Down Syndrome Research Forum 2015 – Abstracts

1. Guest keynote: The importance of individual differences in understanding the Down syndrome genotype and phenotype

Professor Annette Karmiloff-Smith. Professorial Research Fellow, Birkbeck Centre for Brain & Cognitive Development, University of London.

2. Memory development in infants and toddlers with Down syndrome.

Esha Massand, Annette Karmiloff-Smith, Mr George Ball
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We have been studying a large population of infants/toddlers with Down syndrome (DS) over a very broad protocol. In this talk, we will present our data on individual differences in memory profiles from some 60 infants/toddlers with DS, aged 6-60 months, from eye-tracking tasks measuring memory for objects and their locations. We have correlated these findings with those from other tasks with the same infants, measuring attention and sleep. Combined, these tasks reveal an interesting profile of early memory performance and the factors influencing it, as well as highlighting the considerable individual differences among very young children with DS. We hope that these findings will yield potential clinical markers (endophenotypes) for the cognitive variation in young children with DS and point to important early interventions.

3. Effects of sleep on early cognitive development in young children with Down syndrome.

Anna Ashworth, Coventry University, Dagmara Dimitriou, Institute of Education, London

Effects of sleep on early cognitive development in young children with Down syndrome

In typically developing (TD) children poor sleep contributes to cognitive difficulties. Children with Down syndrome (DS) often have severe sleep problems, particularly with breathing, as well as cognitive and behavioural difficulties. It is currently unknown how sleep problems affect early cognitive development in individuals with DS. This study explores, for the first time, the relationship between objective measures of sleep and well-validated indices of early cognitive development in 2- to 4 year-olds with DS and
age-matched TD children. Sleep was monitored using home respiratory polysomnography and children completed the Mullen Scales of Early Learning to assess motor skills, visual reception and language development.

We report preliminary data on sleep problems in both groups as well as the relationship between sleep and cognitive development. We expect that sleep problems contribute to delays in early cognitive abilities. These findings will support the notion that sleep problems should be examined and treated from an early age in children with DS, which may be crucial for achieving the greatest cognitive outcomes. Since DS is the most common sporadic developmental disorder, this will have wide-reaching clinical implications and set the stage for follow-up intervention studies.

4. ‘Tell it Right, Start it Right’: an evaluation of training about Down syndrome for health professionals
Louise D Bryant¹, Lucy Dix¹, Shiela Puri², Shenaz Ahmed¹
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How a diagnosis of Down syndrome (DS) is delivered to parents can impact on the way they feel about the diagnosis. Parents can feel that the news is delivered insensitively and the way a diagnosis is delivered can stay with parents and may even affect their decision making (Skotko, 2005). The issue of how and when diagnosis is given to parents has been discussed since the 1980’s (Cunningham, 1984) and remarkably little has changed (Skotko B. G., 2009). Health care professionals feel they have very little training and knowledge about DS which can lead to difficulties delivering a diagnosis.

In response the UK Down’s Syndrome Association developed the ‘Tell It Right, Start It Right’ training programme in 2010 for health care professionals. As well as giving professional information and advice about the medical, educational and life experiences of individuals with Down syndrome, the training uses parents and individuals with Down syndrome to tell their stories of diagnosis, childhood and life as an adult with Down syndrome.

This study carried out an evaluation of this training using the Kirkpatrick model of training evaluation. A repeated measures online survey was used to evaluate the training objectives at three time points: before training, immediately after training and two months after training.

Whilst the main aim of our study was to evaluate the efficacy of the training and subsequent dissemination amongst health care professionals, analysis of the surveys also highlighted the differences between parental and healthcare professionals’ perspectives of the diagnosis situation. Of particular interest is the difficulty healthcare professionals have in matching parents’ very individual expectations and needs. The efficacy of using parents and individuals with Down syndrome in training will be discussed and suggestions made for how this model could be utilised in other areas of professional training.


Tell it right, start it right: http://www.downs-syndrome.org.uk/policy-and-campaigns/tell-it-right-start-it-right/
5. Exploring the support needs of health visitors working with children with Down syndrome: a pilot study.
Sandra Redman¹, Silvana Mengoni²
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**Background** Down syndrome is associated with an increased risk of health issues. These health issues are particularly enhanced in the early years with high levels of monitoring, support and therapy required. Many parents have expressed their concern about healthcare professionals’ limited knowledge of Down syndrome. Families of individuals with Down syndrome report a tendency of healthcare professionals to attribute symptoms to the child having Down syndrome rather than a health problem. Health Visitors conduct multiple health and developmental reviews in the early years of a child’s life. The training and understanding that Health Visitors have of Down syndrome is particularly crucial to enable effective health monitoring; however there is no published research in this area. Furthermore, initial research suggests that health monitoring guidelines for Down syndrome are not followed consistently by healthcare professionals.

**Objectives** This study is currently underway and aims to: (a) explore Health Visitors’ existing knowledge of Down syndrome, (b) investigate Health Visitors’ information and training needs about Down syndrome and (c) develop and evaluate a pilot training package.

**Design** Thirty Health Visitors from two local services will take part in group training workshops, which will be evaluated with a pre/post-test design. Health Visitors will complete a questionnaire about their experience and knowledge of Down syndrome and will then participate in a short training workshop. A second questionnaire will focus on post-training knowledge gains and feedback on the training. We will also gather the views about Health Visitors’ support needs from Health Visitor management through a focus group.

We plan to use the findings to apply for funds to develop and evaluate a comprehensive training programme for Health Visitors across a larger number of local areas.

6. Exploring the prevalence of reading skills in 7 year old children with Down syndrome: What characterises those with early reading skills relative to those without?
Kari-Anne Naess¹ & Liz Smith² (presenting) ¹University of Oslo, ²University of Bristol

There is a lot of individual variation in reading skills and related abilities in the Down syndrome (DS) population. Many individuals with Down syndrome (DS) have the capacity to develop reading skills but what characterises those with early reading skills relative to those without and what the prevalence of reading skills is in this clinical group is yet unknown. In this study we tested 43 children with DS who were all aged 7, in their second year of education. We assessed the prevalence of reading skills in these young children with DS and explored what differentiates reader’s vs non-readers. Measures of children’s phonological awareness (four measures), nonverbal mental ability, vocabulary (e.g., BPVS, picture naming), grammar, verbal short-term memory, letter knowledge and rapid naming performance were recorded. We found that 11.6% (five) of the children with DS in our sample showed measurable levels of reading skill. Z scores were computed for children’s performance on each measure. Across all 5 children displaying reading skills, positive z scores were consistently observed for measures of vocabulary and letter knowledge. For PA in contrast, results varied substantially across the five readers, with a number of negative z scores observed across the different measures. These findings indicate that vocabulary and letter knowledge play an important role in the early development of reading skills in those with DS. This research has implications for reading interventions, indicating that targeting vocabulary ability and letter knowledge early on in development could be particularly
helpful in also supporting reading in those with DS; this may be useful to supplement current sight word and phonetic approaches. Importantly, increasing reading skills early in development may result in cascading benefits in other areas of development.

7. Developing number skills in children with Down syndrome – a look at intervention in children aged 1 to 6 years.
Wendy Uttley, Down Syndrome Training & Support Service Ltd, Bradford, UK.

We run a five year early intervention programme covering number, speech, language and motor development. 65 children have been through the programme. Parents and teaching assistants are directly involved.

Is it evident that these children have better understanding of basic numbers? Is possible to reduce the gap between number and reading skills? Are their number skills within the range of skills of their mainstream peers? Case studies from our intervention groups follow children through five years of development. Questionnaires were sent into schools via parents. We collated the results of 16 children, aged 4.9 to 11.2 years. 94% can rote count to 10 or more. 69% can recognize all of the digits 0 to 10. One to one correspondence averaged 10 items when pointing to count and 8 when moving to count. Of the Eight children aged 6+, 75% can do basic addition and 50% can recognize some 2 digit numbers. The questionnaire was subjective in that I asked if number skills were – better than most, about the same, less than most, much below the rest of the class. The same question was asked of reading skills. 69% of the children were reported to have number skills better than or equal to their reading skills. In number skills, 44% were within the range of their mainstream peers with 2 reported as above average. In reading 56% were on a par with these peers. Some reported ability far below what I expected of the child, suggesting the need for good training and high expectations.

The correlation between poor speech and good number skills needs exploring further. Of the 6 children with poorer speech, three have number skills at least on a par with reading skills, and 2 have number skills greater than reading skills. We know that improved speech is linked to good reading skills; are these children not as motivated by reading as they are by number work?

8. The development of arithmetic skills in children with Down Syndrome
Sophie Brigstocke1Kristina Goetz, Margaret J. Snowling2 Charles Hulme3
1University of York, 2University of Oxford, 3University College London.

This article presents the performance of a large sample of children with DS, from mainstream schools, on tasks assessing number skills, reading, vocabulary and nonverbal ability in comparison to younger typically developing children matched for reading ability, over 2 years. In line with previous findings, for the children with DS, performance was weaker in number task compared to reading accuracy. Performance in in the number tasks was also significantly weaker than that of the typically developing controls. Longitudinally, performance of both groups of children improved over time but the rate of progress for the children with DS was strikingly low compared to the TD control group across all measures. Correlations between measures highlighted the importance of vocabulary skills in the development of number skills in both groups. A further study was conducted with 17 children with DS. This aimed to investigate whether children with DS experience difficulties with tasks thought to tap a rudimentary nonverbal ’number sense’ – in this case a computerized digit comparison and a subitising/counting task which collected reaction time data - in comparison to typical children matched for written arithmetic skills. There was no evidence from our experimental tasks that children with DS have impaired basic number processing skills; they show normal distance effects in a digit
comparison task and a have a typical subitising span. This suggests that the speed and efficiency with which children with DS can map between analogue magnitude representations and Arabic digits is comparable to that of younger typically developing children matched for overall arithmetic level. Regression analysis revealed that counting speed was the strongest predictor of performance in the BAS Number Skills task for typically developing children. It is interesting to note that this was not the case for the children with DS. It is likely this is a result of their slow and inconsistent counting behaviour.


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Introduction: Down syndrome (DS) is caused by the presence of an extra chromosome 21, where the amyloid precursor protein gene lies. This gene produces amyloid protein, the main component of β-amyloid plaques that, along with hyperphosphorylated neurofibrillary tau tangles, make up the pathological brain characteristics of Alzheimer’s disease (AD). 100% of people with DS will develop this brain pathology but, although there is higher rate of AD than the typically developing population, (around 50% age 50 display symptoms), it never reaches full penetrance (Lai & Williams, 1989). This study investigates the presence in sub-groups of children of individual differences that resemble those in adults with or without AD. What makes this project different from so many investigating neurodegeneration is that fact that we are studying children. Although this may seem counter-intuitive for an adult onset condition, the genetic nature of DS ensures that the changes leading to potential AD are present from very early on; indeed, β-amyloid deposition has been observed in children with DS from aged 8 onwards (Lemere et al, 1996; Leverenz & Raskind, 1998). Additionally individual differences in DS are observed as early as infancy (Crawley & Spiker, 1983), demonstrating the potential for childhood to contain information about the changes occurring in the human brain prior to symptom onset.

Materials and Methods: Seventy children (with DS and typically developing controls) between the ages of 4 and 16 have been recruited. These individuals were assessed for genetic, neural, cognitive, behavioural, and environmental factors, in order to create rich profiles of sub-groups of children.

Results and conclusions: I present the preliminary results of our analyses of the first year of research, such as the reversal of target looking time over age in DS compared to TD, significant memory task differences (p=0.03, df=23) and interesting trends in the data so far. The findings could yield indications for early intervention.


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The quality of parent-child interactions which occur during shared reading has been suggested as the key factor in a child’s language and literacy development (Reese & Cox, 1999). Some research has focused on techniques which parents use to develop language such as questioning (Anderson et al, 2012) and feedback. Very little of this research has looked at the experience of children with Down syndrome during shared book reading.

A small body of research has found parents to be more directive in their interactions with their children (Rondal & Docquier, 2006) and children to be passive listeners (Trenhol & Mirenda, 2006).
This study aimed to compare shared book reading interactions of parents and children with Down syndrome with parents of typically developing children to see what differences, if any, there are in how parents talk to their children and how their children respond. The study aims to answer the following questions:
1) What are the differences in shared reading interactions between parents and typically developing children and parents and children with Down syndrome?
2) What do parents do to support and develop their child’s language successfully?
3) Does this differ between the two groups?
Eight children with Down syndrome and eight typically developing children were video recorded sharing a picture book with their parents. This was transcribed and coded to examine the extratextual interactions in terms of the types of parent initiations, child responses and parental feedback which was given. A descriptive statistical analysis and sequential analysis were carried out on all coded data to determine the probability of one interaction event following another.

11. A systematic review of parent-mediated interventions to promote communication and language development in children with Down syndrome
Ciara O’Toole1, Alice Lee1, Fiona Gibbon1, Anne van Bysterveldt2, Paul Conway3, Nicola Hart4.
1University College Cork, Ireland; 2University of Canterbury Christchurch, New Zealand; 3University of Limerick, Ireland; 4Down Syndrome Ireland
Best practice guidelines for speech and language interventions with preschool children with Down syndrome highlight the importance of including parents as their child’s main therapists (Buckley & Le Prevost, 2002). Furthermore, studies have identified that the way caregivers interact with their children influences their language and communication development, and so a large part of speech and language intervention is through parent and caregiver-mediated interventions. This paper outlines the planned protocol for a Cochrane systematic review of the evidence for parent training aimed at improving the spoken language skills of preschool children with Down syndrome. As a secondary aim, the effects of the treatment on parent behaviours and on the children’s nonverbal means of communicating will be examined. Randomised controlled trials of parent-training interventions for children with Down syndrome aged 0-6 will be reviewed. Parent training in the form of responsivity education/ focused stimulation designed to improve expressive and receptive language will be considered. In addition, other versions of parent-mediated interventions, such as enhanced milieu teaching, that include a behavioural element and may involve teaching key-word signing or whole-word reading will be reviewed. The training will involve coaching, supervision and support from a clinician and can take place either on an individual or group basis. Outcomes will be measured through expressive and receptive vocabulary and grammar as measured through scores from standardised tests, criterion referenced tests, parent reports, experimental tasks and language samples. Secondary outcomes to be measured will include changes in parental behaviours/responsivity as measured by a validated scale as well as child-related changes in nonverbal communication (e.g. pointing/gestures) and socialisation (e.g. requesting/ commenting) as assessed through naturalistic observations and validated checklists. Possible adverse effects of treatment such as an increase in parental stress will also be measured as well as factors which resulted in noncompliance with the treatment.
12. Nonverbal mental abilities and receptive vocabulary are important predictors for social problems in children with Down syndrome
Kari-Anne B. Næss¹, Egil Nygaard¹, Johanne Ostad³, Anne-Stine Dolva² & Solveig-Alma Halaas Lyster¹
¹ University of Oslo ² Lillehammer University College ³The National Library of Norway

Social functioning is important for well-being, learning and development. Children with Down syndrome may be at greater risk of impaired social functioning compared to typically developing controls because of different risk factors. The aim of this study was to investigate the profile of social functioning, seen as social capabilities and social problems, in an age cohort of children with Down syndrome compared to typically developing children and to reveal possible different predictors between groups. Parental questionnaire and clinical measures of actual predictors were recorded. Compared to nonverbal mental age matched controls, the children with Down syndrome scored weaker on social capabilities. However, no differences in predictors between the two groups were revealed. The children with Down syndrome showed greater social problems compared to both nonverbal mental age matched and chronological age matched controls. Nonverbal mental abilities and receptive vocabulary were more important predictors for social problems in children with Down syndrome compared to controls. These results have important implications for practice and research.

13. Exploration strategies around a novel town: Do typical and atypical groups use the same or different strategies to locate target items? Work in progress
Emily K. Farran¹, Kerry Hudson¹, Hayley White¹, Hannah Ward¹, Malanie Facon², Yannick Courbois², Katie Gilligan¹, Pascal Sockel², Daniel Mellier³, Mark Blades⁴
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Typically developing children aged 6 to 12 years, individuals with Down syndrome and individuals with Williams syndrome explored three novel virtual reality towns. Each town had ten blocks of buildings, three distant landmarks and 40 landmarks within the town. Town 1 involved a three minute exploration to “learn as much as you can about where everything is in the town”. In towns 2 and 3, participants attempted to locate six targets (stars) with and without the presence of an additional “Satellite-Navigation”-style map of the town which showed their location from an overhead viewpoint. Data is yet to be analysed, but we are interested in the routes that participants took, whether systematic strategies were adopted and whether participants explored the whole town whilst looking for targets. This will further inform us about whether people have a cognitive map of their surroundings, and how this develops. The purpose of adding “Satellite-Navigation” was to determine whether this affects people’s routes in the maze; this will tell us whether training people to use maps could help route learning skills. We hypothesise first that the DS and WS groups will not all form a cognitive map, with least success in the DS group, and second that the DS group might adopt compensation strategies such as using a fixed route for each exploration. Preliminary results will be presented.
14. Child and parent contributions to shared reading: do prompts make a difference?
Kate Cain¹, Hui Lee Sim², Kelly Burgoyne²,
¹Lancaster University ²University College London

Shared book reading can be a useful tool for children to practice and improve their language development (Crain-Thoreson & Dale, 1999). However, not all parents read books with their child in the same way, therefore they do not all take advantage of the potential benefits of shared book reading to help their child’s language development. Previous research shows that the quality of parent-child communicative exchanges and the techniques that successfully engage children’s active participation in shared book reading are the keys to maximize the power of shared book reading, leading to greater improvement in language development for children with and without language delay.

The small body of research on shared book reading involving children with DS shows that DS children are generally passive listeners during shared book reading (Trenholm & Mirenda, 2006) and that parents tend to ask closed ended question that require yes/no responses or pointing (Abbeduto, Warren, & Conners, 2007).

In this small-scale pilot study, we investigated shared book reading in 8 dyads comprising a child with Down Syndrome and their parent (all mothers). Each dyad read two books: one a standard picture storybook and one that had questions included to encourage interaction between parents and children. The videoed interactions were transcribed and parental utterances were coded for using a system adapted from Blom-Hoffman and colleagues (Blom-Hoffman, O’Neil-Pirozzi, Volpe, Cutting, & Bissinger, 2007). This coding scheme of adults’ language is based on different types of prompts and statements that are believed to be beneficial in helping parents to engage children’s active participation in shared book reading. Children’s utterances were analysed using CLAN to compare length (MLU) and complexity (vocabulary diversity) between the two conditions.

We report analyses that address the following research questions:

a) Does the inclusion of prompts increase both the quality and quantity of parents’ reading techniques used in shared book reading?

b) Does the inclusion of prompts increase children's participation and language outcomes during shared book reading?

c) Do the changes in parents' reading techniques correlate with the quantity and quality of children's responses during shared book reading?

References
Emily Mason-Apps 1, Vesna Stojanovic 2, Carmel Houston-Price 2.
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Individuals with Down syndrome (DS) typically have marked delays in language development relative to their general cognitive development, with particular difficulties in expressive compared to receptive language, and syntax compared to vocabulary. Yet knowledge is limited with regard to which factors in very early childhood may predict language outcomes at age 3. The aim of this longitudinal study was to assess a group of infants with DS (n=14) and a group of typically-developing (TD) infants (n=35) on a variety of factors that have been shown to be related to language in typically and atypically developing infants, in order to investigate which of these factors are the strongest predictors of later language. These factors included: Non-Verbal Mental Ability, Speech Segmentation, Initiating Joint Attention, Initiating Behavioural Requests, Responding to Joint Attention, Parental Responsivity, Object Categorisation, and Symbolic Play. Longitudinal analyses of the relationships between predictor measures and language outcome measures showed that Speech Segmentation and Initiating Joint Attention were the most important predictors of later language in the typically-developing group, whereas Non-Verbal Mental Ability and Responding to Joint Attention were the strongest predictors of later language for the infants with DS. These results are considered in relation to findings from previous research, and the theoretical and practical implications of the findings will be discussed.

Monica Bray, Leeds Beckett University.

The Directions Into Velocities of Articulation (DIVA) model as developed by Guenther and colleagues (Guenther & Perkell, 2004), is a neural network model of speech acquisition and production. It focusses on the transformation of sensorimotor information into speech-motor movements. The model has been applied to childhood apraxia of speech (Terband, Maassen, Guenther & Brumberg, 2009), and to children with speech delay (Shiller, Rvachew & Brosseau-Lapré, 2010). There is strong evidence, backed up by neurological processing information to suggest that auditory perceptual targets drive the accurate production of speech sounds. This discussion paper applies the above literature to the acquisition and development of speech in children with Down syndrome. Examples from a data set of babies and young children will be used to discuss the implications of the model for practice.

17. Using the See and Learn Speech intervention with pre-school children with Down syndrome.
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Children with Down syndrome show a profile of speech and language difficulties, which includes unintelligibility. There are many factors, which affect the speech sound development of children with Down syndrome. There is also a wide range of interventions which may have an impact on the speech sound development, some easier than others to implement. This study was designed to investigate whether it was possible to improve and accelerate speech sound production of children with Down syndrome using the See and Learn Speech intervention (DSE 2011) and the advantages and disadvantages for parents when carrying out an intervention at home?
Twenty-four children took part in the study over a period of two terms. The study comprised of an intervention, delayed intervention and control group, each of eight children between the ages of two and four years. Each group were matched for age, gender and hearing levels. The results suggested that the See and Learn Speech (DSE 2011) intervention, can accelerate the speech sounds development of children with Down syndrome between the ages of two and four years when carried out four times per week, by parents, for ten minutes per session. Parents found the intervention very easy or easy to follow.

18. **Oral motor control and speech/language development in children with Down syndrome: what we know and what we don’t.**
Adam Goody 1, Katie Alcock 2, Padraic Monaghan 2, 1University of York, UK, 2University of Lancaster, UK.

Despite the presence of a combination of orofacial abnormalities, motor difficulties, and expressive language impairment in children with Down syndrome, few studies have investigated how these factors might be related. This talk will discuss what we currently know regarding this relationship by summarising previous work as well as reviewing findings from a longitudinal study of oral motor control and speech/language development which was presented at the 2014 research forum. I will then discuss limitations of previous research and gaps in our knowledge, namely that while associations have been found between oral motor control and both speech and expressive language development, the precise nature of this relationship is still unclear. It will be argued that future research needs to address both a theoretical understanding of this relationship as well as address the implications of this research for clinical practice. Future research ideas will be presented which will aim to answer two questions: (1) what is the precise nature of the oral motor/language relationship and how does this change across development, and (2) what implications will this have for the use of oral motor therapy.

19. **The role of language impairment in the comprehension of novel metaphor: Evidence from Down syndrome and autism.**
Alexandra Perovic, Nausicaa Pouscoulous, Division of Psychology and Language Sciences University College London

Figurative language is known to be particularly impaired in autism spectrum, yet recent claims point to impaired linguistic skills, rather than autism symptomatology, as the underlying cause of this phenomenon (Gernsbacher & Pripas-Kapit 2012). If this is the case, figurative language should be compromised equally in individuals with autism and concurrent language impairment, and individuals without autism but with known language and cognitive impairments, e.g. Down syndrome (DS).

To test this prediction, we investigate comprehension of novel metaphor in 14 children with DS (CA M=9;06; non-verbal IQ=51; vocabulary SS=61, grammar SS=55), 15 children with autism-plus-language impairment (ALI) matched to the DS group on IQ, grammar and vocabulary (CA M=11;05; non-verbal IQ=60; vocabulary SS=64, grammar SS=56) and 16 children with autism and normal language (ALN) (CA M=11;04; non-verbal IQ=96; vocabulary SS=89, grammar SS=91),

To determine where the difficulties with metaphor comprehension may arise (insufficient vocabulary, difficulty taking context into account, inability to make a pragmatic inference), we used an act-out reference assignment task, where participants were shown pairs of minimally different toys and asked to choose the one matching the metaphorical description (e.g., ‘car with a sick foot’). The task was followed by a test of the key vocabulary used in the metaphor sentences.
No statistically significant differences were observed between the groups, however, a trend was observed for a significant Group effect, with the DS group performing poorest.

Our results indicate that a methodology that controls for vocabulary knowledge and minimizes the cognitive demands of the interpretation process helps children with developmental disorders correctly interpret novel metaphor - regardless of the presence or absence of language and cognitive impairments. We will discuss the implications of these findings for the literature on figurative language in DS, as well as introduce a novel metaphor picture-selection-task we are designing to further this investigation.

20. Comprehension and Production of Relative Clauses in Neurodevelopmental Conditions: Evidence from Down Syndrome (DS) and Williams Syndrome (WS)
Nikolitsa Stathopoulou, Chris Jarrold University of Bristol

This study is a part of a two-year EU-funded (Marie Curie) fellowship that is hosted by the School of Experimental Psychology in the University of Bristol. We will present some preliminary results from cross-linguistic comparisons, namely, two groups of English-speaking individuals with Down Syndrome (DS) and Williams Syndrome (WS) and two groups of Greek-speaking individuals with DS and WS. Each atypical group comprises fifteen individuals in each language (aged 8 to 25 years). Their performance is compared to that of larger groups of typically developing children, namely, 70 English-speaking children and 70 Greek-speaking children.

Cross-linguistic studies serve to circumvent certain confounds that may exist in one language alone. In this case, the comparison will indicate whether the difficulties in language function and performance observed in these conditions are the same or different across languages; in turn highlighting the fundamental difficulties that are universal to a given condition. We investigated the syntactic development of the individuals with DS and WS by testing their ability to interpret and produce complex grammatical structures, namely, relative clauses. For the comprehension and production of relative clauses, we employed an act-out task and an elicitation task respectively, where participants were encouraged to play with a number of toys and perform the commands given by the experimenter.

Between-groups comparisons revealed significant differences in performance between the two atypical populations, that is, DS and WS as well as differences in performance between the atypical populations and the typically developing children. By reporting these results we will attempt to answer the following questions: (1) Do the language deficits associated with DS and WS manifest themselves differently in the comprehension as opposed to the production of language? (2) Is the nature of these difficulties comparable in languages of different levels of morphological enrichment (English-Greek)?

Lucy Dix, Dr Paula Clarke, Dr Mary Chambers University of Leeds, School of Education.

The completion of our cross sectional study of the development of theory of mind (ToM) in children with Down syndrome allows us to present our full findings and suggest ways forward for further research in this area. This study tested 40 children aged between 2 and 9 years on a range of tasks specifically designed to examine the precursors, development and maturation of ToM skills. Results were analysed using quantitative pass/fail measures and detailed qualitative case series studies were made on 12 children. Findings suggest that a number of factors may be implicit in the slow development of ToM in children with DS. Working memory, inhibitory control, language comprehension, encyclopaedic knowledge and conceptual development are all identified as possible contributory factors in children’s difficulties with some ToM tasks.
The children in our study showed ToM skills which lag behind those of their typically developing peers (as judged by prior research (Wellman, 2001)) by more than ¼ their chronological age. This has serious implications for the classroom and for the development of social cognition in this group. Whilst children with Down syndrome may be using their good social skills in everyday situations (Cebula, 2008) this may mask an underlying difficulty with understanding other’s points of view. Aspects of the National Curriculum (DFE, 2013) rely heavily on understanding other’s perspectives and children with Down syndrome may not have the underlying concepts to fully access and comprehend certain areas of learning. Ways ahead in teaching and learning will be discussed as well as areas for further research.

References

22. Consolidation of new vocabulary in children with Down syndrome
Faye Smith¹, Hannah Nash², Emma Hayiou-Thomas³ and Maggie Snowling⁴
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In vocabulary training studies, children with Down syndrome are able to learn new words better than might be expected given their language and memory weaknesses (Mosse & Jarrold, 2011; Mengoni et al., 2013). This study investigates whether, despite good initial learning, children with Down syndrome have a deficit in long-term consolidation of new vocabulary. Thirteen children with Down syndrome (age 9-18) and fifteen vocabulary-matched typically developing controls (age 5-6) were trained to learn six novel words. Participants’ were tested on their knowledge of the new words using expressive recall, picture-word matching and mispronunciation tasks immediately after learning, 24-hours and 1-week later.

Patterns of recall on all tasks were similar across both groups over the three sessions. The only group difference lay in the poorer overall performance of the group with Down syndrome on the mispronunciation task, although the pattern of consolidation over time was similar. Thus, we did not find evidence of a vocabulary consolidation deficit in Down syndrome using an explicit training procedure. This finding has practical implications for vocabulary intervention methodologies and theoretical implications for the nature of the language and memory impairments in Down syndrome.

23. Early language intervention for infants with Down syndrome.
Emily Seager, Vesna Stojanovik, University of Reading, Courtenay Norbury, Royal Holloway

The majority of individuals with Down Syndrome (DS) have some form of language deficit (Robert, Price & Malkin, 2007) with particular difficulties in expressive compared to receptive language. Research has found that the number of words a child knows when they enter school will have a significant effect on their progress (Buckley & Le Prevost, 2002) and children with DS often reach school age with few recognisable words. Despite this there are few published treatment studies for infants with DS, and the existing ones tend to focus on children who are already in primary or secondary school (Burgoyne et al., 2012; Camarata et al., 2006). Recent research (Mason-Apps, 2013) assessed various predictors of language in a group of children with DS including: speech segmentation, responding to joint attention and initiating behavioural requests. They found that responding to joint attention at 18 months significantly predicted language at 30-35 months. Therefore improving early response to joint attention may improve later language for these children.
The proposed study will develop an intervention which is aimed at specifically improving responding to joint attention skills at 18 months in the hope of improving language abilities at 30-35 months. The intervention will be based on the work of Whalen and Schreibman (2003) and will last for a period of 10 weeks.

24. Language support for pre-school children with Down syndrome
Vesna Stojanovik, University of Reading

The focus of this presentation will be a discussion of language support provision for pre-school children with Down syndrome. We have been running monthly meetings at the University of Reading for 2 years now which are aimed at parents/carers who have pre-school children with Down syndrome. The meetings are run by speech and language therapy students and PhD students and academic staff involved in research in language in Down syndrome. Each session has a specific focus. For example, some sessions focus on the benefits of shared book reading (dialogic reading); others focus on the use of visual support in eliciting speech from children with Down syndrome. A few of the children who had attended the language support groups, subsequently took part in small scale intervention studies run by final year speech and language therapy students. We will present the results from two single cases and their outcomes. Each case study has a different focus: one is speech and the other one language and they are tailored to the specific needs for each child.

25. The Down syndrome Language Plus Project: Investigating optimal routes for the design of iPad tasks, to support vocabulary in children with Down syndrome.
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The Down syndrome Language Plus project involves a randomized controlled trial of a vocabulary intervention designed for 6-7 year old children with Down syndrome (DS). The intervention aims to improve vocabulary, applying a dual approach including shared picture books and a systematic training program, both on an iPad. To inform the design involving the iPad, we are currently conducting a parental survey about DS children`s use of tablets (and computers). Information about 6-10 year old children`s use of tablets (e.g., preferences, habits and areas of difficulty) is important to carefully consider in the intervention design process. The survey investigates regularity of use, types of use (e.g., learning tasks, watching videos), who children interact with when on tablets, and how they use the tablet (e.g., actively/passively). We also ask about their likes and dislikes in terms of preferred materials (e.g., pictures, sounds, voices) as well as whether the children like repeating tasks, taking turns, whether they have any difficulties relating to tablet use, and whether they like receiving help. We also ask about their preferred feedback. Responses thus far indicate that children with DS use tablets daily. Most children with DS do some learning activities on the tablet, but most commonly they watch videos and play games on the tablet. Activities with music and sounds are popular and repetition of favourite activities was commonly reported. Children often use the tablet alone, but when they do use the tablet with someone else it tends to be an adult/older child. Children with DS also experience strategic difficulties, and seldom choose to do tasks on the tablet that are challenging, often needing help to get started. Both visual and auditory appraisal were highlighted as motivational feedback factors. These findings are important to consider when developing tasks to be completed on the iPad, which has important relevancy for interventions and educational settings.