investigated whether children experience collective guilt. Five-year-olds \(N=65\) watched an ingroup or an outgroup member break a neutral individual’s toy. When this toy was broken by an ingroup member, children were
more likely to say that their own group should apologise and that they themselves should repair it. Another experiment investigated whether 5-year-olds (N=48) are loyal to their groups. Children were bribed to reveal a secret told to them by their own group or another group. Children were less vulnerable to bribery when it was their own group’s secret. This commitment to the group enables children to become reliable collaborators and so facilitates successful group cooperation.

PAPER 3
Social exclusion, group dynamics, and children’s intergroup attitudes
Melanie Killen, University of Maryland
Children often exclude others due to an ingroup preference. Yet what defines the ingroup? Is it about group membership (gender, race, nationality), or group norms, and do children reject ingroup members? Study 1 (N = 381) surveyed 9 and 13 year olds and found that children disliked ingroup members who advocated for inequality, preferring outgroup members who supported moral norms. In Study 2, (N = 729), however, 9 = 16 year olds liked ingroup members who challenged group norms about conventions such as dress codes. In Study 3 (N = 199) when a group had an exclusive norm, children expected their own group to be inclusive and the outgroup to be exclusive. Investigating group norms reveals early sources of prejudice.

PAPER 4
Children’s intergroup helping: The role of empathy and prosocial reputation
Maykel Verkuyten, et al., Utrecht University
Two studies were conducted on children’s (8 to 13 years) intergroup helping intentions. In Study 1, children indicated their intention to help national in-group or out-group peers in high need in either a public or private context. Children’s empathic tendencies predicted their intention to help and neither the public-private context nor group membership had any effects. Study 2 examined intergroup helping in low and high need situations. In line with the competitive altruism model, in the low need situation and when helping was public, children intended to help out-group peers more than in-group peers, particularly when they perceived a prosocial classroom norm about the out-group. When the need was relatively high empathy did outweigh children’s reputational considerations.

DISSCUSSANT
Adam Rutland, Goldsmiths, University of London

103 (1455)
SYMPOSIUM
Beyond the body: how developing body representations shape perception, action and social cognition
Dorothy Cowie, Durham University
Body representations are fundamental to interactions between the self, the other and the environment. Research in this symposium therefore moves beyond simply studying how body location is learned, and seeks to understand how body representations become mapped spatially onto other senses (talk 1), contribute to the development of perspective taking and navigation (talks 2+3) and which neural systems are involved (talk 4). Infancy and childhood researchers are brought together to discuss exciting new directions in own-body representation research.
PAPER 1

Getting in touch with the world of sound: Localising touches in the auditory environment at 6 months of age

Andrew Bremner, Goldsmiths; Reeva Misra & Charles Spence University of Oxford; Cristy Ho, University of Hong Kong; Rhiannon Thomas, Goldsmiths, of London

I will describe research investigating the infants’ ability to localize touches in the external environment, reporting an experiment investigating young infants’ perception of the spatial correspondence between tactile and auditory stimuli. Fourteen 6-month-olds were presented with trials in which vibrotactile and auditory stimuli on the hands were presented either co-located on the same hand or on incongruent hands. Infants preferred to look at their hands on incongruent trials. A control condition ruled out an explanation in terms of the greater spatial extent of the bimodal stimuli on incongruent trials. Thus, at 6 months of age infants are able to perceive spatial correspondences between touch and the auditory environment; this bears implications for multisensory perception of the space behind the body.

PAPER 2

Visual influence on path reproduction in darkness is stronger during childhood

Karin Petrini, Bath University; Andrea Caradonna, & Celia Foster, University College London; Marko Nardini, Durham University

Objectives: To find our way in darkness we rely on our body. The length of our lower limbs, for example, might determine how many steps we take to reach a position in space. For adults this information is highly reliable since the body is fully developed. For children it is not as their body keeps changing. Hence, children could benefit more from using other cues such as vision during path encoding.

Method: We used immersive virtual reality to isolate visual and motor cues during encoding of a two-legged path in fifteen 10-11-year-old children and eighteen adults, and examined how path reproduction in darkness is affected by vision during encoding.

Results: By fitting a bivariate normal distribution we obtained a measure of the dispersion of the participants’ end-points (variable error). Only children reduced their variable error when encoding in the bimodal condition.

Conclusions: Only children are more susceptible to visual information.

PAPER 3

The role of embodied transformations in visual perspective-taking

Amy Pearson & Sofia Messini, Durham University

Objectives: Visual perspective taking is involved in many everyday social acts (e.g. passing someone a drink). This study aims to investigate the link between spatial transformations of bodies and visual perspective taking, while also examining the role of autistic traits in these processes.

Method: Using pictures of bodies as stimuli, typically developing adults made mental rotation or egocentric judgements about the orientations of bodies; and made visual judgements about what other people could see. Additionally all participants completed the Autism Quotient.

Results: Preliminary analyses suggest that participants with higher autistic traits are less able to use the self as a reference frame and worse at perspective taking.

Conclusions: These findings highlight the role of manipulating bodily representations in social communication.
PAPER 4
Developmental origins and cortical underpinnings of body awareness in infancy
Maria Laura Filipetti, Mark Johnson & Sarah Lloyd-Fox, Centre for Brain and Cognitive Development, of London; Matthew Longo, Birkbeck, of London; Teresa Farroni & Gulia Orioli, University of Padua

Objectives: Despite the vast amount of research that has addressed bodily self-consciousness in adulthood, studies of the developmental underpinnings of body perception are poorly understood, largely due to the variety of methods being used.

Method: Over a series of experiments, newborns’ looking behavior was measured in response to visual-tactile stimulation, while we manipulated the temporal synchrony and spatial congruency of the multisensory information. Furthermore, using functional Near Infrared Spectroscopy (fNIRS) was used to investigate cortical activation in response to body-related information in five-month-old infants.

Results: Infants show discrimination of temporal and spatial properties of body-related multisensory information.

Conclusions: Combined behavioural and NIRS results suggest common brain mechanisms of body awareness between infants and adults.

PAPER 5
Beyond the body: a roadmap
Tessa Dekker, University College London

In the symposium papers we will have heard evidence of the sensory processes that underlie children’s body representations, and how these representations develop through childhood. However, many of the papers also share the insight that developing body representations contribute to other skill domains. These include spatial localisation, motor skills, perspective taking & social understanding. The discussion will set forward a tentative model of the links between body representations and other skills, and discuss how this might be grounded in the sensory, motor and somatosensory areas of the brain. We hope that this model will stimulate lively discussion amongst the speakers and audience. Ultimately, we aim to provide a roadmap for future research in the area.

SYMPOSIUM
Development of mathematical abilities and learning
Tamara Schleepen, Maastricht University

Mathematical skills are essential in school education and deficits strongly limit educational achievement. To develop targeted interventions, we need to understand the factors enabling successful mathematical development. This symposium brings together new research on development and intervention from different cognitive and neuropsychological perspectives. We will focus on cognitive factors related to individual differences in mathematical abilities in children (De Smedt, Schleepen & Cappelletti) and discuss (neuro)biological factors and possible interventions in mathematical development (Krause, Jonkman).
PAPER 1
Neurochemistry of numerical cognition: how neurotransmitter balances relate to maths achievement and how we can modulate these
Beatrix Krause, Oxford University

Objective/Method: We found strong associations between the balance of inhibitory (GABA) and excitatory (glutamate) (I/E) neurotransmitters in differential areas in the child (frontal) and the adult brain (parietal), using noninvasive magnetic resonance spectroscopy (MRS). We hypothesized that this balance can be artificially modulated using transcranial random noise stimulation (tRNS), which we investigated using 72 participants in a 5-day between-subject sham-controlled learning experiment. We stimulated either intraparietal sulci (IPS) or dorsolateral prefrontal cortices (DLPFCs).

Results: We found reduced glutamate increases in the parietal cortex after tRNS.

Conclusion: Noninvasive measures of I/E may serve as potential biomarkers for neurodevelopmental disorders in the future and will help design brain-based interventions that have the capacity to modulate this balance.

PAPER 2
Inhibitory control and individual differences in arithmetic fact retrieval
Bert De Smedt, University of Leuven

Objective: Children with dyscalculia show impairments in arithmetic fact retrieval. It has been suggested that these might arise due inefficient inhibitory control. Here, we investigated whether domain-general as well as domain-specific inhibitory control was related to individual differences in arithmetic fact retrieval.

Method: Participants were 48 9- to 10-year olds (fourth grade). All completed standardized tests of arithmetic fact retrieval and reading ability. Inhibitory control was assessed with a color-word stroop and quantity stroop task.

Results: Both color-word stroop and quantity stroop were uniquely related to individual differences in arithmetic fact retrieval. Only the color-word stroop was related to reading ability.

Conclusion: Domain-general and domain-specific inhibitory control explain individual differences in arithmetic fact retrieval.

PAPER 3
Kindergartner’s non-symbolic numerical distance effects on ERPs predict future arithmetic performance
Lisa Jonkman, Maastricht University

Objective: To study to what extent symbolic and non-symbolic numerical distance effects (NDE) on performance and ERPs in kindergarten predicted future arithmetic performance.

Method: Twenty-nine children performed symbolic and non-symbolic number comparison tasks in their second kindergarten year and one year later in grade 1. Distance effects on behavior and ERPs were measured and related to different longitudinally sampled measures of number sense and arithmetic performance.

Results: Only kindergartner’s non-symbolic NDE’s on accuracy, early parietal (P2p) and later frontal-central ERP activity predicted future arithmetic performance.

Conclusion: The non-symbolic parietal P2p-NDE effect was suggested to be related to retrieval of ordinal representations of number while the later frontal NDE was related to number processing activities requiring verbal processing.
PAPER 4
The association between numerical magnitude representations and fact retrieval strategies during multiplication
Tamara Schleepen, Maastricht University; Hanneke Van Mier, Maastricht University, Netherlands; Bert De Smedt, University of Leuven

Objective: It has been found that children with better access to symbolic (but not nonsymbolic) magnitude representations retrieve more facts from memory and are faster at executing fact retrieval strategies during single digit addition and subtraction. It has not been studied yet if a similar relation exists for multiplication.

Method: The current study investigated this association in 9-10 year-old children who performed a symbolic (digits) and nonsymbolic (dots) numerical magnitude task, and a multiplication task. Results/conclusion: Data collection is currently ongoing. Results from correlation analyses, controlling for cognitive ability and motor speed, between numerical magnitude processing and fact retrieval during multiplication will be presented. Theoretical implications of the findings as well as implications for education will be discussed.

PAPER 5
Changes in mathematical abilities across the life span
Marinella Cappelletti, Goldsmiths University of London

Objectives: How do mathematical abilities change with development and across the life span? A popular view suggest that number sense is an innate, cross-species and cross-cultural ability to understand and manipulate quantity, which may imply a relative stability throughout life. Methods/Results: Here we present three studies showing that numeracy skills are indeed well maintained across ages once fully developed, although this may depend on the availability of other cognitive ability, such as inhibitory skills.

Conclusions: Throughout the life span, numeracy skills can still be malleable enough to be sensitive to learning, possibly because these skills are firmly supported by a network of brain regions that are flexibly involved in numeracy and that tend to age less compared to other regions.

105 (1151)
BRIEF EMPIRICAL REPORT
Say What You See: The Utility and Understanding of emotions in Williams syndrome (WS) and autism (ASD)
Rachel Cole-Fletcher & Vicki Bruce, Newcastle University

Objectives: Two experiments aimed to explore in what ways the utility and understanding of emotions underpin the social exchange profiles seen in WS and ASD.

Method: 15 individuals each with WS and ASD were matched on chronological and mental age to typical individuals on a modified ‘Triangles Playing Tricks’ (TPT) task and a novel social cognition (SC) task.

Results: Mixed-design ANOVAs found significant differences between the types of descriptions and attributions that individuals with WS and ASD gave.

Conclusions: Results suggest that there are divides between the types of cues, and how these cues are used, in WS and ASD. Elucidating profiles of where difficulties lie could lead to possible support strategies for individuals with these disorders to better understand their social environment.
BRIEF EMPIRICAL REPORT
Measuring reciprocity in children with autism
Tineke Backer van Ommeren, Anke Scheeren & Sander Begeer, VU University Amsterdam

Objectives: To assess the validity and reliability of a new test to directly measure reciprocal behavior in children with and without autism.

Methods: Children with (n = 146) and without (n = 78) autism were tested with the Interactive Drawing Test (IDT), a dyadic procedure designed to elicit reciprocal behavior.

Results: Children with autism showed profound limitations in the quality and flexibility of their reciprocal behavior. Good test-retest and interrater reliability, internal consistency and validity (based on comparison with standard measures of autism (ADOS and SRS) were found.

Conclusions: The IDT is a sensitive measure for reciprocity, a defining feature of autism. The test has a unique potential for applications in clinical assessment and treatment studies.

BRIEF EMPIRICAL REPORT
Social play in autism requires inhibitory control
Tamas Borbely, University of Sussex

High-functioning children with autism (HFA) are typically impaired in cooperation, a capacity that forms the basis of social play and group learning. Despite its developmental importance, the predictors of poor cooperation are little understood. We set out to contribute to the executive dysfunction account of social impairments in autism through investigating the link between inhibition and three components of cooperation: reciprocity, accepting the play partner’s input, and fairness. We tested HFA children in primary school and age-matched typically-developing (TD) peers on various measures of inhibition, a cooperative play task, moral reasoning, and sharing in a dictator game. Our results provide evidence for a model where deficits in inhibitory control moderate the relationship between social knowledge and social competence.

BRIEF EMPIRICAL REPORT
Can individuals with Autism Spectrum Disorders and typically developing individuals rapidly use Theory of Mind information?
Elisa Back, Kingston University London

The aim of this study was to investigate whether individuals with and without ASD can rapidly process visual perspectives. 18 participants with ASD (aged 16-20) were matched on chronological age and full-scale IQ to 18 typically developing participants. They were asked to make rapid judgements about how many dots could be seen on the walls of a cartoon room, either from their own point of view or from the point of view of an avatar or a camera situated in the room. Individuals with and without ASD were able to rapidly process visual perspectives although individuals with ASD experienced both egocentric and altercentric interference. Findings can be explained by difficulties with executive control or self-perspective inhibition.
**BRIEF EMPIRICAL REPORT**

**Social Motivation In Autism**
*Indu Dubey, University of Nottingham; Antonia Hamilton, University College London*

**Objective:** Social motivation theory has been proposed to account for the lack of social skills in autism. However there are currently very few simple behavioural ways to test these claims.

**Method:** We developed a behavioural paradigm to measure social motivation. It evaluates the effort participants invest to look at social vs non-social stimuli. Unlike other paradigms it controls the effect of attention and measures the reward value of the stimuli. Typically developing individuals (aged 4-45) and 40 individuals with autism were tested.

**Results:** Both the groups make a trade-off for effort and preference. However typical children and adults prefer social stimuli and people with autism have a significant preference for non-social stimuli.

**Conclusion:** People with autism may have higher reward value for non-social stimuli.

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**BRIEF EMPIRICAL REPORT**

**Triadic joint attention with a virtual agent in children with and without autism**
*Gillian Little & Lizann Bonnar, University of Strathclyde; Gnanathusharan Rajendran, Heriott Watt University*

**Objectives:** Here, we investigate how children with and without ASD initiate and respond to joint attention with a computer character.

**Methods:** We utilised gaze contingent eye tracking and a recognition memory task. 22 ASD participants (mean age = 10.5yrs, mean FSIQ = 81.7) and 44 typically developing matched controls followed and directed a virtual character’s gaze to a series of referent images. Eye movements and memory for the images were recorded.

**Results:** Early data (TD N=5, ASD N=2) suggests enhanced image recognition when responding to joint attention. Differences in eye movements and recognition memory between the ASD and control groups will be discussed.

**Conclusions:** This demonstrates the potential of interactive social characters for enhancing our knowledge of joint attention.

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**BRIEF EMPIRICAL REPORT**

**Developmental effects on vocabulary knowledge in Greek skilled and less-skilled oral comprehenders**
*Elisavet Chrysochoou, Department of Psychology, College; Zoe Bablekou, School of Early Childhood Education, University of Thessaloniki; Smaragda Kazi, Department of Psychology, University of Social and Political Sciences*

**Objectives:** We investigated age-related effects on vocabulary knowledge differences between skilled and less-skilled oral comprehenders.

**Method:** Participants (N=174, 5.5, 7.5, and 9.5 years) were presented with oral stories, accompanied by higher-order comprehension questions. Skilled and less-skilled comprehenders were identified within every age group. A receptive vocabulary and several memory tasks were administered.
Results: ANOVA revealed a significant skill level x age interaction; the eldest group produced the greatest vocabulary differences. Working memory, as a covariate, differentiated the developmental pattern: group differences became non-significant at 5.5 years; still, they reached a higher significance level at 9.5, as compared to 7.5 years.

Conclusion: The effects of oral comprehension capacity on vocabulary development are discussed, indicating the value of early identification of higher-order comprehension difficulties.

Keywords: Vocabulary, oral comprehension, working memory, children, comprehension control, simile comprehension, inferences.

112 (1184)
BRIEF EMPIRICAL REPORT
Phonological sensitivity as a factor in learning foreign language vocabulary: evidence from pseudoword learning experiments on Polish 9-year-olds
Marta Marecka, Faculty of English; Karolina Rataj & Donata Janiszewska, Faculty of English, Mickiewicz University

Objectives: Phonological sensitivity (PS) is connected to literacy. We examined if it also plays a role in learning foreign language vocabulary. We used pseudoword learning tasks to simulate foreign word learning.

Methods: Participants: 43 typically developing Polish 9-year-olds learning English at school
Materials: PS: Polish Dyslexia battery, English CTOPP. Speed of pseudoword learning: paired-associates tasks with Polish, English and nonwordlike pseudowords
Additionally tested: intelligence (Raven’s matrices), verbal STM (ISR tasks), L2 vocabulary

Results: PS and pseudoword learning correlated (Pearson’s r = 0.43, p = 0.003). The effect was present in stepwise backward regression and most pronounced for nonwordlike pseudowords.

Conclusions: PS is connected to speed of learning foreign pseudowords. PS trainings might facilitate foreign language learning.

113 (1357)
BRIEF EMPIRICAL REPORT
English-learning nine-month-olds already know where vowels can occur in native words
Katrin Skoruppa, University of Essex; Laurence White & Caroline Floccia, Plymouth University

Objectives: Nine-month-old infants already know where consonants can occur in words of their native language. This study investigates for the first time whether they are also sensitive to language-specific restrictions on vowels; specifically, whether they know that English words cannot end in lax vowels (e.g. *[\textipa{dɪ:tʊ]}]*).

Method: Twenty-four English-learning nine-month-olds listened to two-syllable nonsense words of in a headturn preference paradigm. Half of them ended in lax (e.g. *[\textipa{tə:mɒ}]* ) and half in tense vowels (here, *[\textipa{mɒtə}]* ); 6 lists of 12 items.

Results: Infants significantly preferred the words ending in lax vowels (mean lax: 10.7 sec; mean tense: 9.4 sec; t(23)=2.10, p=.047).
**Conclusion:** At nine months, infants are already sensitive to the lax vowel constraint, suggesting that both consonants and vowels are important for early lexical development.

**114 (1278)**

**BRIEF EMPIRICAL REPORT**

**Standardisation of a picture naming task for English-speaking British children between 19 and 36 months**  
*Allegra Cattani, School of Psychology*

First lexical skills are generally assessed through parental questionnaires. No other lexical assessment is available to British children before the age of 36 months. The purpose is to standardise a new picture naming task, which assesses lexical subcomponents of comprehension and production of nouns and predicates for children between 19 and 36 months. Around 300 monolingual British children were assessed on the picture naming task together with the equivalent age CDI. Correct responses, type of errors and no responses were recorded. The development of vocabulary of the children evidenced an almost parallel trend of the subcomponents, with a precedence of the noun comprehension followed by the predicate comprehension; subsequently the children mastered the nouns production and lately the predicate production. The analyses of internal consistency and concurrent validity were all significant.

**115 (1129)**

**BRIEF EMPIRICAL REPORT**

**Working memory and vocabulary development in Greek preschool and primary school children**  
*Elisavet Chrysochoou, Department of Psychology, College; Zoe Bablekou, School of Early Childhood Education, University of Thessaloniki; Elvira Masoura, Department of Psychology, University of Thessaloniki; Nikolaos Tsigilis, Department of Journalism and Mass Media Communication, University of Thessaloniki*

**Objectives:** We investigated the relative contributions of verbal short-term memory (STM) and working memory (WM) to vocabulary development in the early years. Participants (5.5-, 7.5-, 8.5- and 9.5-years, N = 216) were native speakers of Greek, a language differing from English in which most investigations have been conducted.  
**Method:** Children were assessed with a receptive vocabulary task and several verbal STM and WM tasks.  
**Results - Conclusion:** Both STM and WM appeared to influence early vocabulary development. Vocabulary was associated with verbal STM at 7.5 and 8.5 years, but only with verbal WM at 5.5 years. Associations declined by 9.5 years earlier than in English-speaking children. Findings are discussed in relation to Greek language characteristics, demonstrating the importance of cross-cultural investigations.  
**Keywords:** Vocabulary development; Verbal short-term memory; Verbal working memory; Children
BRIEF EMPIRICAL REPORT
What can gestures tell us about children’s developing understanding of spelling?
Elizabeth Kirk, University of York

Objectives: Our aim was to explore the gestures that accompany children’s explanations on a spelling production task. We investigated children’s sensitivity to strategies conveyed in a teacher’s gestures and the extent to which children’s gestures reveal transitional knowledge.

Method: Forty-five children (aged 4 - 6 years) completed a spelling production task. A pre-test, post-test design was employed with children randomly allocated to either a gesture or verbal instruction intervention. Children’s verbal explanations were coded according to their level of Representational Redescription. Gesture production was measured.

Results: Data will be presented regarding the relationship between gesture and children’s understanding of spelling.

Conclusions: Children convey spelling strategies in their gestures, offering teachers insight into their developing understanding of spelling.

BRIEF EMPIRICAL REPORT
From bystanders to “upstanders”: Evaluating the effectiveness of a role-play anti-bullying intervention for promoting assertive bystander intentions and actual assertive behaviours.
Nicola Abbott, Canterbury Christ Church University; Jayne Thompson, University of Kent

Objectives: The current research designed and evaluated the effectiveness of an intervention that aimed to promote assertive bystander intentions and behaviours, via facilitating self-efficacy towards intervening.

Method: Participants (N = 121, 12-13 years) took part in a one day role-play experimental condition, or a control condition. Questionnaire data measured self-efficacy towards intervening, self-assertive self-efficacy and assertive bystander intentions. Participants (N= 60) also completed an innovative measure of actual assertive bystander behaviour in a cyberbullying context.

Results: The experimental condition reported significantly higher self-efficacy towards intervening, greater assertive bystander intentions and greater assertive bystander behaviours (i.e. more likely and faster reaction times), compared to the control condition.

Conclusion: Practical and theoretical implications for anti-bullying interventions and the distinction between bystander intentions and behaviours are highlighted.

BRIEF EMPIRICAL REPORT
When friends are not so friendly: Investigating friendship quality, participant roles in bullying situations and links to well-being in primary school children
Rachel Maunder & Claire Monks, The University of Northampton

Objectives: Bullying can occur within friendship groups but may be less likely to be identified as ‘bullying’. This paper reports initial findings from research examining positive and negative elements of children’s friendships, and their link to well-being.
Method: Primary school children (aged 9-11yrs) completed questionnaires assessing global self-worth, school belonging, friendship quality, and peer-nominations of Participant Roles in bullying.

Results: Relationships between friendship quality, school belonging and global self-worth are reported, along with analysis of negative relationships within friendships, and bullying within the peer group.

Conclusions: The complexity of children’s peer relationships, and how positive relationships, negative interactions and bullying behaviour can co-occur are highlighted. The importance of friendships for children’s well-being is also discussed.

119 (1148)
BRIEF EMPIRICAL REPORT
Perceptions of Bullying – a preliminary review of understandings in relation to bullying (actions, consequences and solutions) from the perspective of Children, Parents and Teachers
Wendy Sims-Schouten & Jane Wood, University of Portsmouth

Objectives: Despite three decades of research into bullying, this form of systematic aggression continues to be common, with students becoming more and more unreceptive to teachers’ antibullying lessons. This small-scale study looks at parents’, students’ and teacher’s perceptions in relation to a number of ‘student behaviour scenarios’ (vignettes).

Method: Data is collected from focus groups with parents, children (9-15 years old) and teachers. Participants are presented with vignettes and Likert-scale questionnaires.

Results: Although participants agree on overall definitions regarding bullying, differences are found in how participants’ perceive the student behaviour scenarios (bullying versus non-bullying) and their recommended interventions and solutions (resilience building versus zero-tolerance).

Conclusion: Bullying interventions require us to take seriously perceptions (also in relation to possible solutions) from teachers, students and parents.

120 (1238)
BRIEF EMPIRICAL REPORT
Self-reported bullying, victimization and defending in children with special educational needs in mainstream schools: Links with emotional and behavioural problems
Elian Fink, Evidence Based Practice Unit; Jessica Deighton & Miranda Wolpert, Evidence Based Practice Unit, College London & the Anna Freud Centre

Objectives: Examine the prevalence of bullying, victimisation and defending behavior in children with special educational needs (SEN), and associations with emotional and behavioural problems.

Method: Children with SEN (N = 67; Mage = 10.1 years) and control (N = 281; Mage = 10.0 years) children reported on their bullying, victimisation and defending behaviour, and emotional and behavioural problems.

Results: Compared to control children, children with SEN had similar rates of victimisation but were more likely to report bullying and less likely to report defending behaviour. Behavioural problems were positively associated with bullying and victimisation and negatively associated with defending. Only victimisation was associated with emotional problems.
Conclusions: These findings have implications for the design and implementation of school-wide anti-bullying interventions.

121 (1289)
BRIEF EMPIRICAL REPORT
A typology of childhood and adolescent reactive aggression, proactive violence and bullying
Lisa Hopkins, Erica Bowen & Clare Wood, Coventry University
Objectives: To identify a typology of children and adolescents use of Reactive Aggression and Proactive Violence and explore whether groups based upon the use of these behaviours differed in their involvement in bullying, empathy and their perception of the social acceptance of these behaviours.
Methods: Cluster analysis was employed to investigate patterns of use of reactively aggressive and proactively violent behaviours obtained from a questionnaire completed by 655 9-14 year olds.
Results: Distinct behavioural groups were identified, further differentiated by their involvement in bullying, ability to empathise and perception of the social acceptance of reactive aggression and proactive violence.
Conclusion: The current research identifies the need for targeted interventions based upon frequency of the use of reactive aggression and proactive violence.

122 (1149)
BRIEF EMPIRICAL REPORT
Relational Aggression in Young Children – ‘Butter wouldn’t Melt’ or is it possible to ‘Spot a Bad Un’?
Wendy Sims-Schouten, University of Portsmouth
Objectives: Empathic morality is likely to promote prosocial behaviour. Yet, the affective self is a function of complex interactions between genetic, temperamental and social environmental factors during early development. The present study examined early years practitioners’ and parents’ interpretations of young children's (relational aggressive) behaviour in early years settings.
Method: Early Years practitioners and parents (four focus groups) were presented with specific cases of child interactions (vignettes), and asked to discuss this.
Results: Differences were found between parents’ and practitioners’ perceptions in relation to relation aggression in early years, especially regarding the issue of whether this behaviour is intentional or not.
Conclusion: More research is needed on relational aggression in early years, with a view to gaining understanding in suitable interventions and preventions.

123 (1352)
BRIEF EMPIRICAL REPORT
The effects of motion and intensity on deaf children’s recognition of facial expressions of emotion
Anna Jones, Deafness, College London; Roberto Gutierrez, University of Hertfordshire; Amanda Ludlow, University of Hertfordshire, of Birmingham
Objective: While some research suggests that deaf children are poorer at recognising facial expressions of emotion than hearing children, these studies are limited to the use of static images – yet emotion is rarely static in nature.
Method: Study one assesses the influence of motion on 6-11 year-old deaf (N= 28) and hearing control children’s (N= 28) emotion recognition. Both still images and video clips of real human faces are presented displaying six basic emotions.
Study two investigates children's ability to recognise emotions at increasing degrees of intensity.

Results: The deaf children demonstrate an advantage for motion; however, the findings reveal consistently poorer performance in deaf children's recognition of disgust.

Conclusions: The importance of the socialisation of emotion and using ecologically valid stimuli are discussed.

124 (1441)
BRIEF EMPIRICAL REPORT
Executive function and language in deaf and hearing children
Anna Jones, Deafness, College London; Chloe Marshall, Institute of Education, of London; Nicola Botting, City University; Gary Morgan, City University
Objective: Limited evidence suggests that deaf children may have difficulties in higher-order cognitive skills (executive functioning, EF). This study presents a comprehensive investigation of EF in deaf children controlling for age and nonverbal IQ.

Method: Seven measures of EF are assessed in 105 deaf children (aged 6-11) and 105 typically developing hearing controls in addition to 3 language measures (narrative, vocabulary, parental report).

Results: Deaf children's performance is significantly poorer than hearing controls in 4 of the 7 measures (inhibition, switching, semantic fluency and complex working memory). Regression analyses reveal that vocabulary predicts deaf children's results in these 4 EF tasks.

Conclusions: The likely fractionation of the EFs and the contribution to the debate on the relationship between language and EF are discussed.

125 (1283)
BRIEF EMPIRICAL REPORT
Where will the cat go? Deaf and hearing infants' predictions of others’ behaviours
Lizet Ketelaar, Developmental Psychology, Netherlands; Luca Surian, Department of Psychology and Cognitive Science, of Trento; Boya Li, Developmental Psychology, University, Netherlands; Carin H. Wiefferink, Dutch Foundation for the Deaf and Hard of Hearing Child, Netherlands; Johan H.M. Frijns, Department of Otorhinolaryngology Head and Neck Surgery, University Medical Centre, Netherlands
Objectives: Deaf children have theory-of-mind delays, hampering their ability to understand that people act based on their (false) beliefs. This study examines whether delays are already apparent in infancy.

Method: Sixty 1.5-year-old infants with and without hearing impairments watched cartoons of a cat chasing a mouse. The cat either had a true or a false belief about the mouse's hiding location. An eye tracker recorded infants' looking behaviours.

Results: Anticipatory looking towards one of the hiding locations reveals infants’ expectations about the cat's behaviour. Patterns of deaf and hearing infants are compared to examine differences in (false) belief understanding.

Conclusions: Detecting between-group differences in infancy on a nonverbal measure of theory of mind rules out that delays in deaf children stem from language delays.
BRIEF EMPIRICAL REPORT
Children's recognition of emotion through body language: Is recognition enhanced with cartoon drawings?
Dawn Watling, Royal Holloway; Ramona DaCruz, Bethany Elms, Iesha Ginn & Zehra Saifuddin, Royal Holloway; of London

Background: Children’s emotion recognition has traditionally been explored using facial expressions of emotion; however, much information about emotion is conveyed through body language.

Method: 272 children between 6 and 12 years completed an emotion matching task, of the six basic emotions, where they matched body posture with facial expressions of emotion. The stimuli were either cartoon drawings or human images (both reflecting the same body posture).

Results: Children had better matching ability for the cartoon drawings than human figure, but this was particularly true when matching cartoon body to the cartoon face.

Conclusions: Findings are discussed in line with the emergence of emotion recognition skills and the nature of drawings versus human figures.

BRIEF EMPIRICAL REPORT
Low empathy in hearing-impaired (pre)adolescents compared to normal hearing controls.
Anouk Netten, Department of Otorhinolaryngology and Head & Neck Surgery; Carolien Rieffe, Department of Developmental Psychology; University; Stephanie Theunissen, Jeroen Briaire, Wim Soede & Johan Frijns, Department of Otorhinolaryngology and Head & Neck Surgery, University Medical Center; Evelien Dirks, Dutch Foundation for the Deaf and Hard of Hearing Child

Objective: This study examined the level of empathy and prosocial behaviour in hearing-impaired (pre)adolescents compared to normal hearing controls.

Methods: Groups were compared using self-reports, a parent-report and observation tasks to rate the children’s level of empathy, attendance to others’ emotions, emotion recognition, and prosocial behaviour. The study group (mean age 11.9 years) consisted of 122 hearing-impaired children and 129 hearing children.

Results: After controlling for their language skills, hearing-impaired children reported lower levels of cognitive empathy and prosocial behaviour than hearing peers. During observations, hearing-impaired children showed more attention to the others’ emotions but less prosocial behaviour.

Conclusion: Hearing-impaired children show lower empathy than hearing children, which can have numerous consequences for initiating and maintaining relationships.

INIVITED SYMPOSIUM
Emotional Processing in Childhood
Andy Field, University of Sussex

This symposium brings together talks that look at different aspects of how children develop an understanding of their emotional world. Evin Aktar will present findings from a study investigated the effect of positive and negative facial expressions, and of head/gaze direction on infants’ pupil responses to unfamiliar objects. She also looks at the impact of parental anxiety and depression on this process. If children to use adults’ emotions
to determine how to respond in novel situations, then this would be a viable pathway to learn fears, and Chris Askew presents findings from an on-going project looking at the observational learning of fear in children. He will show that observing another’s fear can lead to increases in children’s fear-related beliefs, behaviour, heart rate and attentional bias for animals. These two studies suggest that children rely on identifying other’s emotion to negotiate their emotional world. Carolien Rieffe picks up this theme by discussing the extent to which emotion identification and emotion regulation are dependent upon each other or are independent contributors to the development of psychopathology. Finally, Andy Field explores how this emotional processing develops both in non-anxious and trait anxious children.

PAPER 1
Infants’ Processing of Emotion and Gaze Direction: The effect of maternal and paternal depression/anxiety
Evin Aktar, Dorothy J. Mandell, Mirjana Majdandžić, Wieke de Vente, Maartje Rajmakers and Susan M. Bögels

Objectives: We investigated the effects of emotion and gaze direction on 15-month-old infants’ pupil responses to unfamiliar objects, to explore the links between infants’ pupil reactivity to emotion and parents’ depression/anxiety in a non-clinical sample.

Method: Infants’ pupil responses (N=40) were measured via eye-trackers during the presentations of unfamiliar objects, before and after being paired with happy, sad, fearful or neutral faces gazing towards or away from the objects. Parents filled questionnaires of depression/anxiety.

Results: Infants’ (N=19, in progress) showed smaller pupil dilations to the objects paired with emotional faces than with neutral faces. The effect of gaze was not significant. Maternal depression/anxiety predicted decreased sensitivity to the objects paired with sad and fearful faces, while paternal depression/anxiety predicted increased sensitivity to the objects paired with fearful faces.

Conclusions: Exposure to mothers’ vs. fathers’ depression/anxiety have different effects on infants’ pupil reactivity to objects paired with negative facial expressions.

PAPER 2
Effects of vicarious learning on childhood fear acquisition and fear reversal
Chris Askew, Reynolds & Professor Andy Field, Child Anxiety: Theory and Treatment Lab (CATTLab), University of Sussex

Objectives: Lang (1968) demonstrated three human anxiety response systems: verbal-cognitive, behavioural avoidance and physiological. Two experiments investigated the effects of vicarious learning (modelling) on children’s responses in each of these systems.

Method: 141 children (7-11 years) saw pictures of novel animals together with adult faces expressing fear. Children’s fear beliefs, behavioural preferences, behavioural avoidance, heart rate and attentional bias for the animals were measured. Children in the second study experienced the same initial procedure but then saw the animals again with happy faces (counterconditioning).

Results: Increases in fear beliefs, avoidance, heart rate, and attentional bias were detected following fear vicarious learning. In the second study, responses returned to baseline following positive vicarious counterconditioning.
Conclusions: Fear vicarious learning leads to increases in children’s responses in each of Lang’s anxiety systems, but these changes can be reversed using positive modelling. The findings have implications for our understanding of the development and treatment of fear.

PAPER 3
Emotions in play
Carolien Rieffe, Leiden University, the Netherlands; Guida Veiga, University of Lisbon, Portugal; Brad J. Bushman, Ohio State University, USA
Objectives: Is it good to act aggressively in a playful situation, so we learn how to regulate this in a safe environment; or does it just enhance emotion dysregulation? In this presentation we examine the effect of physical play, and rough and tumble play (RTP) in particular, on children’s emotional functioning.
Method: We included 90 preschoolers, aged 4-6 years old. Play behaviors were videotaped at the playground and obtained through parent reports. Emotional competence was measured through parent reports.
Results: Physical play, such as running, was related to better emotional competence, but this was the opposite for RTP. Yet, when we controlled for qualitative aspects of RTP at home, RTP was no longer associated with more emotion dysregulation.
Conclusions: Although physical play might contribute positively to children’s emotional lives, adding aggression – even in a playful manner – seems to turn this around, which is in line with the desensitization hypothesis.

PAPER 4
Turning children into Daleks: What is the emotional impact of scary TV on children?
Professor Andy Field, Child Anxiety: Theory and Treatment Lab (CATTLab), University of Sussex
Objectives: The cult of Skaro, a trio of the last surviving Daleks, have abducted Andy Field to be their scientific advisor. Their objective is to take over Earth. Isn’t that always a Dalek’s objective? His advice? Weaken the children of earth by transmitting messages of fear through TV and the internet.
Method: Through a meta-analysis and two experiments looking at the emotional impact of scary fictional TV, this paper looks at the evidence that this form of visual media has a negative emotional impact on children.
Results: The overall impact of scary visual media on children’s internalising emotions is variable, but at the group level not as strong as individual studies suggest. The two experiments also suggests that certain types of scary TV might paradoxically promote resilience and coping skills rather than fear and anxiety in some children.
Conclusions: Despite a common belief that scary visual media has a detrimental impact on children’s emotional wellbeing, the picture appears more complicated. Certain types of programmes containing scary content may help some children to become less emotionally vulnerable, not more. Did Andy escape the Daleks alive? To answer that you will need to come to the talk.
SYMPOSIUM
The impact of creative arts projects on the socio-emotional and motivational development of children and young people
Fidelma Hanrahan, University of Sussex
This symposium explores the socio-emotional and motivational impact of creative arts projects on young people. The first paper captures the impact of drama involvement on the social and motivational profile of young people who experienced school exclusion. The second and third papers look at the potential value of creative music education and intervention for supporting the development of disadvantaged adolescents and young offenders. The fourth explores the impact of story-drama activities on preschoolers' emerging social and emotional competencies.

PAPER 1
“It makes me feel alive”: The socio-motivational impact of drama and theatre on marginalised young people
Fidelma Hanrahan, University of Sussex
Objectives: An in-depth, longitudinal, idiographic study examined the impact of drama and theatre involvement on marginalised young people.
Method: Semi-structured interviews, at three separate time points over two years, were conducted with four young people involved in a theatre project.
Results: Interpretative phenomenological analysis suggested that applied theatre creates space and support for the authentic self, and provides optimal conditions for promoting positive growth and resilience through voluntary engagement in a positive activity with accounts emphasising the pivotal role of interpersonal relationships and a nurturing environment. Some accounts also suggested that drama provides a uniquely engaging and therapeutic way to reflect on, express and explore experiences.
Conclusions: The results are discussed in relation to core psychological processes underpinning self-development.

PAPER 2
Musical Pathways: a study of young offenders engaged with a music programme
Nick de Viggiani, University of the West of England
Objectives: This research explored the potential creative music interventions bring to young offenders.
Method: 118 young people were recruited to 15 music programmes across 8 youth justice sites in the UK. Facilitated by trained musicians, these provided the research context for participant observation and semi-structured interviews, plus pre- and post-programme health, wellbeing and social inclusion scores.
Results: Participatory music programmes unlock young people’s creativity, communication and learning. Empathic, non-judgemental approaches used by musicians can be extremely powerful for engaging individuals who exhibit typically challenging or recalcitrant behaviours.
Conclusions: Arts programmes play a vital role in tapping into vulnerable young people’s creativity and growth. Moreover, qualitative research methodologies are essential when studying vulnerable groups, where sensitivity is paramount and trust must be negotiated.
PAPER 3
Composing myself: music, voice and agency amongst disadvantaged adolescents
Douglas Lonie, National Foundation for Youth Music
Objectives: To understand how creative non-formal music education develops the self-concept and intrinsic motivation of ‘disadvantaged’ adolescents, presenting two recent studies by the National Foundation for Youth Music.
Method: A survey of young people measuring musical development, self-concept and agency within a music mentoring programme (n=280) at baseline and after 10 sessions and a qualitative case study of five participants in a hip-hop project taking place on a deprived housing estate.
Results: Both studies indicate young people having a clearer sense of ‘voice’ and increased self-understanding through sustained participation in non-formal learning.
Conclusions: Out-of-school and sustained creative education opportunities can re-engage adolescents in their communities through a deeper understanding of the self and surrounding social structures.

PAPER 4
The impact of story-drama on children’s social and emotional competencies
Aysenur Karabulut, University of Sussex
Objectives: To investigate creative contexts for children’s socio-emotional development and specifically to evaluate the impact of story-drama activities on preschoolers’ socio-emotional competencies.
Method: This action research integrated both quantitative (SDQ: Strengths and Difficulties Questionnaire) and qualitative measures (semi-structured interviews, observations, documents and field notes) with 10 children participating in a sequence of 6 drama workshops.
Results: The quantitative data was analysed using online scoring and thematic coding was applied to analyse interview transcripts, observations, documents and field notes. Children attending the workshops became more skilled in narration, communication, self-expression and emotional expression.
Conclusions: Creative practices such as storytelling, role playing and drama can help children express and manage feelings, build social skills and reduce stress in their lives.

DISCUSSANT
The impact of creative arts projects on vulnerable populations of children and young people.
Susan Hallam, Institute of Education

130 (1268)
SYMPOSIUM
Exploring the links between testosterone and children's sex-typed behaviours
Rebecca Noorderhaven, Department of Psychology
In this symposium, we explore the role of testosterone in the development of gendered behaviour, including physical aggression, sexual orientation, spatial ability and social skills. We also discuss methods for measuring testosterone (with saliva or blood samples or by researching individuals with a history of atypical testosterone exposure), and the ages at which testosterone is important. Finally, we consider
how other factors, such as the social environment and practice, might act with testosterone to influence gender development.

**PAPER 1**

**Prenatal testosterone exposure and physical aggression in preadolescent children**

Debra Spencer, Department of Psychology

Research reveals a clear sex difference, favouring males, in physical aggression and links this sex difference to levels of testosterone (T) present during prenatal development. One method of studying the effect of prenatal T on postnatal behaviours such as physical aggression is to compare individuals exposed to unusually high levels of T prenatally to their unaffected same-sex relatives. I report the results of a study that compared levels of physical aggression in 119 children with congenital adrenal hyperplasia, aged between 4 and 11 years, and their similarly-aged unaffected relatives. Although the expected group differences in physical aggression were found, further analyses revealed that factors related to the quality of the parent-child relationship also contributed significantly to these differences.

**PAPER 2**

**Relating prenatal and pubertal testosterone and sex-typed behaviour in early childhood to emerging sexual orientation among girls**

Gu Li, Department of Psychology

Sexual orientation demonstrates a remarkable sex difference. This longitudinal study investigated the effects of prenatal and pubertal testosterone (T) and sex-typed behaviour in early childhood on girls’ emerging sexual orientation. Presumably, elevated prenatal T organises same-sex sexual orientation in girls, whereas pubertal T activates romantic attractions and activities. Moreover, male-typed behaviour among girls is associated with increased same-sex and decreased other-sex sexual orientation. We found that among girls, prenatal T measured in maternal blood explained little of the emerging sexual (romantic) attractions, activities, and identity. In contrast, pubertal T measured in saliva was associated with increased heterosexual attraction and activities. Male-typed behaviour at 3.5 years among girls predicted a weaker heterosexual identity but more heterosexual romantic attraction at 13 years.

**PAPER 3**

**Testosterone and mental rotation in early infancy**

Mihaela Constantinescu, Department of Psychology

Cognitive abilities are known to exhibit gender differences, with females outperforming males in specific aspects of verbal ability, and males showing an advantage in spatial tasks. Among the gender differences in spatial abilities favouring males, differences in mental rotation are the most robust. Research shows that such differences occur early in infancy, but their causes are not yet fully understood. One possible explanation is that they are influenced by underlying hormonal factors. I report the results of a study supporting this hypothesis. The study investigated the relationship between testosterone and mental rotation in 60 healthy infants. Sex differences in levels of salivary testosterone were found at age 4-10 weeks, which correlated with performance on mental rotation tasks in male infants.
Sex differences in spatial ability and social skills: nature versus nurture
Rebecca Noorderhaven, Department of Psychology

Men are better at mental rotation (a type of spatial ability), while women are better at following another person’s gaze (linked to empathy and social skills). In my study, I explore whether these sex differences are already present during early infancy (at 3-5 months). I evaluate whether these abilities might be linked to the early peak of Testosterone that takes place in new-born boys between 1-2 months (the nature argument). I also look at how parents’ ideas about gender roles and their gender schemas might influence their child’s mental rotation and gaze following abilities (the nurture argument). Finally, I test out two training methods aimed at improving mental rotation and gaze following ability.

Coping with Uncertainty in Everyday Situations (CUES): a parent based group intervention for children with Autism Spectrum Disorder
Jacqui Rodgers, Emma Honey & Mark Freeston, Newcastle University

Objective: Anxiety is a significant problem for many individuals with Autism Spectrum Disorder (ASD). For some anxiety includes intolerance of uncertainty (IU). This study evaluated acceptability and feasibility of a novel parent group intervention targeting IU for young people with ASD (CUES: Coping with Anxiety in Everyday Situations).

Methods: The intervention was developed in consultation with parents and professionals. Two eight week parent based intervention groups were undertaken, which included in-session activities and homework tasks.

Results: Outcome measures included the Spence Anxiety Scale (Parent Version), the Intolerance of Uncertainty Scale (Parent version) pre & post intervention and assessment of changes in a target uncertain situation. Assessment of acceptability and feasibility, attendance and drop-out were also recorded.

Conclusions: Findings indicate that the intervention was valid and meaningful and indicate that CUES has promise as a targeted package to assist young people with ASD and their families to manage responses to uncertainty.

Inhibitory control in children with high-functioning autism – A meta-analysis and issues of measurement
Tamas Borbely, University of Sussex

Inhibitory control is an aspect of executive function, which has been linked to impulsivity and social functioning. While anecdotal evidence suggests that children with autism are impaired in this domain, experimental results are equivocal. Tentative explanations for the contradictory findings have focused on purported differences between the experimental measures commonly used to assess inhibition, suggesting that children with autism may be impaired in some aspects of inhibition (e.g. prepotent responses) but not in others (e.g. interference). In a meta-analysis of over 60 studies (total N over 1,600), we found clear evidence for impaired inhibition in high-functioning children with autism (HFA) and for differences between measures. These results are discussed in terms of their implications for measuring inhibition experimentally.
BRIEF EMPIRICAL REPORT
Visual-tactile integration in children with and without Autism Spectrum Disorder (ASD)
Katie Greenfield, The University of Nottingham

Objective: Children with autism spectrum disorders (ASD) are less susceptible to the rubber hand illusion (RHI) than controls, indicating atypical tactile-visual integration. The ASD children may have an enlarged temporal binding window for sensory integration. Alternatively, they could be focusing predominantly on proprioceptive inputs at the expense of integrating these with other incoming sensory information. The current study tested these explanations.

Method: 28 children with ASD and 63 control children completed a RHI task conducted via a multisensory illusion system (MIRAGE).

Results and conclusions: Preliminary results indicate that atypical visual-tactile integration in ASD is not due to increased reliance on proprioceptive inputs but, instead, could be caused by an enlarged temporal binding window for multisensory integration.

BRIEF EMPIRICAL REPORT
The influence of low- and high-level perceptual cues on shape constancy in typical and autistic individuals
Danielle Smith & Harriet Allen, University of Nottingham

Objectives: To examine the integration of low- and high-level visual information in teens with Autism Spectrum Disorder (ASD).

Method: 39 teenaged participants with ASD, and 40 typically-developing (TD) verbal and non-verbal intelligence-matched teens were tested. A shape-constancy paradigm was used to measure the effect of prior knowledge of real shape and low-level visual cues (binocular disparity and texture gradient) upon shape judgement.

Results: Low-level visual cues increased shape constancy. Prior knowledge effects depended upon the presence of binocular disparity. ASD experienced less shape constancy overall, but diagnosis did not interact with any other factor.

Conclusion: Perception in ASD is influenced by both low- and high-level information in a similar manner, though not to the same degree, as for TD.

BRIEF EMPIRICAL REPORT
Creative abilities in Children with Autism Spectrum disorders: it is a potential?
Stefania Molteni, Università degli Studi di Milano, Bicocca, Dipartimento di Scienze Umane per la Formazione "Riccardo Massa"

Aim: Some traits of autism seem to be particularly favorable for the development of creative abilities (Asperger, 1944; Happé e Vidal, 2009). This study aimed at investigating on creative abilities of children with autism (ASD).

Method: Participants were 51 ASD children aged between 5 and 11 and 51 TD children paired for age. We investigated creativity by: a test that measures the ability to realize creative products and a test that measures the ability to differentiate between creative and non-creative personal productions.

Results: The analyses of variance showed that children with ASD have creative abilities comparable to those of TD children: they produce elaborate and original
ideas, but show rigid thinking (F=9.158; p<.005) and some difficulties to share other children’s point of view.

**Conclusion:** Our results underlined the importance of looking not only at deficit, but above all the potential, like creative competences, of children with ASD.

138 (1265)
BRIEF EMPIRICAL REPORT
Do infants experience contagious social laughter or yawns?
*Caspar Addyman, Birkbeck; Atsushi Senju, Birkbeck, of London*

**Aim:** This study investigates the social aspects of laughter in infancy. As a comparison we also exposed infants to adult yawning. Previous research claims that infants are unaffected by contagious yawning.

**Method:** In experiment 1 18-month-old infants were filmed interacting with parent and experimenter in either laughter or yawning conditions. In experiment 2, short audio clips of genuine or posed laughter were played from speakers behind the infant.

**Results:** Data collection is still underway but preliminary analyses of experiment 1 show that infant activity level and affective state was influenced by adults actions and by familiarity (parent vs experimenter). In experiment 2 infants showed a greater tendency to turn around when hearing genuine laughter.

**Conclusions:** Our results indicate that laughter has an important social role in early life and that young infants tune into adults’ affective states. Additionally, infants appear to discriminate genuine from posed laughter.

139 (1282)
BRIEF EMPIRICAL REPORT
Effective gesture use by infants in mother-infant-sibling interactions
*Takeshi Kishimoto, University of the Sacred Heart*

**Objectives:** We investigated the hypothesis that, in infants-mother-sibling interactions, infants with older siblings aged from 11 to 24 months produce deictic gestures when they are close to or engaging in joint attention with their mothers more frequently than same aged infants in mother-infant interaction.

**Methods:** Fifteen infant-mother dyads and 6 infant-mother-sibling triads were individually observed for 15 minutes in the play room with toys.

**Results:** In infant-mother-sibling interactions, the infants produced deictic gestures when they were close to or engaging in joint attention with their mothers more frequently than infants in the infant-mother interactions.

**Conclusion:** The infants with older siblings would carefully monitor their mothers in the infant-mother-sibling interaction, and produced deictic gestures when they could provoke responses from their mothers effectively.

140 (1160)
BRIEF EMPIRICAL REPORT
The Development of the Mother-Infant Scaffolding Scale (MISS): A Validation Study
*Roni Mermelshtine, Birkbeck, University of London*

**Objectives:** Maternal scaffolding with older children predicts intellectual functioning. Validation of a newly developed instrument assessing maternal scaffolding with infants.

**Method:** Semi-structured play interactions between 51 mothers and 10 month infants from the Families Children and Child Care study were coded using the MISS...
focusing on the central aspects of scaffolding: cognitive input, contingency and transfer of responsibility. Participant selection was random from children with three cognitive ability levels at school-entry age.

**Results:** Associations between contextual factors and the MISS reflected criterion validity. ANOVAs supported instrument’s discriminant/ predictive validity, showing near/significant differences in mothers’ input between high and low ability groups.

**Conclusions:** Study demonstrates the MISS validity, suggesting that infants can benefit from intensive exposure to cognitive, contingent interactions.

141 (1169)

**BRIEF EMPIRICAL REPORT**

**What determines the differences in maternal use of mental state language?**

*Hiromi Tsuji, Osaka Shoin Women's University*

Maternal sensory sensitivity has been shown to predict affective behaviours towards children. We hypothesised that sensory sensitivity may be linked to mental state references.

Sensory sensitivity was measured using the emotional face change detection experiment for 79 adult females (35 mothers), with additional measures of empathy and emotion labelling. Self-reports on the use of mental state terms were collected as dependent variables.

Sensory sensitivity was positively linked to the use of cognitive terms but negatively linked to emotion terms. These relationships were found to be unique to the maternal group. None of other variables related to the use of mental state language.

Maternal sensory sensitivity plays a pivotal role in how mothers interact with and talk to their children.

142 (1407)

**BRIEF EMPIRICAL REPORT**

**Planning To Move Or Moving To Plan? Children's Embodied Executive Functioning And Gestural Interfaces.**

*Peter McKenn, Daniel Boa & Oliver Lemon, Heriot-Watt University; Martin Corley, The University of Edinburgh*

**Objective:** Investigate benefits of embodied interaction with gestural interfaces in executive function (EF) tasks. In a technologically saturated environment, the developmental significance of these technologies warrants investigation. Hypothesis: Task performance better using embodied interface (dance mat) compared to PC keyboard.

**Methods:** Children aged 5 and 7 (N = 24) played a computerised executive function task as a virtual frog. The goal was route planning and movement across lily pads to a finish point. Performance metrics: the number of hops; time to first move.

**Results:** Younger children planned for longer using gestural interface. Time to first move negatively correlated with number of hops. Overall, older group were better planners.

**Conclusions:** Gestural interfaces sensitive to EF ability and can embody cognition.
BRIEF EMPIRICAL REPORT
MODELING THE ROLE OF NON-VERBAL COMMUNICATION IN EARLY LEXICAL ACQUISITION IN TYPICAL AND ATYPICAL POPULATIONS
Christina Papaeliou, University of the Aegean; Petros Maragos, Kokkonitsa Sakellaki & Maria Vrettopoulou, University of the Aegean; Papoulidi, University College London; Emmanouil Perakakis, Elias Iosif & Alexandros Potamianos Technical University of Crete

The present study aims to investigate the role of affect and non-verbal communication in early word acquisition in typical and atypical development, using a parallel distributed model and semantic networks. Fifteen children with signs of Autism Spectrum Disorders, according to maternal report, and 15 children with language delay were matched to 15 typically developing children in mental age and expressive vocabulary. None of the children produced any word combination. Children’s vocal behavior was recorded daily for six months. Also, children were video-recorded, while playing with their mother in a semi-structured condition every fortnight at home. The computational model identified different patterns of non-verbal behavior and maternal input in the three groups, which contribute differently to early vocabulary acquisition. Discussion focuses on the utilization of the findings for the design of a screening software for autism spectrum disorders and language delay for infants and toddlers.

BRIEF EMPIRICAL REPORT
Using virtual environments to explore wayfinding strategies in typically developing 5-year olds
Jamie Lingwood & Danielle Matthews, University of Sheffield; Emily Farran, Institute of Education; Yannick Courbois, Universite Lille Nord de France

Previous research has shown that young children experience difficulty remembering routes. It is important to explore effective strategies that can be used to improve route learning skills in children. In a series of two experiments, 76 5-year olds were shown a route in a virtual environment before they were asked to retrace this route themselves. Two different strategies improved route learning performance: Verbally labelling on-route landmarks and attending to familiar landmarks both reduced the number of errors and number of trials to reach learning criterion, relative to controls. This is the first study to explore how different wayfinding strategies can help young children improve their route learning skills.

BRIEF EMPIRICAL REPORT
Effects of counting system transparency on numerical abilities: the case of Welsh
Ann Dowker, Dept of Experimental Psychology; Manon Roberts, Worcester College

The Welsh language uses a regular counting system, whereas English uses an irregular counting system, and schools within Wales teach either through the medium of Welsh or English. This provides the opportunity to compare linguistic effects on arithmetical skills in the absence of the confounding factors that arise in international comparisons. This study followed up earlier work (Dowker, Bala & Lloyd, 2008) suggesting that language properties influence children’s performance in certain numerical tasks by comparing the performance of 20 Welsh- and 20 English-medium Year 2 (6-to-7-year-old) pupils in arithmetic, nonverbal line estimations and transcoding. Groups did not differ in global arithmetic abilities, but...
the Welsh-medium pupils performed better in the nonverbal line estimation tasks, and read Arabic numbers aloud more accurately than the English-medium group. Thus, the transparency of the counting system seems to affect some, but not all, numerical abilities.

146 (1285)
BRIEF EMPIRICAL REPORT
The role of action experiences in the development of number concepts
Andrew Manches, University of Edinburgh
Objectives: Theoretical arguments suggest that numerical concepts may be grounded upon prior perceptuo-motor experiences, e.g. manipulating objects. This study contributes by examining action and gesture in numerical explanations. The research question was: what is the relationship between adults’ actions and gestures when explaining early numerical relationships?
Method: 10 student teachers explained two numerical relationships presented as consecutive addition sums: 8+1=9; 1+8=9 (commutative) then 1+8=9; 2+7=9 (compensation). Participants explained one concept with, and one without, physical blocks (counterbalanced).
Results: Action and Gestures were coded through video analysis software. In explanations, participants used similar actions: swapping over groups (commutative) or moving one block between groups (compensation). Without materials, 7 participants used gestures simulating these actions. 5 participants gestured using a pinch/grasp hand form.
Conclusions: Notwithstanding methodological issues (e.g. sample/explanation order), this study indicates the role of simulated action in adults’ numerical concepts, and subsequently examines children’s developing concepts.

147 (1258)
BRIEF EMPIRICAL REPORT
Mathematical anxiety and mathematical achievement in very preterm children
Victoria Simms, University of Ulster; Lucy Cragg, University of Nottingham; Camilla Gilmore, Loughborough University; Neil Marlow, University College London; Samantha Johnson, University of Leicester
Children born very preterm (VP; <32 weeks gestation) have significant deficits in mathematical achievement; however, the underlying causes of these difficulties are poorly understood. We assessed whether mathematical anxiety was a unique predictor of mathematical achievement in VP children after accounting for general emotional problems. 113 VP and 77 term-born (>36 weeks) children aged 7-10 years completed a mathematical anxiety questionnaire and a mathematics achievement test. Parents and teachers completed a standardised questionnaire of children’s emotional problems. VP children had significantly poorer mathematical achievement, more emotional problems and increased mathematical anxiety compared to controls. General emotional problems, rather than mathematical anxiety, were an independent predictor of mathematical achievement in VP children but not controls. Reducing preterm children’s general anxiety may improve their mathematical achievement.
BRIEF EMPIRICAL REPORT
The influence of Language on Mathematical Skills
Florence Gabriel, Centre for Neuroscience in Education; Denes Szucs, Centre for Neuroscience in Education, of Cambridge

The objective of this research is to shed light on the influential factors of core mathematical abilities. We explored the key cognitive strengths and weaknesses of two populations who experience learning difficulties in mathematics: children with developmental dyscalculia (DD) and children with specific language impairment (SLI). We tested 12 children with SLI, 12 participants with DD and 12 control children. We tested their IQ, mathematical and reading abilities, short-term and working memory, as well as number familiarity, symbolic and non-symbolic comparison. We found robust evidence for impaired visuo-spatial short-term and working memory in DD, and impaired verbal short-term memory in SLI. Children with SLI showed major deficits in counting skills. Children with DD and children with SLI had poor arithmetical skills, whereas children with SLI also showed poor mathematical reasoning skills. We discuss the influence of language and working memory on mathematical skills.

KEYNOTE
Gender and the social Worlds of Children
Professor Carol Martin, Arizona State University

Both real and illusory differences between girls and boys garner much attention and have wide-ranging impact. However, the processes contributing to real and imagined gender differences are even more interesting to consider than the differences themselves. Researchers have demonstrated that children are surrounded by a culture that makes salient many forms of gendered information, but children do not passively absorb this information. Instead, children actively participate in their own gender socialization and they do so by selectively using information provided by their gendered environment. To better understand the processes contributing to beliefs and behaviors related to gender differences, in my presentation, I will discuss the gender-segregated social worlds that children grow up in, and the individual factors that motivate and influence children to adopt gender-typed behaviors and roles. Research has demonstrated that the “social dosage” of same-sex peers that children interact with influences their adoption of gendered behaviors and that these experiences may influence a wide range of gender-related attitudes and beliefs. New studies explore these individual differences and find that some children form identities and beliefs that allow them greater flexibility and more gender integration in their social lives. Finally, this line of research has motivated the development of an innovative intervention to promote gender-integrated social worlds for children with the goal of enhancing positive and harmonious gender relationships.
150 (744)
POSTER
Social pragmatic features of maternal input and children’s early language development
Tamiko Ogur, Jyunko Hirai & Naoko Hamabe, Tezukayama University
The associations of maternal speech acts with children’s subsequent vocabulary production were examined. Mother-infant pairs of eighteen 9 months, sixteen 12 months, and fifteen 18 months participated. Maternal utterances were coded as follow-in/lead-in and speech acts: attention devices, information asking, command, suggestion, labelling, and description. Partial correlations between maternal speech acts and children’s vocabulary production from CDIs at 24 months controlling for mothers’ utterance frequencies and children’s initial lexicons were computed. Maternal speech acts at 18 months did not affect the later vocabulary production. Follow-in description and lead-in labelling at 12 months were positively correlated with later vocabulary production. Lead-in information asking at 9 months and follow-in information asking at 12 months were negatively correlated with later vocabulary production.

151 (823)
POSTER
“It’s for old things and dinosaur teeth!” Children’s understanding of natural history museums.
Louise Bunce, Winchester University
Objectives: The display of animal taxidermy in Natural History Museums (NHMs) provides opportunities to learn about the natural world, but do children perceive museums as educational or merely for entertainment?
Method: 120 4-9-year-olds visiting the NHM, Oxford, were interviewed about their knowledge of museums (e.g. What is a museum for?) and perceptions of the function and origins of a taxidermy rabbit (e.g. Does it belong in the museum? Was it born?).
Results: Even the youngest children had a basic understanding that a museum is for learning, e.g. by looking at ‘old things’, but understanding the function and origins of taxidermy changed with age.
Conclusions: The results have implications for improving the educational value of children’s museum experience.

152 (1112)
POSTER
The effects of advertising on adults’ and children’s implicit and explicit responses to brands.
Hayley Gilman, Keele University
Objectives: Research suggests that children recognize the persuasive nature of advertisements that use celebrities. The aim of this study was to investigate how simply pairing celebrities with brands influences children’s and adults’ explicit and implicit attitudes to brands.
Method: Celebrities and non-celebrities were paired with real and fake brands. Explicit attitudes to the brands were then tested. Ultimate brand choice was also recorded.

Results: Adults and children showed an explicit (p < .001) and implicit preference (d = .51 children; d = .77 adults) for celebrity brands. Most selected a celebrity brand as their final choice.

Conclusions: Pairing celebrities with brands, without endorsement, leads to more positive explicit and implicit attitudes towards the brand and greater likelihood of brand selection.

153 (1122)
POSTER
Preschoolers’ ability to adapt their behaviour according to others’ knowledge
Fumikazu Furumi, Yukiko Oba & Erika Tsuji, Kyoto University
This study examined if preschoolers can change their behaviour according to others’ knowledge. Thirty-nine preschoolers (4–6 years old) performed a story-telling task, which was developed for this study. First, children watched a film in pairs. After that, one child explained the film to the other. In the next session, the children’s partners were swapped with children who had watched a different film. The children then explained the first film to the new partner. When the children explained the film to the new partner, they included particular names that appeared in the story more frequently than when they explained the film to the former partner. This result suggests that preschoolers can adapt their explanations according to others’ knowledge.

154 (1155)
POSTER
White Water Writers: Giving young people the chance to become published authors in a week
Yvonne Skipper & Patrick Leman, Royal Holloway, of London
Objectives: This research examined the effectiveness of an innovative literary project which allows groups of young people to write and publish a novel collaboratively in a week.
Method: Four groups of young people aged 12-18 (N=37) participated in literary camps. Before participating they completed a questionnaire examining their perceptions of their skills and themselves, e.g. self-esteem. This questionnaire was repeated at the end of the programme.
Results: Although most young people joined the project to improve ‘hard skills’ - such as writing - results suggest that participating in the project led young people to rate both their hard and soft skills (such as teamwork and communication) more positively and also led to increases in self-esteem.
Conclusion: This suggests that innovative programmes such as this can help young people to develop new skills and improve their self-concept.
Younger children’s perceptions of others’ humour
Lucy James, Shannen Fuller & Sofia Zahid, University of Keele

Objectives: Previous research has found that people using adaptive humour styles are perceived more positively than those using maladaptive humour styles. Such research however, is yet to consider children.

Method: 300 children were provided with one of eight vignettes describing either a male or female child, using one of four styles of humour. Participants then completed a questionnaire assessing their perceptions of the child.

Results: A series of 2x4 fully unrelated ANOVAs showed that children using maladaptive humour styles, particularly aggressive humour, were perceived less positively than those using adaptive styles of humour.

Conclusions: Understanding the consequences of different forms of humour in children may be vital in developing ways to encourage positive uses of humour whilst discouraging the use of potentially harmful forms.

Mapping real-world to online vulnerability in young people with developmental disorders: Illustrations from Autism and Williams syndrome
Emma Lough, Durham University

The internet poses a new kind of threat, especially for those individuals already vulnerable in society. The current paper draws on the social phenotypes associated with Autism Spectrum Disorder (ASD) and Williams syndrome (WS) to propose that individuals with some developmental disorders face an elevated level of risk whilst online. Many individuals with ASD struggle to maintain social relations and are frequent users of screen-based technology, using the internet to seek out social connections. Similarly, individuals with WS harbour an extreme pro-social drive to interact with others, both familiar and unfamiliar, and experience difficulties understanding the subtle nuances of social behaviour. Specific risk factors such as these are used to illustrate the case for online vulnerability in developmental disorders.

Development in Cognitive Control of Social Processing: evidence from the Attention Network Test
Francesca Federico, Department of Developmental and Social Psychology; Andrea Marotta & Maria Casagrande, Department of Psychology, University of Rome; Alfredo Spagna, Department of Psychology, Queens College of the City University of New York

In every day life co-occurring stimuli compete for limited attentional resources, and the inhibition of irrelevant information – i.e. executive control function - is crucial for successful decision-making and goal-directed behaviors. Despite the relevance of faces as a drive for social interactions, little is known about the development of executive control towards distracting face-like stimuli. In this study we examined differences in children’s performance on three different attentional network test versions where fishes, pictures of real faces and schematic faces were used to modulate the extent of social information load. Our data showed that 8 and 10
years old children were significantly faster, more accurate and efficient in inhibiting the effect produced by distracting stimuli than children of 6 years old. Further, a similar staircase pattern results for alerting scores. The ability to inhibit the automatic orientation of attention seems to emerge after 8 years, as confirmed by our results.

158 (1189)
POSTER
The effect of Multi-sensory intervention on spontaneous communication and behaviour adjustment of Iranian children with autism
Fatemeh Ahmadi & Lindsay Pennington, Newcastle University

Difficulty in developing spoken language and initiating communication are common in children with autism. They are reported to be associated with problem behaviours and to affect family dynamics.

Picture Exchange Communication System (PECS), Sign language and combination of both PECS and sign were employed to increase spontaneous and functional communication by preschool children with autism in Iran.

Single case experimental design with multiple baselines was conducted, involving 8 non-verbal children over 6 months in a clinical setting.

Most children showed marked improvement in spontaneous communication. Gesture was the most frequent mode of communication. PECS appeared to be the most effective and multi-sensory to be the least effective intervention. Decrease in problem behaviours was observed for most children.

Children’s learning appears to be affected by their autism characteristics. Possible effects of culture, parenting or other factors on children’s learning should be studied further.

159 (1198)
POSTER
Individual differences in developmental trajectories of children’s comprehension of essential and non-essential counting features
Ana Escudero, Purificación Rodríguez, M. Oliva Lago & Cristina Dopico, Complutense University of Madrid

This 3-year longitudinal study aimed to analyse the developmental changes in children’s ability to differentiate essential from nonessential counting features. 24 kindergarteners participated. By means of a computer-presented detection task, children watched a character performing several kinds of counts: (a) Erroneous, (b) correct-conventional (included as control trials), and (c) correct-unconventional or pseudoerrors (with or without statements of the cardinal value of the sets). Children had to judge the correctness of the character’s performance and justify their responses. The findings showed that children’s explanations increased the reliability of the coding criterion. Furthermore, marked individual differences in children’s developmental patterns were found. This research offers a more detailed picture of the developmental trajectories of children’s understanding of essential and nonessential counting aspects.
Awareness of action readiness in executive function development
Nicolas Chevalier, University of Edinburgh

Are children aware of their readiness (or lack thereof) to complete an effortful task effectively? Gaze position was recorded while 27 6-7-year-olds and 29 10-11-year-olds performed a cued task-switching paradigm in which they sorted a target by shape or colour as a function of a task cue presented ahead of the target. Critically, after cue onset, children pressed a button to start target presentation when they felt ready to respond to it. Longer preparation time (cue-target interval) was associated with more accurate and faster responses. Older children showed longer preparation and strategically fixated the cue first, then moved to the target before triggering it. Younger children were less well prepared when they triggered the target, as shown by shorter preparation time and more saccades back to the cue after target onset. Increase in awareness of action readiness with age highlights the contribution of metacognitive processes to executive function development.

Cognitive control and emotion regulation in adolescence
Chiara Malagoli, Department of Educational Sciences; Maria Carmen Usai, Department of Educational Sciences, of Genoa

**Objectives:** Explore the existing relationship between cognitive control and emotion regulation during adolescence. The literature reports some differences from early to late adolescence.

**Method:** A battery of Inhibition tasks involving cognitive (Go-Nogo, flanker, antisaccade) and emotional aspects (Iowa gambling, Emotional Go-Nogo,) plus a self-report about emotion regulation (DERS) was administered to 81 participants, age range 14-19 (data collection in progress).

**Results:** Pearson correlations indicate an association between cognitive inhibition tasks and DERS, moreover between cognitive and emotional aspects of inhibition.

**Conclusions:** Results suggest an association between different inhibitory domains: the ability of pursuing objectives despite the emotional charge with the ability to manage interference; the ability to control impulsive responses with the ability to manage emotional activation.

Preliminary study on analyses of uniqueness in spontaneous speech in Japanese children
Sayuri Takahira, Tamagawa University

**Objectives:** Although experimental studies in children's thinking are important, it is also important to study it in their everyday life. The purpose of this study is to categorise the Japanese children's unique speech in their everyday life and analyse what make them so unique.

**Method:** About 2000 spontaneous speech data in Japanese children (2 to 7 year olds) was collected from a weekly column on a newspaper which parents posted what they thought it was interesting or unique (2000 to 2013). Data was categorized and analysed using qualitative methods.

**Results:** Four patterns of uniqueness in spontaneous speech were identified: mistakes based on phonological affinity; transductive reasoning; personification
analogy; and deductive reasoning, and analysed based on constraints’ theory and inference rules.

163 (1232) POSTER
My teacher, a stranger and me: Who do I trust?
Melisa Sausa & Silvia Guerrero, Universidad de Castilla-La Mancha; Cristina Dopico & Ana Escudero, Universidad Complutense de Madrid

Previous research has shown that children are prone to trust a familiar informant (i.e. mother, teacher…) rather than a stranger when acquiring new information. To examine the generalizability of children’s reliance on familiar informants, thirty-six preschool children from Spain were asked about their confidence in their own teacher vs a stranger in two contexts of decision: Learning new words for new objects and judging the transgression of familiar socio-conventional rules. Results showed that 3 and 5 year-old children trusted their teacher over the stranger when learning new words. However, in the socio-conventional context, there were found differences of age: 5 yr-olds tended to follow their own criteria, independent of their teacher’s opinion, while 3 yr-olds behaved without any stable criteria. These findings will be discussed considering previous research on trust in testimony during childhood.

164 (1237) POSTER
Word learning in preferential looking - simple association, or NOT?
Graham Schafer, University of Reading

Infants’s word learning can be studied using intermodal preference looking e.g. Schafer and Plunkett (1998 - ‘SP98’) demonstrated learning of two newly-encountered words by 17-month-olds. But is such learning ‘linguistic’, or simply classical conditioning? We studied 22 16-month-olds in a replication and extension of SP98. Group 1 was a formal replication of SP98. Group 2 was yoked (same counterbalancing/randomization as Group 1), but auditory stimuli were acoustically reversed versions of those used in Group 1. So Group 2 auditory stimuli much less wordlike (as confirmed in a pre-test with eight adults), whilst preserving their acoustic and mathematical complexity. At test, children in Group 1 looked longer at the matching picture than the nonmatching picture t(10)=2.36, p<.05, d=0.43. Infants in Group 2 did not t(10)=0.073 (group difference t(20)=1.80, p<.05). Thus we replicate SP98 and further suggest that learning reported in SP98 was not simple classical conditioning.

165 (1242) POSTER
A computer mediated role-play approach to measuring children’s social vulnerabilities.
Toni L Fallon & Ruth S Aylett, Heriot-Watt University; Helen Minnis, University of Glasgow

Objectives: Investigates computer mediated role-play technology for measuring indiscriminate friendliness (IF: Socially disinhibited behaviour). IF is currently assessed qualitatively, therefore a standardised measure is warranted.

Method: Children 6, 8, & 10 years-old(N= >50). Two modes of IF measures have been developed; “paper pencil” and computer-mediated role-play tasks. (task modes
matched on themes). Strange Stories employed as a measure of Theory of Mind (ToM). Parent and Teacher versions of the Relationship Problems Questionnaire (RPQ).

**Results:** The developmental trends of IF, their relationship with ToM, and RPQ's. Benefits of using computer-mediated role-play as an assessment tool in contrast to traditional methods.

**Conclusions:** Findings have implications for improving our understanding of IF and informing clinical measurement for socially vulnerable groups of children.

166 (1255)

**POSTER**

Triggers for children’s logic development: holding information online versus talking about it

*Kiloran Metcalfe & Jane Mellanby, University of Oxford*

**Objectives:** Does the development of working memory system underlie qualitative changes in logic, specifically seriation? What develops first: seriation or language to describe it?

**Method:** 102 English-speaking children (47 girls, mean age 6.3 years) were tested individually in two sessions three months apart on measures of seriation, working memory and grammar acquisition.

**Results:** Verbal working memory predicted seriation performance, controlling for age and non-verbal intelligence (p=0.048), while visuo-spatial or verbal short-term memory did not. Passing the seriation test predicted (p<0.01) comprehension of the comparative (sentences with terms such as “bigger”, “longer”, “taller”), controlling for age and non-verbal intelligence, but not the other way round.

**Conclusions:** Working memory and language development are associated with qualitative changes in logic, specifically seriation, but cannot fully account for them.

167 (1260)

**POSTER**

The relationship between media exposure and children’s wellbeing.

*Anna Scarlet, University of Sussex*

**Objectives:** This longitudinal study explored trajectories of children’s wellbeing in response to viewing fictional fear-inducing TV. Trait anxiety and avoidant coping styles (internalising and externalising) were expected to increase among viewers.

**Method:** Participants (N = 51, M Age = 9) completed baseline wellbeing measures and self-selected whether or not to watch a TV show. The wellbeing measures were then repeated 1 and 2 weeks later.

**Results:** ANOVA and MANOVA analyses: Viewers used externalised coping styles significantly less than non-viewers after watching (partial eta squared = .062). Viewers did not express significantly higher anxiety ratings than non-viewers at any time point (partial eta squared = .038).

**Conclusions:** Viewer’s reduced externalising and stable anxiety challenges existing research and suggests that aspects of the viewing experience (e.g. overcoming fears in a safe environment) may increase children’s resilience.

168(1273)

**POSTER**

Feeling bad makes you a better person? Moral emotions and social functioning in deaf children

*Evelien Broekhof, Developmental psychology; Maartje Kouwenberg, Koninklijke Auris*
Objective: Deaf children show more anti-social behaviors than hearing children. Anti-social behavior in hearing children is often due to impaired moral functioning. This develops through social learning, which is more difficult for deaf children. Does impaired moral development explain social problems in deaf children?

Method: 90 (moderately) deaf and 131 hearing children (9-15 years) filled out self-reports about guilt, shame, empathy, and social behaviors on three separate occasions (9-month interval).

Results: Longitudinal patterns of deaf and hearing children are compared to examine the effect of moral development on social behavior, and study the role of social learning.

Conclusions: If moral development contributes to social development in deaf children like in hearing children, this provides new insights on how to improve deaf children’s social functioning.

169 (1291)

POSTER

Empathy and altruism in children and their correlation with socio-cultural factors: a comparative study between Greece and G. Britain

Dimitra Dritsa, University of Athens

Objectives: To comparatively explore school children’s prosocial behaviour (empathy and altruism) in Greece and G.Britain and examine their relationship with socio-cultural factors.

Method: The method of vignettes is utilised for exploring prosocial behaviour in children. Social and cultural parameters are investigated by using a composite questionnaire for parents, consisting of the Personality Questionnaire-Desirable Personality Traits, the Family Values and Family Roles Questionnaires and the Bogardus Social Distance Scale. Factor analysis is conducted for each subscale and factor equivalence is sought before drawing comparisons.

Results and Conclusions: Greek children express more empathy and show greater tendency to altruistic behaviour than their British counterparts. Certain traditional values, family roles and emotional proximity between family members are found to correlate with prosocial attributes.

170 (1310)

POSTER

Preschoolers rectify resource inequalities and ensure fair distribution of necessary goods

Laura Elenbaas, University of Maryland

Objective: This study investigated preschoolers’ allocations of necessary and luxury goods in the context of individual inequalities.

Method: Participants were 3-5 year-olds (N = 93). In a between-subjects design, participants allocated six necessary resources (needed to avoid harm) or six luxury resources (enjoyable to have) to story characters who had many resources (“rich”) or no resources (“poor”).

Results: Participants allocated more luxury resources to the poor character (M = 3.8) than the rich character, but allocated necessary resources equally. Across resource type, older participants allocated more resources to the poor character (M = 3.9), and younger participants allocated equally.

Conclusion: Preschoolers demonstrate both an interest in rectifying resource inequalities and an interest in ensuring that necessary goods are distributed equally.
Comparing methods for assessing manual motor development in the classroom: questionnaires, pencil-and-paper assessments or end-point kinematics?

Liam Hill, Institute of Psychological Sciences; Katy Shire, Institute of Psychological Sciences, of Leeds; Sara Magallon-Recalde, Department of Education, of Pamplona; Peter Culmer, School of Mechanical Engineering, of Leeds

Aim: To evaluate the feasibility of using novel computerised methods (end-point kinematics) to measure manual development in large samples of the general population whilst comparing this technique against two traditional assessment methods.

Methods: 415 students (4-11 years old, 220 Male) from a mainstream UK primary school had their manual dexterity assessed using: (i) a portable kinematic assessment tool (KAT); (ii) a teacher-completed movement skills questionnaire (DCD-Q); (iii) a norm-referenced pencil-and-paper test battery (Beery VMI).

Results: Low levels of agreement (correlational or categorical) were found between KAT, DCD-Q and Beery VMI scores.

Conclusions: Traditional subjective assessments of manual development are poor substitutes for objective, reliable and precise kinematic-recordings which can now be feasibly deployed within classroom (or clinical) settings.

Young Children’s Attitudes towards the Police in the UK

Julie Gawrylowicz, Royal Holloway; Alana James, Royal Holloway, of London

Objectives: Attitudes towards the police become increasingly negative during adolescence but little is known about young children’s attitudes; this study aimed to address this gap.

Method: 118 children aged 5 to 11 years in England completed an attitude scale and a knowledge questionnaire about police activities.

Results: Preliminary analyses identified that children have an accurate understanding of everyday police activities. Attitudes were generally positive, but younger children (aged 5-7 years) displayed more negative attitudes on some items than older children (aged 8-11 years).

Conclusions: Children hold accurate knowledge and positive attitudes towards the police, but further research is needed to explore how some negative attitudes held by very young children become more positive with age.

Adolescent Perfectionism and Eating Disorders: A Focus Group Study of Clinician Perspectives

Susannah Johnston & Joanne Williams, University of Edinburgh

Objectives: Adolescent perfectionism is associated with developmental psychopathology. This study explored clinician perspectives of adolescent perfectionism in order to shed light on the nature of perfectionism as it presents in adolescents with eating disorders.

Method: Four clinicians from differing professional backgrounds within a Child and Adolescent Mental Health Service (CAMHS) team were recruited to participate in a
focus group study of their perspectives and experiences of adolescent perfectionism. The session was audiotaped and transcribed.

Results: Inductive thematic analysis identified 4 core themes: conceptualisation, development, impact of perfectionism, and clinical interventions.

Conclusions: This study provided fresh insight into adolescent perfectionism and its connections with eating disorders. The information identified provides a framework for the advancement of both theoretical and applied work on adolescent perfectionism.

174 (1360)
POSTER
Do maternal interaction styles in high, middle and low socioeconomic status families affect their infant's language development?
Lisa Wheatley, University of Hertfordshire
An exploration of socioeconomic status (SES) differences in interaction of mother-infant dyads during book-sharing. Mother’s verbal and non-verbal behaviours were examined in relation to their infant’s language and communicative development. Mothers from high, mid, and low SES backgrounds were video-recorded viewing two novel picture-books with their infants, aged 10-14 months old, for 10 minutes. Infant’s language, gesture production, and cognitive stimulation in the home environment were measured.

175 (1369)
POSTER
Resilient Fathers and Child Social Functioning
Roni Mermelshtine & Jacqueline Barnes, Birkbeck, University of London
Objectives: The importance of fathers’ resiliency for child development is often overlooked. We demonstrate that paternal resiliency predicts children’s social functioning.

Method: 546 fathers reported on experience of parental care, mental-health at 4 time-points and children’s socio-emotional/behavioural functioning at school-entry. Cluster analysis determined group membership according to parental care and mental-health.

Results: Four clusters: positive care/good mental-health; positive care/poor mental-health; negative care/good mental-health (resilient); negative care/poor mental-health (vulnerable). Children of resilient fathers did not significantly differ in social functioning from children of fathers who experienced positive care. Children of vulnerable fathers significantly vary from all other clusters.

Conclusions: Fathers’ resiliency in the face of adverse care experiences can contribute to children’s adaptive functioning, protecting from intergenerational transmission of negative care.

176 (1382)
POSTER
Do mothers with good theory of mind understand children’s mind easily?
Yuichiro Kikuno, Kyoto University; Haruo Kikuno, Sizuoka Sangyo University
Some studies showed that it is difficult for mothers to understand their children’s mind. These study suggest that the processing of mother’s understanding of children’s mind would be complicate. In this study effects of mother’s childcare anxiety and theory of mind were examined. Mothers were presented question items consisting of mother’s theory of mind and anxiety. The results showed that the
ability of mother’s understanding was depend on mother’s theory of mind and childcare anxiety. These results suggest that even mothers with good theory of mind do not understand children’s mind easily.

177 (1387)
POSTER
Counting constructs: Children's skill in sophisticated probabilistic inference doesn’t help their arithmetic
Amanda Waterman, IPS; Rebecca Sheridan, Oscar Giles & Mark Mon-Williams, IPS, of Leeds
Objectives: Determine whether sophisticated probabilistic inference capabilities emerge before the cognitive skills that underpin arithmetic.
Method: 114 children and 21 adults completed: (i) a dot counting task; (ii) a relative frequency task requiring a judgment on which of three shapes appeared most frequently in a sequence of 36.
Results: (i) Children and adults showed a linear increase between dot number and reaction time but only after dot number exceeded four. (ii) Children showed adult performance even when the frequency difference between shapes was 2/36.
Conclusions: Sophisticated inference capabilities are present well in advance of basic arithmetic skills. The probabilistic capabilities can be ascribed to the perceptual-motor system (system I) with arithmetic requiring the more slowly developing cognitive system (system II).

178 (1410)
POSTER
Distributional learning affects ten-month-olds’ visual categorization, but only for a short time.
Caroline Junge & Maartje Rajmakers, University of Amsterdam
Objectives: Infants track frequencies of occurrences (‘distributional learning’) to guide categorization, as demonstrated for auditory categorization. We examined whether distributional learning also extends to visual categorization.
Method: Thirty 10-month-olds saw all tokens from an 8-step continuum of two objects, either with a unimodal or bimodal distribution. The test was the alternating/non-alternating paradigm of tokens presented equally often across conditions.
Results: whereas infants in the bimodal condition preferred alternating trials throughout test, infants in the unimodal condition initially showed no preference (trial-type x block x condition; p=0.076).
Conclusions: Infants with a unimodal distribution did not initially distinguish between tokens that belong to distinct categories for infants from the bimodal distribution. This suggests that distributional learning indeed affects infants’ visual categorization.

179 (1426)
POSTER
Aspects of home literacy in 6-year-old children at elevated risk of reading difficulties.
Lorna Hamilton, York St John University
Objectives: This study describes literacy interactions in the home and self-perceptions of ability in children at elevated risk of reading difficulty.
**Method:** Family interview data from the fourth phase of a longitudinal study are reported. Participants were 83 children at family-risk of dyslexia (FR), 72 children with language impairment (LI), 70 typically developing children (TD) and their parents.

**Results:** The groups did not differ in the frequency of formal parent-child literacy activities in the home (e.g. homework support). However, a stepwise pattern (TD>FR>LI) was observed in frequency of informal interactions (e.g. shared reading). LI children rated their reading most poorly, in line with concurrently measured reading performance.

**Conclusion:** Children with poor reading engage with print for fun in the home less often than TD peers by age 6, and show awareness of their difficulties.

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**POSTER**

**Are mental rotation and mathematical abilities related to each other in 6-7 and 9-10 year-old children?**

*Tamara Schleepen, Maastricht University; Nina Bien & Hanneke van Mier, Maastricht University, Netherlands*

**Objective:** Studies in adults have shown that the ability to mentally rotate objects is related to (higher-level) mathematical skills. If this relation is also present in (younger) children has not been studied yet.

**Method:** To examine this, 6-7 and 9-10 year-old children performed a mental rotation task, a symbolic and nonsymbolic magnitude comparison task, and an addition task.

**Results:** To assess the possible connection between mental rotation ability and mathematical skills as well as its developmental course, correlation analyses, performed separately in the two age groups, will be presented.

**Conclusions:** If mental rotation ability is found to be related to mathematical skills in (younger) children, this might have important implications for intervention in case of mathematical disabilities.

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**POSTER**

**Theory of mind in children with specific language impairment: A systematic review and meta-analysis**

*Kristine Kahr Nilsson, Department of Communication and Psychology, University; Kristine Jensen de Lopez, Department of Communication and Psychology, for Developmental and Applied Psychological Science, CeDAPS, University*

**Aim:** This meta-analytic review examined theory of mind ability of children with Specific Language Impairment (SLI).

**Method:** Data-bases were searched for studies comparing children with SLI to age-matched typically developing (TD) children.

**Results:** Random effects model synthesizing 13 studies (N= 621) indicated that children with SLI had substantially lower performance on theory of mind tasks compared to TD children (p < .001, Cohen’s d = .97). Tests for funnel plot asymmetry and fail-safe number suggested that the result was robust and unlikely to reflect publication bias.

**Conclusion:** By suggesting that children with SLI have theory of mind impairments the finding underline the need for further investigating the interface between language and social cognition in these children.
Playing hide-and-seek with cognitive impairments in autism

Sarah White, UCL

Autism is a developmental disorder with its biological basis in the brain. Although several cognitive mechanisms have been suggested, the biological cause has yet to be identified. The idea of fractionating autism has been fruitful as there appears to be no mechanism at any level of causality that is sufficient to explain the totality of the autistic syndrome. This does not address heterogeneity between individuals however, a notion that is also widely presumed to be true but which has received much less empirical attention. So are we able to identify an abnormality at any level of explanation that is universal to all individuals with autism? Cognitive heterogeneity has recently been suggested to be more characteristic of autism than any single cognitive profile; large subgroups of individuals with ASD certainly appear to behave ‘normally’ on tests designed to tap into each of the hypothesised cognitive causes of autism. I will present a number of strands of evidence using cognitive and neurocognitive methods that indicate that mentalising difficulties are present in autism, even when mentalising task performance appears completely intact. On the other hand, I will suggest that a local cognitive bias is a source of variation in autism, present in only a subset of individuals. Mentalising abnormalities may after all be a universal feature of autism and provide a neurocognitive phenotype that underlies the impairments in social communication. This lends credence to clinical intuition that a specific impairment can unite very heterogeneous cases, hitherto uncaptured by diagnostic, behavioural or biological measures.

Cross-cultural genetically sensitive investigations into individual differences in motivation, learning, and academic achievement

Yulia Kovas, Tomsk State University, Russia & Goldsmiths, University of London

The symposium presents 4 talks describing recent insights gained from interdisciplinary research into the origins of individual differences in educationally relevant traits. The first talk (Kovas) explores several recent findings from behavioural genetic research in education, highlighting the complex and dynamic processes through which individual differences in ability and achievement emerge. The second talk (Rodic) presents results from two genetically informative cross-cultural investigations into individual differences in children’s mathematical ability and performance. The third talk (Greven) presents insights into the aetiology of Attention Deficit Hyperactivity Disorder. Specifically, the study tested whether the low extreme of the ADHD continuum represents adaptive behavioural and cognitive outcomes and examined genetic and environmental underpinnings of the low extremes. The fourth talk describes how applying genetically sensitive approaches can improve our understanding of the role of environment in children’s academic development and achievement.
PAPER 1
What do we know about genetic and environmental influences on educationally relevant traits?

Yulia Kovas, Tomsk State University, Russia & Goldsmiths, University of London

Behavioural genetic research into educationally relevant traits has moved beyond estimating the relative contributions of genetic and environmental factors to individual differences. Many important findings have recently emerged from this research, suggesting that aetiology of individual differences is multi-factorial, dynamic, and complex. In this talk I will present some latest unexpected results from twin studies. For example, academic achievement - such performance in reading, language and mathematics - has been found to be highly heritable throughout school education in the UK. On the contrary, heritability of general cognitive ability has been found to be only moderately heritable in the early school years. Heritability of general cognitive ability has also been shown to increase gradually, reaching substantial levels in adulthood. It is possible that high heritability of reading and mathematics can be explained by the high homogeneity of educational environments. For example, the UK National Curriculum is highly uniform and therefore may decrease the environmental contribution to the variance in these traits. On the contrary, general cognitive ability is not explicitly taught at schools, and therefore may be under highly variable environmental influences across individuals, especially early in development. As children go through school, they may begin to use their acquired new skills in ways to further develop their general cognitive ability. Active gene-environment correlations, whereby children experience, modify, and select their environments differently, depending in part on their genetic uniqueness, may contribute to the observed increase in heritability of IQ. Other findings from twin studies suggest that the extent to which a person performs similarly in different school subjects largely depends on the effects of the same genetic factors. On the contrary, discrepancies in performance in different subjects seem to largely stem from environmental factors. The results also suggest that individual differences in motivation, interest, and self-esteem develop through complex co-action of genetic and environmental factors. Molecular genetic research has begun to identify specific DNA markers that are involved in genetic effects on educational outcomes. This research suggests that every individual is likely to have a unique combination of genetic variants, each having only a small effect on abilities and achievement. Moreover, each genetic variant contributes to many different traits. Contrary to common opinion, these genetic effects are not static or deterministic, but change throughout life and in different educational and cultural contexts. Further advances in educationally relevant genomic research might help understand the aetiology of individual differences in learning and find ways to improve learning for all.

PAPER 2
Individual differences in mathematical ability: Cross-cultural and molecular genetics investigations

Maja Rodic, Tosto, M., Tikhomirova, T., Malykh, S., & Kovas, Y., Goldsmiths, University of London

Children’s mathematical achievement varies across countries and there is a wealth of evidence to support this finding (PISA, 2012, TIMSS, 2011). Research consistently highlights better mathematical performance of school children from Asian Pacific countries, such as China, Korea, Singapore and Japan. However, the more interesting and perhaps a more important finding is the there is a huge
variation in ability within each country, regardless of their cross-cultural ranking. The results from two genetically informative cross-cultural investigations into individual differences in children's mathematical ability and performance are presented. First study has evaluated 626 5-7-year-old children in the UK, China, Russia, and Kyrgyzstan on a cognitive test battery measuring: (1) general skills; (2) non-symbolic number sense; (3) symbolic number understanding; (4) simple arithmetic - operating with numbers; and (5) familiarity with numbers. The findings show small inter-population differences with 13% of the variance in arithmetic skills explained by the sample, replicating the pattern, previously found with older children in PISA. Furthermore, the same cognitive skills were related to early arithmetic in these diverse populations. Second study presents the novel approach to study genetics of cognitive traits –using the perspective of rare genetic disorders. A brief description of cognitive profiles of two genetic syndromes – Williams and Prader-Willi – is given and it is discussed what can be learnt from rare genetic pathologies about normal variation in educationally relevant traits. The results from a molecular genetics association study, investigating specific genetic regions implicated in these syndromes in a normal population are presented. The importance of both culture and genetics will be discussed.

PAPER 3
Do high and low extremes of the ADHD trait continuum represent maladaptive outcomes? A population-based twin study
Corina Greven, Radboud University Medical Centre Nijmegen, Donders Institute for Brain, Cognition and Behaviour, Department of Cognitive Neuroscience, the Netherlands, Karakter Child and Adolescent Psychiatry University Center, The Netherlands, King’s College London, Institute of Psychiatry, United Kingdom; van der Meer, J. M. J. & Buitelaar, J.K., Radboud University Medical Centre Nijmegen, Donders Institute for Brain, Cognition and Behaviour, Department of Cognitive Neuroscience, the Netherlands, Karakter Child and Adolescent Psychiatry University Center, The Netherlands; Rommelse, N., Karakter Child and Adolescent Psychiatry University Center, The Netherlands, Radboud University Medical Center, Donders Institute for Brain, Cognition and Behavior, Department of Psychiatry, The Netherlands; Plomin, R., King’s College London, Institute of Psychiatry, United Kingdom

ADHD is thought to reflect the high, symptomatic extreme of a quantitative trait continuum that is subject to genetic and environmental influences. One implicit assumption is that the low extreme represents higher functioning; however it is possible that extreme deviations in either direction on clinical continua may both represent maladaptive cognitive and behavioural outcomes. From an evolutionary perspective, scoring in the mid-range of the continuum may represent a favourable trade-off between advantages and disadvantages of extreme polygenic liabilities. This study aimed to test whether the low extreme of the ADHD continuum represents adaptive behavioural and cognitive outcomes, and to examine genetic and environmental underpinnings of the low extremes. Data came from 1050 16-year old twin pairs from a UK population-representative sample (the Twins Early Development Study). Individual differences in ADHD traits were assessed on a continuum from low to high using self-ratings on the Strength and Weaknesses of ADHD symptoms and Normal behaviour (SWAN) questionnaire. ADHD traits were related to child behavioural (internalising, externalising problems and positive behaviours), academic and cognitive outcome measures using polynomial regression. Group heritability of high and low extreme scores on the ADHD trait was obtained using DeFries-Fulker extremes analysis. Significant linear relations between the
ADHD trait and the outcome measures suggested that the low extreme of the ADHD trait was associated with more positive behavioural, academic and cognitive outcomes than the high, symptomatic end. Moreover, group heritability was high and significant for the high, symptomatic extreme, but was non-significant for the low extreme. Studying the correlates of the low continuum extreme may deepen our understanding of the mechanisms underlying positive behavioral, academic and cognitive functioning. Finding significant group heritability suggests that there are genetic links between the high distribution extreme and normal variation in ADHD traits. However, the low extreme appears to carry a lower genetic loading.

**PAPER 4**

**Heritable yet Malleable: Environmental Influences on Adopted Children’s Academic Achievement**

Gordon Harrold, Leslie D. Leve, Daniel S. Shaw, Misaki N. Natsuaki, David Reiss Jenae M. Neiderhiser, Rudd Centre for Adoption Research and Practice, University of Sussex, Brighton, UK

Past research using an adoption design, where rearing parents and children are not genetically related, has identified significant mean level effects of rearing environment on child IQ. These findings are notable, given the high heritability and modest shared environmental influences on scholastic achievement during childhood highlighted by past twin-based studies in particular. The present study used data from Cohort I \( (n = 361 \text{ children}) \) of the US-based Early Growth and Development Study (EGDS), a prospective adoption study, to examine genetic and environmental influences on children’s academic achievement. Woodcock Johnson achievement subscales were administered to adopted children in first grade (age 7) and to adoptive parents and birth parents in adulthood. Correlational analyses revealed a lack of association between children’s achievement scores and adoptive mothers’ and fathers’ achievement scores (0 of 10 correlations were significant, mean \( r = .02 \)). In contrast, significant associations between adopted children and birth mothers’ and fathers’ achievement scores were identified (9 of 10 correlations were significant, mean \( r = .19 \)), suggesting a genetic transmission mechanism to academic achievement scores. However, when standard mean level scores were examined, adopted children’s achievement scores more closely resembled their adoptive parents’ scores than their birth parents’ scores. For the four reading domains, adopted child standard scores were approximately one \( SD \) above birth parent scores and .5 \( SD \) above adoptive parent scores, with means of 109.17 \( (SD = 12.82) \), 96.19 \( (SD = 11.08) \), and 103.93 \( (SD = 8.13) \), respectively. For math, the adopted child standard score \( (M = 99.83; \ SD = 15.48) \) fell in between that of birth parents \( (M = 89.51; \ SD = 14.12) \) and adoptive parents \( (M = 105.81; \ SD = 10.97) \). Overall, these findings are consistent with Scarr’s adoption findings related to IQ, suggesting that adoption is associated with mean level increases in children’s achievement, despite the greater magnitude of association between adoptive child and birth parent vs. adoptive parent achievement scores. The important role of families on children’s scholastic achievement, even when biological relatives have lower achievement, will be discussed.
185 (1207)
SYMPOSIUM
Processes underlying cognitive flexibility in childhood
Lily FitzGibbon, University of Sheffield
Cognitive flexibility allows us to update our thoughts and behaviour according to changes in the environment. Despite its importance, much is still unknown about the processes that underpin cognitive flexibility during development. This symposium highlights the key component skills required for cognitive flexibility in childhood. Using a variety of paradigms across a broad age range (2 to 10 years) we show how working memory, inhibition, priming, context monitoring and sensitivity to feedback enable the development of cognitive flexibility.

PAPER 1
Two types of cognitive flexibility in 2- to 4-year-olds: Differential contributions of working memory and inhibitory control
Emma Blakey & Daniel Carroll, University of Sheffield
The current study examined how working memory (WM) and inhibitory control (IC) contribute to the development of two different types of cognitive flexibility (CF) from two to four years. Ninety-six children completed measures of WM, IC and two closely matched CF tasks: one requiring children to switch rules while resolving perceptual conflict; and the other requiring them to switch rules while ignoring task irrelevant information. The two kinds of CF were associated with different core executive functions. WM was related to resolving conflict. IC was related to ignoring task irrelevant information. These data indicate that WM helps children to maintain in mind the current task rule, while IC helps children to suppress their attention to irrelevant information.

PAPER 2
Exploring the role of priming in the development of cognitive flexibility
Lily FitzGibbon, University of Sheffield
Priming of stimulus-task associations impairs children’s ability to flexibly switch between tasks. This priming can be manipulated by changing the set size of the tasks – increasing the set size reduces priming effects. This study investigated whether priming is driven by individual stimuli or stimulus categories. 186 five- to ten-year-olds completed a cognitive flexibility task in one of three set-size conditions which varied in the number of individual stimuli and categories on the tasks. There were two main findings: there was a shift from individual- to category-level priming between five and eight years and the effects of priming decreased with age. These results suggest that individual- and category-level priming affect cognitive flexibility at different points during its development.

PAPER 3
Cognitive flexibility and context monitoring in 7- and 9-year-olds
Joanna Lucenet, Aix-Marseille University
Children’s ability to adjust to changes in context is a potentially crucial factor in the development of cognitive flexibility. Eighty 7- and 9-year-olds performed a cognitive flexibility task in which context monitoring was assessed by manipulating task-switch frequency (low vs. high conditions). The contribution of proactive-control was assessed using an AX-Continuous Performance Task. Results showed that cognitive flexibility was modulated by switch frequency in both age groups. Importantly, the more proactive children were the better they adjusted to the
switch frequency. These results highlight that context monitoring plays a crucial role in children’s flexibility which depends on the ability to use context information to anticipate task response.

**PAPER 4**

*Preschoolers learn to switch with causally related feedback*

*Bianca van Bers & Maartje Raijmakers, University of Amsterdam*

Training cognitive flexibility is of great interest, but not easily achieved. In three experiments we study the effects of feedback on preschoolers switch behavior in the Dimensional Change Card Sorting (DCCS) task. Feedback was connected to the stimulus and causally related to children’s behaviour. Experiments 1 and 2 show that children receiving feedback on their post-switch behaviour performed better than children administered a standard DCCS task. This effect transferred to a subsequent standard DCCS task after five minutes and after one week. Experiment 3 shows that children switched to the new post-switch sorting rules and not to rules that oppose the pre-switch sorting rules. These results highlight preschoolers’ sensitivity for the design of feedback in learning an abstract rule.

**DISSCUSSANT**

*Dr Nicolas Chevalier, University of Edinburgh*

**186 (1371)**

**SYMPOSIUM**

From the laboratory to the learning environment: The roles of social-emotional competence and social understanding in academic and psychosocial adjustment, targeted interventions, and educational policy.

*Amanda Aldercotte, University of Cambridge*

Children’s social-emotional competence and social understanding are presently hot topics in the realm of educational policy. With the common thread of social-emotional learning in mind, the papers in this symposium depict snapshots of the stages associated with transforming academic research into educational policy. From discerning what skills nurture positive development to assessing novel interventions, creating valid measures of such skills, and evaluating the effectiveness of current educational programs, this symposium offers a unique combination of longitudinal, experimental, and nation-wide research.

**PAPER 1**

*Social-emotional and executive function development from toddlerhood to late childhood: A combinative impact on social and academic success.*

*Amanda Aldercotte & Rory Devine, University of Cambridge*

**Objectives:** To investigate the links between children’s executive functions (EF), social-emotional competence (SEC), and later feelings of self-worth, academic competence, and social acceptance. **Method:** A socially diverse sample of 87 children participated at ages 2-, 3-, and 10-years-old. **Results:** Path models revealed stability in EF and SEC development, however, the relations between these domains varied across childhood and developmental outcomes. EF and regulated/prosocial behaviour supported the emergence and continuity of later SEC behaviours. Although EF and SEC at age 3 were important for feelings of self-worth
at age 10, regulated/prosocial behaviour promoted academic competence while social acceptance was impacted by aggression.

**Conclusions:** The combinative roles of EF and SEC are important to address in designing and assessing educational interventions.

**PAPER 2**

**Longitudinal associations between children’s psychosocial and academic outcomes.**

*Michael Wigelsworth, University of Manchester*

**Objectives:** To model longitudinal associations between secondary school pupils (N ≈ 4,000) psychosocial and academic outcomes, through a developmental cascades model.

**Method:** Drawing on a nationally representative database, structural equation modelling (SEM) is used to examine emotional intelligence, internalising symptoms, externalising problems and academic performance across two year period.

**Results:** Data suggests some evidence for psychosocial difficulties leading to later academic difficulties (adjustment erosion) and that academic difficulties lead to later psychosocial difficulties (academic incompetence). The role of shared risk – effects above varying as a function of ‘third variable’ risk (e.g. socio-economic status) will also be discussed.

**Conclusions:** The analysis provides an important contribution to developmental theory, which can in turn inform prevention and intervention efforts.

**PAPER 3**

**The Starting School Survey (Triple S): Evaluating a brief measure of school readiness.**

*Claire Hughes & Sarah Foley, University of Cambridge*

**Objectives:** Developing a simple measure of school readiness is important for both research and practice. We have developed a new 30-item measure, the Starting School Survey (SSS) and tested its sensitivity and test-retest reliability.

**Method:** Staff from schools/nurseries in areas of deprivation have completed the SSS for 1500 2- to 5-year-olds; we are currently gathering further ratings to assess test-retest reliability and age-related change.

**Results:** All 5 SSS subscales (language/ cognition, socio-emotional skills, self-regulation, daily living skills, family support) show robust effects of age, gender, family income and birth-order. Test-retest reliability and age-related change in SSS scores will also be reported.

**Conclusions:** The SSS is a promising instrument for screening children who require extra educational support.

**PAPER 4**

**Promoting theory of mind in middle childhood: A training program.**

*Federica Bianco, University of Pavia; Rory Devine & Claire Hughes, University of Cambridge; Robin Banerjee, University of Sussex*

**Objectives:** We developed a conversation-based ToM training for 9- to 10-year-old children and measured its effectiveness.

**Method:** We recruited 91 children that were assigned either to the intervention (N = 45) or to a control condition (N = 46). The two groups were matched at pre-test for gender, age, socio-economic background, verbal ability, reading comprehension, executive function, and ToM.
**Results:** The intervention group showed significantly greater gains in ToM than the control group; this contrast was stable over two months. The improvement in ToM: a) was independent of any changes in executive functions, and b) generalized to a novel film-based ToM task.

**Conclusions:** Our findings showed the importance of conversations for shaping children’s ToM in middle childhood.

**Examining the ‘Social and Emotional Aspects of Learning’ (SEAL) programs and its associations with school ethos, pupil social experiences, attendance, and attainment.**

*Robin Banerjee, University of Sussex*

This last paper is the discussant. Professor Banerjee will be reviewing his recent work on the 'Social and Emotional Aspects of Learning' (SEAL) programs that have been rolled out nationally in both primary and secondary schools. More specifically, he will focus on the various factors associated with the school environment that impact its implementation and effectiveness.

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**187 (1223)**  
**WORKSHOP**  
“**It’s a different set of rules isn’t it?” Experiences of the Post-16 Transition from Compulsory Education for Individuals with High Functioning Autism, including Asperger’s Syndrome, and their Parents.**

*Charli Franklin, London Borough of Tower Hamlets Educational Psychology Service*

The post-16 transition can be challenging for young people with High Functioning Autism including Asperger’s Syndrome (HFA/AS) and can take a toll on their parents. However, little formal evidence of the psychological impact of this transition exists. This research explores the experiences of post-16 transition from compulsory education for those with HFA/AS and their parents. Seven participants were selected using purposive sampling, of which four were parents and three were young people with HFA/AS. Participants were interviewed and Interpretative Phenomenological Analysis was used to analyse the interview transcripts.

Three overarching themes were identified: Managing in the Wider World, Knowing How to Support the Young Person and Making Sense of the Transition Process. Connections were made between these themes, relevant psychological theories and recent research. This study highlights the challenges and support experienced by parents and young people with HFA/AS during this transition.

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**188 (1388)**  
**BRIEF EMPIRICAL REPORT**  
**Personality and Empathy as Determinants of Adolescents’ Evaluation of Ostracism**

*Kate Ellis-Davies, University of Cambridge*

As children develop, they become keenly aware of social norms, and the ostracism that may befall transgressors (Over & Carpenter, 2009). Adolescence has been described as a period of development characterized by increased sensitivity to group identification. Evaluations of those who are ostracized may be negative or more sympathetic. While idiosyncratic measures have been examined in evaluating the experience of being ostracized, they have not yet received attention as predictors of perception of ostracism in other individuals. This study is the first to explore idiosyncratic variation in adolescents’ responses to ostracism of another individual. Twenty adolescents personality, empathy and family type were assessed.
through questionnaires. Subsequently, adolescents viewed videos of abstract ostracism vignettes (taken from Over and Carpenter, 2009). Analysis assessed idiosyncratic predictors of adolescence attribution of blame to the ostracized character. Discussion of results will relate to the need for individual differences approaches within studies of ostracism.

189 (1370)
BRIEF EMPIRICAL REPORT
Does the Majority Always Know Best? Young Children’s Flexible Trust in Majority Opinion
Shiri Einav, University of Nottingham

Objectives: Copying the majority is an adaptive social learning strategy but the majority does not always know best. Do children trust the majority even when a dissenter has privileged knowledge and should be trusted instead?

Method: 4-6 year-olds (N=103) heard conflicting claims about the identity of hidden drawings from a majority and a dissenter: in one condition, the dissenter had privileged knowledge over the majority (he drew the pictures); in another he did not (they were drawn by an absent third party).

Results: Overall, children were less likely to trust the majority in the Privileged-Dissenter condition. Moreover, older children made majority-based inferences when the dissenter had no privileged knowledge but systematically endorsed the dissenter when he did.

Conclusions: By 5 years, children can make an epistemic-based judgement to decide whether or not to follow the majority, rather than automatically following the most common view.

190 (1350)
BRIEF EMPIRICAL REPORT
Siren: using multiplayer digital games to improve children’s conflict resolution skills
Richard Joiner & Ella Beaney, University of Bath; Adam Joinson, University of the West of England; Gordon Ingram, Bath Spa University; Jeppe Nielsen, Serious Games Interactive

The ability to resolve conflicts is essential to the development of children's friendships. Several interventions exist for facilitating this development, but few have been designed to exploit the advantages of digital games. The aim of this study was to investigate whether playing an especially designed multiplayer digital game (Village Voices) improved children’s conflict resolution skills. The study consisted of a pre-test, 4 game play sessions and a post-test. The 11 year old children were split into a game playing group (n = 20) and a control group (n = 17). The findings showed that they found Village Voices motivating to play and it generated numerous conflicts. There were no significant differences between the groups in terms of pre-test and post-test measures of conflict, however over time children were more likely to use more positive conflict resolution strategies and 3/5 of the groups developed their own rules for dealing with conflicts.

191 (1235)
BRIEF EMPIRICAL REPORT
Cross-cultural variability in children’s sensitivity to group consensus
Ileana Enesco & Siyu Quan, Universidad Complutense de Madrid; Cristina Cascado & Silvia Guerrero, Universidad de Castilla-La Mancha
To what extent are children sensitive to group consensus? What is the role of dissenters in children's decisions? Are there cultural differences? These and related questions have become a focus of interest in recent developmental research. This paper compares findings of a series of studies with preschoolers from Spain and China. Participants faced different scenarios (i.e., function of new objects; judging social or moral rules) in which they had to make decisions after listening either to the conflicting opinions of a majority vs. a dissenter (Dissenter condition), or to the opinion of just a unanimous majority (Non-dissenter condition). Across scenarios and conditions, results revealed some remarkable cross-country differences, particularly in the non-dissenter condition. Overall, Chinese preschoolers were more likely than Spaniards to side with the consensus. Discussion focuses on the meaning of the observed cultural variability in children's sensitivity to consensus.

192 (1064)
BRIEF EMPIRICAL REPORT
How Do Cross-ethnic Friendships Relate to Positive Psychological and Academic Outcomes Amongst Children? The role of Self-disclosure and Affirmation
Sabahat C Bagci, Madoka Kumashiro, Adam Rutland, Peter K Smith & Herbert Blumberg, Goldsmiths of London
Objectives: We examined interpersonal processes whereby cross-ethnic friendships may relate to psychological well-being (PWB) and academic well-being (AWB), testing cross-ethnic friend self-disclosure and ideal-self affirmation as mediators in these associations.
Method: Cross-ethnic friendship quality, self-disclosure and affirmation, PWB (well-being and resilience) and AWB (academic self-concepts and level) were assessed among 243 White European and 241 South Asian children (aged 11) recruited from multiethnic schools around London.
Results: Multilevel SEM's showed that affirmation mediated the effects of quality on PWB and AWB for Asians and on PWB for Whites. Self-disclosure mediated the effects of quality on PWB for Asians. For both groups, self-disclosure mediated the effects of quality on affirmation.
Conclusion: Findings demonstrate that cross-ethnic friendships in multiethnic settings may contribute to well-being through positive interpersonal processes.

193 (1367)
BRIEF EMPIRICAL REPORT
Development of gender knowledge and preferences about toys : looking to 4 year-old children's reasoning
Veronique Rouyer, Laboratory PDPS; Yoan Mieyaa, Laboratory PDPS, of Toulouse 2
Interaction with toys can be seen as the gateway to many aspects of children's gender development in early childhood. The present study examined the reasoning of four-year-old boys' and girls' classifications and preferences of toy pictures. A total of 102 children were shown male, female, neutral toy pictures and asked to tell which ones they preferred, to identify « boy » and « girl » toys, and to explain why they had made these choices. The preschoolers showed differential patterns to link gender knowledge and preferences for toys, and two main explanations ("egocentric"; "familiarity"), based on the way they refered to their socialization experiences within family and nursery school, mainly with their relationships with sibling and peers.
BRIEF EMPIRICAL REPORT
Children's preferences for gender-typed toys: a systematic review, meta-analysis and meta-regression.
Brenda K. Todd, Department of Psychology; Steven Di Costa, Institute of Cognitive Neuroscience, College London; Amanda Green, Department of Psychology, University London; John Barry, Institute of Women's Health, College London
The biological and environmental origins of sex-typed behaviour are investigated in studies of children's play with gender-typed toys. We report a systematic review of typical children's toy preferences in 25 groups of children from 14 studies based in various Western countries. Participants were 585 boys and 632 girls, aged between one and eight years. Boys and girls played with 'gender-typical' toys significantly longer than 'gender-atypical' toys. Meta-regression showed no significant effect of child's age, publication date, geographical location of the study or of adult presence, but gender differences were greater in the home rather than child care contexts. These findings suggest a role for both nature and nurture in gender-typed toy preference and have implications for education and child care.

BRIEF EMPIRICAL REPORT
Being Good Boys and Girls: The Development of Differential Gender-Typing of Prosocial Behaviour in Adolescence
Ben Hine, University of West London; Elian Fink, University College London
Objectives: This study explored adolescents' gender-typing of prosocial behaviour from 11-16yrs. Along with other stereotypes, the stereotype that prosocial behaviour is broadly feminine consolidates in adolescence. In response, boys may perform more prosocial behaviours that have masculine qualities.
Method: 998 adolescents (11-16yrs) in 5 age groups were asked to rate 25 prosocial behaviours using a 5-point masculinity/femininity scale.
Results: Principle components analysis assessed whether participants' ratings could be explained by common components. From 12yrs onwards, a component emerged representing behaviours rated as distinctly masculine.
Conclusions: This study shows that adolescents, from 12yrs onwards, gender-typed some behaviours as masculine. This may represent adolescents' recognition that boys perform more masculine, and fewer feminine behaviours in response to gender-based pressure from peers.

BRIEF EMPIRICAL REPORT
Predicting prosocial behaviour at 5 and 7 years of age: Does it matter if you are a girl or a boy?
Rebecca-Lee Kuhnert & Marc de Rosnay, University of Sydney; Elian Fink, University College London
Objectives: To investigate gender differences in how socio-emotional understanding predicts prosocial behaviour using a prospective longitudinal design.
Method: Children were assessed at 5 years (58 boys, 56 girls) and 7 years (49 boys, 47 girls) on social understanding, emotion understanding and vocabulary. They were observed in triadic peer interactions coded for prosocial behaviour at both timepoints.
Results: Linear regression analyses showed girls were significantly more prosocial than boys at both timepoints. At 7 years, emotion understanding significantly
predicted prosocial behaviour for girls only, controlling for social understanding and vocabulary.

**Conclusions:** Prosocial behaviour may be influenced by emotion understanding for girls but not boys. This has implications regarding the gender-differentiated role of prosocial behaviour in children's peer relations.

**197 (1204)**

**BRIEF EMPIRICAL REPORT**

**Unconditional acceptance and educational outcomes: A structural model of gender differences**

Evanthia Makri-Botsari, ASPETE; Maria Spanoudaki, MA in Education, EdD student of Roehampton University, London

The purposes of the study were: a) to explore the effects of unconditionality of acceptance by parents and teachers on students' perceived acceptance by socializing agents and learning outcomes as indexed by academic intrinsic motivation, academic self-perception, and academic achievement; and b) to detect gender specific patterns in the associations among the aforementioned constructs. To test the role of gender as a moderator, a multi-group analysis was employed within the framework of structural equation modelling. The results on a sample of 427 adolescents showed that conditionality of acceptance undermined level of perceived acceptance for both social agents. Unconditionality of teacher acceptance exerted stronger influences on students' educational outcomes, with effect sizes being larger for girls than for boys.

**198 (1219)**

**BRIEF EMPIRICAL REPORT**

**Gender in children's accounts of “what a scientist does”**

Fiona Lyddy, National University of Ireland Maynooth

**Aim:** Gender role modelling is an important aspect of motivation to enter STEM. This study examined representations of gender in children's accounts of 'what a scientist does'.

**Method:** Sixty children (aged 6-8) wrote on the topic “What does a scientist do?” and drew a picture. Responses were analysed for gender references and other patterns.

**Results:** Gender was mentioned in 70% of accounts and almost half of all accounts presented scientists as male. Gender was more evident in pictures than in text. References to a male scientist were equally likely to be made by boys or girls. Only girls referred to a female scientist.

**Conclusion:** Gender stereotypes are evident in children's accounts of scientists, which may have implications for STEM motivation.

**199 (1340)**

**SYMPOSIUM**

**You are not like us! How the intergroup context informs children’s social reasoning**

Jellie Sierksma, Ercomer, Netherlands

Understanding the developmental roots of group based biases is important to improve peer relations and avoid perpetuation of social inequality. This symposium describes recent research into how children (8-15 years) understand and reason about intergroup behavior. The symposium will include data collected from the United States, Britain, and the Netherlands, and will examine group based biases.
with regard to ethnic, school and friendship contexts. Together, this symposium yields new insights about the role of intergroup processes in children’s daily lives.

PAPER 1
Children's ethnic group attitudes and peer relationships in the context of the classroom
Patrick J Leman, Department of Psychology, of London; Yvonne Skipper, School of Psychology, University; Dawn Watling, Department of Psychology, Holloway, of London; Adam Rutland, Department of Psychology, College, of London
We assessed the implicit and explicit ethnic attitudes of 9 year old children (N=499) 4 to 6 weeks apart, and additionally collected sociometric data to compare attitudinal measures with children’s real friendship choices. Findings from our multi-ethnic sample (white/European and South Asian) reveal that children’s ethnic group attitudes follow predicted ingroup bias; that is, both South Asian and white European children showed implicit preference for their own ethnic group. However, explicit ethnic group attitudes revealed an unexpected outgroup bias. Social relationships (sociometric ratings and friendship choices) also seem to reflect ingroup preference and this become more pronounced over time. The present study supports previous findings of growing ethnic homophily and cleavage in relationships across middle to late childhood.

PAPER 2
Children's Perceptions of the Group Attitudes of their Classmates
Jochem Thijs, Ercomer
Several studies have demonstrated the normative importance of in-group peers for children’s group attitudes and intergroup behaviors (e.g., Abrams, Rutland, Pelletier, & Cameron, 2009; Nesdale, 2008). Much of this research involves experiments in which children’s perceptions of peer norms are systematically manipulated. However, outside the laboratory peer norms are not always clearly communicated, and an important question is how children arrive at their perception of the norms of real-life reference groups. In our study, we examined native-Dutch preadolescents’ perceptions (n = 339) of their classmates' attitudes toward various ethnic groups. Multilevel modeling showed that these perceptions depended on classmates’ actual attitudes, but also on ethnic classroom composition and peer acceptance.

PAPER 3
Children and adolescents' interpretations of peer based social exclusion
Shelby Cooley, Department of Human Development, Park; Melanie Killen, Department of Human Development, of Maryland, Park
The aim of this study was to investigate 9-year-old and 13-year-old U.S. children’s decisions about inclusion and exclusion in peer contexts that varied along three dimensions: 1) peer contexts were same-race or interracial; 2) messages about exclusion were covert or overt; and 3) messages about exclusion came from peers or parents. In addition, survey-based data were collected for participant race, identity and intergroup-contact. Novel findings from the on-going study reveal that African-American participants evaluated interracial exclusion as more wrong than their European-American counterparts and more wrong than exclusion in a same-race context. Additionally, 9-year-olds and 13-year-olds differentially evaluated peer and parent messages about exclusion. The findings will be discussed in light of intergroup theories, racial identity development, and moral reasoning.
**PAPER 4**  
**Understanding age differences in bystander helping: An intergroup approach**  
*Sally Palmer, School of psychology; Lindsey Cameron, School of psychology, of Kent*

This study examined the role of intergroup factors (e.g., social identity, ingroup norms, social-moral reasoning) to investigate the developmental decline in helpful bystander responses to bullying. Participants (N=113) aged 8-10 and 13-15, observed a student from another school (outgroup) targeting a student from the participants’ school (ingroup). Participants indicated ingroup identification, bystander norms, bystander intentions, and reasons for their response. Moderation analysis showed that social identification and ingroup norms were important for adolescents’ bystander responses only. Furthermore, adolescents prioritised psychological reasons for their bystander response, whereas younger children prioritised moral reasons. In line with developmental predictions, intergroup theory extends what we know about when and why young bystanders help bullied peers. Implications for school-based interventions will be discussed.

**PAPER 5**  
**In-group bias in children’s helping can be overpowered by inducing empathy**  
*Jellie Sierksma, Ercomer; Jochem Thijs & Maykel Verkuyten, Ercomer, University, The Netherlands*

An experimental vignette study was conducted among children (8-13 years) to examine whether inducing empathy is an effective intervention to overpower group boundaries in children’s helping. Children were induced or not induced to empathize with the recipient of help, who could be part of their group of friends or not. Children intended to help in-group peers more compared to out-group peers. However, when empathy was induced they intended to help friends and non-friends equally much. Inducing empathy was effective independent of the recipient’s level of need and children’s social perspective taking ability. Encouraging children to imagine how a recipient of help feels, might thus be a powerful strategy to prevent group based biases from influencing children’s helping.

**200 (1471)**  
**SYMPOSIUM**  
**The dynamics of multiple systems in cognitive development**  
*Ingmar Visser, University of Amsterdam*

Dual or multiple systems theories are ubiquitous in cognitive development, with examples in memory, reasoning, categorization, and other subfields. In this symposium we present a number of examples in cognitive development where multiple systems are assumed to influence observed behavior, for example an implicit and a verbal system in reasoning about floating and sinking. Detecting the existence of multiple systems requires suitable analytical methods that are also presented along with the substantive gains that are made by applying such methods.
PAPER 1
Children’s thinking about sinking: how predictions tell a different story than justifications.
Rooske Franse & Maartje Raijmakers, University of Amsterdam
Objectives: The objective is to give a systematic description of children’s knowledge on floating and sinking, which includes both implicit and verbalizable knowledge.
Methods: Participants: 139 children (4 - 12 years; 76 boys) were tested at a Dutch primary school.
Task and Procedure: Children were asked to predict buoyancy of different types of 3D objects (abstract blocks, blocks of well known materials, and well known objects). Afterwards they were asked to justify their choices in a structured interview.
Results & Conclusion: Mathematical modeling of the data revealed that children were advanced in predicting buoyancy of objects and blocks, integrating volume and mass. Verbal knowledge was less advanced, mostly referring to one dimension only, referring to facts, and only weakly related to age.

PAPER 2
A latent variable approach to reveal short term memory strategies for serial order in primary school children.
Gabriela Koppenol-Gonzales, Tilburg University/Erasmus University Rotterdam; Jeroen Vermunt, Tilburg University; Dr Samantha Bouwmeester, Erasmus University
Objectives: In studies on the development of cognitive processes, the differences between age groups are often interpreted as developmental differences. We argue that this approach is problematic, because systematic variance in cognitive performance within an age group is considered to be measurement error.
Methods: We used a latent class analysis to investigate developmental differences in short term memory strategies by studying the serial position curves of 210 primary school children.
Results & Conclusion: The results indicate that five latent classes can be distinguished in which children show qualitative and quantitative differences in memory performance. Some children clearly used a verbal strategy while others used a visual strategy to solve the memory tasks. A small group of low performing children seems to use a mix of ineffective strategies.

PAPER 3
A longitudinal study on the changes in verbal and visual short term memory processes.
Gabriela Koppenol-Gonzales, Tilburg University/Erasmus University Rotterdam; Jeroen Vermunt, Tilburg University; Dr Samantha Bouwmeester, Erasmus University
Objectives: Developmental research on memory processes does not give a clear picture of the developmental course of the verbal and visual memory systems. The objective of the current study is to examine individual differences between children in the development of short term memory processes.
Methods: We presented 210 children (5-12 years) with short term memory tasks. From this group, 30 children were presented three additional times with the tasks during a year.
Results & Conclusion: A combination of latent class analysis and a Markov model were used to distinguish individual differences in memory development. The
assumed developmental pathway of visual processing to verbal processing was not found, showing large individual differences between and within children.

PAPER 4  
Development of representational shifts in category learning  
Verena Schmittmann, Tilburg University  
Objectives: In adults, learning ill-defined categories may involve shifts and changing interactions between multiple learning systems over time. In the present study, we investigate how learning system recruitment and shifts between learning systems develop from childhood to adulthood.  
Method: 155 6- to 12-year-old children and 28 adults underwent extensive training on an ill-defined category structure similar to a study in adults by Johansen and Palmeri (2002). We performed preliminary latent Markov analysis of categorization response patterns.  
Results: Participants applied several rule-based and exemplar-based categorization strategies. Random guessing appeared a common strategy in younger children. Older children and adults were more likely than younger children to successfully apply rules. Children and adults may shift from initial rule-based to later exemplar-based categorization.

PAPER 5  
It's a Catastrophe! Testing the dynamics between competing cognitive states  
Ingmar Visser, University of Amsterdam  
Objective: Dual or multiple systems theories are ubiquitous in cognitive development. Dual systems theories require specification of the dynamics between the components. Competition between multiple systems results in particular dynamics, and the objective of the current work is to provide a model for such dynamics.  
Methods: We present a dynamical systems approach to describe the interaction between multiple systems of cognitive functioning. A number of predictions are derived from the model, among them bimodality, divergence, and hysteresis.  
Results & Conclusion: We develop parametric tests for these predictions, using latent class and latent Markov models, and apply them in a longitudinal data set of the conservation of liquid task.

201 (1327)  
SYMPOSIUM  
Children and Adolescent's Interactions with Animals: An Under-Researched Area of Developmental Psychology  
Jo Williams, University of Edinburgh  
Children's interactions with animals effect both children's development and animals' welfare. This symposium brings together researchers from three teams across the UK to examine different aspects of children/animal interactions. We consider positive developmental outcomes associated with pet ownership and also the negative impact dog bites can have on children's lives. Throughout the symposium educational interventions are highlighted as an important approach to enhancing safe and positive children/animal interactions. The symposium considers the relevance of child/animal interactions for developmental theory.
PAPER 1
Adolescents and Pets: Associations Between Pet Ownership, Developmental and Health-related Outcomes
Ferran Marsa Sambola, Janine Muldoon & Candace Currie, University of St Andrews; Alistair Lawrence, Scotland's Rural College

Objectives: This study examines the associations between pet ownership and a range of health and developmental variables in questionnaire-based survey with a large sample of UK adolescents.

Methods: A sample of 11,288 11-15 year-olds completed the Health Behaviours in School-aged Children Survey in school, including items on pet ownership and a range of health and developmental indicators.

Results: Children who owned pets reported significantly fewer physical fights; less peer victimisation; fewer somatic and psychological symptoms, lower levels of alcohol and tobacco use, and higher academic achievement.

Conclusion: Pet ownership is associated with a range of positive developmental outcomes. Discussion will focus on possible mediation factors that may underlie these findings.

PAPER 2
Development of Attitudes Towards Animals During Adolescence
Melanie Connor & Alistair Lawrence, Scotland's Rural University

Objectives: Adult attitudes towards animals and interest in animal welfare are greatly influenced by childhood experiences. We are interested in the development of human attitudes towards animals and their relationship with empathy levels.

Method: A UK-wide online questionnaire launched in February 2014 with an expected sample of 600 adolescents (12-17 years) aims to investigate adolescents’ attitudes towards animals using affect and utility as determinants and empathy using the IRI and a human-animal empathy measure.

Results: Data analysis is conducted using multivariate statistics. Analyses include correlations between empathy levels, gender, age, pet ownership and attitudes towards animals.

Conclusion: This study provides insights into the development of human attitudes towards animals, which may be indicative of human-human empathy development.

PAPER 3
Children and Dogs - Risks and Safety Interventions
Kerstin Meints, University of Lincoln

Objectives: We investigated how children and adults interpret dogs’ facial expressions and body language using an intervention to improve knowledge.

Method: We tested 4-7-year-olds and adults (N=24 per age) cross-sectionally with still images and 3-5-year-olds (N=124) longitudinally and adults (N=38). We obtained participants’ judgements and eye-tracked looking behaviour.

Results: While adults make hardly any mistakes with still images, 4-7-year-olds often misinterpret dogs’ aggressive facial expressions as “happy”. With videos, repeated measures ANOVAS revealed 3-5-year-olds and adults showing errors before intervention, with children again misinterpreting dogs showing teeth as “happy”. After intervention, children from age 4 and adults show significantly improved knowledge.

Conclusion: For safe interactions it is vital - and possible - to teach children and adults dogs’ signalling.
PAPER 4
Measuring Benefits to Scottish Male Young Offenders in the First Prison-based Dog Training Programme in the UK
Rebecca Leonardi, Gill McIvor & Sarah-Jane Vick, University of Stirling

Objectives: This paper examines the perspectives of young men involved in the first prison-based dog training programme in the UK, ‘Paws for Progress’. Human-animal interaction programmes used in prisons are reported as successful in improving emotional, social and practical outcomes for young male offenders.

Methods: The voluntary sample consists of 72 male young offenders who completed the course PAWS dog-training course. Thematic analysis was applied to semi-structured interviews conducted pre- and post-participation.

Results: Young men benefit in many ways, for example increasing their patience and confidence, improving their social interactions as well as gaining qualifications and skills.

Conclusion: The results are discussed in relation to the development of the intervention and future directions for research in this field.

PAPER 5
Promoting Positive Child/Animal Interactions Through Enhancing Understanding of Animal’s Welfare Needs: An Intervention Study
Jo Williams, University of Edinburgh; Alistair Lawrence, Scotland’s Rural College

Objectives: This study evaluated an educational intervention designed to improve primary school children’s understanding of animals’ welfare needs, empathy, attachment to pets and attitudes towards animals.

Methods: A sample 410 9-10 year-olds in 16 school classes participated. Half of the classes participated in the intervention, and half formed a control group. Children completed pre-test, post-test and delayed-post-test questionnaires comprising a range of standardised and bespoke measures.

Results: The intervention group demonstrated significantly greater knowledge gains than the control, but there were no intervention effects on empathy, attitudes, or attachment to pets.

Conclusion: The intervention improved children’s understanding of animals’ welfare needs but had little impact on empathy, attitudes and attachments.

202 (1293)
WORKSHOP
More shame than guilt? Moral emotions and social behavior in children with Autism
Marieke de Bruine, Psychology, Netherlands; Mark de Rooij, Psychology, University, Netherlands; Lex Stockmann Stockmann, Centrum Autism, Netherlands; Carolien Rieffe, Psychology, University, Netherlands/Dutch Foundation for the Deaf and Hard of Hearing Child, Netherlands

Objective: Moral emotions like shame and guilt relate to avoidant and approaching social behavior respectively in typical developing children. Problems with interpreting social situations in children with autism may cause a different pattern. Possibly, autism is related to more shame than guilt.

Method: 81 children with autism and 132 control children (9-15 years) filled out self-reports about guilt, shame and social behaviors. The questionnaires were administered at 3 times with 9 months in between.
**Results:** Levels and effects of guilt and shame on social behavior will be examined with longitudinal (multilevel) analyses. These patterns will be compared between children with autism and control children.

**Conclusion:** These outcomes will give new insights in the relation between social understanding and moral development.

**204 (1163)**
**BRIEF EMPIRICAL REPORT**
**Using Eye Tracking to Explore the Impact of Visual Distraction in the Classroom for Pupils with Autism or Language Impairment**  
*Mary Hanley, Rachel Wilson, Mariam Khairat & Korey Taylor, Durham University; Martin McPhillips, Queen’s University Belfast*  
Eye-tracking studies show how attention in autism is atypically captured by non-social information (background, objects etc.). We report data from a novel eye-tracking investigation exploring the impact of visual distraction on learning for children with autism (CWA) and children with language impairments, compared to TD children. Using bespoke video stimuli simulating school lessons and manipulating levels of visual distraction, we tracked children’s eye movements while they watched the lessons and tested learning afterwards. Preliminary analyses showed that visual distraction had a dramatic impact upon attention allocation during learning tasks that was even greater for children with autism than those without autism. The results provide a detailed understanding of how children with and without developmental difficulties cope with learning in typical classroom environments.

**205 (1107)**
**BRIEF EMPIRICAL REPORT**
**MeASURE: A systematic review of tools for evaluation of outcomes of early intervention in young children with autism spectrum disorder (ASD).**  
*Inelegwu Oono, Jacqui Rodgers, Magdalena Glod & Shannon Roalinob, Newcastle University; Jennifer Hanratty, Nuala Livingstone, Queen’s University Belfast; Caroline Terwee, VU University Medical Centre Amsterdam*  
**Objectives:** This review examined the measurement properties of tools used to evaluate outcomes in children up to six years with ASD.  
**Methods:** Following a systematic review to identify tools used in longitudinal and early intervention studies in ASD, we conducted a systematic review of their measurement properties using the COSMIN checklist (Consensus-based Standards for the selection of health Measurement Instruments).  
**Results:** 189 tools were identified in 10,261 papers. 2,665 papers were found concerning 132 searchable tools, and data extracted from 128 papers about 57 of these tools. Evidence for the most robust tools will be presented.  
**Conclusions:** This review collated evidence about use of outcome measurement tools in early ASD. With input from parents and other stakeholders, recommendations about robust tools and gaps in measurement of outcomes were developed.
A training study to enhance verbal short-term memory performance in individuals with Down syndrome, providing ordered pictorial associations

Liz Smith, University of Bristol

This study aimed to enhance verbal short-term memory in individuals with Down syndrome (DS), 17 individuals with DS (age 5-27 years) participated; half took part in an active control condition before training. Memory span was recorded multiple times before and after training. During training, participants received phonological and semantic pictorial links on a visual story board to aid recall of verbal items. Active control participants received irrelevant pictures on the board. While participants did not make significant use of the pictorial associations, significant benefits across all participants were observed simply as a result of the visual conceptual aid for ordered recall. Those experiencing larger benefits with the visual board displayed greater subsequent memory span improvements. These results have implications for interventions/education.

Deferred imitation as a measure of episodic-like memory in infants and toddlers with Down syndrome

George Ball, Esha Massand & Annette Karmiloff-Smith, CBCD, of London

Objectives: Growing evidence suggests that episodic-like memory in individuals with Down syndrome (DS) is severely delayed, but this has rarely been researched in DS infancy.

Method: A deferred imitation, 5-step paradigm was used to measure episodic-like memory, targeting fifty 6-60-month-olds with DS, matched to MA-/CA-controls. The child performs immediate imitation, followed by deferred imitation at 10-minutes and 24-hours. Immediate recall assesses encoding; subsequent imitation assesses memory retrieval, with memory for actions tapping semantic memory and memory for sequence tapping episodic-like memory.

Results: Infants with DS tend to imitate actions but ignore sequence; toddlers with DS imitate actions and partial sequences. Further analyses will compare with MA-/CA-controls.

Conclusions: Semantic memory is better than episodic-like memory from early in the DS trajectory.

What do 6-year-olds know about body posture?

Dorothy Cowie & Eliana Zampieri, Durham University; Andrew J Bremner, Goldsmiths

Objectives: We used the Rubber Hand Illusion to investigate children’s perception of own-body posture.

Method: 6- to 7-year-olds and adults experienced synchronous visual-tactile stimulation on a real hand and a fake hand. The fake hand was either at the same orientation has the real hand, or in an anatomically impossible posture.

Results: Following stimulation, participants were asked to point under their own index finger. There were main effects of group and fake hand orientation. Most importantly, children but not adults pointed further than baseline towards the impossibly-angled fake hand.
Conclusions: Children rely on sight of a hand to judge body posture. They strongly rely on visual information which not only conflicts with current proprioceptive input but indicates an impossible posture.

210 (1164)
BRIEF EMPIRICAL REPORT
Attachments and Interactions in Infants with Atypical Appearance: A Systematic Review
Catherine Tyerman & Andrew Thompson, Sheffield University
Objective: Identify studies examining interactions and attachments in infants with atypical appearance.
Method: Studies were included if they examined interactions or attachment in infants with a condition causing a visible difference. Databases searches used derivatives of attachment and congenital abnormalities entered in pairs, with no limitation to publication date. All articles were assessed for quality using a recognised procedure.
Results: Nineteen studies were found. They suggested that atypical appearance did not affect attachment, but did reduce quality of parent-child interaction. Attachments developed over time, with evidence to support visible difference potentially increasing strength of attachment.
Conclusion: Clinicians might wish to monitor parent-child interactions in children with an atypical appearance. Further research examining the relationship between interactions on attachment is required.

211 (1425)
BRIEF EMPIRICAL REPORT
Look at Mii: Children’s sense of identity using a Wii
Isabella McMurray & Rebecca Bell, University of Bedfordshire
Children’s representation of themselves through drawings has been found to give an insight into their self-concept, emotional and cognitive development. However, despite the literature base on individuals’ representation of themselves using new technologies, this has focused on adults. This novel study aimed to explore how children represent themselves through the creation of a ‘Mii character’ on a Nintendo Wii with 30 children (aged 3-7 years old). All the children selected a congruent gender; there were differences in which skin colours children selected. Younger children found it harder to verbalise why they picked their mii character. Children also selected characteristics similar to their parents or a fictional character. Using Mii characters might help our understanding of other aspects of children’s development.

212 (1398)
BRIEF EMPIRICAL REPORT
Face perception, g, and social development
Nicholas Shakeshaft & Robert Plomin, King’s College London
Objectives: Recent twin studies report that individual differences in face perception (the identification and recognition of faces) are as heritable as general cognitive ability (g), but unrelated both to non-facial recognition and to g. This study examines these findings and considers their antecedents in social functioning in infancy, childhood and adolescence.
**Method:** 1000 twin pairs from the Twins Early Development Study (TEDS) completed cognitive and self-report face and object recognition measures at age 18.

**Results:** Model-fitting analyses found high heritability for face (60%) and object (70%) recognition. Face recognition correlated genetically with object recognition (0.34) and with g (0.24).

**Conclusions:** Genetic influences on face perception overlap significantly with non-facial perception and g, although much domain-specific genetic influence remains.

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**BRIEF EMPIRICAL REPORT**

The robust and embodied nature of the SNARC effect is revealed through fast action selection

*Amanda Waterman, IPS; Rebecca Sheridan, Mark Mon-Williams & Oscar Giles, IPS, of Leeds; Maaike von Rooijen, Radboud University, IPS, of Leeds; Bert Steenburgen, Radboud University*

**Objectives:** Western individuals show shorter reaction times responding to smaller numbers with the left hand and vice-versa (SNARC effect). Does this reflect hardwired sensorimotor maps (embodied) or transient learning (short-term associations)?

**Method:** 39 adults and 132 children aimed movements to an unmarked number-line where a central number specified required location, and colour indicated line direction (number increasing leftwards or rightwards). Two consistent direction blocks (counterbalanced) preceded a mixed direction block.

**Results:** In adults a large SNARC effect occurred in the mixed block regardless of preceding block direction but was negligible in the consistent blocks. Children’s data are being analysed.

**Conclusions:** Mental flexibility allows adults to learn new spatial-numerical maps but the default representation is rightwards, predicted by embodied cognition.

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**BRIEF EMPIRICAL REPORT**

Findings from a Physical Activity intervention for Children with ADHD and Reading Difficulties: Impact on Cognition and Behaviour.

*Josie Booth, University of Dundee; Phil Tomporowski, University of Georgia; Bryan McCullick, University of Georgia; John Reilly, University of Strathclyde*

**Objectives:** This research explores whether physical activity (PA) improves cognition and behaviour in children with Attention-Deficit-Hyperactivity-Disorder (ADHD), reading-difficulties (RD), and co-occurring ADHD-and-RD.

**Method:** 80 children in total, aged 9-12, completed tasks assessing executive functions and attainment. Parents and teachers completed behaviour questionnaires. Half of the participants then took part in a PA programme. Following this, all participants will complete the same measures as at baseline.

**Results:** Data collection is ongoing. It is anticipated that the PA programme will have an impact on cognition, attainment and behaviour. Greater improvements are expected for participants with developmental-difficulties than typically-developing-controls; however it is not possible to say which group will benefit most.

**Conclusions:** Results may have implications for children, families and policy.
BRIEF EMPIRICAL REPORT
The developmental trajectory of boundary-cue bias in spatial navigation: An unexpected journey
Alastair Smith, School of Psychology; Matthew Buckley & Mark Haselgrove, School of Psychology, of Nottingham

Objectives: Adults learning to navigate enclosed spaces have been found to prefer information provided by the boundaries of the environment, as opposed to landmarks within it. Children aged five and seven years do not display a preference for either cue, suggesting that a boundary bias occurs after seven years.

Method: We recruited 5-11 year old children, as well as an adult sample, in order to explore the developmental profile of this putative change. Participants were required to navigate to a hidden goal in a virtual environment, the location of which was signalled by both boundary and landmark cues. At test, these cues were placed into conflict to assess search preferences.

Results: Although adults were biased towards using boundary information, older children demonstrated a preference for landmarks.

Conclusions: The boundary bias may be a comparatively late developing trait, and one that could supersede an initial preference for landmarks.

BRIEF EMPIRICAL REPORT
Exploring the developmental course of potential precursors and the emergence of ADHD symptoms in early childhood with a longitudinal community sample.
Mirjam Meeuwsen & Stephanie van Goozen, Cardiff University

Objectives: Data from the Cardiff Child Development Study (CCDS) were used to examine the predictive power of possible precursors and the stability of ADHD symptoms in early childhood.

Methods: 332 expecting mothers were recruited during pregnancy and families were followed up five times for data collection.

Results: Temperamental activity levels at 6 months predicted later ADHD symptoms at 33 months (measured using the CBCL subscale). Children’s activity levels during several tasks at 6 and 33 months predicted ADHD symptoms as well as performance on a battery of executive functioning tasks. Executive functioning at 33 months was also related to concurrent ADHD symptoms.

Conclusions: This suggests that some longitudinal continuity is found in early childhood for possible precursors to ADHD symptoms.

BRIEF EMPIRICAL REPORT
Adolescents, Attention and Aggression: ADHD predictors of aggressive behaviours
Saffron Morris, University of Birmingham

The study aimed to examine ADHD in relation to the four distinct manifestations of aggression; Overt, Relational, Reactive and Instrumental. Method: 293 adolescents completed a questionnaire assessing the four dimensions of aggression and the Conner3AI screening for ADHD. Findings: The research found four significant ADHD predictors of aggression: aggression was a significant individual predictor of all 4 forms of aggression. Family relations was a significant individual predictor for overt reactive aggression for females (β=.14, p<.05) and relational reactive aggression for...
males (β=.23, p<.009). Hyperactivity/ impulsivity was a significant individual predictor of overt reactive aggression for both males (β=.34, p<.002) and females (β=.31, p<.001) and positive impressions was a significant individual predictor of relational instrumental aggression for females (β=.16, p<.04).

218 (1320)
SYMPOSIUM
Pictorial understanding and drawing in children with typical development and autism.
Calum Hartley, Lancaster University
This symposium integrates research on pictorial understanding in typical development and autism. First, we review the developmental trajectory over which typical children learn that pictures are symbols (Jolley). Second, we investigate whether typical 4- to 8-year-olds understand how photographers and artists create pictures (Armitage & Allen). Third, we explore whether children with and without autism reflect on artists’ intentions when comprehending pictures (Hartley & Allen). Finally, we examine why children with autism display deficits in imaginative drawing (Allen & Craig).

PAPER 1
The developmental understanding of the symbolic nature of pictures from birth to 5 years.
Richard Jolley, Staffordshire University
Objectives: To describe and explain the developmental understanding of the dual (i.e. symbolic) nature of pictures.
Results: Babies show a rudimentary discrimination and recognition between pictures and their real-world referents, although they may still display some uncertainty that the pictorial contents are different from those of the referent. It is not until at least two years of age before the toddler understands the one-to-one correspondence between pictures and their specific referents. By around 4 years of age they can simultaneously hold in mind both the representational and distinct features of pictures.
Conclusions: Both picture-specific understanding and cognitive flexibility contribute to a mature concept of the symbolic nature of pictures.

PAPER 2
Photographic representation: Intentionality and referent knowledge.
Emma Armitage, Lancaster University
Objectives: Experiment 1 addressed whether children use photographer’s intentions as a source of pictorial information. Experiment 2 investigated when children recognise that photographers must be in the presence of their referents, while artists can draw from memory and imagination.
Method: Sixty-four 4- and 6-year-old children participated in Experiment 1. Sixty-four 6- and 8-year-old children participated in Experiment 2.
Results: In Experiment 1, children relied more on artist’s, than photographer’s intentions, when labeling pictures. In Experiment 2, 6 and 8 year olds were equally proficient at identifying what artists and photographers need to know about their referents.
Conclusions: From a young age, children are aware that modality affects picture interpretation; they know photographs are less dependent on their creators than drawings.

PAPER 3
Is children’s naming and drawing of pictures mediated by representational status? Evidence from typical development and autism.
Calum Hartley, Lancaster University
Objectives: To identify whether children with typical development (TD) and autism reflect on representational status when comprehending 2-D shapes.
Method: Sixty-four TD children aged 2–5 years (Experiment 1) and twenty children with autism (Experiment 2) were shown line drawings roughly shaped like familiar objects, and were informed that they were either intentional or accidental creations. Children were asked to name and draw each shape.
Results: TD children only evidenced a preference for symbolic shape-based naming when pictures were intentional representations, and more frequently drew the symbolised referents of intentional stimuli. By contrast, representational status did not influence naming or drawing in children with autism.
Conclusions: Picture comprehension in TD (but not autism) is not exclusively shape-based – the meaning of a 2-D shape is determined by the intentions of its creator.

PAPER 4
Melissa Allen, Lancaster University
Objectives: Research suggests children with Autism Spectrum Disorder (ASD) have difficulty with imagination expressed in drawings. We examine two competing hypotheses: this is due to either planning deficits or reflects a general imaginative deficit.
Method: Sixteen children with ASD (CA 13.5, MA 8.3) were matched to 16 children with learning disability. They were asked to draw ‘impossible’ entities both spontaneously and with a template, and to combine two entities into one ‘unreal’ entity.
Results: Children with ASD were impaired with spontaneous pictures but no group differences were found using a template. The ASD group also had difficulty combining two entities.
Conclusions: Deficits in imaginative drawing in ASD are linked to planning difficulty.

DISCUSSANT
Norman Freeman, University of Bristol

219 (1303)
SYMPOSIUM
Bullying into Perspective
Carolien Rieffe, Leiden University
The current symposium presents a new and unique combination of studies, highlighting broader issues related to the bullying process, including the effectiveness of a school intervention program, the social goals in bullying, the effect of bully-related roles like defenders and outsiders, the causal link with
emotions, and the effect of self- versus peer-report, using cross sectional and longitudinal designs. Additionally, bullying roles and causes are compared between typically developing children and children with autism, emphasizing the influence of social learning on the development of bullying.

**PAPER 1**

**Bullying in high school: Impact of a peer mediation program**  
*Lidon Villanueva, University Jaume I Spain*

**Objective:** To analyze the impact of peer mediation programs on bullying in high schools

**Method:** This impact was measured by 1) roles adopted in the conflict (aggressor, helper, victim, defender, and bystander); 2) attitudes to victims; and 3) school climate. Two public high schools in Spain with similar characteristics were compared: one developing a peer mediation program, and one without such a program. Questionnaires were obtained from students (12-15 years old, N = 323), at Time 1 (baseline), and Time 2 (after the program was implemented).

**Results:** The outcomes supported the validity of the mediation program.

**Conclusion:** Schools can increase pro-victim attitudes in students, and improve their school climate, which contributes to the prevention of bullying.

**PAPER 2**

**Social goals as key mediators of bullies’ responses to provocation**  
*David Smalley, University of Sussex*

**Objectives:** Bullies are known to display distinct patterns of reasoning about social situations. Two studies evaluated a variety of social goals as potential mediators of the associations between bullying and behavioral responses to hypothetical situations.

**Method:** A total of 352 children aged seven to ten received peer-nomination scores for bullying and also responded to hypothetical vignettes involving ambiguous provocation.

**Results:** Specific social goals in the hypothetical situations remained significantly associated with bullying after controlling for other biases and also mediated pathways between bullying and both cooperative and aggressive responses to provocation.

**Conclusions:** The results point to the theoretical significance of social goals in understanding the behavioral profile of bullies, and also raise important issues for intervention in school settings.

**PAPER 3**

**Do outsiders become bullies or remain outsiders? The role of moral emotions and moral disengagement**  
*Marina Camodeca & Angela Mazzone, University of Chieti*

**Objectives:** We aimed at investigating whether outsiders’ behaviour was stable or whether it evolved into bullying, proposing that its development depended on shame, guilt, and moral disengagement.

**Method:** Students (N = 98; Mage T1 = 11.33 years; SD = 0.99) were tested with a 9-months interval. They completed questionnaires about moral disengagement and moral emotions, and nominated peers for bully and outsider roles.

**Results:** Regressions showed that outsiders with low scores on guilt at T1 were at risk of becoming bullies at T2 (Beta = 1.29*), whereas outsiders displaying high levels of shame at T1 remained outsiders at T2 (Beta = 1.16**).
Conclusions: These outcomes highlighted the importance of considering morality in explaining the outsiders’ longitudinal involvement in bullying.

PAPER 4
Bullied to be shamed? Bullying and (moral) emotions in children with or without an Autism Spectrum Disorder
Carolien Rieffe, Marieke De Bruin & Mark De Rooij, University of Leiden; Lex Stockmann, Center for Autism
Objective: Does shame evoke bullying, or vice versa? This question also applies to other emotions, such as anger and anxiety. Question is if the causal relationship that is found for typically developing children, also applies to children with an Autism Spectrum Disorder (ASD).
Method: 120 children with and without ASD (9 – 15 years old) filled out self-reports about their emotions and how often they experienced bullying. Children filled out these questionnaires 3 times, with 9 month interval.
Results: Patterns between these variables are compared between children with and without ASD to examine differences in causal relationships.
Conclusions: Detecting between-group differences shows that bullying in children with ASD has a different etiology than for typically developing children.

PAPER 5
Self-reported and peer-reported bullying in autism versus community high schools
Elian Fink, University College London; Frits Goossens, Tjeert Olthof & Sander Begeer, Free University
Objectives: Examine self- and peer-reported bullying, victimisation and defending behaviour among adolescents with and without autism.
Method: Autism (N = 28; Mage = 13.1 years) and control (N = 520; Mage = 12.9 years) participants reported on their own and peers’ bullying, victimisation and defending behaviour.
Results: Adolescents with autism had similar rates of self- and peer-reported bullying and victimisation compared to control children. However, they were less likely to self-report defending behaviours compared to control adolescents, although there was no group difference in peer-reported defending behaviours.
Conclusions: These findings indicate the pivotal role of informants when examining bullying in autism or typical groups and highlight the similarities and differences of bullying roles among special and mainstream educational settings.

220 (1262)
SYMPOSIUM
Cognitive Bias Modification in adolescents with psychopathology: Promising vistas?
M. J. Van der Molen, VU University
Recently, Cognitive Bias Modification (i.e., CBM) paradigms have been developed that target misinterpretations and or attentional biases in order to treat and prevent psychopathology in adolescents. This symposium gives a state-of-the-art overview of CBM in adolescents to reduce anxiety and depression (presentation 1), obsessive compulsive disorder (presentation 2), reactive aggression (presentation 3) and in adolescents to prevent them from using alcohol and cannabis (presentation 4). The symposium ends with discussing the possibilities and limitations of CBM in adolescent psychopathology.
**PAPER 1**

**Attentional bias modification in adolescents: how to reduce anxiety and depression?**  
*L. De Voogd, P. Prins & E. Salemink, University of Amsterdam*

A negative attentional bias plays an important role in the etiology of anxiety and depression. Research has shown that attention bias modification (ABM) can be effective in changing attentional bias and emotional vulnerability. Given the peak prevalence of emotional disorders in adolescence, we investigated the preventative potential of ABM in this age-group.

The current study tested two types of ABM (and other cognitive trainings, not presented here) in unselected adolescents. Participants (aged 11-18) were administered 8 online sessions (2x/week) of dot-probe (n=128), visual search (n=126) or placebo control training (n=164).

Compared to control, the visual search training was successful in reducing attentional bias, stress-reactivity and perseverative negative thinking. It also affected depressive symptoms in those with higher baseline symptoms.

**PAPER 2**

**Augmentation of psychological treatment with Cognitive Bias Modification training in adolescents with OCD**  
*E. Salemink, University of Amsterdam; E. De Haan, Academic Center for Child and Adolescent Psychiatry, Bascula*

Misinterpretation of intrusions is an important problem in Obsessive Compulsive Disorder (OCD). The first line of treatment for adolescents with OCD is Cognitive Behavioural Therapy, however there is room for improvement. Recently, promising Cognitive Bias Modification (CBM) training paradigms have been developed that target misinterpretations in anxiety. The aim of the current pilot study was to examine the added value of CBM-I training to CBT in adolescents with OCD (n=16).

Results indicated that both patients themselves and clinician rated the trained patients as having less obsessive symptoms after training. No changes were observed in the placebo group. This small randomised controlled trial is suggestive, regarding the promising additive effects of CBM-I training in an adolescent clinical population.

**PAPER 3**

**New intervention for reducing aggressive behavior? Retraining hostile interpretation bias.**  
*M. Van der Molen, VU University; E. Salemink, University of Amsterdam*

Aggressive adolescents tend to show hostile interpretation bias, they interpret ambiguous information in a more hostile way than do non-aggressive peers. Recent studies showed that negative interpretation bias can be retrained with a Cognitive Bias Modification training directed at Interpretations (CBM-I). However, till date, a CBM-I training is never tried to reduce hostile interpretation bias in aggressive adolescents. For the current study, a CBM-I training is developed to retrain hostile interpretation bias.

Forty reactive aggressive adolescents (age range 12-16) were selected, of which 20 adolescents were randomly assigned to the CBM-I, consisting of five 20-minutes-sessions.

Results revealed that the trained adolescents showed less hostile interpretation bias and less reactive aggression compared to the control group.

**PAPER 4**
Prevention of addiction: Using serious games to motivate adolescents to (re)train their brain

W. Boendermaker & R. Wiers, University of Amsterdam

Alcohol- and cannabis use among adolescents is a major societal problem. They are at risk of weakened cognitive functioning, declining school performance and later addiction problems. Dual Process Models of addiction propose that restoring an imbalance between weakened cognitive control and too strongly developed automatic reactions to drug-related cues can remedy, and possibly prevent, the development of these problems. Although these trainings appear effective in long-time users, their use for prevention in adolescence proves tougher, possibly because of a lack of motivation to train. To counteract this, we have developed a motivating serious game around these trainings. We will discuss results from our current game-training study, focused on attention- and approach bias modification (ABM) as well as inhibition training.

DISCUSSANT

H. Larsen, University of Amsterdam

The symposium ends with discussing the possibilities and limitations of CBM in adolescent psychopathology.

221 (1312)  
BRIEF EMPIRICAL REPORT

How does culture - animistic versus mechanistic - influence children’s understanding of Earth shape and night and day cycle?

Valerie Frede, UT2/Psychology

There is a debate on the relative roles of cultural transmission, presuppositions and teaching on children understanding in astronomy. We expect that children who evolve in a mechanistic culture develop more scientific knowledge in astronomy than children in an animistic culture, in accordance with daily testimonies.

176 French and Burkinabe’s primary school children of grades 1, 3 and 5 have been interviewed at school, about astronomy concepts. We observe that 1) french children answer more scientifically than burkinabe’s children; 2) the answers are mainly fragmented.

Our study highlights the important role of cultural mediation on the acquisition of scientific knowledge in astronomy and the fragmentation nature of this knowledge. No evidence for presuppositions appeared even in the animistic culture.

222 (1313)  
BRIEF EMPIRICAL REPORT

Analysis of children’s knowledge structure about gravitation with LCA method (Latent Class Analysis)

Soren Frappart & Valerie Frede, UT2/Psychology

Do children construct mental models or do they have fragmented knowledge about scientific concepts? For the first time, we study the nature, structure and development of knowledge about gravitation acting in different contexts (i.e. on Earth and beyond).

144 French children from 5 to 18 years old had to predict and justify a dropped stone trajectory. We observe both linear and U-shape developmental curves depending on the context where gravitation is tested. Additionally, coherent patterns of predictions associated to specific justifications are found.
The coherency observed with the LCA method, on a narrow aspect of gravitation knowledge, in contrast with the fragmentation found for children's knowledge in astronomy (broad area), might be explained by the number of questioned topics.

**223 (1349)**

**BRIEF EMPIRICAL REPORT**

**The role of cognitive, affective and motivational factors in children's conceptual change in astronomy**

*Sherin Salem, University of Buckingham*

**Objectives:** Research examining the role of cognitive, affective and motivational (CAM) factors has primarily been conducted with children beyond the primary school years, often focusing on domains other than astronomy. Therefore, the objective of the present study was to clarify the role of CAM factors in young children's conceptual change in astronomy.

**Method:** Participants were 60 children between 8-10 years. CAM factors were assessed and subsequently re-assessed following an instructional intervention designed to elicit conceptual change.

**Results:** Although data collection is ongoing, preliminary analyses indicated that CAM factors each had a significant role in children's conceptual change.

**Conclusions:** This study has implications for the development of interventions based on CAM factors to promote conceptual change among children in the domain of astronomy.

**224 (1233)**

**BRIEF EMPIRICAL REPORT**

**Observation, description and explanation in primary school science**

*Andy Tolmie, Institute of Education*

**Objectives:** Children show accurate tacit awareness of cause-effect relations from infancy, whereas language-based ideas about causation exhibit inaccuracies, possibly because they derive from conversation and interact with perception in complex ways.

**Methods:** Seven to nine year olds (N = 92) were asked to describe and explain instances of melting, freezing, evaporation and condensation, which vary in the extent to which they are observed and referred to conversationally.

**Results:** Performance on description and explanation was best for melting, worst for condensation. For melting and freezing, explanations were related to expressive language, descriptions to terminology. Neither predicted the other. For evaporation, explanations and descriptions were mutually predictive.

**Conclusions:** Given the underlying patterns of exposure, the data indicate understanding of each state change is influenced by observation and language. Where available, conversation influences explanations and these are dissociated from description. Where conversational influence is less, explanations are generated in bottom-up fashion via description.

**225 (1449)**

**BRIEF EMPIRICAL REPORT**

**Sensorimotor drivers of spatial remapping of touch: Effects of sensorimotor training on somatosensory ERPs in infants**

*Jannath Begum Ali, Goldsmiths; Andrew Bremner, Goldsmiths, of London*

To know where a touch occurs in external space we need to localise the sensation first on the limb, and then take into account the position of the limb in external
space. This study investigates whether the sensorimotor experience of moving the limbs into different positions drives this process of somatosensory remapping in the infant brain. 15 typically developing infants aged 6.25-6.5 months were tested on a battery of motor assessment and reaching tasks. We recorded cortical somatosensory evoked potentials from infants whilst presenting vibrotactile stimuli to their hands across crossed- and uncrossed-hands postures before and after they engaged in a game which involved reaching across the midline (10 minutes every day for 2 weeks). Data collection is currently under way. This presentation will discuss our findings and the further research to be conducted.

226 (1391)
BRIEF EMPIRICAL REPORT
The neural basis of shared touch in human infancy
Silvia Rigato, University of Essex, of London; Aleksandra Romanska & Andrew J. Bremner, Goldsmiths, of London
Objectives: We investigated the development of vicarious tactile representations in 8-month-olds by examining whether their somatosensory evoked potentials to touch are modulated by observing touch delivered to another person.
Method: 13 infants were presented with vibrotactile stimuli to their hands whilst observing a dynamic display in which a brush moved to touch either another person’s hand (touch condition) or a table top next to that person’s hand (baseline condition).
Results: The baseline condition differed significantly from the touch condition between 150 and 200 ms.
Conclusions: Observing touch delivered to another person modulates the infants’ somatosensory processing. We suggest that the somatosensory system plays a critical role in providing information about one’s own and others’ sensory states by 8 months of age.

227 (1335)
BRIEF EMPIRICAL REPORT
The relationship between a child’s postural stability and manual dexterity
Mark Mon-Williams, Institute of Psychological Sciences; Ian Flatters, Richard Wilkie & Faisal Mushtaq, Institute of Psychological Sciences, of Leeds; Raymond Holt, School of Mechanical Engineering, of Leeds
Objectives: To measure the empirical relationship between postural stability and manual motor control.
Method: We recorded objective computerised measures of postural stability and manual control in a sample of school children (n = 278) aged 3-11 years
Results: A strong correlation was found across the sample between separate measures of postural stability and manual control taken on different days. Following age correction, a significant but modest correlation was found, dependent on the specific manual task.
Conclusions: These data reflect an interdependent functional relationship between manual control and postural stability development. Nevertheless, the relatively small proportion of the explained variance is consistent with the anatomically distinct neural architecture that exists for ‘gross’ and ‘fine’ motor control.
228 (1478)
BRIEF EMPIRICAL REPORT
Examining the development of somatosensory remapping in young children: Crossmodal exogenous cuing effects
Rhiannon L. Thomas & Andrew J. Bremner, Goldsmiths College
Tactile stimuli are initially represented in somatotopic coordinates, before they are remapped into an external frame of reference. Whilst in a crossed arms posture, when adults are presented with tactile cues followed very shortly by visual targets they respond faster at the uncued rather than cued location. Thus, they are quicker to respond at the location that their hand would typically be, rather than its current location. This suggests that for a brief moment the somatotopic representation of touch has consequences for behaviour. As the gap between the target and the cue is lengthened responses become speeded at the cued location. Here we report a study investigating the time course of this remapping and its consequences for behaviour, from four years of age.

229 (1364)
BRIEF EMPIRICAL REPORT
Risky perceptuo-motor choices across childhood
Tessa Dekker, University College London; Marko Nardini, Durham University
Whether climbing steep hills or avoiding cars on misty roads, to minimize the risks of our actions, we must combine knowledge of our abilities with external cost factors. Adults often estimate their visuomotor skills accurately and optimize their performance accordingly. This process might be less reliable in children with changing, growing bodies. In a rapid-reaching task, children touched target/penalty configurations to win points. The point-maximizing aiming location depended on their precision. In a follow-up task, children bought information to increase perceptual certainty about target locations, thus trading-off costs against perceptual accuracy to maximize scores. Comparisons of task performance with optimal actor/observer models revealed that children make overly risky perceptuo-motor decisions, possibly because they are still learning their own visuomotor abilities.

230 (1253)
BRIEF EMPIRICAL REPORT
New approaches to assessing the development of biological understanding in young children
Zayba Ghazali, Institute of Education
This study explores young children’s ideas about science in an effort to understand conceptual development across ages 4-11, using a triple cohort longitudinal design, so that a putative developmental trajectory relating to biological concepts can be ascertained. 141 children were investigated on their knowledge of four areas of biology currently included in the National Curriculum using a novel method that was developed and administered alongside measures of domain-general capabilities including working memory, inhibition and attention switching. Numeracy, language and other demographic measures were also collected. Early findings suggest children have incoherent ideas about biology, and that conceptual development takes a piecemeal route of progression.
This implies current curricular design is flawed in its assumption of sequential learning where it is thought generalised understanding can be developed on the basis of earlier concepts.

231 (1200)
**BRIEF EMPIRICAL REPORT**

**The examination of "don't know" response in preschooler's emotion inference: Focusing on the uncertainty monitoring.**

*Tatsuaki KONDO, Graduate school of Human Development and Environment*

**Objects:** Many researchers have investigated preschool children's emotion understanding based on “I know” response. However, emotions of others are essentially uncertain. This study investigated the mechanism of “don’t know” response in preschooler's emotion inference with focusing on the uncertainty monitoring.

**Method:** Nineteen 4-year olds, Twenty-nine 5-year olds, and Thirty 6-year olds inferred the emotion of “friend”, “fictitious-character”, and “informed(fictitious)-other” from equivocal situational cues(e.g., a beetle stops on one’s arm).

**Results:** For the number of “don’t know” response and the response time of emotion inference, mixed-factor ANOVA was conducted. The results indicated that the number of “don’t know” response was generally small, but the response time to infer the emotion of “informed-other” and “friend” were longer than that of “fictitious-other”.

**Conclusion:** Preschool children infer the emotion of others, even if they don’t have enough information. However, the examination of uncertainty monitoring suggests that they implicitly recognize the uncertainty of others.

332 (1202)
**BRIEF EMPIRICAL REPORT**

**The development of reputation management and its underlying mechanisms**

*Eilidh Cage, Institute of Education; Liz Pellicano, Institute of Education*

Adults have been shown to manage their reputation in a multitude of situations. Such reputation management can be implicit, with automatic, unconscious regulation of reputation in others’ presence, or it can be explicit, involving conscious effort to protect the self. There is a paucity of research, however, on the development of reputation management and the processes underpinning its development. Seventy-four typically developing children aged between 6 and 14 years completed newly designed tasks to index implicit and explicit reputation management and a battery of tasks tapping putative mechanisms underlying such management, including theory of mind, reciprocity, social motivation and executive function. Eight-year-olds showed explicit concern about their reputation, but implicit reputation management did not emerge until around 12 years. Correlational analyses also indicated different processes may underlie explicit and implicit reputation management. These findings suggest both diverging developmental trajectories for different aspects of reputation management and distinct underlying mechanisms.
233 (1167)
BRIEF EMPIRICAL REPORT
Adolescent Development of the Cortisol Response to Social Evaluation in Relation with Puberty and Social-Cognitive Development
Esther Van den Bos, Leiden University

Objectives: The cortisol response to social evaluation has been shown to increase with pubertal development. The present longitudinal study investigated whether social-cognitive development also contributes to this normative increase.

Method: Data were collected twice over a two-year interval for a community sample of 217 participants, aged 8 to 17 years at Time 1. Participants provided saliva samples while completing the Leiden Public Speaking Task. Pubertal development was assessed with a self-report questionnaire. Social cognition was measured with a cartoon description task.

Results: Regression analyses with clustered bootstrap showed an additional contribution of social-cognition besides puberty.

Conclusions: Because increasing stress reactivity has been related to the rising incidence of psychopathology in adolescence, insight in underlying factors may have practical implications.

234 (1229)
BRIEF EMPIRICAL REPORT
Engaging in Mental Time Travel: A developmental perspective
Jemma McGourty & Teresa McCormack, Queen's University

Objective: The quantity of information that children produce when imagining the future correlates with the amount recollected about the past, suggesting common processes. We examined whether there were relations between the type of information produced, with information classified as either episodic or script-like.

Method: Study 1 - 135 3-to-10-year-olds discussed a past and an upcoming birthday party. Study 2 - 62 3-to-5-year-olds described Christmas Day, three weeks before and after it occurred.

Results: The numbers of past and future clauses and the types of details produced were correlated, controlling for VIQ. However, even the 3-year-olds produced some non-overlapping episodic information for both event types.

Conclusions: Findings support the claim that past and future mental time travel are distinct but closely related abilities.

235 (1239)
BRIEF EMPIRICAL REPORT
Drawing Development in Mainstream and Steiner Schools
Sarah Rose, Keele University

Objectives: The drawings of pupils experiencing contrasting educational approaches were compared. It was anticipated that Mainstream school pupils would demonstrate superior representational ability, while Steiner school pupils would demonstrate superior expressive ability. Additionally, it was predicted that stylistic differences would be evident in their free drawings.

Method: One hundred and eighty 6- to 16-year-old pupils from the two school types completed three expressive, two representational and one free drawing. Artist raters assessed each drawing.

Results: No consistent between-school differences were found in the expressive drawings. However, Steiner pupils produced superior representational drawings and stylistic differences of colour and composition were evident in the free drawings.
Conclusions: The unexpected findings are discussed in relation to the social, cultural and educational influences on children’s drawing development.

236 (1446)
BRIEF EMPIRICAL REPORT
The effect of touch-screen play on toddlers focused attention
Amanda Carr, Canterbury Canterbury Christ Church University

Objectives: The study aimed to assess the immediate effect of playing simple games using a touch-screen tablet on very young children’s focused attention.

Method: Eighteen children (10 months to 3 years old) and a parent were observed during touch-screen play and free play with toys. Using a novel object task focused attention was measured at baseline, after touch-screen play and after toy play. The order in which children participated in each play condition was counterbalanced.

Results: There was no difference in children’s focused attention between the touch-screen or toy play conditions. Overall attention for the task, measured by length of play, increased with age.

Conclusions: This study found no evidence for a short term effect of ‘screen time’ on children’s focused attention. Longitudinal data is needed to assess cumulative effects.

237 (1100)
BRIEF EMPIRICAL REPORT
Parents’ and Teachers’ Opinion of Preschool Children’s Social Problem Solving and Behavioural Problems
László Kasi & Zita Gál, University of Szeged

The aim of our research was to shed light on what parents and teachers of 4-6 year-olds think of these children’s social problem solving and their difficulties in terms of problem solving, adaptability and prosocial behaviour; and the connection between one’s opinion about social problem solving and family background (Social Problem Solving Inventory, 2002; Strength and Difficulty, 2001; Parent/Teacher Rating Scale-Revised, 1997; Family Background, 2013). Parents and teachers have different opinions in almost all aspects, and there is also a difference between how mothers and fathers rated most of the factors. Contrary to previous research in the field, it is not teachers who have the most negative opinion but fathers. The teachers rate girls and boys differently and there is no significant difference in terms of how mothers rate boys and girls. The combined variation of family background variables is lower for fathers and mothers than for teachers.

238 (1292)
BRIEF EMPIRICAL REPORT
A Cross-sectional Study of Analogical Reasoning in Children and Adults: Does item format influence the relationship with executive functions?
Spyridon Kolovos, Rosa Alberto, Mariska Brinkman & Claire E. Stevenson, Leiden University

Objectives: Analogical reasoning (AR) is a fundamental component of cognitive development. It is related to executive functions (EF), e.g. working memory and inhibition. The aim was to investigate how EF components are related to AR in children and adults, and whether this differs for multiple-choice versus constructed-response items.

Method: An EF battery and an AR task were administered to 70 children and 63 adults, both recruited through educational settings.
Results: Adults outperformed children on all tasks. Preliminary results show that performance on EF related differently to multiple-choice versus constructed-response items. Respective differences between item-format and age-group will be discussed.

Conclusions: Developmental changes influence performance on EF and AR tasks. Multiple-choice and constructed-response items are interrelated but distinct measures of AR.

240 (1423)
BRIEF EMPIRICAL REPORT
Explaining individual differences in children’s understanding of disclaimers: The role of attributions
Dawn Watling, Royal Holloway; Selina Nath, University of Exeter

Background: Little is known about why it is only at 11 years children demonstrate an understanding of disclaimers. One reason might be that these challenge how children explain the positive and negative behaviours of others.

Methods: 268 8 to 14 year olds completed the Children's Attributional Style Questionnaire – Revised and heard hypothetical stories (no disclaimer, unstable ability-related disclaimer or stable ability-related disclaimer and were asked to judge the protagonists' future performance and character.

Results: Children's attributions of negative behaviours/outcomes predicted future performance judgements, as well as character judgments.

Conclusions: Findings are discussed in light of children's default attributional styles and how disclaimers can result in differential thinking when making judgements.

241
KEYNOTE
The Smartphone Generation
Professor Patti Valkenburg, University of Amsterdam

Children and teenagers are at the forefront of many new digital technologies. Children as young as 3 months old are currently using smartphones or tablets to play with their favorite ‘Baby App’. These devices are rapidly becoming the new infant and toddler toys. As of age 12, virtually all teenagers are online, and about three in four are ‘mobile internet users’ (compared to less than half of adults, Pew Research Center, 2013). In her talk, Valkenburg will explain—inspired by theories of motor, cognitive, and social-emotional development -- why children from infancy to adolescence are so hugely attracted to the newest generation of digital tools. She also discusses some positive and negative effects of these tools on children and teenagers, and why some children and teenagers may be particularly susceptible to these effects.
Children's freehand drawings of single and mixed emotion in themselves and others

Esther Burkitt, University of Chichester

Objectives: This study extended previous research that focussed on single emotions and investigated the impact of mixed emotion in children’s freehand drawings of themselves and others.

Method: 180 children (89 boy and 91 girls) aged between 5 years 1 month and 8 years 10 months formed three age groups in two conditions. Children drew either themselves or another child after listening to a condition appropriate vignette.

Results: Regression analysis indicated a developmental increase in the recognition and depiction of mixed emotion. Correspondence analysis revealed systematic drawn differences across all age groups between single and mixed emotion.

Conclusions: The cue dependency theory was supported in terms of the precise cues given in the drawing situation systematically influencing the process and product.

Children's Understanding that Emotion Influences Behaviour

Ana Aznar, Kingston University

Young children’s understanding that emotions influence behaviour has been neglected in past research. Two studies examined children’s understanding that emotion influences behaviour. In study 1, 35 (17 girls; 18 boys) 4-year-old and 27 (13 girls; 14 boys) 6-year-old children answered questions probing their understanding of how emotions influence behaviour and completed a standardised test of emotion understanding. Six-year-old children had a greater understanding that emotions influence situations than did four-year-old children, which was related to mentalistic aspects of emotion understanding. In study 2, 90 children aged 3, 4, 5, 6, and 7 answered questions about the likelihood of action based on emotion. There was an age increase in understanding with children 4 years and older scoring above chance. The findings suggest that children’s understanding that emotions influence their behaviour is a distinct component of emotion understanding that emerges in early childhood.

Maternal mindset about child development

Ai Mizokawa, Meiji Gakuin University

This study investigated the possible link between maternal mindset about child development and parenting, and preschoolers’ belief systems. Eighty-three Japanese mothers of preschool children, who participated in the study, were given a questionnaire in which they were asked about their mindset about child development, point of view about feedback in child-raring, emotional expressivity
toward their children, and educational background. Their children were asked questions about goal orientation and preferences in the receipt of praise. The results demonstrate that the mothers’ mindset about their children’s ability to develop their own competence was associated with their beliefs about feedback, emotional expressivity, and educational background. It was also found that children’s goal orientation and preferences regarding praise varied with those maternal variables.

245 (824)
POSTER
Is it real? The development of judgments about ontological status and authenticity
Louise Bunce, Winchester University
Objectives: This study reexamined children’s judgments of the real/not-real status of fictional characters because this judgment can be made according to ontological status or authenticity.
Method: Sixty children (4;1-years, 5;3-years) and 20 adults were shown pairs of photographs of fictional characters (e.g., Postman Pat) and people dressing-up as those characters. They were asked: ‘Does X live in the real world?’ (ontological status) and ‘Is this the real X?’ (authenticity).
Results: As expected, younger children, and some older children, made fewer accurate ontology judgments than authenticity judgments whereas adults made accurate judgments on both dimensions. A similar pattern emerged in participants’ justifications for their judgments.
Conclusions: Implications for the development of children’s ability to make real/not-real judgments are discussed.

246 (1114)
POSTER
The effect of visual perceptual load on auditory awareness in Autism Spectrum Disorders
Julian Tillmann, University College London
Objectives: This study investigated cross-modal selective attention in children with Autism Spectrum Disorders (ASD) by applying Lavie’s perceptual load theory (Lavie, 2005).
Methods: 26 ASD and 44 TD children performed either a high or low perceptual load version of a line discrimination task. On a critical trial, an unexpected, task-irrelevant auditory stimulus was played concurrently with the visual stimulus. Participants were then asked whether they had noticed anything else on that trial.
Results: Awareness rates for an auditory stimulus were reduced for TD controls under high visual perceptual load, but remained unaffected in children with ASD.
Conclusions: These findings extend the hypothesis that individuals with ASD have an increased perceptual capacity to contexts involving cross modal selective attention.
Imitation and language in middle childhood.

Hannah Hobson, University of Oxford

Imitation has been suggested to be of key importance for language development, but historically the investigation of this association has been largely limited to young children. This study investigated how children’s imitation ability relates to language, and whether different types of imitation (body movement imitation and actions with objects) have different relationships to language skills. This poster will present data on 40 typically-developing children aged 7 to 11 years. The children performed imitation tasks with and without objects, as well as tests of sentence repetition, nonword repetition, vocabulary and comprehension. Preliminary findings suggest that the relationships between imitation and language skills are not the same for school age children as for young children.

Effects of planning and executive functions on the performance of young children in the execution of script with turning back.

Kaichi Yanaoka, Graduate School of the University of Kyoto

Objective: This research examined the effects of planning and executive functions on young children’s performance in executing a script with and without turning back.

Method: 94 young children performed a newly developed “doll task”, two executive function tasks, a planning task and a receptive vocabulary task. The doll task requires participants to enact the script of changing clothes and to turn back by taking off obstrucive items.

Results: The results showed in the doll task the answers were divided into three steps. Shifting has a positive influence on whether young children can turn back. Moreover, planning contributes to take the shortest route to execute the script.

Conclusion: These findings suggest that shifting and planning play different roles in turning back during executing the script.

The Effect of Parenting styles on the Academic self-concept and Behavioural problems

Hoshiar Muhammad & John Adams, Durham University

Parenting styles affect children’s lives in terms of their academic self-concept and behaviour (e.g., Ali and Frederickson, 2011). A number of studies claim that not only do parenting practices differ among ethnic groups, but that the effects of such parenting practices also vary (e.g. Huntsinger and Jose, 2009). The present study examined the association between parenting styles, academic self-concept and behaviour problems in primary school children Kurdish (Iraqi) society. 199 children, mean age 11.7 months and 48 teachers participated in the study. Results showed that involvement and positive parenting were positively correlated with the children’s academic self-concept and negatively correlated with behavioural problems. Poor monitoring and corporal punishment were negatively correlated with academic self-concept and positively with behaviour problems. Furthermore, it was found that positive parenting was more prevalent amongst girl than boys. However, poor monitoring was higher among boys than girls. As regards to behaviour problems, girls were more.
Gaze Laterality Bias for Faces in Williams Syndrome
Rachel Wilson, Debbie Riby, Michelle Goshawk, Mike Burt & Durham University; Elisa Back, Kingston University

Although faces are more or less symmetrical, we frequently show a left gaze bias (LGB) to faces implicating right hemisphere processing and a Right Hemisphere Dominance model for face/emotion processing. Interestingly, individuals with Autism, whose behaviour is characterised by social withdrawal, have previously been reported to show a lack of right hemisphere face dominance. We report data from eye tracking studies exploring face gaze bias in the developmental disorder Williams syndrome (WS). Preliminary gaze analyses indicate that WS individuals show an atypically extreme LGB when evaluating emotional expressions. This is particularly interesting given the hypersociable and emotionally sensitive profile associated with the disorder and the implications of these data will be discussed.

Different predictors of success for different pragmatic tasks: evidence from children with ASD and LD
Clara Andres-Roqueta, Universitat Jaume I de Castelló

Aim: This study aims to address which kind of pragmatic deficits are present in children with Autistic Spectrum Disorder (ASD), compared to children with Language Disorders (LD); and whether those difficulties are related to their social-cognition or general linguistic competence.

Method: Children with ASD (n=20) and with LD (n=20) completed a linguistic-pragmatic task (scalar implicatures) and social-pragmatic task (context mental-states-understanding), and compared to age- and language-matched typically-developing children.

Results: For linguistic-pragmatics, both ASD and LD groups performed similarly, and performance was predicted by language competence. For social-pragmatics, children with ASD underperformed LD group, and performance was predicted by theory-of-mind.

Conclusion: Children with ASD and LD are challenged by linguistic-pragmatics keeping with their language level. However, children with ASD’s challenges in theory-of-mind lead to exceptional challenges in complex communicative situations. Distinction between linguistic- and social-pragmatic competence may inform therapy practice and help to differentiate them from Social Communication Disorder categories.

Early biological factors in mother infant relation: Immunological and endocrinological functions in cord blood might be the interpretative variables of maternal affect toward infants during the puerperal period.
Hatsumi Yamamoto, Clinical Research Institute, Hospital Organization; Noriko Yamakawa, Shigeki Tanaka, Clinical Research Institute, Medical Center, Hospital Organization; Kohta Tamai, Hokkai School of Commerce; Megumi Sasaki, Child Research Center, Women’s University; Kumiko Namba, Naoko Obanawa & Masatoshi Kawai, Child Research Center; Women’s University
Objectives: We evaluated the relevance between the concentration of biomarkers of immune and endocrine system in cord blood and the maternal affect toward infants.

Method: Eighty seven mothers were examined the maternal affect toward infants by the general health questionnaire, prenatal attachment inventory, resilience, mother and baby scale, and maternal attachment inventory questionnaires during pregnancy, at discharge and at first month checkup. Biomarkers such as NK cells, cortisol, endorphin etc. were also measured in cord blood at birth.

Results: High concentration of endorphin was significantly co-related with the lower level of avoidance of maternal affect toward infants.

Conclusions: The concentration of endorphin in cord blood might be the interpretative variables of maternal affect toward infants during the puerperal period.

253 (1213)
POSTER
The influence of well-being, optimism, and emotional intelligence on music preferences of teenagers and young adults
Stella Tsermentseli, Department of Psychology; Jessin Siirak, Department of Psychology, University of Greenwich

Objectives: The present study examined how different aspects of a young person’s well-being were related to their musical preferences.

Methods: A total of 260 participants (N = 260, age range 17-25yrs, M = 19.95, SD = 1.96) completed surveys measuring musical preferences (STOMP; Rentfrow & Gosling, 2003), emotional intelligence (SSEIT; Schutte et al., 1998), optimism (LOT; Scheier & Carver, 1985), depression (DASS – 21; Lovibond & Lovibond, 1995) and psychological distress (GHQ-12; Goldberg & Williams 1988).

Results: Linear regressions found that increased emotional intelligence and optimism and decreased depression and psychological distress predicted a preference for reflective and complex music. Additionally, increased psychological distress was associated with intensive and aggressive musical genres whilst rhythmic beat-based music was associated with increased levels of depression.

Conclusions: These findings help us further understand the role of music listening as part of youths’ well-being.

254 (1218)
POSTER
How effective is the “Wonderful Words” intervention programme at teaching target vocabulary?
Hannah Dyson, University College London

Objectives: Vocabulary is vital for children’s attainment, but research has uncovered a large vocabulary gap between higher and lower achievers. This study trialled an in-depth vocabulary instruction programme which aims to address this gap.

Method and Results: 46 lower-achieving children participated in the intervention over ten weeks, while 156 of their higher-achieving peers acted as controls. A highly significant effect of treatment was seen when comparing pre- and post-intervention scores across the two groups. This effect did not generalise to untreated words.
Conclusions: This study demonstrated that Wonderful Words is effective at teaching target vocabulary, but that a more sustained intervention programme would arguably be needed to elicit generalisation and close the vocabulary gap.

255 (1225)
POSTER
Siblings of Children with Autism Spectrum Disorder: The Influence of Coping Style and the Broader Autism Phenotype (BAP) on Psychosocial Adjustment
Hsiao-Wei Tsai, Sue Fletcher-Watson & Evelyn McGregor, University of Edinburgh
Objectives: To examine factors that may place typically developing (TD) siblings of children with ASD at risk of psychosocial adjustment difficulties.
Method: Questionnaire measures (demographics, adjustment, coping style, social support, and BAP) were collected from 82 parents of a child with ASD and from the TD sibling (9 – 18 years).
Results: Sibling psychosocial adjustment was rated as poorer by siblings than parents. Poorer adjustment was associated with both parent and sibling coping style, specifically with parents’ use of avoidant emotional coping and with siblings’ negative coping style. Adjustment was better if the sibling had social support and fewer BAP characteristics.
Conclusions: Supporting the development of adaptive coping styles in parents and siblings is important for positive adjustment for siblings.

256 (1230)
POSTER
Relationship between self-regulation in early childhood and later index scores in WISC-III.
Kumiko Namba, Centre for the Study of Child Development; Masatoshi Kawai, Megumi Sasaki, Michiko Ishikawa, Naoko Obanawa, Centre for the Study of Child Development; Women’s University; Hatsumi Yamamoto, Noriko Yamakawa & Shigeki Tanaka, Clinical Research Institute, Medical Centre, Hospital Organization; Kohta Tamai, Hokkai school of commerce
Objectives: To reveal the relationship between development of self-regulation in early childhood and later through WISC-III index scores.
Method: As a part of the Japan Children Study, 55 children were presented with self-regulation tasks at 3.5, 5 and 6 years-of-age, and WISC-III in 2nd year Primary school.
Results: Through a combination self-regulation experiments, subjects were subdivided into four groups. ANOVAs showed main effects of self-regulation were at Verbal Comprehension Index (VCI) and Perceptual Reasoning Index (PRI); a group that succeeded at 3.5 and failed at 5 and/or 6 received the highest score; groups that failed at 3.5 but succeeded at 5 and 6 received the lowest.
Conclusions: Self-regulation at 3.5 years-of-age appears important for later language and perception.
The role of dissenters in preschooler’s decisions
Cristina Cascado & Melisa Sausa, Universidad de Castilla-La Mancha; Irene Solbes & Mª Oliva Lago, Universidad Complutense de Madrid

Previous studies have shown that preschoolers are inclined to follow a majority more likely than a dissenter when they have to learn new words but not when they have to judge the transgression of a social rule and the majority –but not the dissenter– agrees with this transgression. To examine the specific role that dissenters play in children’s decisions, 64 children aged 4 to 5 years faced different scenarios related to two domains of knowledge: Novel object labeling and Socio-conventional rules. Half of the participants had to choose between the conflicting opinions of a majority and one dissenter (condition 3v1) across the scenarios, while the other 32 children faced a majority without dissenter (condition 3v0). Preliminary analyses show that the absence of dissenter increases the probability to follow the majority more in the labelling than in the socio-conventional domain. Findings are discussed considering previous research on children’s trust in testimony.

Can language development help the understanding of scientific reasoning?
Emma Gabbott & Jane Mellanby, University of Oxford

Objectives: Scientific investigation involves hypothetical reasoning. We explored the relationship between the understanding of hypothetical, counterfactual conditional (“if”) sentences and scientific reasoning development.

Method: 101 English-speaking children (49 girls, mean age 9.3 years) were tested individually on conditional sentence comprehension, scientific reasoning - specifically the understanding of hypothesis testing and control variable strategy. Verbal and non-verbal intelligence were tested with groups of children.

Results: Conditional sentence comprehension was significantly related to understanding of hypothesis testing (p<0.01), after controlling for age and intelligence scores. No such relationship was detected with control variable strategy test.

Discussion: In the next stage of the project the relationships will be investigated longitudinally to establish the direction of causality.

Infants can learn timing via physical instruction: An EMG study
Caspar Addyman, Birkbeck; Lilian Fautrelle, Université Paris Ouest; Robert French & Elizabeth Thomas Université de Bourgogne; Denis Mareschal, Birkbeck, of London; Sinead Rocha, Birkbeck, of London

Aim: No previous experiments have investigated infant interval timing ability directly in a physical task.

Method: An experimenter raised an infant’s arms 7 times at fixed intervals before pausing to see if the infant would initiate movements in a response interval. We used surface electromyography (EMG) to measure responses. We tested a total of 60 infants in three age groups (4, 6, 8 months old) across two timing conditions, (2 or 4 second cycles).
Results: For each group we calculated the mean and standard deviation of the time of onset of the EMG bursts. T-tests revealed significant differences between conditions at each age group (Table 1). Density functions were plotted for each condition, grouping infants by age confirming that responses were not uniform across the interval but clustered around the target values (Figure 1).

Conclusions: EMGs reveal that 4- to 8-month-olds can use timing information to structure their physical interactions.

260 (1264)
POSTER
Examining changes in numerical representations and mathematical achievement after feedback
Sarah O’Connor, N/A
Accurate internal representations of number are associated with mathematical proficiency. This study investigated if an intervention could a) increase the accuracy of children’s numerical representations and b) show transfer to increased mathematical achievement. Forty 8-year-old children were assigned to either a control or feedback group. Pre and post intervention all children completed a number line task, assessing the accuracy of their numerical representations, and standardised mathematical achievement tests. The intervention consisted of both groups receiving training on the number line task, with only the feedback group receiving critique about their performance. Significant improvements on the number line task were observed for the feedback group only; there was no transfer to mathematical achievement. This study questions the causal relationship between numerical representations and mathematical achievement.

261 (1277)
POSTER
Getting into the Groove: An EMG study of rhythmic movement to music in infancy
Sinead-Elouise Rocha & Denis Mareschal, Centre for Brain and Cognitive Development, College, of London
Objective: Despite early rhythm processing abilities (Trehub & Thorpe, 1989), under-two-year-olds do not seem to synchronise their movement to music (Zentner & Eerola, 2010). However, no experiments have investigated rhythmic movement in infants by directly measuring muscle activation.

Method: The present study uses electromyography to measure the timing of motor activation in 10-and-18-month-old infants, when exposed to music of different tempos, with human or digital partners.

Hypotheses: Older toddlers find it easier to entrain to the beat if close to their spontaneous motor tempo, and with a social partner (Kirshner & Tomasello, 2009). By using EMG, we expect to find rhythmic engagement of muscles prior to overt synchronous movement, with greater accuracy when engaged with the human partner, and at faster tempos.
Adolescents with autism rely less on reasoning heuristics than typically developing adolescents: Evidence from the Cognitive Reflection Test
Jayne Hamilton & Dr Kinga Morsanyi, Queen's University Belfast

When people reason, they often rely on heuristic shortcuts, which can result in incorrect responses. Previous studies showed that participants with autism exhibited enhanced logical performance on these tasks. However, as participants had to choose between a heuristic and a logical response, it is difficult to tell if participants with autism were simply less biased or they were more logical. We circumvent this problem by administering the Cognitive Reflection Test (long), which consists of 8 open-ended problems. Our participants were 21 high-functioning adolescents with autism and 49 typically developing adolescents. Although participants with autism generated the same number of logical responses as controls, they generated significantly fewer heuristic responses. That is, they were simply less susceptible to heuristics than controls.

Children's Memories of Stories: Effects of Emotional Valence and Congruency
Laura Pearce, University of Sussex

Objectives: The current study seeks to compare the accuracy of memory for negative and positive fictional material, exploring gender and trait anxiety as possible moderators.

Method: Fifty-six children (M = 8.92 yrs, SD = 1.15 yrs) recruited from schools completed SCAS and MASC-10 anxiety inventories. Children viewed emotionally positive and negative images from the TV show 'Merlin', paired with emotionally congruent or incongruent stories, followed by a recognition task.

Results: A three-way ANCOVA (images × congruency × modality) with gender and anxiety as covariates indicated significantly higher discriminability for narrative compared to visual items in the incongruent and congruent-negative conditions. No significant difference was observed in the congruent-positive condition. Gender and trait anxiety do not appear to moderate recognition scores.

Conclusions: Findings suggest that when emotionally negative scenarios are perceived, children focus on verbal more than visual information, in line with existing literature.

The effect of adult explanation on preschoolers’ exploratory behavior in a museum setting
Tessa van Schijndel, University of Amsterdam

As preschoolers are nowadays a visible group in science museums, an important question is how adults can optimally guide this group's learning experiences. In a previous study, we found a positive relationship between parents' evidence descriptions and preschoolers' exploration of exhibits. Possibly, evidence descriptions provide structure to children's exploration by maintaining attention to relevant task aspects. However, as from this result no causal conclusions could be drawn, the present study aims at replication in an experimental paradigm.
Preschoolers explored two exhibits in a science museum- or school setting. Test-leaders guided children’s exploration by performing an evidence description (commenting on exhibit features and evidence resulting from manipulations), open question, or minimal coaching style. For all styles, they aimed at positively motivating children to explore. Children’s exploration was assessed with the Exploratory Behavior Scale. Preliminary results point to the importance of giving evidence descriptions in guiding young children’s informal learning experiences.

265 (1351)
POSTER
Feasibility study of a robotic-arm intervention to improve manual control in children with motor impairments
Katy Shire, Institute of Psychological Sciences, Bradford Institute for Health Research, Teaching Hospitals NHS Foundation Trust; Liam Hill, Institute of Psychological Sciences, of Leeds; Georgios Kountouriotis, Institute of Transport Studies, of Leeds; Winona Snapp-Childs & Geoffrey Bingham, Department of Psychological & Brain Sciences, University
Aim: Investigate the feasibility of using haptic training systems, in primary schools, to improve the manual coordination of children with movement problems.
Methods: 57 children (19 female, aged 5-11) with poor fine-motor control (< 15th percentile on a standardised assessment) took part in a within-participants crossover design study that assessed a 5-week in-school robotic training intervention. During training children manipulated a stylus, with an attached robotic arm providing additional haptic feedback to encourage children to follow desired trajectories.
Results: Feasibility of use within schools was established, with future implementation barriers identified via qualitative interviews with staff and students. Encouraging quantitative improvements in fine-motor control were also observed.
Conclusions: The robotic haptic training systems show promise as school-based platforms for intervention.

266 (1356)
POSTER
Priming Self Versus Others Modulates the Endowment Effect and Willingness to Swap Toys in Preschoolers
Sandra Weltzien, University of Bristol
Objectives: People typically prefer to keep things even when offered a trade for an equally attractive alternative (the endowment effect). According to the “extended self” hypothesis we value possessions because they are perceived as tangible manifestations of the self. Here, we investigated the relationship between object valuation and the self-concept in three-and four-year-olds.
Method: 60 children evaluated two identical toys using a preference “smiley-scale” before and after an experimental manipulation; self-priming, other-priming or a control-condition.
Results: Children demonstrated equivalence (giving equal value to the toys before ownership was ascribed). After ownership was allocated, a significant interaction was found between toy-owner and experimental condition: children valued their own toy higher than the experimenter’s toy following self-priming. In addition to the effect on evaluation, endowment effects were observed in relation to children’s willingness to swap their toy.
Conclusions: These findings demonstrate that priming of self-concepts modulates the endowment effect in preschoolers.

267 (1362) POSTER
Investigating the role of temporal speech perception in the development of reading
Patrick Stark & Tim Fosker, Queen's University Belfast
Objectives: The core cause of reading difficulties is believed to relate to deficient awareness of the unit sounds of speech (phonological awareness), potentially stemming from deficient processing of temporal speech cues. The importance of these cues for phonological awareness tasks using natural and temporally modified speech was examined.
Method: Three phoneme deletion tasks using natural, compressed and expanded speech were administered to poor readers (PR), age matched (CA) and reading age matched controls (RA). Performance was assessed again 1 year later.
Results: Only CA’s phonological awareness was impacted by speech compression, PRs and RAs were unaffected. The RA group was impacted one year later.
Conclusions: These results suggest an important developmental role of temporal speech perception in the acquisition of reading ability.

268 (1378) POSTER
The Questionnaire of Memory (Q-MEM): A New Measure of Everyday Memory Functioning in School-Age Children
Corinne Catale, Steve Majerus & Thierry Meulemans, University of Liège
Aim: We develop a new measure of everyday memory, the Questionnaire of Memory (Q-MEM), specifically adapted for the ecological assessment of memory disorders in school-age children.
Method: The Q-MEM was constructed with four sections tapping effortful/intentional learning, automatic/procedural learning, prospective memory/organization, and working memory. 700 parents of 5- to 12-year-old typically developing children and 51 parents of children with learning disabilities participated in the study.
Results: Confirmatory Factor Analyses supported the Q-MEM’s four-factor structure. In addition, the reliability coefficients are satisfactory for all subscales. Furthermore, comparisons between Q-MEM profiles of children with learning disabilities and typically developing children revealed significant differences.
Conclusion: These results suggest that the Q-MEM could be a promising measure for identifying children with memory problems.

269 (1393) POSTER
Attachment Orientation and Theory of Mind in Adolescence.
Lance Slade, University of Roehampton
Attachment styles have been identified in adult close relationships (Hazan & Shaver, 1987). Individuals with an avoidant attachment style, who typically seek to avoid or withdraw from close and intimate contact, are poorer at detecting and decoding emotional expressions. However, less is known about more complex mental state (i.e., theory of mind) understanding. To explore this link 118 adolescents (aged 16-
17 years) were given tasks measuring: theory of mind understanding (the ‘reading the mind in eyes’ task) and use (mental state talk used when describing pictures of social scenes), emotion recognition (emotion faces task), language ability (PPVT) and self-reported attachment style (ECR; Experience of Close Relationships questionnaire). Preliminary analyses shows that adolescents who scored higher in avoidance scored significantly lower on both theory of mind and emotion understanding. The link with mental state talk will also be presented. Potential implications for adolescent social interaction will be discussed.

270 (1408)
POSTER
Investigating the Nature of Auditory Learning in Beginning Readers
Ciara Laverty, Sarah Miller & Tim Fosker, Queens University Belfast

Objectives: Recent research has established clear links between children’s early auditory discrimination capacities and their later reading ability. This study aimed to examine the relevance of auditory learning as a predictor of reading ability.

Method: Auditory learning was provisionally examined in 30 typically developing children by measuring individual patterns of change in auditory discrimination thresholds over a 9 week period. Follow-up reading measures have at present been measured in 16 of these children.

Results: Preliminary analyses highlighted subgroups of auditory learning behaviour which may be related to later reading success.

Conclusions: Typically developing children differ widely in there capacity to learn to discriminate sound changes relevant for later reading. It is unclear whether explicitly training auditory discrimination will enhance children’s reading.

272 (1427)
POSTER
Investigating the development of neural responses to different rates of auditory change
Rebecca McKelvey, School of Psychology; Rachel McIlveen, Teresa Rushe & Tim Fosker, School of Psychology, Belfast

Objectives: To investigate developmental changes in the laterality of neural responses to syllable and phoneme rates of auditory presentation. We hypothesised a more right lateralised response to syllable than phoneme rate sounds in adults and a more equitable response across hemispheres in 6-month old infants.

Method: EEG was recorded while eighteen adults and 10 infants listened passively to tones that approximated the rate of syllable and phoneme changes in speech.

Results: Initial EEG analysis revealed different lateralisation of the responses to syllable and phoneme rates in adults and infants.

Conclusions: The different pattern of lateralisation in adults and infants suggests a developmental change in processing auditory rates. A longitudinal follow-up will establish whether this difference is associated with changes in processing language.
Automatization of mirror-tracing skill in children with Developmental Coordination Disorder
Caroline Lejeune, Lise Desmottes & Corinne Catale, University of Liege

Aim: This study investigated the hypothesis of a skill automatization deficit in Developmental Coordination Disorder (DCD).

Method: Thirty children (15 with DCD and 15 control children), aged between 7 and 12 years old, were administered the mirror-tracing task during two 10-trials sessions separated by one week. An auditory interference task was introduced at the end of the procedural learning phase to test skill automatization.

Results: Interestingly, no between-group difference was revealed in learning and automatization measures excepted for a specific subgroup of DCD children (n=5) who experienced difficulties in skill automatization.

Conclusion: The results of our preliminary study highlighted the heterogeneity of the deficit presented in DCD and they emphasized the importance to explore further the lack of automatization presented in some children with DCD.

Multisensory influences on body representations in children with developmental coordination disorder (DCD)
Joanne S. Camp, Goldsmiths; Elisabeth L. Hill & Andrew J. Bremner, Goldsmiths, of London

We perceive our body and peripersonal environment through multiple sensory modalities, allowing for efficient movement and environmental interactions. Previous research indicated that such multisensory processes undergo significant development in infancy and early childhood in typically developing (TD) individuals. However, relatively little research has investigated these processes in neurodevelopmental disorders. Children with developmental coordination disorder (DCD) aged between 7 and 11 years are currently completing various experimental measures used previously with TD children, in which multisensory influences on bodily representation are assessed. We aim to further understand body representation in children with DCD, and its relationship with multisensory processing and motor development more generally.
**KEYNOTE**

**Neural basis of executive function in young children**

*Dr Yusuke Muriguchi, Joetsu University of Education, Niigata, Japan*

Executive function refers to the higher-order cognitive control process for the attainment of a specific goal. There are several subcomponents of executive function, such as inhibition, cognitive shifting, and working memory. Extensive neuroimaging research in adults has revealed that the lateral prefrontal cortex plays an important role in executive function. Developmental studies have reported behavioral evidence showing that executive function changes significantly during preschool years. However, the neural mechanism of executive function in young children is still unclear. My colleagues and I have examined the relationship between the development of cognitive shifting and the lateral prefrontal cortex in young children using near-infrared spectroscopy (NIRS). In cross-sectional and longitudinal study, we found that the development of cognitive shifting was strongly correlated with the activations in the lateral prefrontal cortex. Moreover, our training program improved behavioral performances and the activations in the lateral prefrontal cortex during cognitive shifting task. Finally, we showed that the prefrontal activations during cognitive shifting tasks may be abnormal in children with developmental disorders. The results consistently showed that the lateral prefrontal cortex play an important role of the development of executive function in young children. I’ll discuss several methodological issues and future direction in the research areas.

**INVITED SYMPOSIUM**

**What Good is the Developing Self?**

*Sander Thomaes, University of Southampton, Utrecht University*

Is the self a psychological resource that helps shape youth’s psychological and academic adjustment? Conventional wisdom suggests it is. Parents believe that when their children feel good about themselves, this helps them relate to other people. Teachers believe that when their pupils have an accurate sense of who they are, this helps them make wise academic and career choices. Therapists think that when they help their patients to be true to their own values, they will be better able to cope with adversity and live happier lives. Yet, empirically, the importance of the self as a source of psychological and academic adjustment is controversial (Baumeister, 2003; Thomaes, Poorthuis, & Nelemans, 2011). Indeed, much more is known about the self as an outcome than as a determinant of adjustment. Some experts have even argued that the self is an epiphenomenon, and typically functions to index but not to determine or cause adjustment.

This symposium challenges the epiphenomenon view of the self. It brings together a group of self-researchers who study important aspects of the self that gained relatively little attention in the developmental literature thus far, including authenticity, narcissism, and self-knowledge. They use a variety of methodological approaches, including experience sampling, experimental, and longitudinal approaches, to try to illustrate and understand the importance of the self in shaping
youth’s psychological adjustment and well-being. Paper 1 uses experience sampling methods to test how authenticity, the sense of being true or ‘real’, predicts adolescents’ feelings of well-being and happiness in day-to-day life. Paper 2 uses longitudinal methods to test how children's narcissistic traits shape, and are also shaped by, interactions with parents. Papers 3 and 4 use experimental and longitudinal methods to test how self-knowledge and temporarily induced self-representations influence youth’s school subject and professional career choices. Collectively, these papers explore the developing self as a multifaceted psychological resource. Classic research has focused mainly, and perhaps somewhat narrowly, on self-esteem as a core dimension of the developing self. The research presented here proposes that other dimensions of the self matter as well. It highlights authenticity, narcissism, and self-knowledge as important self-dimensions that contribute in unique ways to well-being and adjustment. By adopting a comprehensive, multidimensional perspective on the self, developmentalists will be able to gain improved understanding of the self as a psychological resource that shapes youth’s psychological and academic adjustment.

PAPER 1
To Thine Own Self Be True – And Be Happy?
Sander Thomaes, University of Southampton
To thine own self be true, And it must follow, As the night the day, Thou canst not then be false to any man (William Shakespeare, Hamlet, Act 1). Much like The Bard believed in the importance of authenticity (i.e., the sense that one is “real” or “true”), most people now believe that authenticity is a source of psychological well-being among adults, and perhaps especially so among youths. It is common for parents to believe that when their teenagers are true to their values and feelings, this will allow them to be happy. Similarly, adolescents themselves often think that they will fare best if they “put off their masks” and “be oneself” (Guignon, 2004). Yet there is a paucity of empirical knowledge of authenticity as a source of youths’ psychological well-being.

The presented research provides an initial test of a new model we developed on authenticity’s role in subjective well-being. This Need Fulfilment Model of Authenticity holds that authenticity is a function of fulfilment of two basic, independent psychological needs—relatedness and autonomy (Ryan & Deci, 2000). Relatedness refers to the desire to be accepted by others, whereas autonomy refers to the desire to enact one’s values or feelings. Briefly, the model posits both that adolescents experience authenticity when both needs are met and that authenticity, in turn, will increase subjective well-being.

We present two studies that test this model. Study 1 tests how individual differences in trait authenticity contribute to adolescents’ subjective well-being, above and beyond the contributions of self-esteem. Study 2, an experience sampling study, tests how momentary (relatedness and autonomy) need fulfilment predicts intra-individual change in authenticity which, in turn, may contribute to subjective well-being. Participants are 12-17 years old adolescents. Adolescence is a time when individuals are greatly concerned about “being who one really is,” and a time when the impact of authenticity on well-being is assumed to be strong (Winnicott, 1965). Together, this research will provide initial evidence on whether and how authenticity allows youths to be happy.
PAPER 2
I Burn With Love for-Me! On the Socialization of Narcissism in Children
Eddie Brummelman, Utrecht University
Narcissistic children feel superior to others, fantasize about personal successes, and believe they deserve special treatment. When they are criticized or rejected, narcissistic children feel humiliated and are prone to lash out aggressively. However, little is known about the parenting processes that might foster narcissism in children. We conducted a four-wave longitudinal study on the socialization of childhood narcissism. We pitted two dominant theories against each other—social learning theory (which holds that narcissism is cultivated by parental overvaluation) and psychodynamic theory (which holds that narcissism is cultivated by parental lack of warmth). We timed the study in late childhood, when individual differences in narcissism first emerge. In this presentation, I will present our findings and discuss their theoretical and practical implications. Insight into the parenting processes that contribute to narcissism might inform intervention efforts to curtail narcissistic development at an early age.

PAPER 3
Self-Knowledge: Measurement and Implications for Development
Jaap Denissen, Tilburg University
Self-knowledge has been described as desirable by ancient philosophers, religious authorities, and contemporary psychologists. It is a central epistemological prerequisite for theories about the self-regulatory function of self-representations. And it is a methodological requirement for the validity of self-report questionnaires. Yet surprisingly little research has taken up the empirical study of self-knowledge. In the presentation, it is argued that this partly has methodological reasons. Before issues like construct definition, benchmark convergence, and self-enhancement are not solved, self-knowledge cannot be easily assessed. A novel approach is presented to measure self-knowledge that addresses these methodological challenges. The measure was developed in the domain of motive dispositions, focusing on the affiliation motive. Benchmarks include traditional projective tests but also a new paradigm to measure facial muscle activation via EMG. The approach is described in terms of its psychometric properties and its ability to predict both concurrent well-being as longer-term vocational choices.

PAPER 4
The Impact of Feedback on Girls’ and Boys’ Choices to Study and Persist in Science
Yvonne Skipper, Keele University
Objectives: This research examined whether teacher feedback could impact young people’s self-perceptions and thus encourage them to study and persist with subjects.
Method: Participants were aged 13 years. For study 1 N=479, for study 2 N=273. Both studies used a scenario methodology. Study 1 examined whether adolescents were more likely to choose to study sciences or languages if they received ability, effort or no feedback. Study 2 examined whether feedback would encourage adolescents to persist in sciences.
Results: Results suggested that specifically person feedback encouraged young people to take science but feedback in any form encouraged them to take
languages. Furthermore, early successful experiences appeared to be important in ensuring young people persisted with science and feedback was less important.

**Conclusion:** These findings suggest that teacher feedback may be one way of changing self-perceptions and encouraging young people into science subjects.

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**277 (1413)**

**SYMPOSIUM**

**Mathematical anxiety: The social and cognitive dynamics**

*Kinga Morsanyi, Queen’s University Belfast*

Devine and Morsanyi investigate gender differences, whereas Jansen and Primi discuss the cognitive correlates of maths anxiety (MA). Devine reports that although girls have higher levels of MA, they perform at the same level as boys in maths. Morsanyi extends these findings to self-efficacy, and reports a link between MA and popularity in girls. Jansen presents the effects of an intervention programme on maths performance, maths-related attitudes and anxiety. Finally, Primi explores the links between MA and decision-making skills.

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**PAPER 1**

**Gender differences in mathematics anxiety when controlling for test anxiety**

*Amy Devine, Francesca Hill, & Dénes Szücs, University of Cambridge; Ann Dowker, University of Oxford*

Mathematics anxiety (MA) is thought to affect a notable proportion of the school age population. Some research has revealed moderate negative correlations between MA and performance, and girls may report higher levels of MA than boys. The current research compared the MA, test anxiety (TA) and mathematics performance of primary and secondary school children. In 433 children aged 11 to 15 years (mean age = 13.42 years), no gender differences emerged for mathematics performance but levels of MA and TA were higher for girls than for boys. When controlling for TA, the negative correlation between MA and performance remained for girls only. Primary school data and the implications of these findings will also be described.

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**PAPER 2**

**The social dynamics of mathematical anxiety and maths-related attitudes**

*Kinga Morsanyi, Tobias Kahl & Rebecca Rooney, Queen's University Belfast*

Mathematical anxiety has been linked to social factors, such as stereotype threat, especially in girls. In the present study secondary school students between the ages of 14 and 16 were administered tests of mathematical ability, self-efficacy and measures of mathematical and test anxiety. Girls performed at the same level as boys on the mathematics tests, but reported higher levels of mathematical and test anxiety, and lower self-efficacy. The pupils were also asked to name their three most popular classmates. Popularity was negatively related to maths anxiety in girls, but it was unrelated to all the other measures. In boys, popularity was related to chronological age only. These results add to the growing evidence regarding the social nature of maths anxiety.
PAPER 3
The influence of experiencing success in math on math anxiety, perceived math competence, and math performance
Brenda Jansen, Marthe Straatemeier, Sanne H. G. Van der Ven, Sharon Klinkenberg & Han L. J. Van der Maas, University of Amsterdam
This study investigated whether children would experience less math anxiety and feel more competent when they experience high success rates in math. Using a computer-adaptive program ensured comparable success rates across children. A total of 207 children (grades 3-6) were distributed over a control and three experimental conditions (differing in success rate) in which they used the program for six weeks. Math anxiety, perceived math competence, and math performance were assessed before and after the practice period. Math anxiety scores improved equally in all conditions. Improvement in perceived math competence was modest. Math performance improved in the experimental conditions only. The higher the pre-set success rate, the more problems were attempted, and the more math performance improved.

PAPER 4
Mathematical anxiety and decision processes involving numeracy
Caterina Primi, Maria Anna Donati & Francesca Chiesi, University of Florence
The negative consequences of math anxiety (MA) on educational outcomes are well-known, but it is less clear whether MA also affects people’s behaviour in other contexts. The aim of this work was to explore the effects of MA on the tendency to give incorrect heuristic responses in two well-known decision-making tasks: the Cognitive Reflection Test (CRT) and the framing task. Participants were 265 secondary school students and 395 high school students. As expected, MA was related to a higher number of incorrect heuristic responses in the CRT, and to being more susceptible to framing effects, even when the effects of test anxiety and math achievement were controlled for. These results show a link between MA and decision-making errors.

DISCUSSANT
Carlo Tomasetto, University of Bologna

278 (1424)
BRIEF EMPIRICAL REPORT
DNA evidence on the genetic link between family socioeconomic status and children's educational achievement
Eva Krapohl, Institute of Psychiatry; Maciej Trzaskowski, Kalli Rimfeld & Robert Plomin, Institute of Psychiatry, College London
A critical finding for understanding associations between environmental factors and children's development is that most environmental measures show substantial genetic influence. However, core aspects of children's environment such as socioeconomic status (SES) cannot be investigated by twin studies because they are shared between twins.
Here, bivariate Genomic-Relatedness-Matrix Restricted Maximum Likelihood (GREML) analyses on DNA from 3000 unrelated children reveal significant genetic influence on family SES, and on its association with children's educational achievement (GCSE). Mediation analyses further demonstrate a direct link of SES on educational achievement independent of IQ.
These findings provide the first DNA evidence for substantial genetic influence on children’s educational achievement and demonstrate the ability to investigate genetic influences on between-family environmental factors.

279 (1397)  
BRIEF EMPIRICAL REPORT  
"Strengths in Education: a longitudinal developmental study of strengths and academic attainment in UK school pupils"  
Nicola Gibson, University of Aberdeen  
Research suggests positive traits play a role in successful learning. The current study reports findings on the development of Strengths (SAI-Y) in relation to measures of Coping (WOC), Optimism (LOT-R), Trait Affect (PANAS), and teacher-rated pupil progress as part of a developmental, longitudinal study into the relationship of non-cognitive strengths to attainment in UK adolescents. A longitudinal study of pupils (age 15 – 17) from two UK secondary schools investigated the development of positive psychological constructs (Strengths, Coping, Optimism, Trait Affect) and their relationship to successful learning outcomes (Pupil Progress Assessments) across 3 time points approximately 6 months apart. The structure and developmental change in strengths during mid adolescence, and constructs related to successful learning as assessed by teaching staff, are identified and discussed. Findings are interpreted in the context of the relevance of non-cognitive factors to successful learning outcomes, and the development of these factors in middle adolescence.

280 (1355)  
BRIEF EMPIRICAL REPORT  
Understanding the correlation between intelligence and education  
Richard Cowan, Institute of Education, University of London  
Objectives: The correlation between intelligence and educational achievement is compatible with many relationships. This study assesses them with measures of general cognitive skills, English, and Mathematics at three ages.  
Method: One member of each pair of twins participating in the Twins Early Development Study (TEDS) was selected (n = 1074). Data on general cognitive skills, Mathematics, and English skills were collected during the project.  
Results: Multiple regressions determined the contributions of mathematics, English, and general cognitive skills at 7 to skills at 9, and skills at 9 to skills at 10. Each earlier skill made unique contributions to explaining variance in each other at the later age. This suggests reciprocal relationships between intelligence and education but other explanations are possible.

281 (1420)  
BRIEF EMPIRICAL REPORT  
Socially constructing the ‘starting school’ transition: how and why do children and families use the available child development discourse?  
Katherine M Cartmell, University of Huddersfield  
Objectives: To uncover how and why an educational transition is socially constructed using a child development lens.  
Method: Ethnographically followed a group of 12 British primary school children, through their first year of formal education whilst simultaneously interviewing
parents to understand how the transition was being constructed from the families’ perspectives.

**Results:** Emerging themes showed that the transition was socially constructed to represent an artefact perceived differently according to individual families; yet, at the same time most struggled to contain the very idea of alignment or misalignment to traditionally recognised child development milestones.

**Conclusions:** Practitioners need to be more aware of how current child development discourse is used, by all, to socially construct the very notion of what an educational transition is.

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282 (1361)
**BRIEF EMPIRICAL REPORT**
**Understanding pathways to school disaffection: Associations between social experiences, self-construals, cognitions, and behavioural orientations**
*Fidelma Hanrahan, University of Sussex*

**Objectives:** This study examined the systematic associations among a range of constructs involved in young people’s socio-motivational engagement at school that remain poorly understood, particularly in relation to school-excluded pupils.

**Method:** A cross-sectional survey study with 209 secondary school pupils, half of whom had been excluded from mainstream school, was carried out with questions tapping into key psychological processes identified by a model of school disaffection.

**Results:** Structural equation modelling revealed indirect links between perceived parental support and reports on behavioural and emotional responses to potential conflict situations, via self-worth, helpless attribution patterns, and extrinsic aspirations. Distinct pathways emerged for excluded and non-excluded pupils.

**Conclusions:** The findings highlight the interplay of perceived family relationships with cognitive and motivational processes at school.

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283 (1411)
**BRIEF EMPIRICAL REPORT**
**Evidence for pleiotropy in academic achievement at the end of compulsory education in UK.**
*Kaili Rimfeld, Robert Plomin, Nicholas Shakeshaft & Maciej Trzaskowski, King’s College London; Yulia Kovas, Goldsmith’s, of London; Philip Dale, University of New Mexico*

We have previously shown that academic achievement at the end of compulsory education is highly heritable (58% for compulsory core subjects). The purpose of the present study was to investigate the genetic links between the various subjects of the UK-wide standardized GCSE examination results at age 16 for 12,614 twins (6,307 pairs). High phenotypic correlations between GCSE subjects were found for English, mathematics, science, foreign languages and humanities (.60-.80).

Multivariate genetic analyses supported the Generalist Genes Hypothesis in that individual differences in academic achievement for different subjects are largely explained by the same genes (genetic correlations: .69-.85). We conclude that there is strong genetic pleiotropy across GCSE subjects at the end of compulsory education in UK.
BRIEF EMPIRICAL REPORT

Children with imaginary companion attribute agency to an invisible agent
Yusuke Moriguchi, Joetsu University of Education

Objectives: Children treat an invisible entity as a live and thinking entity, known as an imaginary companion (IC). This study examined whether children with IC tended to attribute agency to an invisible agent compared to those without IC.

Method: Preschool children were introduced to an invisible agent and an invisible stone, and then given a sequence of questions about the biological, psychological, and perceptual properties of the agent.

Result and Discussion: As the results, children assigned biological and psychological properties to the agent but not the stone. The tendency of assigning such properties was stronger in children with ICs than in those without ICs. These results suggested that children with IC experience agency in interaction with an invisible agent.

BRIEF EMPIRICAL REPORT

Young children’s understanding of pretend play
Honami Otsuka, Graduate School of Human Development and Environment

In pretend play between young children and adults, children need to understand adults’ pretending. In current study, 2- and 3-year-olds played with an experimenter and a teddy bear. In experimenter condition, children were required to give a toy to the experimenter when she asked them “Give me.” In bear condition, children were required to give a toy to the teddy bear when the experimenter asked them in high-pitched voice (i.e. pretending voice). 3-year-olds changed the partner to give the toy in accordance with the conditions. In contrast, 2-year-olds gave the toy to the teddy bear regardless of the conditions. There results suggest that 2-year-olds share pretend play with adults in different way from 3-year-olds.

BRIEF EMPIRICAL REPORT

The role of affect in fantasy-reality judgments: looking at real, near-real and make-believe entities
Allan Lavill & Fiona Knott, University of Reading

Objectives: To examine the role of affect in entity categorisation, as research has shown that children are more likely to categorise make-believe events as real when they are positive than when they are negative.

Method: 67 3-8-year-old children (school recruitment) and 35 adults (research panel) sorted 24 entities (8 real; 8 make-believe (four positive and four negative); 8 near-real (four positive and four negative) into categories of real, make-believe or not sure.

Results: Mixed ANOVA showed that 3-6-year-old children (not 7-8-year-old children and adults) made significantly more errors by categorising positive make-believe/near-real entities as real compared to negative make-believe/near-real entities.

Conclusion: These findings suggest that affect can influence fantasy-reality judgments and highlight the potential role of affect in children’s decision-making.
BRIEF EMPIRICAL REPORT
“It’s got real fur but it’s not alive.” Children’s understanding of museum taxidermy.

Louise Bunce, Winchester University

Objectives: Animal taxidermy has dual reality status in that it is both real/authentic but unreal/not-alive. This study examined the extent to which 4-9-year-olds understand these distinctions and thus experience the aesthetic and educational value of taxidermy.

Method: 120 children visiting the Museum of Natural History, Oxford, volunteered to be interviewed about a taxidermy rabbit (condition 1) or taxidermy and toy rabbit (condition 2). Children were asked questions about reality status including: ‘Does it have real fur? and ‘Is it alive?’

Results: Even the youngest children understood the authentic nature of taxidermy, but responses to questions about its living status varied by age and condition.

Conclusions: The results have implications for improving the educational value of children’s museum experience.

BRIEF EMPIRICAL REPORT
Advanced Theory-of-Mind Abilities: Structure and Relations to General Cognitive Development

Christopher Osterhaus, Freiburg University of Education

Despite the existence of diverse tasks for tracking advanced theory-of-mind development, little agreement exists regarding the conceptual unity of the underlying construct. Furthermore, the influences of general cognitive abilities have not yet been studied systematically.

Two studies tested 466 and 402 primary school children for their higher-order false belief understanding, social understanding, emotion recognition, and perspective taking abilities, as well as for language skills, intelligence, inhibition, and working memory. Structural equation analyses revealed a model with three separate, but correlated factors. Significant age-related development was observed only when the significant effects of language skills and inhibition were not modeled.

Our findings support the conceptual diversity of advanced theory-of-mind abilities and point to a close relation with general cognitive development.
**291 (1383)**

**BRIEF EMPIRICAL REPORT**

Exploring children's understanding of their own aggressive and non-aggressive behaviours

*Katie Rix & Claire Monks, University of Greenwich*

Research has shown that different forms of aggression can be identified in children as young as four years old (e.g. Monks, Smith & Swettenham, 2003) and that there are numerous negative effects for children of behaving aggressively (e.g. White and Kistner, 2011).

However, there is a gap in the research, exploring how children aged four to seven years understand and explain their own aggressive behaviour. This report will detail findings from a three phase longitudinal study with children aged four to seven, in which self-reports of aggression are compared to the reports of others, and children's explanations for their aggressive and non-aggressive behaviour are investigated.

Developing an understanding of children's own perceptions of their aggressive behaviour can help lead to the development of interventions within schools to reduce both the occurrence of these behaviours and their negative impacts.

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**292 (1332)**

**BRIEF EMPIRICAL REPORT**

Why some children with externalizing problems develop internalizing symptoms: Testing two pathways in a genetically sensitive cohort study.

*Jasmin Wertz, MRC Social, of Psychiatry, College London; Helena Zavos, Timothy Matthews, Kirsten Harvey, Louise Arseneault & Alice Hunt, MRC Social, and Developmental Psychiatry Centre, of Psychiatry, College London; Carmine Pariante, James Black Centre, of Psychiatry, College London*

**Objective:** To test whether negative experiences and genetic influences can explain the association between externalizing problems in childhood and internalizing symptoms in preadolescence. **Method:** We used data from the Environmental Risk (E-Risk) Study, a birth cohort of 2,232 twins. We assessed problem behaviour at age-5 and 12. We measured negative experiences between age-7 and 10 and used linear regression analyses to test their effect on the association. We examined genetic influences using a Cholesky decomposition. **Results:** Age-5 externalizing problems predicted age-12 new internalizing problems. Negative experiences accounted for some of this association. A set of common genes influenced both problems. **Conclusions:** Our findings highlight the role of genetic influences in explaining the association, and suggest that negative experiences contribute through gene-environment interplay.
293 (1380)
BRIEF EMPIRICAL REPORT
Experienced regret following risky decision making in childhood
Eimear O'Connor & Aidan Feeney, Queen's University Belfast; Sarah Beck, University of Birmingham

Objectives: Previous developmental studies of regret with younger children have used tasks in which children simply chose at random between two boxes. We examined the developmental profile of regret and relief in a decision-making task in which children knew that the choices varied in risk.

Method: Six-to-nine-year-olds chose between two boxes, one “safe” and one “risky”, to win points. Children provided emotional ratings following their choice and then once they had seen the prize in the unchosen box.

Results: We found age-related changes in regret and relief, but the developmental profile of these emotions was dependent on the method used to measure them.

Conclusions: By at least 8, children experience counterfactual emotions following more complex decisions that vary in risk.

294 (1217)
BRIEF EMPIRICAL REPORT
The influence of early experiences at home and pre-school on children’s social/behaviour development at school entry: a multilevel study in rural China
Xiaofei Qi, Birkbeck; Edward Melhuish, Birkbeck, of London; Jacqueline Barnes, Birkbeck, of London

Many studies reveal the convincing evidence that high quality early experiences are related to better cognitive outcomes at school entry and better academic achievement at school. The social/behaviour level evidence, however, is inconsistent. This study explored the influences of aspects of home and pre-school environment upon children’s social/behaviour development at school entry in less developed rural China. The sample included 298 children (Mean age=69 months, SD=3.3 months, 151 girls) from 19 pre-schools. Multilevel models were constructed for social outcomes accounting for selected child, parents and family characteristics. No preschool level predictors are significant at school entry for social outcomes. Better home learning environment, however, is a significant predictor for fewer behaviour problems (both internalising and externalising) and more prosocial behaviour. In conclusion, home learning environment plays an important role in social/behaviour development at school entry.

295 (1180)
BRIEF EMPIRICAL REPORT
Lifetime, psychological and personality factors associated with deliberate self-harm among Northern Irish adolescents.
Allison M.C. Gillen & Donal McAteer, University of Ulster; Teresa Rushe, Queen's University Belfast

Objectives: Clinical experience and research suggests that deliberate self-harm (DSH) rates among adolescents have been increasing.

Method: The CASE survey was completed by 864 participants (11-18 years) from schools in NI (56% female).

Results: DSH was associated with older age (13% in 15-18 years; 9% in 13-14 years & 2% in 11-12 years) and females (12% girls; 3% boys). Lifestyle factors
that were significantly associated included bullying experiences; experiencing family and friend difficulties; smoking, drinking and drug use. Psychological factors that were significantly associated included adoption of emotion-focused coping strategies; lower self-esteem and increased difficulties (SDQ). Personality variables that were significantly associated included higher behavioural inhibition and mood volatility.

**Conclusions:** This extends on previous research by highlighting important personality characteristics of adolescents who DSH.

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**296 (1252)**

**BRIEF EMPIRICAL REPORT**

**Do school-aged children spontaneously follow gaze? Evidence from eye-tracking**

*Clare Carty & Martin McPhillips, Queen’s University; Mary Hanley, Durham University*

**Objectives:** Attention to faces and interpretation of face cues is accepted to be important for social development, yet relatively little is known about the precise relationship between social attention and social development.

**Methods:** We used eye-tracking to explore how typically developing (TD) children followed gaze cues in everyday scenes and whether this related to their social functioning. TD children (N=99) viewed images of an actor directing their gaze to a target in scenes under two conditions: free viewing and cued viewing ('identify the target of the actor’s gaze').

**Results:** The children did not spontaneously follow gaze, but were able to so when cued. Attention patterns indicated that looking at the correct target in the cued condition was associated with better social function.

**Conclusions:** The findings raise important questions about the spontaneous nature of gaze following in TD children.

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**297 (1194)**

**BRIEF EMPIRICAL REPORT**

**How do social and associative cues facilitate language acquisition in TD children and children with ASD?**

*Charlotte Field, Lancaster University*

**Objectives:** Three studies investigated whether typically developing (TD) children, children with autistic spectrum disorders (ASD) and children with other developmental disorders (DD) use social and associative cues to help them learn words.

**Method:** Children (TD, N = 25; ASD, N = 24; DD, N = 14) viewed videos of a speaker naming an object while gazing and pointing (social video), an arrow or light highlighted the object (associative video) or a social and associative cue occurred towards different objects (conflicting video).

**Results:** Children with ASD used gaze at a later age than TD children. All children chose at chance with the conflicting video.

**Conclusions:** Word learning from social cues is delayed in ASD. Theoretical implications are discussed.
BRIEF EMPIRICAL REPORT

Telling the story: Children with intellectual disabilities’ accounts of a personal experience

Emma-Jayne Brown, Wellington; Charlie Lewis, Lancaster; Michael Lamb, Cambridge; Deirdre Brown, Wellington, Zealand

Objectives: We investigated the narrative coherence of children’s accounts of an interactive event when interviewed using a forensically relevant interviewing protocol that prepares children for narrative reporting and encourages elaborative responding.

Method: We compared the accounts of children with intellectual disabilities (CWID) of mild (N= 23) and moderate (N=21) intellectual impairment (7-12 years), with typically developing children matched for mental-age (N= 31) or chronological age (N=36).

Results: A narrative analysis shows that children with mild intellectual disabilities provided accounts like typically developing children matched for both chronological and mental age. Children with moderate intellectual disabilities performed more poorly, although their accounts included key markers of narrative quality.

Conclusion: These findings challenge negative perceptions regarding the abilities of CWID as eye-witnesses, highlighting the need to use interviewing techniques that enhance narrative-based reporting.

BRIEF EMPIRICAL REPORT

Tactile perception in the autism: A psychophysics investigation into tactile thresholds and their related sensory experiences.

Saffron Morris & Hoi Fae Kwok, University of Birmingham

The study intended to investigate sensory experiences and tactile thresholds of ASD adolescents compared to typically developing peers. Method: The study consisted of 13 ASD participants and 13 controls, matched by the British Picture Vocabulary Scale. Diagnosis was confirmed using the Autism Diagnostic Observation Schedule. The Sensory Profile and psychophysics experiments measuring 3 tactile thresholds were completed. Results: The ASD group had a significantly higher light touch threshold, significantly higher scores in the low registration (p=.001) and tactile processing (p=.004) on the sensory profile, and a correlation was found between hypertactile scores and coarse texture discrimination threshold (p=.02). Conclusion: Findings demonstrate significant tactile abnormalities within the ASD population for sensory experiences and how these impact the processing of physical tactile stimuli. Research investigating tactile perception in autism has potential to improve the material properties of the individual’s environment to aid coping and develop sensory based interventions.

WORKSHOP

Identifying rules and strategies in development with mixture and Markov models

Ingmar Visser, University of Amsterdam; Maarten Speekenbrink, University College London

Objectives and scope: There are many situations in which one may encounter distinct types of entities, such as different animal species, and different states in which these entities may exist, for example motivational states like hunger.
Cognition is sometimes also best understood in terms of discrete types and states. For example, forms of cognitive development can be characterised as the acquisition of increasingly complex rules which constitute different types of reasoning and associated response patterns in reasoning tasks, such as in performance on the balance scale task (Jansen, Raij-makers, & Visser, 2007). And rather than a gradually shifting trade-off, people may switch rapidly between distinct decision-making modes favouring either speed or accuracy (Dutilh, Wagenmakers, Visser, & Maas, 2011). Another example is the developmental pattern observed in children performing on the Dimensional Change Card Sorting (DCCS) task (Bers, Visser, Schijndel, Mandell, & Raijmakers, 2011), which is used to measure cognitive flexibility in 3- and 4-year olds. The idea that cognitive processes are guided by qualitatively different strategies underlies a wide range of theories concerned with topics such as word recognition, cognitive development, categorization learning, and decision making, to name but a few (for an overview, see e.g. Scheibehenne, Rieskamp, & Wagenmakers, 2013). In these examples, and generally in (cognitive) development, the types and states concerned are the (cognitive) strategies that children use to respond to a task.

As the identity strategies is generally not directly observable, nor always known a priori, appropriate statistical techniques are required to identify them. This tutorial will focus on mixture models (MMs) and hidden Markov models (HMMs), which are the basis of such techniques. In the context of MMs, a type or state (e.g., a cognitive strategy) is formalized as a probability distribution over observables, i.e. childrens’ performance on a particular task. Because a dataset may contain different types, the overall distribution is a mixture of such individual component distributions. As the component distributions need not be of the same parametric family (e.g., Gaussian distributions can be mixed with other distributions), MMs allow for considerable flexibility in the examples in the remainder of the tutorial will use this package.

301 (1315)
INVITED SYMPOSIUM
Risk and protective factors for bullying and peer victimisation
Claire Fox, Keele University

This symposium will address new questions regarding risk and protective factors for bullying and peer victimisation and offer new insights into how best to intervene to enhance children’s resilience. First, Dieter Wolke will report on the effects of bullying involvement into adulthood from several longitudinal studies in the UK and USA. Next, Mike Boulton will report the results of an experiment to examine the effects of a cross-age teaching intervention for victims of bullying. Lucy Betts will present the findings from a study which examined links between cyberbullying/victimisation, time spent online and confidence with technology. Claire Fox will then begin to unpick the causal relationships linking children’s humours styles and peer victimisation. Finally, Peter Smith will act as a discussant.

PAPER 1
The Long Shadow Thrown by Bulling: Risk and Protective Factors
Dieter Wolke, University of Warwick

Objectives: A review of findings of the long term adverse effects of being bullied from early childhood into adulthood.
Methods: Participants from several prospective studies. Control for pre-existing social conditions, parenting and pre-existing psychiatric problems. Meta-analyses of the effects of parenting and socio-economic conditions and bullying involvement.

Results: Being bullied in childhood is associated with increased anxiety, depression, psychotic experiences, self-harm and psychotic experiences in adolescence and early adulthood. It also has long-term adverse effects on economic function such as holding down jobs, unemployment and saving behaviour. Protective factors identified include a warm relationship with parents and siblings, a positive atmosphere at home and higher self-esteem.

Conclusions: Being bullied in childhood affects adolescent and adult function and economic activity for many years.

PAPER 2
The effects of a cross-age teaching of social skills (CATS) intervention on victims of bullying
Mike Boulton, University of Chester

Objectives: Victims of bullying often hold self-blaming attributions, do not tell teachers, and exhibit low self-esteem. Tested a novel cross-age teaching (CATS) intervention to address these issues.

Methods: A wait-list control pre/post-test experimental design, with random allocation (N = 41). In small groups, participants designed and delivered a bullying-themed lesson for younger pupils, including the notion that bullies not victims were to blame and that disclosing can help in different ways.

Results: The intervention led to an improvement on all three dependent variables, effects were stronger with a bigger dose of intervention (six versus four hours), and changes in self-blame/self-esteem mediated the effect of the intervention on disclosure.

Conclusion: Theoretical and practical implications are that CATS can help build resilience in victims.

PAPER 3
The Relationship between Peer Victimisation and Children’s Humour Styles: It’s No Laughing Matter!
Claire Fox & Sian Jones, Keele University

Objectives: This study assessed the concurrent and prospective associations between peer victimisation and four humour styles, two of which are adaptive (affiliative and self-enhancing) and two maladaptive (aggressive and self-defeating).

Methods: Participants were 1,234 adolescents (48% female) aged 11-13 years, drawn from six secondary schools in England. Self- and peer-reports of peer victimisation were collected, as were self-reports of humour styles.

Results: In cross-sectional analyses, peer victimisation was associated with all four humour styles, most strongly with self-defeating and affiliative humour. Across the school year, peer victimisation predicted an increase in self-defeating humour and a decrease in affiliative humour (and vice-versa).

Conclusions: These results have implications for models of humour development and how we understand the continuity of peer victimisation.
PAPER 4
Young people’s cyber victimisation experiences and cyber bullying behaviours: The role of technological confidence, time spent online, and wellbeing
Lucy Betts & Karin Spenser, Nottingham Trent University
Objectives: Technological confidence and time spent online were examined as predictors of young people’s engagement in cyber victimisation and cyber bullying behaviours.
Method: Four hundred and forty (281 female, 154 male) 16- to 19-year-olds (M age = 16.95) completed measures of cyber victimisation, cyber bullying behaviours, time spent using technology, technology confidence, and wellbeing.
Results: Cluster analysis revealed distinct groups characterised by different profiles of cyber victimisation and cyber bullying behaviours. Predictors of group membership varied according intensity of cyber victimisation and cyber bullying behaviours.
Conclusion: The results reveal that the risk factors associated with cyber victimisation and cyber bullying behaviours varied according to the intensity of these experiences. Time spent online was not a significant risk.

DISCUSSANT
Peter Smith, University of London

302 (1436)
SYMPOSIUM
Parental sensitivity from infancy to pre-adolescence: mechanisms and outcomes.
Claire Hughes, Cambridge
Research interest in parental sensitivity has a long history. Recent work highlights the enduring salience and multi-faceted nature of this construct as well as the distinct levels of analysis adopted. Illustrating these themes, the papers in this symposium: (i) straddle an extended developmental period (from infancy to pre-adolescence); (ii) adopt several distinct measures of sensitivity (from autonomy support and scaffolding through to mind-mindedness); and (iii) encompass multiple levels of analysis, from physiology through to parent and child cognition and behaviour.

PAPER 1
Hormones and parenting quality: Testosterone in relation to mothers’ and fathers’ sensitivity and intrusiveness
Judi Mesman, Marleen Groeneveld, Liesbeth Hallers-Haalboom, Sheila van Berkel Berkel, Lotte van der Pol & Marian Bakermans-Kranenburg, Leiden
Objectives: To investigate the role of hormones in caregiving quality by examining maternal and paternal salivary testosterone levels in relation to their sensitivity and intrusiveness towards toddlers.
Method: We collected morning and evening saliva samples from 222 mothers and fathers and observed their sensitivity and intrusiveness during a free-play situation with their toddlers on a different day.
Results: Morning and evening testosterone were unrelated to observed parenting in both mothers and fathers, but a smaller decline in testosterone during the day in fathers was associated with more intrusive parenting, r(222) = .18, p < .01.
Conclusions: Our study provides evidence for the notion that high testosterone levels in fathers relate to behavioral patterns that are incompatible with sensitive caregiving.

PAPER 2
Do mind-minded parents show greater sensitivity when scaffolding their preschool children’s play?
Claire Hughes, Centre for Family Research, Department of Psychology, University of Cambridge

Objectives: We aimed to assess whether parental mind-mindedness (the proclivity to view one’s child as an agent) was related to detailed measures of sensitivity in goal-directed situations (indexed by scaffolding in dyadic play).

Method: 110 parent-child (aged 3 and 4) dyads were filmed in lab play sessions and coded for parental scaffolding behaviour. Mind-mindedness was coded from 5-minute speech samples.

Results: Analyses are in progress. Individual differences in mind-mindedness will be examined in relation to distinct markers of parental scaffolding (e.g., contingent shifting).

Conclusions: Mechanisms linking mind-mindedness to child outcomes have yet to be elucidated – scaffolding provides a promising candidate.

PAPER 3
Maternal Autonomy-Support and Psychological Control: Links with Maternal and Child Executive Function
Claire Hughes, Centre for Family Research, Department of Psychology, University of Cambridge

Objectives: Recent findings highlight parental influences on preschool children’s executive function, but this research has yet to include older children. We are currently investigating this issue in a study of 300 10- to 13-year-olds.

Method: Parallel batteries of on-line executive function tasks are presented to both children and parents; in addition, both children and parents report on the parent-child relationship.

Results: We will examine similarities in parent and child profiles of executive function and explore whether our multi-informant measure of the parent-child relationship is a partial mediator of the predicted intergenerational stability of executive function.

Conclusions: Our study extends previous research by examining parental executive function as a predictor of parental sensitivity and exploring parental insensitivity as a potential mediator of links between poor executive function in parents and children.

PAPER 4
Does maternal mind-mindedness buffer pre-teenage children at risk for disruptive behaviour?
Sarah Foley & Claire Hughes, Centre for Family Research, Department of Psychology, University of Cambridge

Objectives: Little is known of the impact of mind-mindedness (i.e. mothers’ propensity to see their children as agents with their own thoughts, feelings and intentions) on disruptive behaviour beyond the preschool years.
**Method:** Data from 120 children, seen at age 6 and 12, was used to create multi-informant ratings of disruptive behaviour. Mind-mindedness was coded from the transcripts of mothers’ 5-minute speech samples collected at age 12.

**Results:** A regression and two-way ANOVA showed; 1) 7 risk factors explained 59% of the variance in disruptive behaviour, mind-mindedness accounted for an additional 5%, (2) divided into high/low groups, risk status and mind-mindedness showed a significant interaction.

**Conclusions:** Maternal mind-mindedness may act as a buffer for pre-adolescents at elevated risk of showing disruptive behaviour.

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**303 (1433)**

**BRIEF EMPIRICAL REPORT**

**Simple interactions between short-term memory and long-term knowledge explain large amounts of developmental phenomena**

*Gary Jones, Nottingham Trent University*

**Objectives:** Many explanations of developmental change ignore probably the most important interaction within the developing cognitive system: that of short-term memory and long-term knowledge. CLASSIC (Jones et al., 2014) is a simple specification of this interaction that has been highly successful in explaining children’s nonword repetition.

**Method and Results:** Here, I show that CLASSIC also provides a convincing explanation for a range of other developmental phenomena: (i) increases in processing speed with age; (ii) correlations between linguistic exposure and vocabulary size; (iii) large neighbourhood words being learnt more easily than small neighbourhood words; (iv) recognition being faster for words in familiar frames than in isolation.

**Conclusions:** Surprisingly simple explanations of the link between short-term and long-term memory can account for seemingly complex developmental phenomena.

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**304 (1467)**

**BRIEF EMPIRICAL REPORT**

**Does working memory training really train memory?**

*Harry Purser, University of Nottingham*

**Objectives:** To identify whether working memory (WM) training of primary age children improves working or short-term memory after controlling for executive function gains. In Baddeley’s (1986) model, WM consists of passive short-term storage and executive processes. No study appears to have demonstrated successful training of passive short-term storage, raising the possibility that WM training may, in effect, be executive training.

**Method:** 40 9- to 10-year-olds were trained on the N-back working memory tasks over a six-week period. A battery of cognitive tasks was administered before and after training, assessing the components of Baddeley’s (1986) working memory model.

**Results:** Multiple regression will be used to establish whether memory is trained over and above executive processes.

**Conclusions:** Work is in progress.
EXECUTIVE FUNCTION TRAINING IMPROVES PRESCHOOL WORKING MEMORY

Emma Blakey, The University of Sheffield

A number of studies have reported improvements in Executive Functions (EFs) following cognitive training. However, little research has examined the effectiveness of training in preschoolers, despite the fact that preschool EFs predict school readiness and later academic achievement. The current study compared an EF-training group with an active control group. 35 4-year-olds completed four sessions of computerised tasks over one month. Importantly, baseline and outcome cognitive tasks were different to the training tasks. The training group significantly improved their working memory from pre-training relative to the control group. Notably, this effect was maintained three months later. Children with poor working memory were more likely to maintain this improvement. Training was most effective for children who needed it the most.

WHERE DID I SEE IT? DISSOCIATION OF RECOGNITION MEMORY IN CHILDREN

Laura Koenig & Timothy J. Perfect, Plymouth University

According to dual-process theories recollection (slow and associated with contextual details) and familiarity (fast and automatic) are two independent processes underlying recognition memory (Yonelinas, 2002). The aim was to examine the development of processes underlying recognition as measured by the ability to recollect qualitative details about an item itself, that is, the spatial location of an item. Using an adapted version of the process dissociation paradigm (Jacoby, 1991) in 5-, 7-, 10-year-olds and adults (N = 193) we show that already 5-year-olds were able to recollect spatial location of an item. Recollection increased throughout childhood, particularly between 11-years and adulthood. Familiarity differed between 5-years and adulthood (Experiment 1). In Experiment 2, under limited response time during retrieval, recollection was only reduced in 5-year-olds and adults, whereas familiarity was left unaffected in all age groups. These findings are discussed in terms of dual-process theories of recognition memory.

ASSessing executive functions in children with motor difficulties and Developmental Coordination Disorder

Hayley C Leonard, Goldsmiths; Marialivia Bernardi, London South Bank University; Elisabeth L Hill, Goldsmiths, of London; Lucy A Henry, City University

Objectives: To assess the full range of executive functions (EFs) in children with motor difficulties in terms of the verbal and non-verbal components of the tasks.

Method: Children aged 7-11 with a diagnosis of Developmental Coordination Disorder (DCD: N=29) and with motor difficulties identified through screening (MD: N=30) were compared to typically-developing children (TD: N=39) on verbal and non-verbal tests of executive-loaded working memory, inhibition, switching, planning and fluency.

Results: Children with motor impairments performed significantly worse than the TD group in the non-verbal measures of all EFs except for switching.
Conclusions: Difficulties in non-verbal EFs could have a significant impact on classroom functioning, particularly when tasks involve processing visuo-spatial information or a motor skill, such as handwriting.

308 (1244)
BRIEF EMPIRICAL REPORT
Longitudinal changes in cognitive growth from childhood to adolescence among youth at elevated risk for schizophrenia and spectrum disorders
Hannah Dickson, University of West London
Objective: To determine developmental trajectories of cognitive growth among youth aged 9-15 years, including individuals at risk for schizophrenia and typically-developing youth.
Method: 104 youth were assessed on up to three occasions on measures of general intelligence (IQ), scholastic achievement, memory, and executive function (EF). Cognitive changes were estimated using longitudinal mixed models on repeated measures.
Results: Relative to their typically-developing peers, at-risk youth exhibited stable deficits in IQ, scholastic achievement, and verbal working memory during adolescent development, but rapid improvements in verbal memory and some aspects of EF.
Conclusions: Findings indicate deviations from normal adolescent neurodevelopmental processes in at-risk youth that represent potential targets for preventive intervention for schizophrenia.

309 (1250)
BRIEF EMPIRICAL REPORT
Ready to read: how staff training impacts literacy skills in pre-schools
Arjette Karemaker, Kathy Sylva, Gulzar Kanji & Victoria Murphy, University of Oxford
Objectives: To determine whether a childcare staff-training intervention designed to improve practitioners' language and literacy instruction can in turn build children's language and literacy skills. The training was expected to assist practitioner's efforts to support children in acquiring emergent literacy skills.
Method: A quasi-experimental, pre- and post test comparison design was adopted. Four childcare centres received the staff-training (intervention group) and four centres were in the (waiting) comparison group. The intervention was delivered through four 2-hour sessions over a 4-week period. It focused on supporting staff to develop knowledge and skills for implementing effective emergent literacy activities. Seventy-one 3-4 year old children (Intervention: n=42; Comparison: n=29) were pre- and post tested on emergent literacy measures.
Results: An ANCOVA revealed that the intervention children performed significantly better at post-test on the Naming Vocabulary measure.
Conclusions: A four-week professional training programme for early years staff can successfully improve children’s emergent literacy skills.

310 (1294)
BRIEF EMPIRICAL REPORT
Preschoolers - perspectival understanding and word learning effects
Conny Hien, University of Dundee
Research suggests that children can only flexibly apply more than one label in one discourse after they pass standard false belief tasks. Both abilities require the understanding of perspective. Initial studies (Hien, 2013) extended this to word learning. Children suspend the disambiguation effect (a well-known naming
phenomenon) when prompted with pragmatic cues at the same time as they pass other metacognitive tasks.

A study with 38 children (mean age 53 m) applied the pragmatic cue paradigm to another proposed word learning effect, the correction effect. Children tended to ‘correct’ one of two novel labels even when faced with strong pragmatic information indicating overlap. The correction effect correlated with other metacognitive tasks but persisted even with older children. Findings from a misnaming task (Waxman & Hatch, 1992), that preschool children can produce multiple labels in one discourse, were not replicated even after simplifying the task in a second study.

311 (1177)
BRIEF EMPIRICAL REPORT
Introducing Reading Quest: Evaluating a modified version of Reading Recovery
Katherine Tremain, Centre for Education Research and Practice, of Bristol; Anthony Feiler, Graduate School of Education, of Bristol; Shireen Sadreddini, Centre for Education Research and Practice
Objectives: This study evaluated the success of Reading Quest (RQ), a literacy intervention based on Reading Recovery (RR), while addressing methodological limitations identified with RR research.
Method: Ninety-six Year 2 pupils completed the Observation Survey of Early Literacy Achievement (OSELA) pre- and post-RQ. Year 2 pupils in five RQ and three comparison schools completed the Graded Word Spelling (GWS; n=92) and Word Recognition and Phonics Skills tests (WRaPS; n=104) three times in 2011-2013.
Results: RQ pupils progressed significantly on the OSELA (Wilcoxon signed-rank) but did not progress more than non-RQ peers on the WRaPS or GWS tests (mixed-design ANOVAs).
Conclusions: While other difficulties prevented conclusions about RQ, addressing methodological limitations in RR research demonstrated how design impacts judgements of effectiveness.

312 (1428)
BRIEF EMPIRICAL REPORT
Developing phonological segmentation: The importance of discrimination for different rates of auditory change
Tim Fosker, Aoife O’Laoide & Christopher Russell, Queen’s University Belfast
Objective: To investigate the relevance of auditory temporal processing to the typical course of reading development. Specifically we hypothesised that sensitivity to different rates of auditory change are important for segmenting different sized phonological units.
Method: Typically developing proficient and beginning readers were examined for their auditory discrimination of different rates of pitch and intensity change and their phonological segmentation abilities for different size units.
Results: Initial analyses showed that sensitivity to different rates of auditory change develop with age and that associations between auditory discrimination and phonological segmentation skills are moderated by the size of the phonological unit being segmented.
Conclusions: Sensitivity to multiple auditory timescales is important for the development of phonological segmentation of different sized phonological units.
313 (1274)
BRIEF EMPIRICAL REPORT
A new measure of Concepts About Print: ‘Dan the Flying Man’
Fiona Jelley & Kathy Sylva, University of Oxford

Objectives: Children’s concepts about print, that is, their familiarity with the purposes of print and mechanics of reading, are an important precursor in the development of skilled reading. However, there are few up-to-date measures that are both attractive to children and predictive of reading skill. This study describes the development of a novel measure of children’s print concepts.

Method: ‘Dan the Flying Man’ has been developed drawing from Marie Clay’s work. Differing from previous instruments, the measure has been designed to be fun, engaging and uses an authentic storybook. 102 children aged 61-80 months were assessed on the new measure on two occasions.

Results: All children completed the measure and reported enjoying the book. Children’s scores will be examined for internal consistency, test-retest reliability and predictive validity.

Conclusions: ‘Dan the Flying Man’ provides a promising measure of Year 1 children’s Concepts About Print.

314 (1463)
BRIEF EMPIRICAL REPORT
Individual Differences in Framing Effects during Adolescence
Laura M.S. Dekkers, Department of Developmental Psychology; Anna C.K. van Duijvenvoorde, Department of Psychology, University; Brenda R.J. Jansen & Hilde M. Huizenga, Department of Developmental Psychology, of Amsterdam

Objectives: Individuals more often choose for a sure versus risky option, if options are framed as gains versus losses, respectively. We test whether sensitivity to these Framing effects is related to decision strategies and is partially explained by Intolerance to Uncertainty (IU), and Risk and Ambiguity Aversion.

Method: Over 500 adolescents perform on a decision task, to assess decision strategies and sensitivity to framing effects, and are assessed on IU. Half of them perform on a second decision task, to assess Risk and Ambiguity aversion.

Results & Conclusions: Latent Class Analysis reveals a range of decision strategies, only some of which associated with Framing effects. No relationships with IU are found; associations with Risk and Ambiguity Aversion are currently studied.

315 (1395)
BRIEF EMPIRICAL REPORT
Adolescents’ experience of offline and online risks: separate and joint propensities
Anke Goerzig, University of West London

Aim: Adolescence is a period of increased risk experience and ever more often these occur online. The current study aims to investigate whether adolescents’ online and offline risk experiences are driven by the same general propensity to risks.

Method: Offline and online risk experiences (five each) of 18,709 11–16 year old Internet users in 25 European countries were assessed.

Results: Confirmatory factor analyses supported a general-specific model with higher loadings of adolescents’ risk experiences on the general factor than on the two specific factors (offline and online).
Conclusions: While some of adolescents’ risk experiences can be explained by the specific environment (offline vs. online) there is strong evidence for an underlying propensity for risk experience in general.

316 (1390)
BRIEF EMPIRICAL REPORT
“It’s like a boy’s version of make-up”: Understanding adolescents’ photo-sharing practices on social networking sites
Beth Bell, York St John University
Objectives: Photo-sharing via social networking sites (SNS) is becoming increasingly popular among adolescents. However, little is known about the types of photographs that adolescents choose to share on SNS, their motivations for doing so, and how adolescents respond to them.
Method: Thirty-five adolescents (aged 13-17) participated in focus groups that explored their photo-sharing practices on SNS.
Results: Thematic analysis was used to analyse the data, leading to the development of eight themes: ‘showing off and likes’, ‘humor and embarrassment’, ‘permanence and proof’, ‘confidence and approval’, ‘materialism and status symbols’, ‘filters and reality’, ‘individual differences and individuality’, and ‘body and appearance concerns’.
Conclusions: The photo-sharing practices of adolescents on SNS are complex and future research should examine the themes highlighted.

317 (1385)
BRIEF EMPIRICAL REPORT
Does the label matter? An experimental investigation of the effects of the depression label in adolescence.
Louise Dolphin, University College Dublin
Category labels strongly influence perceptions of social groups. Labels increase within-category similarity, and decrease between-category similarity. Using an experimental design, we assess the impact of depression labels versus continuum information on adolescents’ responses to peer depression. Data collection is ongoing. The current sample consists of 140 adolescents (M=16.2 years), assigned to one of three conditions (control, label, continuum). Participants respond to four audiovisual vignette characters (two depressed, two non-depressed) on three occasions. A MANOVA will assess a) the impact of labels and continuum information on categorisation of responses to depressed and non-depressed characters b) the perseverance of labelling effects. Results will contribute to the literature on adolescent depression labels and peer stigma, alongside providing much-needed information to interventions tackling depression stigma.

318 (1376)
BRIEF EMPIRICAL REPORT
Adolescent - Parent Conflict Resolution Styles: Associations with Adolescent Psychosocial Adjustment and Delinquency
Rebecca Bell, University of Bedfordshire
There is a growing body of literature that explores adolescents’ internalising and externalising behaviours. A correlation design was employed with 16-18 year olds (N=191) using a series of standardised self-report questionnaires to assess the predictors of these behaviours. These included: adolescent’s identity style, the quality of their attachment to their mother, the conflict resolution strategies they
employ in disagreements with their mother and their internalising and externalising behaviours. Multiple Regression analyses found attachment status significantly predicted the greatest levels of variance in adolescents’ conflict resolution styles. Furthermore, conflict resolution styles proved the most significant predictor of both adolescents’ internalising and externalising behaviours. These findings are discussed with references to pedagogic value along with recommendations for further inquiry.

319 (1222)
BRIEF EMPIRICAL REPORT
Inhibitory Profiles in Adolescence
Chiara Malagoli, Department of Educational Sciences; Maria Carmen Usai, Department of Educational Sciences, Genoa
Objectives: Isolate individual profiles in inhibition efficiency when cognitive or emotional aspects are involved.
Method: A battery of Inhibition tasks involving cognitive (Go-Nogo, flanker, antisaccade) and emotional aspects (Iowa gambling task, Emotional Go-Nogo,) plus three WM tasks (two complex and updating measures and a visuo-spatial span) was administered to 81 participants, age range 14-19 (data collection still in progress).
Results: The k-means cluster analysis revealed three main profiles of inhibition functioning: “quick and inaccurate”, “very slow and accurate” and “moderately slow and accurate”. The three groups differ also in other executive tasks
Conclusions: Cognitive inhibition seems to be sensitive to individual differences and also to influence differently the ability to manage responses also in more emotional conditions.

320 (1281)
BRIEF EMPIRICAL REPORT
Cross-cultural comparison of lexical comprehension and production of British, Australian and Italian children
Allegra Cattani, Plymouth University; Evan Kidd, Australian National University; Paola Pettenati, University of Parma
The lexical subcomponents of receptive and expressive nouns and predicates were examined for cross-comparison languages and cultures. Fifty-one English-speaking British children were compared to an equal number of Australian English-speaking children and Italian-speaking children from Italy, matched on gender and age. Triplets of cards comprising a receptive ‘cat’, an expressive card ‘dog’ and a distractor card ‘television’ were shown. A child was asked to point to the receptive card matching the word said by the assessor thereafter to name the expressive card. The analyses on correct responses, errors and no responses evidenced that British and Australian children produced significantly high percentages of no responses compared to the Italian children. While there is an indication of a slow start for the youngest British and Australian children, all older children reached the ceiling of receptive and expressive words. The effects of cultural and linguistic differences are explained.
Development of social essentialism in Northern Ireland and the USA.

Kirsty Smyth, Queen’s University Belfast; John Coley & R. Cole Eidson, Northeastern University Boston

Objective: Social essentialism is the belief that members of social categories share many nonobvious as well as surface features. We examined the effect of historical sectarian conflict on development of essentialist thinking, by comparing social inferences among 6-12-yr-old children from Catholic, Protestant and Integrated schools in Northern Ireland, and public schools in the USA.

Method: Children were taught a novel property about a hypothetical child, and asked whether other children belonging to the same/different religion, gender, and pet ownership categories would share the property.

Results: There was no effect of nationality on children’s use of religion categories to guide inferences. However, by age 10, children in segregated schools in NI were more likely to make category-based social inferences in general than children in integrated schools in NI or in the US.

Conclusion: These results demonstrate the importance of exposure to social diversity in shaping underlying conceptions about social groups.

The effects of pace in television programmes on young children’s viewing behaviour

Alexandra Lamont & Nicholas Reyland, Keele University

Objectives: It is claimed that watching fast paced television programmes may have negative behavioural consequences for children. However, little research has considered the evidence for such claims among young audiences.

Method: Fast and slow paced programmes were watched by 40 3- and 4-year-olds prior to completing a problem solving game and a test of programme comprehension.

Results: Children were more behaviourally attentive to the fast paced programme and performed slightly better on the problem solving task after watching this programme. However, there was no difference in their comprehension of the two programmes.

Conclusions: Watching fast paced television is not associated with negative behaviour. While children are less behaviourally attentive to slow paced programmes, they can demonstrate good comprehension of them.

Consumer-focused coping strategies: Links with media exposure and well-being

Mark Wright & Lance Slade, University of Roehampton; Charlotte Dunkeld

Previous research has linked materialism to lower well-being in children facilitated by media exposure. Kasser (2003) proposes that negative associations between consumer culture values (e.g. materialism) and well-being can be explained by individuals’ focus on these values as strategies for dealing with underlying insecurity. However, this link has not been tested directly by measuring consumer-focused values as coping strategies. In Study 1 involving a sample of 109 9-11-year-olds, consumer-focused coping predicted lower levels of well-being, was linked
with more hours spent watching television, and mediated the link between television exposure and well-being. In Study 2, a sample of over 300 9-11-year-olds completed the same measures used in Study 1, along with additional measures of self-discrepancies and peer status. We discuss with respect to theories that underpin these findings and implications for future research.

324 (1384)
BRIEF EMPIRICAL REPORT
An investigation into the impact of leisure participation and life satisfaction in adolescents with developmental co-ordination disorder.
Sharon Edwards, University of Bedfordshire
Developmental Coordination disorder (DCD) is categorised by a noticeable impairment of motor coordination affecting 5-7% of children. A mixed method design was used to investigate differences in adolescents (12-19 years) with DCD (n= 66) to those without DCD (n=47) on their participation in leisure activities (using the Leisure Diagnostic Battery short form) and life satisfaction (student life satisfaction scale) along with a retrospective seven day leisure diary (n=6). Analysis found that adolescents with DCD participated in significantly less leisure activities and had a lower life satisfaction than adolescents without DCD. Specifically leisure activities with a social aspect were significantly lower for those with DCD, supported in the diary entries. Future studies should explore the social skills of children with DCD.

325
PRIZE WINNER: MARGARET DONALDSON AWARD: A SPECTRUM OF SOCIAIBILITY
Evidence from developmental disorders
Deborah Riby, Durham University
To function successfully in our ever-changing social world, we must quickly and accurately make social evaluations of others and adapt our own behaviour accordingly. Individuals with some disorders of development find these skills particularly difficult and often struggle to manage the demands of everyday social functioning. Williams syndrome (WS) and Autism represent two such disorders. Due to characterisations of hyper-sociability (WS) versus social isolation (Autism), it has been suggested that these groups represent ‘polar opposites’ in terms of social functioning. I will discuss the social profiles associated with these disorders of development, drawing on empirical evidence from our studies of social attention, social cognition and reports of everyday social functioning. I will illustrate that both disorders are associated with a range of social atypicalities – social abilities are rarely ‘typical’ in either group. However, the evidence that I will present indicates that the simplistic view of ‘polar opposites’ is far from accurate and while there may be clear differences there are also important and subtle overlaps between the disorders. It is worth emphasising that understanding social atypicalities associated with WS and Autism can also inform our understanding of ‘typical’ social expertise. I will discuss future research directions that can build on our current knowledge and contribute to the advancement of theory and the development of applied work.
The inflation of fear responses due to US revaluation following vicarious learning

Gemma Reynolds & Chris Askew, Kingston University

Vicarious learning has become an established pathway to fear acquisition. It is generally accepted that associative learning processes underlie vicarious learning. However, what type of association is formed remains unclear. Two possibilities exist; stimulus-stimulus or stimulus-response learning. Traditionally, these types of learning can be dissociated in a US revaluation procedure. To examine US revaluation in the current experiment, children either viewed a scared vicarious learning video or a neutral vicarious learning video. Following this, an inflation group were presented with still images of the adults in the video, and were told that the accompanied sound and image of a very fast heart rate monitor belonged to the adult in the image. A deflation group were shown the same images but with the sound and image of a normal heart rate. Fear beliefs, avoidance behaviour, avoidance intentions and physiological responses were measured. Results, theoretical and clinical implications for treatment are discussed.

As easy as ABC? Assessing the contribution of automatic letter-sound integration in learning to read

Francina Clayton, University College London; Hannah Nash, University of Leeds

Objectives: Recent research has proposed a novel theory of dyslexia, suggesting that problems learning to read arise from a specific deficit establishing automatic associations between letters and speech-sounds. The present study uses behavioural measures to assess the contribution of automatic letter-sound integration in learning to read.

Method: Children aged 5-8 years completed several reading-related measures and an experimental priming task designed to measure the extent to which letters and speech-sounds are automatically integrated.

Results and Conclusion: Results indicate that typically developing children with approximately two years of reading experience automatically integrate visual letters and their corresponding speech-sounds. Furthermore, rapid naming and letter-sound integration appear to depend upon a common cross-modal mechanism and together predict variation in children’s reading performance.

Adolescent depression is associated with impaired cognitive and emotional ability

Tracy Stewart & Simon Hunter, University of Strathclyde; Keith Matthews, University of Dundee

Objective: Depression in adolescence is associated with severe functional impairment. The aim of the present study was to identify cognitive and emotional factors and examine the way in which they relate to depressive symptoms in adolescence.
**Method:** Adolescents (N=165, aged 13-16 years) completed a computerised internal valenced measure of cognitive control, a minimal instruction cueing methodology as a measure of autobiographical memory and a multifactorial scale as a measure of rumination. Depressive and anxiety symptoms were measured via self-report.

**Results:** Decreased cognitive control for emotional information, over-general memory to cue words and brooding rumination were associated with increased levels of depression.

**Conclusion:** School based preventative interventions aimed at increasing early cognitive and emotional ability in adolescence may reduce depressive symptoms. *Please note that these are predicted results and actual results will be analysed and presented at the conference, if selected of course.*

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**329 (1154) POSTER**

**Impact of social cognitive and personality factors on teachers’ inclusive behaviours towards learners with intellectual disabilities**

_Claire Wilson, Lisa Woolfson, Kevin Durkin & Mark Elliott, University of Strathclyde_

**Objectives:** Classroom teaching practices determine the success of inclusive education. Using the Theory of Planned Behaviour (TPB) and the Big Five personality model, the study examined the impact of teacher personality and beliefs on implementing inclusive strategies.

**Method:** Primary school teachers (n=150) completed questionnaires assessing TPB cognitions (attitudes, social norms, perceptions of control, intentions) towards using inclusive strategies and The Big Five Personality Index. Inclusive behaviours were recorded one month later.

**Results:** Regression analysis tested the predictive utility of the TPB on inclusive behaviours. The influence of personality on TPB components was also examined.

**Conclusion:** Teacher belief and personality factors predicting inclusive teaching behaviours are identified. Their importance to the education of children with intellectual disabilities will be discussed.

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**331 (1176) POSTER**

**Impaired Perception of Facial Motion in Autism Spectrum Disorder**

_Justin O’Brien & Christine Girges, Brunel University; Alan Johnston, UCL & Harold Hill, University of Wollongong_

**Introduction:** Facial motion facilitates social cognition, an area of severe impairment in autism spectrum disorder (ASD). We therefore examined the ability of ASD individuals to perceive and utilize information from facial motion.

**Methods:** Fourteen high-functioning ASD adults and typically developing age and IQ matched controls viewed animated averaged faces. Their task was to discriminate between facial motion sequences, identify different individuals based on motion patterns and to recognize genders. Stimuli were presented in both upright and upside-down orientations.

**Results:** Compared to control participants, those with ASD were impaired in all three tasks and failed to show an inversion effect.

**Conclusion:** Impaired facial motion processing is evident in ASD. This may be linked to lower-level motion processing deficits previously reported.
Lifetime, psychological and personality factors associated with deliberate self-harm among Northern Irish adolescents.

**Allison M.C. Gillen & Donal McAteer, University of Ulster; Teresa Rushe, Queen's University Belfast**

**Objectives:** Clinical experience and research suggests that deliberate self-harm (DSH) rates among adolescents have been increasing.

**Method:** The CASE survey was completed by 864 participants (11-18 years) from schools in NI (56% female).

**Results:** DSH was associated with older age (13% in 15-18 years; 9% in 13-14 years & 2% in 11-12 years) and females (12% girls; 3% boys). Lifestyle factors that were significantly associated included bullying experiences; experiencing family and friend difficulties; smoking, drinking and drug use. Psychological factors that were significantly associated included adoption of emotion-focused coping strategies; lower self-esteem and increased difficulties (SDQ). Personality variables that were significantly associated included higher behavioural inhibition and mood volatility.

**Conclusions:** This extends on previous research by highlighting important personality characteristics of adolescents who DSH.

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Development of Dressing Skills in Children with Williams Syndrome and Down Syndrome

**Taylor Renee Davis & Dagmara Dimitriou, Institute of Education, University of London**

The current research develops the Independent Living Skill of dressing in children with Williams Syndrome (WS) and Down Syndrome (DS). The novel intervention used was designed and previously piloted with Visually Impaired and TD children aged 4-6 years. The current research aims to replicate the findings in different populations. 10 children (DS, N=5; WS, N=5) were recruited from specialist schools in London. The research uses pre-intervention(assessment) – intervention – post-intervention(assessment) design. The intervention delivers systematic instruction through play and is assessed over 5 weeks. Analysis concerns group comparison and individual improvement in dressing skills. The research evaluates the suitability of the intervention to neurodevelopmental populations. Severity of disorder may determine intervention effectiveness. Future directions include adapting the intervention to suit individual needs.

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Bullying and Belonging: Teachers’ Reports of School Aggression

**Sian Jones, Oxford Brookes University**

**Objectives:** Research on bullying has confirmed that group processes are pertinent to children’s responses to bullying. However, such research has been done largely with children, has been quantitative in nature, and has often relied on scenarios to portray bullying. The present paper departs from this methodology by examining group processes in qualitative reports of bullying provided by teachers.

**Methods:** Fifty-one teachers completed an internet-based survey about a bullying incident at a school where they worked.
**Results:** Thematic analysis of survey responses concerned two core themes in the reports: (a) children ganging up on another child and (b) children sticking together to protect each other. There was evidence that children and teachers act in specific ways, in line with social identity processes, in order to support or resist bullying.

**Conclusions:** The ways in which anti-bullying interventions might work with teachers' understandings of bullying to enhance group-level responses to it are discussed.

**335 (1201)**

**POSTER**

**Relationship between mother-infant interaction (4 to 42 months) and later social/comprehensive development.**

Kawai Masatoshi, Centre for the Study of Child Development; Kumiko Namba, Megumi Sasaki, Michiko Ishikawa & Naoko Obanawa, Centre for the Study of Child Development, Women's University; Hatsumi Yamamoto, Noriko Yamakawa & Shigeki Tanaka, Clinical Research Institute; Medical Center, Hospital Organization; Kohta Tamai, Hokkai School of Commerce

**Objectives:** A cohort investigation analysing mother-infant interactions in free play was conducted from 2004 as a part of the Japan Children's Study.

**Method:** Mother-infant vocal and gaze behaviours were analysed through microanalysis. Time and frequencies of BV-MV (Baby vocalize to Mother - Mother vocalize to Baby) and BGM-MGB (Baby gaze at Mother - Mother gaze at Baby) were recorded. DA was measured using KIDS developmental scale - 4 months to 6 years.

**Results:** High positive correlation found between BVMV at 4 months and social ability at 9 and 42 months. BVMV at 9 months related to developmental age at 30 months and 5, 6 years old.

**Conclusions:** Verbal React ability of mother is an important factor in infant social development.

**336 (1215)**

**POSTER**

**Time's up! When children’s metamemory knowledge and strategic time monitoring predict prospective memory performance**

Marie Geurten, Charline Leriche & Thierry Meulemans, University of Liege

**Objective:** This study examines the effect of metamemory knowledge, strategic time monitoring, and ongoing task difficulty on children's prospective memory (PM).

**Method:** Seventy-two children (aged of 4, 6, and 9) were given a task inspired by the mirror training paradigm while they performed a time-based memory task. Half of the participants (expert group) were trained to the ongoing activity before the PM test.

**Results:** When controlling for chronological age, results revealed that PM was predicted by strategic time monitoring. Furthermore, the influence of metamemory knowledge on children's strategic time monitoring was demonstrated in the expert group. Non-experts' strategic time monitoring was shown to be predicted only by their ongoing task performance.

**Conclusion:** The implication of metacognitive processes in PM is discussed in the context of the multiprocess framework.
Executive Functioning & Pedestrian Safety in Stimulant-naïve Children with ADHD

Martin Toye & Sinead Rhodes University of Strathclyde; David Coghill, University of Dundee

Objectives: Pedestrian accidents are the most common cause of accidental injury for children and occur disproportionately in the ADHD population. This is likely because executive functioning (EF) is essential for navigating the traffic environment and is often impaired in children with ADHD. This study aims to establish how EF predicts pedestrian safety in children with ADHD.

Methods: 50 stimulant-naïve children with ADHD (5-11 years) and 50 age/IQ-matched controls completed subtests of the CANTAB and a previously validated battery assessing pedestrian behaviour.

Results: Developmental trends of pedestrian safety in drug-naïve children with ADHD emerge. The predictive nature of EF deficits on pedestrian safety in the ADHD population is demonstrated.

Conclusions: Results provide direction for interventions. Implications for other developmental disorders are discussed.

Electronic books versus printed books: Effects of them on joint attention in infancy.

Ayumi Sato, Kyoto Tachibana University; Yumiko Ishikawa, Seigakuin University; Yu Saito, Ochanomizu University; Etsuo Horikawa, Saga University

Objectives: Shared-book-reading is an exceptional opportunity for the occurrence of joint attention, but it is not clear that playing with electronic books (e-books) has same effect. Therefore, we compared frequency of joint attention occurred in a printed book, e-book with narration, or e-book without narration situation.

Method: Twelve-month-olds and their mothers played in above situations and their behaviors were coded.

Results: As the result of ANOVA, the frequencies of responsive joint attention which included referencing other’s face and mother’s looking into child face were less in e-book with narration than printed book situation. A significant positive correlation was found between them.

Conclusions: These results suggest that narration function reduces mother’s looking into child’s face and it reduces responsive joint attention.

Maternal mind-mindedness measured by video stimuli predicted child’s belief and emotion understanding

Ikuko Shinohara, National Institute for Educational Policy Research

Aim: This study examined longitudinal relations among maternal mind-mindedness (MM) for infant, maternal behavior for their children and children’s later development.

Method: Participants were 38 pairs of mother and 6-month-old infant. To measure MM, mothers were asked to describe filmed infants’ mental states, and then mothers’ descriptions were counted. Mother-child interactions were observed longitudinally. In addition, 4-year-old children’s belief and emotional understanding were tested.
Results & Conclusion: MM predicted children’s emotional understanding. This relation was mediated by maternal use of mental states words during interaction. Children whose mother had moderate, but not high or low, level of MM showed better false belief understanding. MM’s non-linear effects on children’s development were suggested.

340 (1236)
POSTER
The strength of the majority with and without dissenters. A study on Chinese preschoolers’ selective trust in consensus
Siyu Quan, Ileana Enesco, Irene Solbes & Purificacion Rodriguez, Universidad Complutense de Madrid
Previous studies have shown that culture plays an important role in children’s sensitivity to group consensus, but many questions regarding the extent and meaning of these cultural differences remain open. This study explored Chinese preschoolers’ (N=48) decisions to side or not with a numerical majority across different scenarios (labeling new objects, judging moral rules), and in two (between-subjects) conditions. In condition 3vs.1, half of the participants listened to opposite claims made by three “teachers” vs. one “teacher”, across scenarios. In condition 3vs.0, the rest of participants listened to the unanimous opinion of three “teachers” without any dissenter. Most participants adhered to the consensus in the labeling scenario, regardless the condition; however, in the moral scenario, children were highly selective in their decisions but only when a dissenter was present. These findings, which diverge from those obtained with Western children, are discussed considering the different approaches to understanding cultural differences.

341 (1248)
POSTER
Pre-verbal and early verbal communication in siblings of children with language impairment or Autism Spectrum Disorder
Helen Cain, City University London
Pre-verbal and early verbal communication in siblings of children with language impairment or Autism Spectrum Disorder
Helen Cain, Nicola Botting and Natalie Hasson
Division of Language and Communication Science, City University London
Background: The research literature on Autism Spectrum Disorders suggests several early markers that may be present in infants. By contrast, although clinical markers for Specific Language Impairment have been identified in pre-school children, it is unknown whether there may also be early markers present in infants who are later diagnosed.
Method: Three groups of infants, including those at high risk of ASD or language impairment, have been assessed at around 12 months of age, and will be reassessed a year later. The assessment protocol includes a dynamic assessment of communication skills, as well as parent report measures.
Results and Conclusions: Preliminary results and conclusions will be presented based on analysis of the Time One assessment data.

342 (1267)
POSTER
Validation of prototypical children’s facial expression stimulus set
Sarah Griffiths, Christopher Jarrold & Marcus Munafo, University of Bristol
Objectives: To create child facial expression prototypes for use in research. To validate these against adult expression prototypes and test for an own-age emotion recognition bias.

Methods: Prototypes of 2 different ages (5-8 & 9-12 years) showing 6 expressions were created by averaging 15 photos for each. Children and adults (N=192) labelled these, and adult expression prototypes, in a 6 forced-choice task.

Results: ANOVA revealed no difference in recognition accuracy of different aged prototypes and no meaningful prototype age by participant age interaction. Recognition improved with age for all emotions except happiness and anger.

Conclusions: Child prototype expressions are recognised as accurately as adult prototype expressions by children and adults. It is not the case that children recognise expressions better on faces their own age.

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343 (1284)
POSTER
Improving the socio-emotional health of young people in early secondary education: a pilot study of the Pyramid intervention project
Michelle Jayman, Bronach Hughes & Pauline Fox, University of West London

Objectives: Poor emotional health in adolescence is related to many negative outcomes including poor academic performance and mental health issues. The Pyramid project (school-based intervention programme) aims to improve the socio-emotional well-being of vulnerable adolescents.

Method: The impact of the Pyramid project on seven early-adolescent students was examined through a mixed-methods design including the Strengths and Difficulties Questionnaire and a focus group.

Results: Improvements in socio-emotional competencies were demonstrated compared to a comparison group. Thematic analysis supported the quantitative findings and identified potential causal mechanisms facilitating change.

Conclusion: This pilot supports extending the research to a larger cohort and examining impact on academic achievement. Findings have the potential to underpin evidence-based policy and practice in the early adolescent population.

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344 (1309)
POSTER
Kindergartners’ resource allocations in the context of educational inequalities
Laura Elenbaas, Shelby Cooley & Jeeyoung Noh, University of Maryland

Objective: This study measured kindergartners’ resource allocations in the context of educational inequalities.

Method: Participants were 5-6 year-olds (N = 78), n = 33 African-American and n = 45 European-American. Participants witnessed an inequality of educational resources between schools attended by African-American versus European-American students, then distributed resources between two new “European-American” and “African-American” schools.

Results: When African-American schools were disadvantaged, participants allocated approximately equally, but when European-American schools were disadvantaged, European-American participants rectified the inequality (allocated more to the disadvantaged school) at a greater rate (M = .73) than African-American participants (M = .40). Data collection is ongoing; participants’ reasoning for their allocations will be discussed.
Conclusion: Equality preference and ingroup bias interacted when kindergartners allocated educational resources.

345 (1333)  
POSTER  
Mind-Body Dualism as a Natural Intuition that Supports Afterlife Beliefs  
Philip Collard & Bruce Hood Bristol University; Paul Bloom, Yale University  
Objectives: Why is afterlife belief (ALB) common? ALB might arise due to cultural learning, or have its foundation in children’s natural intuitions (in particular mind-body dualism: MBD). We have investigated the development of MBD in children using a “copy-box” paradigm, where animals appear to be duplicated. The current work explores these issues in scenarios where humans are duplicated.  
Method: Measures of ALB and MBD were gathered through video-assisted thought experiments about a duplication scenario and questionnaires in 200 adults (child data forthcoming).  
Results: Though half of the adults showed dualistic thought, no correlation between MBD and ALB was observed.  
Conclusion: Ongoing work concerning the developmental stability of this pattern are examined and the ALB/MBD relationships in childhood are discussed.

346 (1353)  
POSTER  
A qualitative evaluation of a short intervention for refugee mothers who have been trafficked to the UK as they parent their infants.  
Sara A. O. Thommessen, Department of Psychology; Brenda K. Todd, Dept of Psychology, University London  
The intergenerational transmission of trauma creates early disadvantages for children, which extend to later social and educational contexts. We report a short-term intervention tailored specifically to first-time mothers trafficked to the UK. Seven women (aged 19-25 years) originating from Africa, Asia, the Middle East and Eastern Europe participated with their babies. Sessions focussed on attachment, resilience and positive parenting. Qualitative analysis of pre- and post-assessment interviews included the experience of taking part, changes in parenting abilities and the mother-infant relationship. We conclude that this brief intervention was effective and recommend early intervention in order to minimise transmission of trauma and enhance children’s ability to integrate successfully into society and develop to their full potential.

347 (1359)  
POSTER  
Well-being and peer relations in children with Specific Language Impairment  
Neeltje van den Bedem & Carolien Rieffe Leiden University; Petra van Alphen, Pontem  
Objectives: Good peer interactions are important for the well-being. Children are less liked by their peers when they have trouble communicating, like children with Specific Language Impairment (SLI). Question is how peer relations relate to the well-being of children with SLI, compared to children with typical development (TD).  
Methods: 114 SLI children and 134 TD children (9-12 years), were compared on their self-reported mood and self-esteem. Peer nominations were obtained within the class-room.
Results: Children with SLI reported more negative moods than their TD peers, which was related to negative peer evaluations. Yet, only in TD children, parents’ acceptance was related to less negative moods.

Conclusion: Possibly, TD children rely on other resources to protect themselves from negative peer evaluations.

348 (1365) POSTER
Using the Universal Colour Discrimination Test to measure colour vision in children.
Sarah Kalwarowsky & Caterina Ripamonti, University College London

Objectives: Many colour vision tests are cognitively difficult for children to perform. This study aims to use a novel colour discrimination test (UCDT), which is suitable for observers of any age, to measure the chromatic discrimination of children as they develop.

Method: We tested healthy observers aged 7-11 years (n=11) and adults (n=21) on the UCDT as well as the Farnsworth-Munsell 100 hue test (FM100).

Results: We found that children’s chromatic discrimination thresholds obtained with the UCDT were similar to adults but their Total Error Scores obtained with the FM100 were higher.

Conclusions: To better understand this apparent discrepancy, we will be extending the age range, which will allow us to characterise variations in chromatic discrimination across age and colour vision tests.

349 (1381) POSTER
Mother’s theory of mind and children’s personality type
Haruo Kikuno, Shizuoka Sangyo University; Qi Li, Kyoto University

How do mothers understand their children’s mind? It is difficult for mothers to guess their children’s mind from signs of children’s face and behavior. The aim of this study is to examine how mothers understand children’s mind. The effects of children’s personality type on mother’s understanding of their children’s mind were examined. Participants were mothers who have young children. Mothers were asked to answer some kinds of questions including children’s type and mother’s theory of mind. The results showed that mother’s understanding her children’s mind was related with children’ type. These results suggest that whether mothers understand their children’s mind would be depend on children’s type more than mother’s theory of mind.

350 (1386) POSTER
What factor is important to young children’s judgment about the weight of the photograph?
Minako Kimura & Yoshinobu Kato, Nagoya University of Arts

Beilin & Pearlman (1991) reported that 3-year-olds tend to confuse the property of photographs with one of its referents. Our previous study revealed that even 4-year-olds might think photographs and their referents shared the property of “weight” as well as the visual property (Kimura & Kato, 2012). The present study aimed to investigate which factor of the three, the size of the frame, the size of the referent, and the size of the image, influenced children’s judgment about the weight of the photograph. The result showed that 4-year-olds rarely committed errors.
when the size of the frame was different for the two photographs. However, when it was equal, their judgment was influenced by the other two size factors.

351 (1409)
POSTER
Attentional task demands affect prosociality in 3-5 year old children and capuchin monkeys
Lea Johanna Dollbaum & Nicola McGuigan Heriot-Watt University; Andrew Whiten, University of St Andrews
Objectives: Previous studies utilising resource distribution tasks with children and non-human primates have shown large within-species variation in prosociality. We tested whether attentional task demands affect cost-free prosociality.
Methods: Donors (44 children and 10 capuchin monkeys) repeatedly chose between rewarding only themselves or themselves and a conspecific. But donors participated in two versions: Normal (donors saw their own reward while making their selection) and Delayed (donors received their own reward after selecting, attentionally less demanding).
Results: Generalised Estimated Equations showed that both species were significantly more prosocial in the Delayed version.
Conclusions: Attentional task demands influenced prosociality in both species explaining (i) the within species variation shown in previous research and (ii) suggesting similar psychological mechanisms in both species.

352 (1422)
POSTER
Cross-situational word learning: comparing modes of verbal input
Caroline Junge & Siméon Lahaije, University of Amsterdam
Objectives: When multiple objects are simultaneously presented, infants can gradually learn their labels across trials, when these labels are presented in isolation. However, infants mainly hear multi-word utterances. Here, we compare whether supporting sentential contexts boosts or hampers word learning.
Method: Cross-situational word learning paradigm (Smith & Yu, 2008) with 18-month-olds, either listening to labels in isolation ("gemer... kavel") or within typically-naming sentences ("look this is a gemer and this is a kavel").
Preliminary Results: 18-month-olds barely learn words from sentences (t15=1.99; p=.07). The isolation condition is currently being tested.
Conclusions: Results suggest that word learning from a complex visual scene proves more difficult when infants also need to segment words from sentences than when they encounter words in isolation.

353 (1432)
POSTER
Social and emotional understanding as predictors of maternal scaffolding behaviour
Ekaterina Cooper, Canterbury Christ Church University
Objectives: The purpose of this study was to investigate the relationship between maternal social and emotional understanding, home environment and effective scaffolding behaviour. 'Scaffolding' refers to the parental support provided to the child during a problem-solving interaction.
Method: Data was collected during home visits and based on mothers’ and children’s (aged 4-5) self-reports and coded observations of scaffolding interactions during simple problem-solving tasks.

Results: Results report a link between mothers’ use of mental state talk and maternal scaffolding behaviour. Aspects of the home environment are also related to the type of support mothers provide during problem-solving interactions.

Conclusions: The study identified factors which predict effective maternal scaffolding. This has important practical applications for identifying behaviour, which might be targeted in helping parents.

354 (1347)
POSTER
Concurrent validity for 2-year olds of three nursery-worker completed language screening measures with a direct measure of receptive language
Emily Seager & Anna Brown, University of Kent
We assessed 70 30-35-month-olds on the auditory component of the Preschool Language Scale (PLS). Nursery keyworkers completed the Language Use Inventory (LUI), the WellComm and a scale most already used. The WellComm predicted the PLS (p < .001), contributing uniquely to 24% of the variance. A rating of attention was a suppressor variable. The LUI was of borderline significance in predicting the PLS (p = 0.052). Good levels of sensitivity (0.75) and specificity (0.83) were found for the WellComm but not when following WellComm manual criteria. The sensitivity of both the LUI and the measure which the nurseries were using was poor. We discuss our findings in relation to UK-wide changes in how two-year-old language is screened.

355 (1480)
POSTER
Children's drawings of world cup football players: A cross-continental study
Linda Duffy & Bahman Baluch, Middlesex University; Rokhsareh Badami, Islamic Azad University, Iran; Elisangela C Ap Pereira, Barao de Maua University, Brazil
Objectives: Evaluation of children's Human Figure Drawings - HFD in the popular game of football.
Method: 120 children aged 10 and 11 years from Brazil, England and Iran (40 from each country, matched for gender) were asked to draw a footballer from their country and one from each of the other two countries. They were asked to indicate their interest in football on a line, with a happy face at one end and a sad face at the opposite end.
Results: Children’s drawings were scored using Koppitz's (1984) HFD criteria and analysed according to gender, nationality of the child, the level of interest expressed, additions (e.g. naming the player) and the size of the drawings.
Conclusions: Nationality, gender and level of interest are considered as significant variables when assessing children’s HFD’s in a sporting context.
Key words: Children, Human Figure Drawings, Sport, Cross continental