BDA symposia

Children at Family risk of Dyslexia

Conveners: Maggie Snowling and Hannah Nash

Part 1: The Importance of Language Skills

1. Persistence and consequences of language and speech difficulties in preschool children.

Hayiou-Thomas, Leavett, Nash & Snowling

The current study compares the persistence of isolated speech or language impairments in young children (SSD or LI), with that of combined deficits in speech and language (LI+SSD). Children participating in a longitudinal family-risk study of dyslexia, were identified as meeting criteria for LI-only (N = 27), SSD-only (N = 28), LI+SSD (N = 37), or TD (N = 71) on the basis of a battery of language measures administered at the age of 3½. Despite the similar severity of impairment in the single and double-deficit groups at the start of the study, the double-deficit group (LI+SSD) had particularly persistent problems, which were still present two years later, with marked difficulties across a range of language and literacy measures at the age of 5½ . The co-occurrence of language and speech deficits in preschool children appears to be a particularly potent combination, independent of the initial severity of impairment, leading to a high level of persistence, and widespread difficulties across a range of oral language and literacy skills.

2. Predicting literacy outcomes in at-risk children; the role of early language skills

Hannah Nash, Charles Hulme, Ruth Leavett, Emma Hayiou-Thomas, Maggie Snowling

The present paper reports data from a longitudinal investigation of the overlap between SLI and dyslexia. Children were recruited when they were 3½ years old and assigned to one of three groups; preschool SLI, family risk (FR) for dyslexia and typically developing (TD). Language skills were reassessed at 4 ½, 5 ½ and 6 ½, at which point we also assessed reading skills. At Time 1 there was overlap between the FR and SLI groups; 30 FR children met criteria for SLI. The prevalence of reading difficulties was highest among children who were at family risk and had SLI (90%) compared with 61% for SLI and 47% for the remainder of the FR group. Together these data show that poor preschool language skills are a major risk factor for reading difficulties. However, early language difficulties can resolve and this complicates prediction.

3. What kinds of speech disorder are risk factors for dyslexia?

Carroll, Nash & Snowling

The present paper examines the role of subtypes of speech sound disorder in the etiology of dyslexia. Children participating in a longitudinal family-risk study of dyslexia, were identified as meeting criteria for LI-only (N = 27), SSD-only (N = 28), LI+SSD (N = 37), or TD (N = 71) on the basis of a battery of receptive and expressive oral language measures, and measures of output phonology, administered at the age of 3½. The nature of each child's speech difficulties was assessed using the Diagnostic Evaluation of Articulation and Phonology (Dodd, Hua, Crosbie, Holm, & Ozanne, 2002). Those children with SSD were then classified as showing either phonological delay (defined as

showing speech error patterns similar to those of a younger, typically developing child) or phonological disorder (defined as showing error patterns not present in typical development). It is predicted that only children with phonological disorder will show difficulties in literacy when retested at 6 ½ years old, and that these difficulties will explain further variance in literacy progress after accounting for broader oral language skills.

4. **The role of language skills in the development of executive function**

Debbie Gooch

Executive function is a complex skill comprising the ability to control attention and self-regulate. Deficits in EF have been linked to disorders such as ADHD which is often associated with poor academic outcomes; ADHD is also frequently comorbid with LI and indeed good language skills are required to successfully complete many measures of EF for example through self-talk (understanding and reminding one's self of the task rules). Currently the role of language skills in the development of EF is unclear. Here we explore the longitudinal relationships between children's early language skills and their executive function development to further our understanding of how this complex set of educationally important skills develop. Data are presented from 3 time points of the Wellcome at risk study. Results will be discussed in relation to literature on EF development.

5. **Associations between early phonology and language skills with later arithmetic performance**

Kristina Moll, Maggie Snowling, & Charles Hulme

It is now established that phonological and language skills underlie some components of mathematics and children with dyslexia tend to perform less well in mathematics than typically developing children. However, the nature of the relationships between language and mathematics is still debated. The present paper examines the association between early phonological and oral language skills assessed before formal literacy/numeracy instruction with later arithmetic skills (addition and subtraction efficiency) assessed in primary school.

In total, 196 children were assessed on measures of phonology, language, counting, number knowledge and arithmetic skills over a period of three years. Mediation analyses are used in order to analyse whether the relationship between phonology and language skills with later arithmetic performance is a direct one or is mediated by verbal maths skills.

Part 2: Beyond Phonology: Risk and Protective Factors

1. **Auditory and speech processing as potential endophenotypes of dyslexia**

Elise de Bree, Kristina Moll, Debbie Gooch & Maggie Snowling

In order to investigate whether phonology, frequency discrimination (FD) and categorical perception (CP) are potential and associated endophenotypes of dyslexia, these cognitive skills were assessed in children with and without a familial risk of dyslexia. Outcomes on phonological tasks generally confirmed phonology as an endophenotype; groups differed on phonological tasks, with FR poor reading children performing most poorly, and correlations between phonology and reading outcomes were found. Non-word repetition related to the family-risk of dyslexia, whereas phoneme awareness related to literacy performance. FD and CP did not yield main effects, even when

controlling for age and children's attention skills. Together, these findings endorse the interpretation that phonology is an endophenotype of dyslexia, but that FD and CP are not. Furthermore, at this age, there is no association between phonology, FD and CP.

2. **The Role of the Home Literacy Environment in the Early Literacy Development of Children at Family-Risk of Dyslexia**

Lorna Hamilton, Emma Hayiou-Thomas, Charles Hulme & Maggie Snowling

Behaviour genetic research has indicated that, while individual differences in reading ability are largely explained by genetic factors, shared environmental influences are important in the earliest stages of reading development. Aspects of the Home Literacy Environment (HLE) have been shown to predict foundational skills for reading, including vocabulary and print knowledge (Sénéchal & LeFevre, 2002). The current study investigated the role of HLE factors in the emergent literacy of a sample of children at family-risk of dyslexia (FR). Storybook exposure was found to predict concurrent receptive language skills in 4-year-old FR and typically developing (TD) children. Parental teaching of letters and words predicted letter knowledge, and this relationship was stronger in the FR group. Relationships between the HLE and phonological awareness were mediated by receptive language and letter knowledge. These results are discussed in the context of multiple risk factors for reading disability.

3. **Evaluation of a Combined Reading and Language Intervention for Children At-Risk of Dyslexia**

Fiona Duff, Charles Hulme, Katy Grainger, Samantha Hardwick & Margaret J. Snowling

Interventions for children at family risk of dyslexia tend to show short-term effects on phoneme awareness and letter-sound knowledge but limited transfer to reading. We report a randomised controlled trial of an intervention delivered to 56 6-year-olds at risk of dyslexia, owing to family risk and/or pre-school language impairment. The intervention was delivered on a daily basis by trained teaching assistants and combined a phonics-based approach to teaching reading with training in oral language (phonological, vocabulary and narrative skills). Children who received 9 weeks of daily intervention made greater progress than waiting controls on phoneme awareness, word reading, phonetic spelling and expressive vocabulary. A longer course of intervention (18 versus 9 weeks) had ongoing benefits for literacy skills (word reading and phonetic spelling). Children with weaker initial literacy skills showed greater benefits. Phoneme awareness and letter-sound knowledge predicted response to intervention, confirming the importance of these skills as the foundations of literacy.

4. **Prevalence of reading and related disorders in children at family-risk.**

Maggie Snowling, Hannah Nash, Debbie Gooch, Kristina Moll, Emma Hayiou-Thomas & Charles Hulme.

It is well established that children with language difficulties are at high-risk of dyslexia. Data from our Wellcome Language and Reading Project attests to this risk. The present paper will consider the reading and spelling outcomes of 260 children in the cohort who have been followed between the ages of 3 and 8 years and asks the questions – what is the prevalence of dyslexia in this sample? What are the primary risk factors? Are there shared endophenotypes between Dyslexia and specific

Language Impairment? What role does the environment play? What are the implications for theory and practice?

Discussant: Brian Byrne, University of New England, Australia.