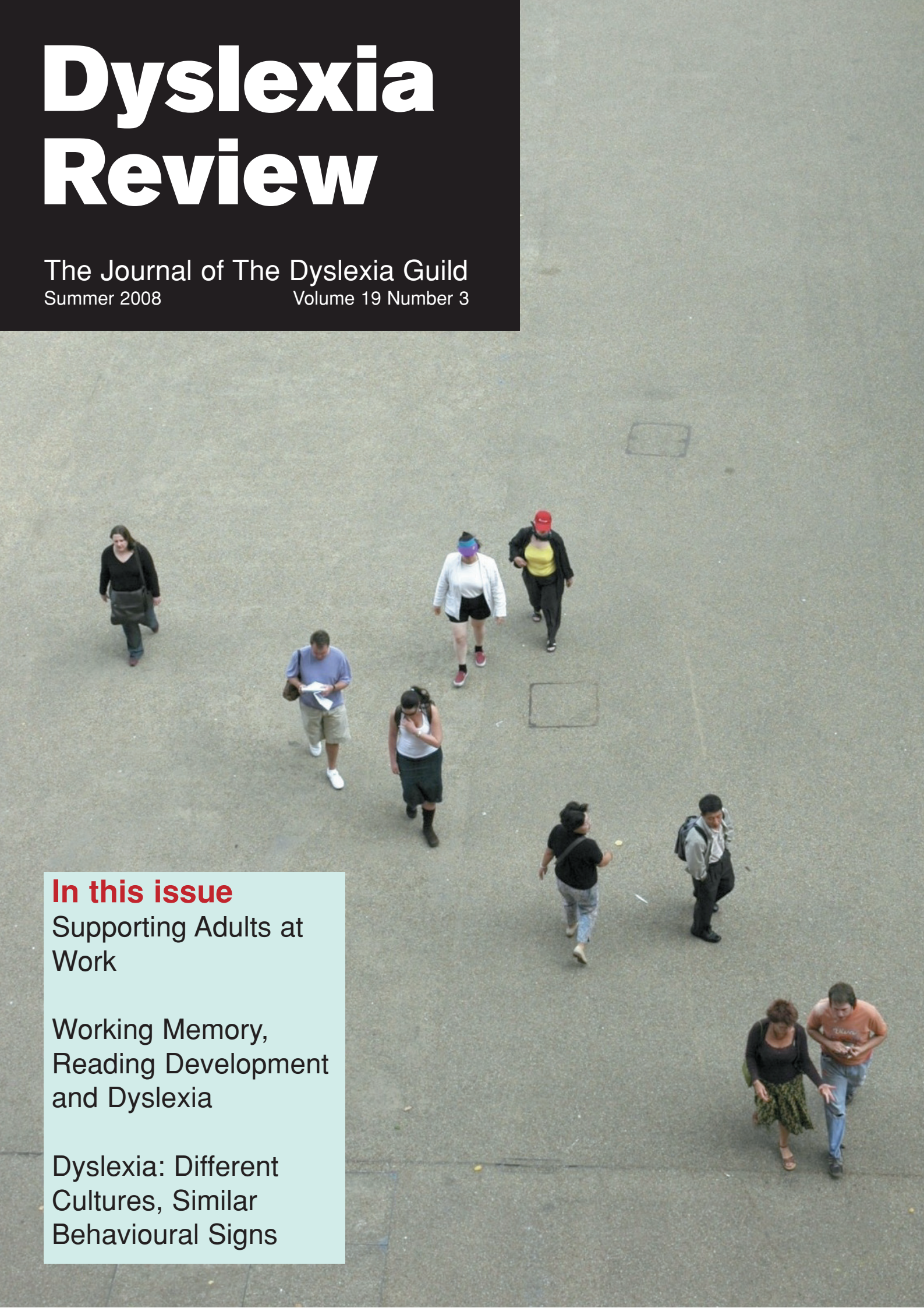
Dyslexia Review

The Journal of The Dyslexia Guild
Summer 2008 Volume 19 Number 3



In this issue

Dyslexia Action

Dyslexia Review
The Journal of the Dyslexia Guild

Editorial

I was extremely pleased and honoured to be offered the role of guest editor for this special edition of Dyslexia Review that has articles which were stimulated by this year's 7th BDA International Conference held at the Harrogate Conference Centre and supported by *Olympus*. The conference's planning committee, chaired by Maggie Snowling, produced an extremely successful conference with an amazing array of high-quality key lectures, symposia, workshops, and exhibitions. Understandably, the conference's programme of abstracts could not provide detailed accounts of these inputs because of lack of space and time. It was therefore very much the hope of the conference's planning committee that the journals *Dyslexia* and *Dyslexia Review* would be able to provide alternative means by which these inputs and offers could be recognised in the form of published journal articles. The subsequent response to the call for papers for *Dyslexia Review* was considerable and, to date, there even appears to be a sufficient number to consider a 2nd journal edition.

Barry Johnson

Dyslexia Review is published three times a year by

Dyslexia Action
Park House, Wick Road, Egham, Surrey, TW20 0HH
T 01784 222 300
www.dyslexiaaction.org.uk

Contents

Working Memory, Reading Development and Dyslexia

Dr Susan Atkinson and Professor Helen Whiteley

Short-term memory skills help us carry out tasks important in everyday life such as remembering a telephone number while we dial it or remembering what was in the fridge while we write a shopping list. These short-term memory skills are not only concerned with capacity – with the amount of information we can recall – but also with interactions between different kinds of information and representations from long-term memory. It is aspects of these skills which we suggest in this paper are compromised in children at risk of reading difficulties.

An influential model of this form of short-term memory is Baddeley's (2000) working memory model. According to this model, working memory consists of three subordinate systems controlled and coordinated by a central executive (CE). The sub-systems are the phonological loop (PL), the visuo-spatial sketchpad (VSSP) and the episodic buffer (EB). Acoustic and verbal information, such as music played on the radio or conversation has automatic access to the PL, where it can be maintained by rehearsal. Visual and spatial stimuli, such as the detail of a picture or images of a cricket match visualised whilst listening to a commentary, similarly have automatic access to the VSSP for maintenance and rehearsal. The EB is thought to interact with long-term memory and to be able to access and use visual, semantic and auditory information. Without rehearsal, information can only be held within these components for a matter of seconds. The CE oversees these subsidiary components, and can both hold and manipulate information from multiple modalities – verbal, acoustic, visual and spatial. Key functions of the CE as identified by Baddeley (1996) include inhibition of competing or interfering information or responses in order to coordinate performance on multiple tasks through allocating attention and to plan and switch between tasks, and retrieval of information from long-term memory.

The different components of working memory have been shown to be important in cognitive attainment, including vocabulary acquisition (Gathercole & Baddeley 1990), maths development (Holmes & Adams 2006), and National Curriculum attainment at 11 and 14 years (Jarvis & Gathercole 2003). There is also extensive evidence suggesting that phonological memory is impaired in people with developmental dyslexia (e.g. Smith-Spark et al 2003), though whether this is due to PL deficits as such, or more general phonological processing difficulties is open to debate (for example, Fawcett & Nicolson, 1995).

Recent research also suggests that CE deficits may be an underlying difficulty in dyslexia. For example, Pickering (2004) argues that children with dyslexia in both English and Greek populations show deficits in both the PL and the CE. Smith-Spark and Fisk (2007) have found CE deficits in students in Higher Education with a diagnosis of dyslexia. While these studies suggest a deficit in the CE, Palmer (2000a, b) argues for a deficit specifically in the inhibition function of the CE. She suggests that for successful word reading, one needs to recode the visual stimuli into phonological representations automatically whilst inhibiting the dominant visual code. Thus, inhibition is necessary for efficient reading, to focus attention and cognitive resources on phonological coding, and to suppress competing or interfering visual codes and activated representations from long-term memory. Children who are struggling to do this at the age of 7/8 years show more positive indicators for dyslexia (Palmer, 2000a), and this skill continues to be impaired in teenagers with dyslexia (Palmer, 2000b).

This research raises the question of whether CE skills generally, and in particular inhibition skills, can predict reading and spelling ability in the early school years, and, more specifically, whether they predict positive indices of dyslexia. The study described here formed part of a longitudinal study, following children from their school Reception year to Year 3. The children were screened for risk of literacy difficulties in the Reception class, and were then re-assessed with measures of academic attainment and working memory skills each year.

Method

Design

One hundred and eight children were screened for risk of literacy difficulties in the Reception class (age 4-5 years), using the Dyslexia Early Screening Test (DEST, Nicolson & Fawcett, 1996). Raven's Coloured Progressive Matrices was also administered as a measure of general nonverbal ability (Raven 1995). Further assessment was carried out in school Years 1, 2 and 3. Results reported here are for the one hundred and two children present throughout the study. The Dyslexia Screening Test (DST, Fawcett & Nicolson 1996) was used as a final screening measure in Year 3. All the children were in mainstream

primary schools, and none of them were on the schools' special needs registers at the beginning of the study.

Materials and procedure

The children's academic attainment was measured using the British Picture Vocabulary Scales (Dunn et al 1982) and the Wide Range Achievement Test reading and spelling subtests (Jastak & Wilkinson 1984). Working memory capacity was assessed using forward digit span with two trials at each length, beginning with 2 digits up to a maximum of 9, presented at a rate of 1 per second (Henry, 2001). As a measure of processing speed, the 'sky search' subtest from the Test of Everyday Attention for Children (Manly et al 2001) was used. Children are asked to mark target matching pairs of spaceships in an A3 sky scene filled with distractor unmatched pairs as quickly as possible. To assess CE functioning, tasks were selected to measure the key functions of long-term memory retrieval (rapid naming, semantic fluency and alliteration fluency) and inhibition (holding and manipulating information whilst suppressing a dominant response: sentence verification and reverse digit span tasks).

Rapid naming: naming pictures with single syllable names as quickly as possible. The score is the time taken plus a five second penalty for each incorrect response.

Semantic fluency: This task was taken from the Phonological Assessment Battery (PhAB: Muter, Hulme & Snowling 1996) and involved recalling as many category exemplars as possible within 30 seconds, for example, 'things to eat' and 'animals'. The number of responses for both categories was summed and recorded, minus repetitions or non-category exemplars.

Alliteration fluency: Again, this task was taken from the PhAB and involved generating as many words as possible beginning with a particular sound, for example, /m/ in 30 seconds. The number of correct responses minus repetitions was recorded.

Sentence verification: the children were asked to listen to sentences, decide whether they were true or false, and then recall the final words in each sentence at the end of the series. For example: *grass grows in the house* ... False ...recall: *house*. They started with one sentence, increasing up to five sentences, one sentence at a time, provided they correctly recalled the final words in two out of the three trials at each length. The score recorded was the final list length recalled correctly.

Reverse digit span: the children were asked to listen to a series of digits presented at the rate of one per second (Henry, 2001), then repeat them back in reverse order, eg 7 2 3 ... 3 2 7. They began with two digits, increasing by one digit in length on successful completion of each trial. Each trial consisted of two attempts: the children progressed to the next length if they got one right. The score recorded was the final list length recalled correctly. All the children were able to repeat back at least one set of 2 digits in reverse order at the beginning of the study.

Results

Initial screening

The DEST put 29% of the sample in the At Risk category (Raven's score range: 6 - 19), 36% Not At Risk (Raven's score range: 11-21), and 35% in a 'middle' category (Raven's score range: 8-25). Because the scoring system for the DEST splits age categories into 3-4 month blocks, the average age for the Not At Risk group was lower than that for the other groups, though not significantly so (At Risk: 62.83 months; Middle: 62.39 months; Not At Risk group: 62.03 months).

Assessment measures

Analysis of covariance allowed us to statistically control for differences between the groups in working memory capacity, processing speed and non-verbal ability. Differences between the three groups throughout the study for spelling and reading remained significant after controlling for these other factors ($p<0.0005$). Figure 1 shows the mean reading scores for each group at each assessment time.

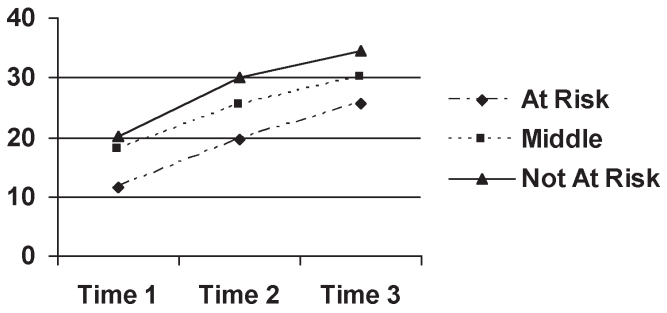


Figure 1: Mean reading scores for each group

Figure 2 shows the mean spelling scores for each group at each assessment time.

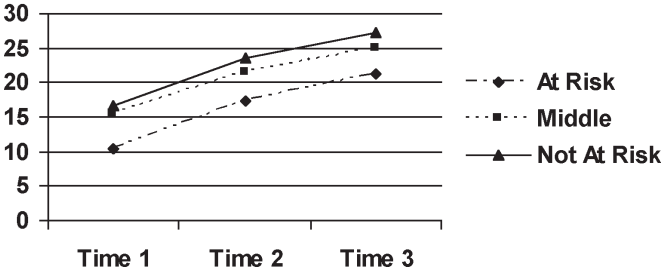


Figure 2: Mean spelling scores for each group

These figures indicate that there are differences throughout the study in reading and spelling.

Exploratory Factor Analysis was used with the data from each year of the study to examine whether the CE measures were all measuring the same component or not. Results reveal two primary factors: Factor 1, comprising reverse digit span and sentence verification, which is assumed to be measuring inhibition skill since both tasks require the holding and manipulation of information whilst suppressing the dominant or obvious response, and Factor 2, where each variable measures long-term memory retrieval: rapid naming, semantic fluency and alliteration fluency.

Standard multiple regressions were performed to investigate which of the CE measures in Years 1, 2 and 3 predict the Year 3 outcomes of reading, spelling and DST at risk quotient. The arrows in the diagram indicate which of the CE measures on the left predict the outcome measures on the right. Measures with no arrows were not significant predictors.

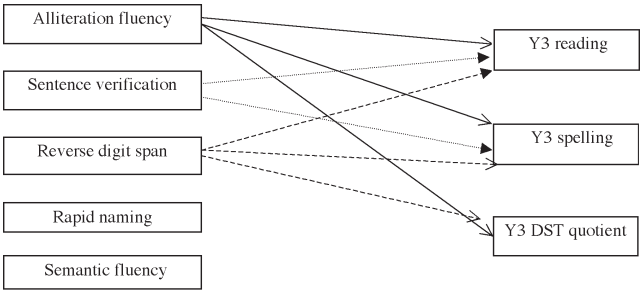


Figure 3: CE measures in Year 1 predicting Year 3 outcomes of reading, spelling and DST at risk quotient

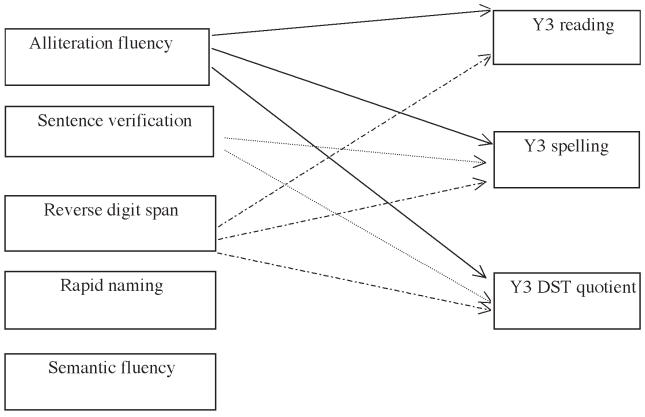


Figure 4: CE measures in Year 2 predicting Year 3 outcomes of reading, spelling and DST at risk quotient

Multiple regressions show that reverse digit span consistently predicts reading, spelling and DST outcome in each year, and the sentence verification task predicts reading and spelling in Year 1, and DST in Years 2 and 3. Of the long-term memory retrieval measures, semantic fluency is never a significant predictor of any of the outcome measures. Alliteration fluency, a measure of access to phonological representations in long-term memory, is a significant predictor of reading, spelling and DST outcome in Years 1 and 2, but only of DST outcome in Year 3. Rapid naming predicts reading and DST.

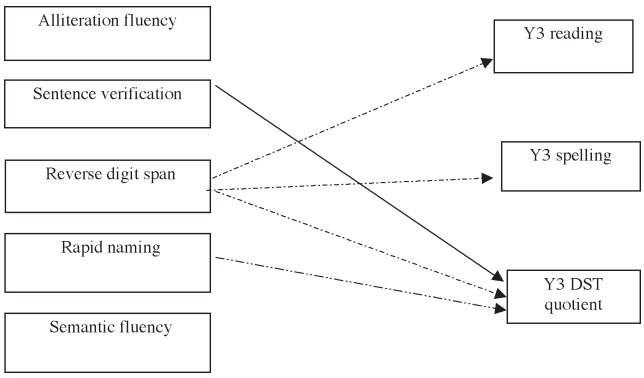


Figure 5: CE measures in Year 3 predicting Year 3 outcomes of reading, spelling and DST at risk quotient

Discussion

There are significant differences between the groups throughout the study for reading and spelling after controlling for general non-verbal ability, working memory capacity and processing speed. This means that literacy differences between the groups cannot be attributed solely to differences in any of these three factors. Analyses indicate that it is the At Risk group whose reading and spelling scores are significantly lower than the other groups' at each point in time. This suggests that the DEST is a reliable early indicator of risk for literacy difficulties: the At Risk group remain poorer readers and spellers throughout the study.

Factor analysis indicates that the CE measures are assessing two different CE components, inhibition and long-term memory retrieval. The multiple regression results show that the inhibition measures, particularly reverse digit span, predict reading, spelling and DST outcome throughout the study. Of the long-term memory measures, alliteration fluency is a significant predictor of all the outcome measures in Years 1 and 2, but not in Year 3, when it only predicts DST outcome. Rapid naming becomes a predictor of DST outcome and reading in Year 3. It could be argued that at this point, as most children become more efficient in their recoding skills, access to specific phonological representations becomes less of an issue in comparison to speed of access to representations. That is, fluency becomes increasingly important as reading proficiency develops and resources need to be freed up to focus on comprehension processes.

The finding that the CE inhibition tests consistently predict reading and spelling scores and positive indicators of dyslexia (ie DST scores) supports the work of Pickering (2004) and Smith-Spark et al (2003, 2007) in identifying a CE deficit underlying literacy difficulties. More specifically, the findings provide support for Palmer (2000a, b), giving a central role to the inhibition function

of the CE in developing fluent, automatic reading and suggesting that this skill is not developing as rapidly in children at risk for reading difficulties as it is in children who are not at risk. This therefore supports a role for the CE in understanding reading development and dyslexia. Working memory deficits in dyslexia are not just related to the phonological loop component: they cannot be explained in terms of differences in PL capacity, phonological processing or processing speed alone.

It is possible that central executive deficits underlie continued difficulties in organisation, sequencing and time estimation experienced by many individuals with dyslexia, which continue after reading and spelling difficulties have been remediated. Problems in these areas can be the main presenting difficulties for those accessing further and higher education where there is increasing emphasis on independent learning and organisational skills in planning work to meet deadlines.

There is contradictory evidence on the possibility and benefits of training working memory skills, but the study reported here raises the question of whether CE training could remediate some of the symptoms of dyslexia. Making inhibition skills explicit through practice may help to address some of the difficulties. Graded activities and exercises which gradually increase in difficulty, utilising video or Playstation- type games, or puzzle activities such as Sudokus might be useful. The authors would welcome further ideas or suggestions from readers.

Dr Susan Atkinson and Professor Helen Whiteley

Dr Susan Atkinson is Senior lecturer at Leeds Metropolitan University
s.j.atkinson@leedsmet.ac.uk

Professor Helen Whiteley is Head of Social and Psychological Sciences at Edge Hill University
whiteleyh@edgehill.ac.uk

References

Baddeley A (1996)
Exploring the Central Executive
Quarterly Journal of Experimental Psychology Vol 49A pp 5-28

Baddeley A (2000)
The episodic buffer: A new component of working memory?
Trends in Cognitive Science Vol 4 pp 417-422

Dunn L I M Dunn L M Whetton C & Pintillie D (1982)
British Picture Vocabulary Scale
Windsor: NFER-Nelson

Fawcett A J & Nicolson R I (1995)
Persistence of phonological awareness deficits in older children with Dyslexia
Reading and Writing: An Interdisciplinary Journal Vol 7 pp361-376

Fawcett A J & Nicolson R I (1996)
The Dyslexia Screening Test Manual.
London: The Psychological Corporation

Gathercole S E & Baddeley A D (1990)
The role of phonological memory in vocabulary acquisition: a study of young children learning new names
British Journal of Psychology Vol 81 pp 439-454

Henry L (2001)
How does the severity of a learning disability affect working memory performance?
Memory Vol 9 Issue 4/5/6 pp233-247

Holmes J & Adams J W (2006)
Working memory and Children's mathematical skills: Implications for mathematical development and mathematics curricula
Educational Psychology Vol 26 No 3 pp 339-366

Jarvis H L & Gathercole S E (2003)
Verbal and nonverbal working memory and achievements on national curriculum tests at 11 and 14 years of age
Educational and Child Psychology Vol 20 pp123-140

Jastak J J & Wilkinson G (1984)
Manual: The Wide Range Achievement Test – Revised
Wilmington DE: Jastak Associates

Manly T Robertson I H Anderson V & Nimmo-Smith I (1999)
The Test of Everyday Attention for Children
Bury St Edmunds: Thames Valley Test Co Ltd

Muter V Hulme C & Snowling M (1996)
Phonological Abilities Test
London: The Psychological Corporation

Nicolson R & Fawcett A (1996)
Dyslexia Early Screening Test
The Psychological Corporation London

Palmer S (2000a)
Working Memory: a developmental study of phonological recoding
Memory Vol 8 No 3 pp179-193

Palmer S (2000b)
Phonological recoding deficit in working memory of dyslexic teenagers
Journal of Research in Reading Vol 23 No 1 pp 28-40

Pickering S J (2004)
Working memory in dyslexia: Beyond the phonological loop
Paper presented at the Sixth BDA International Conference, March 2004

Raven J C (1995)
Coloured Progressive Matrices, Sets A, AB, B.
Oxford Psychologists Press Oxford

Smith-Spark J H Fisk J E Fawcett A & Nicolson R I (2003)
Investigating the central executive in adult dyslexics: Evidence from phonological and visual spatial working memory performance
The European Journal of Cognitive Psychology Vol 15 No 4 pp 567-587.

Smith-Spark J H & Fisk J E (2007)
Working memory functioning in developmental dyslexia
Memory Vol 15 No 1pp 34-56

The Mathematical Profiles of Dyslexic Children: Implications for Practitioners

Dr Fiona Simmons

The causes of mathematical difficulties in dyslexic children: Two opposing viewpoints?

Tim Miles was one of the first researchers to note that children with dyslexia have problems recalling multiplication facts (Miles 1983). This finding has been confirmed by a number of studies that indicate that both children and adults with dyslexia have difficulties recalling arithmetic facts (see Simmons & Singleton 2008a for a review). In recent years there has been increasing interest in the cognitive causes underpinning these arithmetic fact difficulties. It has been suggested that the same cognitive weakness that underlies dyslexic children's reading and spelling difficulties also impacts on some aspects of mathematics. Neuropsychological evidence (Dehaene et al. 1999, Dehaene et al. 2003) suggests that during all mathematical tasks people utilise semantic, domain-specific representations of numbers. These representations are associated with activation in the intraparietal sulcus. However depending on the type of mathematical task, individuals may also utilise verbal or visual representations of number. Verbal representations of number are activated during arithmetic fact retrieval and are associated with activation in left hemisphere language areas. Neuropsychological studies suggest that these left hemisphere language areas are atypical in people with dyslexia (Lishman 2003). I have argued that weak phonological processing impacts on dyslexic children's ability to complete verbally mediated aspects of mathematics (e.g. counting speed, retrieval of arithmetic facts), but leaves other aspects of mathematics (e.g. place value understanding) unimpaired (Simmons & Singleton, 2008a). This argument is consistent with evidence that suggests that aspects of phonological processing predict arithmetic attainment (e.g. Leather & Henry 1994, Hecht et al. 2001, Simmons et al. in press).

An alternative view suggests that phonological processing weaknesses are not the cause of dyslexic children's arithmetic fact recall difficulties, but rather they are caused by an additional domain specific cognitive deficit. Butterworth and his colleagues suggest that some children with dyslexia have an additional cognitive impairment, namely an impaired number module (Butterworth 2005, Landerl et al. 2004). The number module is believed to be responsible for understanding numerosity. Basic number processing tasks are used to tap the efficacy of the number module. Basic number processing tasks include number comparison (where the child has to decide which of two single digit numbers is larger) and dot enumeration (where the child has to quantify a small number of dots). It is suggested that only dyslexic children with an impaired number module have severe mathematical difficulties. Butterworth argues that an impaired number module underpins severe mathematical difficulties regardless of whether the child also has reading difficulties. This view is supported by the results of Landerl et al. (2004). They found that children with severe arithmetic difficulties in the absence of reading difficulties and children with severe arithmetic difficulties with reading difficulties had deficits on tests of basic number processing, whereas children with reading difficulties in the absence of severe arithmetic difficulties did not.

My own research has examined the mathematical profiles of children with dyslexia and considers whether their profiles can be accounted for by the alternative cognitive accounts (Simmons & Singleton 2008b). I compared 38 children with dyslexia to 126 children without special educational needs on tests of counting speed, arithmetic fact recall and place value understanding. The children completed three different arithmetic tests all presented via a computer. In the arithmetic facts test the children attempted addition, subtraction and multiplication fact questions that were visually presented. In the place value understanding test three multi-digit numbers were presented. The child had to identify which was the largest. In the counting speed test children had to count red dots that were displayed on the screen as quickly as they could. There were two types of counting trials. In the first trials (with memory aides) the children could click on the dots, which then changed colour, as they counted. This enabled the child to keep track of the dots that they had already counted. In the second set of trials (without memory aides) no support was given to help the child keep track of their counting. There were statistically significant differences between the groups on the test of arithmetic fact recall and the assessment of counting speed (without memory aides), but no statistically significant differences on the test of place value understanding. A follow-up study where 12 children with dyslexia were matched with 12 children without dyslexia on intellectual ability revealed a similar pattern of strengths and weaknesses. The dyslexic children performed more poorly on the arithmetic fact recall test and both counting speed tests, but at a similar level to their typically developing peers on the place value understanding test. Together these results suggest that whilst children with dyslexia are slow

at counting and have difficulties recalling arithmetic facts their understanding of place value is similar to their typically developing peers.

These results (Simmons & Singleton 2008b) can be seen as broadly consistent with phonological processing impacting on dyslexic children's mathematical development, because verbally mediated aspects of mathematics, that appear reliant on phonological processing, are impaired, but other areas including place value understanding that appear less reliant on phonological processing, are unimpaired. Whilst weak phonological processing provides a logical account of the mathematical profiles of dyslexic children, the possibility that this profile of difficulties could be accounted for by an impaired number module needs to be considered. An impaired number module could only explain dyslexic children's arithmetic weaknesses, if children identified as having an impaired number module display a similar profile of mathematical strengths and weaknesses to dyslexic children (i.e. weak arithmetic fact recall but unimpaired place value understanding). At the present time, the wider mathematical profiles of children with an impaired number module have not been fully investigated. Until further empirical evidence is gathered, it is not possible to reject the impaired number module account of the arithmetic fact recall difficulties of dyslexic children. It may be the case that different children with dyslexia have difficulties with mathematics for different reasons. Some dyslexic children may have subtle and circumscribed difficulties with arithmetic fact recall, which are due to their phonological processing difficulties, whereas other children may have more fundamental and severe difficulties with mathematics due to an impaired number module. Children with this more fundamental difficulty with mathematics would, perhaps, be better described as having dyslexia and dyscalculia. Dyscalculia is defined by the Department for Education and Skills (2001) as, 'A condition that affects the ability to acquire arithmetical skills. Dyscalculic learners may have difficulty *understanding simple number concepts, lack an intuitive grasp of numbers*, and have problems learning number facts and procedures' (p. 2, my italics). Children with an impaired number module would conform to this definition. However dyslexic children whose arithmetic fact recall difficulties are due to phonological processing weaknesses may be confident with basic number concepts and therefore this label may be inappropriate for them.

Implications for practice

Whilst there is debate over the reasons for the arithmetic fact recall difficulties of dyslexic children, the evidence that this aspect of mathematics is difficult for them is fairly consistent. Furthermore, my own findings suggest that these difficulties with arithmetic fact recall *may* coexist alongside relative strengths in other areas of mathematics. This interpretation is consistent with the findings of Geary et al. (2000). They found that children with reading difficulties, who did not have significant difficulties on a standardised mathematics test, still had difficulties rapidly recalling arithmetic facts. Similarly, Rourke and his colleagues, who examined the cognitive profiles of large numbers of children with specific learning difficulties, highlighted that children with a basic phonological processing disorder had stronger mathematical reasoning than mechanical arithmetic (see Rourke & Del Dotto 1994 for a review).
The view that the rapid recall of arithmetic facts in dyslexic children is not *necessarily* indicative of fundamental and widespread problems with mathematics needs to be communicated. Guidance from the Department for Education and Skills (2001) may be communicating an unduly pessimistic picture. This guidance simply lists a wide variety of mathematical skills that are viewed as potential difficulties for children with dyslexia. Areas identified as potential difficulties include place value understanding, counting objects, understanding the structure of the number system, understanding number lines, understanding fractions, using calculators, recognising number patterns and drawing shapes. Whilst many children both with and without dyslexia will have difficulties in these areas, empirical evidence is not cited to suggest that they are differentially difficult for dyslexic children. Currently the only area of mathematics that *converging* evidence from a number of empirical studies indicates is *differentially* difficult for dyslexic children is arithmetic fact recall. Until these other aspects of mathematics are subjected to further empirical scrutiny the guidance from the Department for Education and Skills (2001) needs to be viewed with caution. It may create unduly low expectations of the potential mathematical attainment of dyslexic children.

The arithmetic fact recall difficulties of dyslexic children are particularly important considering the emphasis placed on the use of mental methods in the 'The Primary Framework for Mathematics' (Department for Education and Skills 2006). The heavy emphasis on mental methods is illustrated by the following quote: 'The revised Framework places an emphasis in Key Stage 1 and the first two years of Key Stage 2 on securing children's knowledge of number facts and mental calculation strategies' (Department for Children, Schools and families, n d, p. 4). During the primary years each daily mathematics lesson starts with an oral and mental starter. This emphasis on the aspect of mathematics that dyslexic children find most difficult may impact on their motivation and enjoyment during mathematics lessons. It may result in them believing that they are 'no good at maths' even if they have strengths in other areas of mathematics.

Dyslexic children may appear to perform poorly at mathematics in school, because of the heavy emphasis

on mental methods. Assessment can help determine whether a child with dyslexia has a circumscribed difficulty with mental arithmetic or a more fundamental difficulty with a range of mathematical skills of a dyscalculic nature. One assessment tool that might be employed is the *Dyscalculia Screener* (Butterworth 2003). The screener employs two tests to tap children's sense of numerosity (dot enumeration and number comparison), and a test of their arithmetic fact recall. All the tests assess reaction times, not accuracy. If a child performs poorly on both the tests of arithmetic fact recall and the tests of numerosity, it is assumed that their difficulties are of a dyscalculic nature and are due to an impaired number module. However, if they perform poorly on the arithmetic fact recall test, but show no deficits on the tests of numerosity the child's difficulties are attributed to other causes. Three potential causes for such a profile are suggested: absence from mathematics classes, anxiety about mathematics or inappropriate teaching. Butterworth (2003) does not suggest the possibility that such children may have a domain-general cognitive weakness (such as phonological processing weaknesses or central executive weaknesses) that impacts on their arithmetic fact recall. I would argue that this alternative explanation needs to be considered. Interpreting poor scores on the tests of numerosity and the test of arithmetic fact recall also needs careful consideration. Viewing such a profile as evidence of an impaired number module requires that performance on these tests is not influenced by domain general cognitive abilities or environmental influences. Miles (2004) suggests that difficulty with left and right discrimination could influence children's scores. Furthermore, children with weak phonological representations may perform more poorly on the dot enumeration task, because they are slower to retrieve the phonological codes for number words. Similarly, children who have had more intensive mathematical experiences at home and at school may do better on both tasks because they have developed stronger representations of numbers (see Berch (2005) for a discussion of the issues in assessing children's innate understanding of numerosity).

Whilst *Dyscalculia Screener* may give some indication of whether dyslexic children are slower at basic numerical processes than their peers, a broader assessment is needed to profile both areas of difficulty and areas of strength. The importance of assessment for teaching is emphasised by Kay & Yeo (2003). Standardised mathematics tests can be used in tandem with unstandardised mathematics tasks to identify dyslexic children's current level of attainment. This assessment enables teaching to be targeted at the appropriate level. One assessment tool that might be considered particularly useful is the *WIAT-II*^{UK} (Wechsler 2005). The *WIAT-II*^{UK} includes both tests of numerical operations and mathematical reasoning, allowing the assessor to consider the child's ability to perform arithmetic operations relative to their mathematical reasoning. It has the advantage of not requiring any reading. Unfortunately, this test is only available to chartered psychologists, the parallel version of the test that is available to teachers (WIAT-II^{UK}-*T*, Wechsler, 2006) includes the literacy but not the mathematics subtests.

If a child has a circumscribed difficulty with recalling arithmetic facts, aides such as multiplication squares and calculators may help them access the wider mathematics curriculum and gain enjoyment from being able to utilise their mathematical reasoning without being constrained by their mental arithmetic. However, slow and inaccurate arithmetic fact recall will impact on such children's performance on national assessments where such aides are not permitted (e.g. the mental arithmetic component of GCSE mathematics examinations). A number of authors suggest strategies for increasing dyslexic children's facility with arithmetic facts (e.g. Chinn & Ashcroft 2007, Kay & Yeo 2003, Turner Ellis 2004), which may be helpful in addressing this difficulty. Such techniques often rely on derived fact strategies that require an understanding of mathematical principles (e.g. the communicative principle) and may therefore be more easily accessible to children with secure mathematical reasoning. Butterworth (2003) argues that if children show evidence of an impaired number module interventions should target their understanding of numerosities using concrete objects and counting tasks. It appears logical that different approaches would be appropriate for children whose difficulties with mathematics are underpinned by different cognitive causes. However, specific remediation techniques have not been subject to empirical scrutiny and the interactions between the cause of children's mathematics difficulties and the type of teaching that is most suitable are not yet understood.

Fiona Simmons

Fiona Simmons completed her PhD focussing on the mathematical profiles of children with dyslexia at the University of Hull. She is now a lecturer in psychology at Liverpool John Moores University.

References

Berch D B (2005)
Making sense of number sense: Implications for children with mathematical disabilities
Journal of Learning Disabilities 38 pp333-339

Butterworth B (2003)
Dyscalculia screener
London: Nfer-Nelson

Butterworth B (2005)
Developmental dyscalculia
In J I D Campbell (Ed.) Handbook of Mathematical Cognition pp 455-467
New York: Psychology Press

Chinn S & Ashcroft R (2007)
Mathematics for Dyslexics including Dyscalculia (3rd Edition)
Chichester: Wiley

Dehaene S Piazza M Pinel P and Cohen L (2003)
Three parietal circuits for number processing
Cognitive Neuropsychology 20 pp487-506

Dehaene S Spelke E Pinel P Stanescu R & Tsivkin S (1999)
Sources of mathematical thinking: Behavioural and brain-imaging evidence
Science 284 pp970-974

Department for Children, Schools and Families (n d)
The use of calculators in the teaching and learning of mathematics
Retrieved 8 April 2008 from
www.standards.dfes.gov.uk/primaryframework/mathematics/Papers/Calculators/page004/

Department for Education and Skills (2001)
Guidance to support pupils with dyslexia and dyscalculia
London: Department of Education and Skills

Department for Education and Skills (2006)
The primary framework for teaching literacy and mathematics
London: DfES Publications

Geary D C Hamson C & Hoard M K (2000)
Numerical and arithmetical cognition: A longitudinal study of process and concept deficits in children with learning disability
Journal of Experimental Child Psychology 77 pp236-263

Hecht S A Torgesen J K Wagner R K Rashotte C A (2001)
The relations between phonological processing abilities and emerging individual differences in mathematical computation skills: A longitudinal study from second to fifth grades
Journal of Experimental Child Psychology 79 pp192-227

Kay J & Yeo D (2003)
Dyslexia and Maths
London: David Fulton

Landerl K Bevan A & Butterworth B (2004)
Developmental dyscalculia and basic numerical capacities: a study of 8-9-year-old students
Cognition 93 pp 99-125

Leather C V & Henry L A (1994)
Working memory span and phonological awareness tasks as predictors of early reading ability
Journal of Experimental Child Psychology 58 pp88-111

Lishman W A (2003)
Developmental dyslexia
Journal of Neurology Neurosurgery and Psychiatry 74 pp1603-1605

Miles T R (1983)
Dyslexia: The pattern of difficulties 1st ed
Oxford: Blackwell

Miles T R (2004)
Theoretical background
In Miles T R & Miles E (Eds) Dyslexia and Mathematics 2nd ed pp 1-20
London Routledge: Falmer

Rourke B P & Del Dotto J E (1994)
Learning disabilities: A neuropsychological perspective
Thousand Oaks: California Sage Publications

Simmons F & Singleton C (2008a)
Do weak phonological representations impact on arithmetic development? A review of research into arithmetic and dyslexia
Dyslexia 14 pp77-94

Simmons F & Singleton C (2008b)
The mathematical profiles of dyslexic children
Paper presented at the 7th British Dyslexia Association International Conference, Harrogate, Yorkshire

Simmons F R Singleton C & Horne J (in press)
Phonological processing and visual-spatial sketchpad functioning predict early mathematical attainment: Evidence from a longitudinal study
European Journal of Cognitive Psychology

Turner Ellis S A (2004)
Steering a way through number facts
In Miles, Miles T R & Miles E EdsDyslexia and mathematics 2nd Ed pp 120-138
London: Routledge Falmer

Wechsler D (2005)
Wechsler Individual Achievement Test - Second UK Edition
London: Psychological Corporation

Wechsler D (2006)
Wechsler Individual Achievement Test - Second UK Edition for Teachers
London Psychological Corporation

Exams on Computer: Results of Trials of SQA Digital Question Papers

Paul D Nisbet

Abstract

This paper describes the development and trial of digital question papers by pupils with additional support needs, including dyslexia, sitting Scottish Qualification Authority (SQA) examinations. Digital papers were developed and then used by pupils in 'live' Scottish Standard Grade, Intermediate and Higher examinations in 2006 and again in 2007. The trials were evaluated and marks achieved by pupils analysed. Results indicate that the papers were reliable; pupils preferred using the digital papers to conventional methods of support, such as reader or scribe; and teachers believe that demands on staffing and accommodation are in general reduced.

Introduction

Since 1995 there has been a 340% increase in the number of requests for 'Assessment Arrangements' for candidates sitting Scottish Qualifications Authority (SQA) examinations: from 3,094 candidates in 1995, to 10,660 in 2006 (SQA 2006). Approximately 7% of all candidates sitting SQA examinations now use Assessment Arrangements. It is likely that this increase has been due to a number of factors, including improvements in professional practice and provision and also the impact of legislation such as the Disability Discrimination Act 1995, and the Disability Equality Duty. Assessment Arrangements (previously 'Alternative Assessment Arrangements' and 'Special Arrangements') are intended to 'ensure that all candidates have an equal opportunity to show that they can achieve the national standards required for Units and Courses' (SQA 2007). The majority of the candidates for whom assessment arrangements are requested are described as having specific learning difficulties including dyslexia (Table 1) (Source: SQA Annual Statistical Reports 2003, 2004, 2005, 2006; www.sqa.org.uk).

Schools and centres who present candidates for examinations may request the use of appropriate assessment arrangements to meet the specific needs of the candidate and the assessment. There were 43,291 requests made in 2006 on behalf of the 10,660 candidates, and in most cases, presenting centres requested more than one type of support (Table 2). The most common type of support requested was Extra Time (34,803 requests) followed by the use of a reader (16,815 requests) and then use of a scribe (15,059) (Source: data provided by SQA to the author).

Centres may request the paper to be supplied by SQA in an alternative format such as Braille, Large Print, Modified print, and on coloured paper to suit the needs of the candidate. In 2006, 5,369 individual adapted format question papers were provided (Table 3, (SQA 2006 p13).

The Adapted Digital Question papers were developed in response to a number of factors and observations. Firstly, many pupils with additional support needs routinely use assistive technology in school and at home to access the curriculum: they should therefore also be able to use the same technology in an examination, provided that this does not give the candidate an unfair advantage. Secondly, use of information and communication technology (ICT) offers a more independent method of writing than using a scribe, which is clearly relevant in an assessment context. Thirdly, the widespread use of readers and scribes is expensive in terms of staffing and accommodation given that each pupil requires the amanuensis, a separate room, and an invigilator.

Adapted Digital Question Papers

The SQA Adapted Digital Question papers are electronic versions, in Adobe PDF, of the hard copy paper. The layout and design of the digital version is similar to that of the paper copy which permits candidates to refer to both digital and paper copies, and also ensures that the

Table 1: Number of candidates and entries for whom Assessment Arrangements were requested

	2003		2004		2005		2006	
Difficulty	**Candidates**	**Entries**	**Candidates**	**Entries**	**Candidates**	**Entries**	**Candidates**	**Requests**
Specific Learning Difficulties	5,742	27,532	6,660	31,545	6,625	28,419	6,965	29,002
Various other difficulties (including temporary difficulties)	2,506	11,116	3,238	13,563	2,531	10,122	3,393	12,932
Visual difficulties	102	535	473	2,084	713	2,913	302	1,357
Total	**8,350**	**39,183**	**10,371**	**47,192**	**9,869**	**41,454**	**10,660**	**43,291**

assessment itself remains unaltered. The disadvantage of this is that some questions (particularly in mathematics or science papers) do not suit the digital format given that the papers were originally designed to be accessed and completed using pen and paper.

The digital papers have been adapted in two ways: firstly the question and answer papers have 'answer boxes' so that a candidate can type into the paper on screen. Candidates can use assistive technologies such as alternative or on-screen keyboards or speech recognition programs, to generate text. Candidates with spelling or writing difficulties use the built-in Acrobat Reader spellchecker or word prediction programs to support their writing (where such support does not give an unfair advantage). Secondly, the papers are 'speech enabled' (using TextHelp Systems' PDFaloud Stamping kit) so that candidates with visual or reading difficulties can listen to the text spoken out by the computer.

PDF was chosen in preference to other formats such as DOC, HTML or Daisy because PDF is stable and reliable; accessible for the majority of candidates who require assessment arrangements; interactive (i.e. candidates can type answers and draw on the digital papers); and low cost in terms of production and use (the Adobe Reader and Browsealoud software that is used by pupils to access the papers is free).

The papers are delivered to schools on CD (one CD per entry per candidate) so that they can be accessed on either networked or standalone computers. While networked machines are recommended because of ease of installation and use, some schools appear to have difficulties getting specialist software (e.g. Browsealoud) installed on networks. When a candidate has completed the assessment, the paper is printed out and returned to SQA for marking with the other candidates' handwritten or word processed scripts.

Pilot trials and evaluation

2006 pilot trials

Seventy-three pupils trialled digital versions of past papers in 2005. Staff and pupils were supplied with software and supported by researchers from the project team. Thirty-four students in eight different schools subsequently chose to request Adapted Digital Papers for use in 111 examinations in 2006 (Nisbet et al. 2006).

Table 2: SQA Assessment Arrangements requests, 2006

Type of support requested	No of requests
Extra Time	34,803
Reader	16,815
Scribe	15,059
Use of ICT	3,063
PA Referral	2,480
Coloured Paper	1,327
Transcription with correction	1,190
Calculator	892
Enlarged Print	889
Transcription without correction	678
Question Paper signed to candidate	69
Candidate Signs Responses	56
Braille	28
Use of tape recorder for responses	25

Table 3: Types of Adapted Paper provided, 2006

Type of Adapted Paper	No of papers provided
White paper	1662
Large Print	1071
Colour copies	938
N14 - N18 font	562
Reader copy	408
N20 -N28 font	259
Adapted content	139
N36 - N48 font	104
Digital question papers	146
Braille	80

The majority of the group (20 out of 34 pupils) were described as dyslexic and 7 were dyspraxic. SQA adapted 57 different digital papers, for 19 subject areas, across Intermediate 1 and 2, Standard Grade, and Higher levels. English was the most commonly requested digital paper.

Candidates were asked to complete an evaluation form after sitting each paper and 76 questionnaires were returned in respect of 92 out of 105 (83%) examinations. Students were asked to give the reasons why they chose to use the digital papers; the amount of practice that they had undertaken prior to the examination; whether or not they used the text-to-speech facility; how they answered the paper; whether they required help from staff; whether they would use digital papers again; and whether they felt that SQA should provide digital papers for candidates with additional support needs.

The majority of the pupils chose to use digital papers because they had difficulties with reading, handwriting or spelling, offering comments such as: *'Typing into the paper is much easier than writing. Prolonged writing is difficult and causes a lot of pain'; 'It avoids the need for a scribe. I don't like using a scribe'; 'It is preferable to see the question when typing in an answer, rather than typing into a blank document with a word processor'; 'It would allow me to choose to reread and read any part of the exam quickly without requiring a reader at the time.'.*

Text to speech software was used to support reading in 35 out of 92 examinations (36%) by 10 of the 31 students. Most of students who did not choose to use text-to-speech did not have a reading difficulty and were using the digital papers to support their writing or spelling. 9 out of 10 students used text-to-speech to access all of their digital papers, demonstrating that text-to-speech can be helpful for accessing a range of subjects, including for example Biology, Craft and Design, Geography and Physics.

30 out of 31 students felt that SQA should offer digital papers for examinations, suggesting that, for example: *'it is much easier to use than a reader'; 'it would be easier for markers to read it'; 'you can see what you've written if your writing is bad'; 'not as stressful. It's fairer'. One student felt that papers should only be offered 'to certain people' and that 'there should be a choice'.*

It is important to consider whether the digital papers confer an advantage (or a disadvantage) compared with candidates who are using traditional papers, and also whether digital papers impact on results compared with other types of support such as readers and scribes. The small numbers of pupils and the wide range for papers made meaningful analysis impossible, but SQA statisticians stated that *'Candidates' results from digital papers are similar to their teachers' estimates' and 'there appears to be little difference between [marks awarded for] entries using digital papers and the other entries sat by the same candidates'.*

Staff completed an evaluation questionnaire and Figure 1 shows that the staff (n=7) felt that pupils were more confident, independent, motivated and expert when using the digital papers compared with traditional papers and methods of support.

Staff were asked to score the reliability of the digital papers themselves, and the computers in their schools, on a scale from 1 to 5 (5 is best). On average staff rated the paper reliability 4.75 out of 5 (n=8). The production and quality control procedures developed by SQA therefore appeared to be very effective. The average score for general computer reliability was 4.875.

One of the reasons for developing and trailing the digital papers was because of the demands on staff and accommodation when using scribes and readers, and Figure 2 shows that staff felt that resource demands were lower when using digital papers compared to

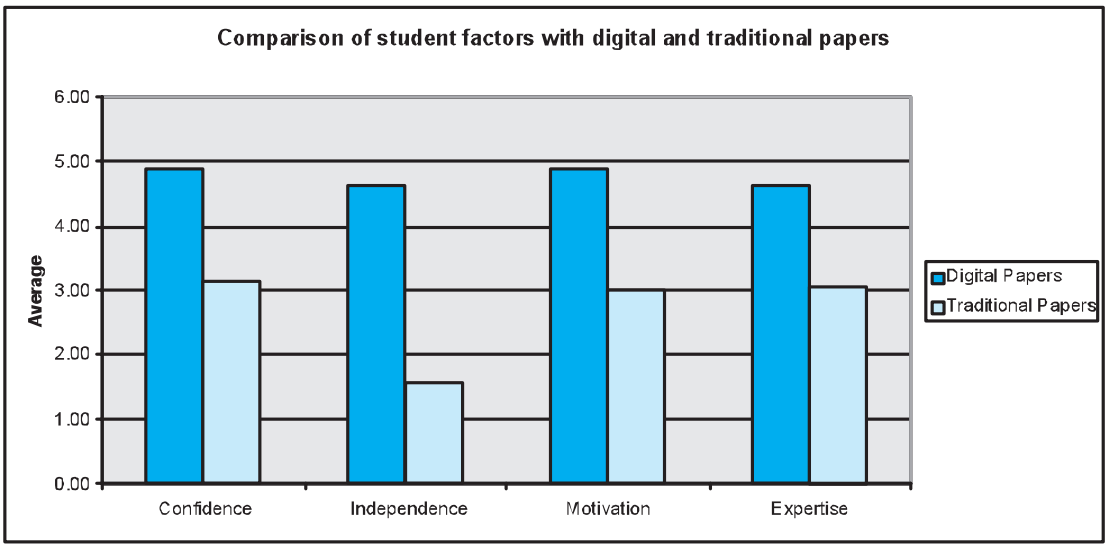


Figure 1: Staff views on pupils' abilities when using digital papers

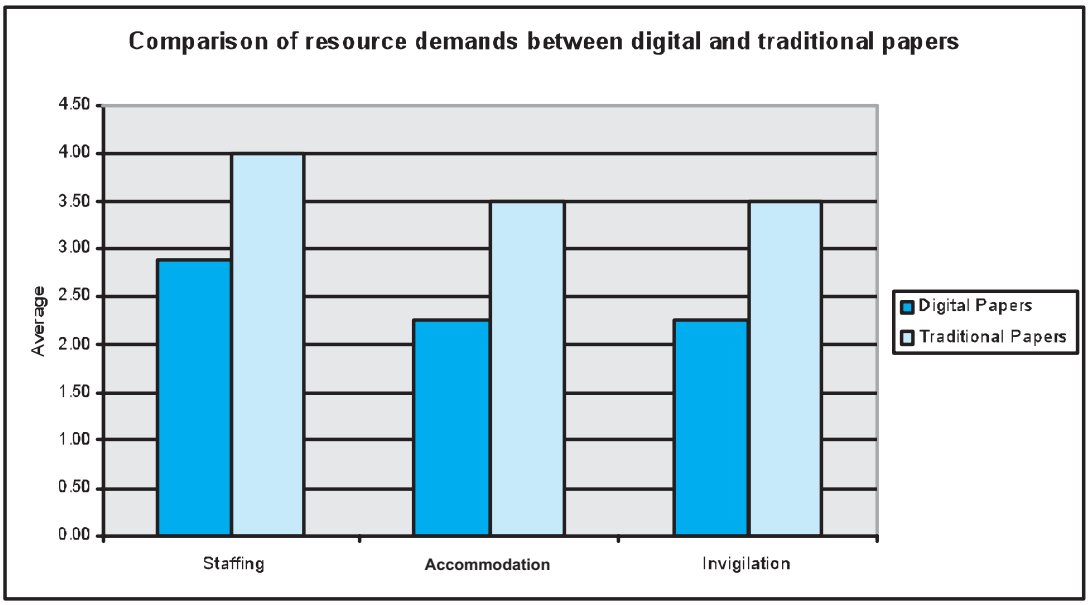


Figure 2: Resource demands with digital papers compared to traditional forms of support

traditional methods of support. One teacher noted that *'We really appreciate this format of exam paper. The pupils are generally much happier to be independent rather than depend on scribes and readers. This year all our S3 and S4s sat the SG English examination at the same time. If we had had to provide readers and/or scribes for this we would not have been able to staff it.'*

2007 pilot trials

Following the successful 2006 trials, more schools were invited to pilot the papers in 2007. Schools were provided with software and digital past papers on CD, and 200 requests for digital papers for 2007 examinations were made by 12 schools on behalf of 80 candidates (Nisbet 2007). 10 of the 12 schools were mainstream secondary, one was a special school for pupils with physical disabilities, and one was a specialist visual impairment support unit attached to a mainstream school.

Again, papers were requested across a wide range of subjects (Table 4) and levels (Figure 3).

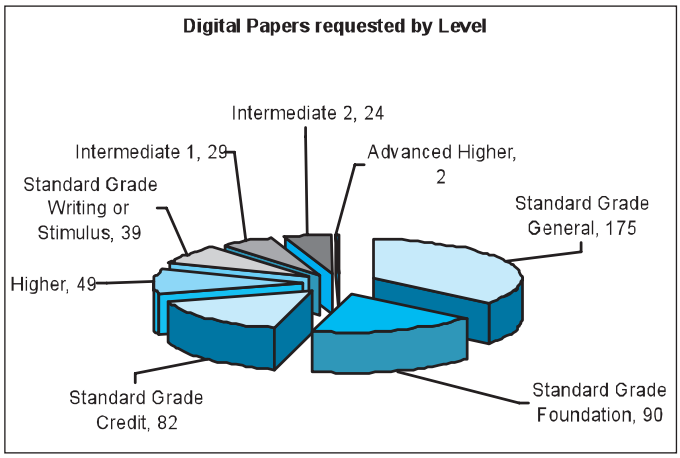


Figure 3: Digital Papers requested in 2007, broken down by Level

Table 4: Number of Digital Papers requested in 2007, by subject

Subject	Digital papers requested	Subject	Digital papers requested
English	219	German	8
Computing	41	Business Management	6
Geography	32	Mathematics	4
French	31	Art & Design	3
Craft & Design	24	Science	2
Administration	19	Social & Voc Skills	2
Biology	17	Accounting	1
History	17	Accounting and Finance	1
Physical Education	11	ESOL	1
Home Economics	10	Human Biology	1
Modern Studies	10	Media Studies	1
Physics	10	Product Design	1
Chemistry	9	Psychology	1
Drama	8		
Total number of Digital Question Papers Requested:			**490**

We did not feel it was reasonable to ask staff and pupils to complete the same detailed questionnaires that were used in 2006, and so staff were asked to provide information about which pupils used the digital papers and whether or not candidates used the text-to-speech facility. Returns showed that digital papers were used in 80% of the entries for which they had been requested and were not used in 6.5% (no data was returned for the remaining 13.5%). Compared with 2006, a smaller percentage of actual digital papers were reported to be used (70% compared to 95%) and upon further investigation this was found to be because the procedure in 2007 required schools to request digital papers for each examination entry rather than for each individual paper. For example, a request for digital papers for Standard Grade English (the most popular entry) would result in five digital papers being delivered by SQA. A pupil with both reading and writing difficulties would use all five papers, but a pupil with writing difficulties only would probably only use the two question and answer papers.

Digital papers compared with other methods of supporting pupils

One aim of introducing digital papers was to try and reduce reliance on readers and scribes. Table 5 gives the total number of requests for different types of writing support in the twelve schools.

Use of different types of support varies widely across the schools, but taken together, there were more requests for use of a word processor and/or digital paper (Figure 4) than there were for scribes. This is very encouraging because nationally, as we saw in Table 1, there are almost five times as many requests for scribes as there are for use of ICT and so the experience in the pilot schools suggests there is considerable potential for reducing the number of scribes used in schools.

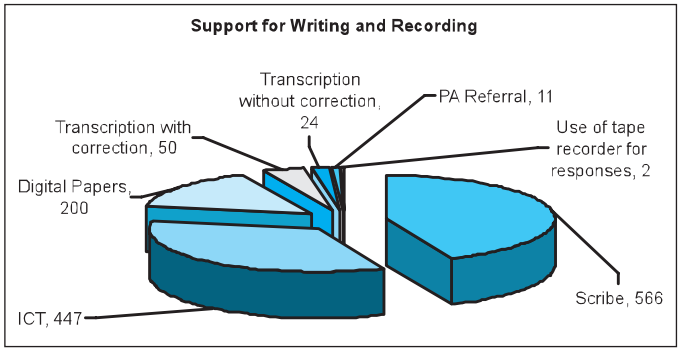


Figure 4: Total number of requests to support writing across all 12 schools

A comparison of the number of requests to support reading is given in Table 6. Only four out of twelve schools used digital papers with text-to-speech software. Uptake varied widely between the different schools, reflecting different needs, policies and also staff and pupil attitudes. Overall, the use of human readers outnumbers the pupils who used digital papers with text-to-speech software by a factor of 18 (Figure 5).

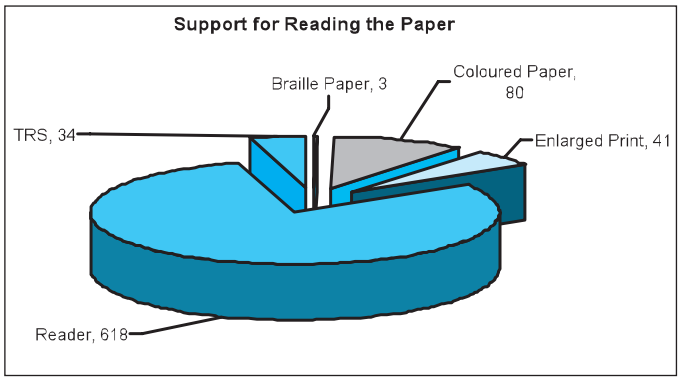


Figure 5: Total number of requests to support reading across all 12 schools

Table 5: 2007 Requests for Assessment Arrangements to support writing and recording (number of entries)

	School A	School B	School C	School D	School E	School F	School G	School H	School I	School J	School K	School L
Scribe	24	21	16	9	144	44	27	109	85	5	45	37
ICT (word processor)	28	67	24	34	33	13	1	114	13	82	21	17
Digital Papers	8	5	20	34	13	7	1	40	8	38	25	1
Transcription with correction	0	7	5	2	5	0	1	0	15	1	1	13
Transcription without correction	0	1	0	1	0	0	1	0	0	0	8	13
PA Referral	0	0	0	0	0	2	0	0	0	9	0	0
Use of tape recorder for responses	0	0	0	0	0	1	0	0	1	0	0	0
Total	60	101	65	80	195	67	31	263	122	135	100	81
ICT and DPs : scribes	**3:2**	**24:7**	**11: 4**	**68:9**	**23:72**	**5:11**	**2:27**	**154:109**	**21:85**	**42:1**	**46:45**	**18:37**

Table 6: 2007 Requests for and use of Assessment Arrangements to support reading (number of entries)

	School A	School B	School C	School D	School E	School F	School G	School H	School I	School J	School K	School L
Braille Paper	0	0	0	0	0	0	0	0	0	0	0	3
Coloured Paper	2	18	0	0	0	0	0	0	50	10	0	0
Enlarged Print	4	0	0	0	0	3	0	6	0	0	0	28
Reader	4	64	27	10	140	49	24	110	100	5	34	51
Digital Paper with text to speech software	0	3	6	5	0	0	0	20	0	0	0	0
Total	10	85	33	15	140	52	24	136	150	15	34	82
TRS : Reader	0:1	3:64	2:9	1:2	0:1	0:1	0:1	2:11	0:1	0:1	0:1	0:1

That staff and pupils appear happier to adopt ICT and digital papers in preference to a scribe, but less keen to use digital papers with text-to-speech in place of a reader may be due to several factors which require further investigation. For example, there may be issues with the quality or accuracy of the synthetic voice; the fact that additional specialist software must be installed; or pupils may simply be less familiar and practiced with text-to-speech tools compared to typing. Nonetheless, since usage of text-to-speech did increase significantly in the four schools (from reading 35 papers in 2006 to 95 in 2007), once text-to-speech is introduced it seems that it is well received by pupils and staff.

From examinations to Books for All

Following the success of the two pilots, SQA approved the use of Adapted Digital Question papers for any candidate who requires assessment arrangements in Scotland and in 2008, 509 requests were made by 48 schools on behalf of 209 candidates.

One of the four principles underpinning SQA's policy on assessment arrangements is that *'Any adjustment to the assessment arrangements should reflect, as far as possible, the candidate's normal way of learning and producing work'*. Therefore, if a pupil intends to use digital papers in an examination, one would expect the same techniques to be used in class. This has impacted on policy and provision in some of the schools who have adopted the digital papers, whereby staff have started to create and adapt prelim[1] examination papers, worksheets, workbooks and textbooks into accessible digital formats: *'We were very pleased with how the whole Pilot went and this year our prelims and third year exams were in digital format using Word and WordTalk as well as class tests. We have now purchased Acrobat Professional and are working on converting all our class tests into a format similar to that of the SQA exams.'* (Nisbet 2007 p.27)

If there are measurable educational, personal and cost benefits that can be obtained by offering pupils the option of using digital examination papers for a few weeks in May and June, then it is reasonable to suggest that there are likely to be even greater benefits to be gained from providing pupils with books and other learning materials in accessible alternative formats throughout the previous eleven years or so of their school education. This wider perspective was the subject of research which was published last year (Nisbet & Aitken 2007). The Books for All report investigated the need for and availability of learning materials in accessible formats for pupils who are 'print-disabled' and offers a roadmap for developing provision in Scotland. In the year since the report was published a number of issues identified in the report have been addressed: from 1st April 2008, Scottish schools are able to adapt copyright books and other resources into accessible formats for any disabled pupil (including those with dyslexia) without having to seek permission from the rightsholder (previously this dispensation only applied to pupils with visual or physical impairments); a high-quality computer voice with a Scottish accent is now available free of charge from CALL Scotland; a free text-to-speech tool for Microsoft Word is also available from CALL Scotland; and a pilot database for cataloguing and sharing learning materials in accessible formats has been developed by CALL Scotland, Learning and Teaching Scotland and SCRAN.

Examinations are seen as being of great importance by many pupils, parents, staff and by society in general, and the uptake of Adapted Digital Papers demonstrates how this can be used to engender significant change in schools.

Paul D Nisbet

Paul D Nisbet is a Senior Research Fellow at CALL (Communication, Access, Literacy and Learning) Scotland, The Moray House School of Education, University of Edinburgh.

[1] Pupils sit prelim (preliminary) papers a few months before the exam, for practice and also as evidence for appeal, for example, should the pupil be absent on the day of the actual examination.

Web links

TextHelp Systems:
http://www.texthelp.com/page.asp
Browsealoud text-to-speech software:
http://www.browsealoud.com/
SQA Assessment Arrangements:
http://www.sqa.org.uk/sqa/14977.html
CALL Scotland sites:
Adapted Digital Papers:
http://www.AdaptedDigitalExams.org.uk
The Scottish Voice:
http://www.theScottishVoice.org.uk
WordTalk:
http://www.wordtalk.org.uk
Books for All:
http://www.booksforall.org.uk
CALL Scotland:
http://callcentrescotland.org.uk

References

SQA (2006)
Disability Equality Scheme 2007-09
Scottish Qualifications Authority
http://www.sqa.org.uk/sqa/17086.html

SQA (2007)
Assessment Arrangements Resource Pack: draft version.
Scottish Qualifications Authority
http://www.sqa.org.uk/sqa/31129.html

Nisbet P D (2007)
SQA Adapted Examination Papers in Digital Format: 2007 Pilot Project Report to Scottish Qualifications Authority. September 2007
CALL Centre, University of Edinburgh
http://www.AdaptedDigitalExams.org.uk/Pilot Trial/

Nisbet P D & Aitken S (2007)
Books for All: Accessible Curriculum Materials for Pupils with Additional Support Needs. Report to Scottish Government Education Department.
Scottish Government ISBN 978 0 7559 1535 4 (web only publication)
http://www.scotland.gov.uk/Publications/2007/06/05081600/0

Nisbet P D Shearer N Balfour F Aitken S (2006)
SQA Adapted Examination Papers in Digital Format: Feasibility Study 2005 - 2006: Final Report to Scottish Qualifications Authority October 2006
CALL Centre, University of Edinburgh
http://www.AdaptedDigitalExams.org.uk/Pilot Trial/

Dyslexia: Different Cultures, Similar Behavioural Signs

Lay Wah Lee

Abstract

The behavioural signs shown by a group of 3 children from Malaysia who have been diagnosed with dyslexia are analysed against the preschool and primary school Handy Hints (checklists) of the British Dyslexia Association (BDA). The results of this analysis showed that even though the children are from different cultures and are learning different languages, there is a good match between the behavioural signs and symptoms exhibited by the children in Malaysia and the signs and symptoms in the BDA checklists. This result suggests that with some adaptations the BDA checklists can be used as a screening tool to identify children with dyslexia in Malaysia. Another implication that warrants further investigation is that the underlying cognitive deficit to explain dyslexia in English may also apply for children in Malaysia.

Malaysia

Malaysia is a multi-ethnic country comprised of Malays, Chinese, Indians and people of other races. The multi-ethnicity of Malaysians is reflected in the Malaysian educational system which has four languages as media of instruction in primary schools. The national language is the Malaysian language (Bahasa Malaysia) which is also the spoken language of the Malay race. English is the second official language in Malaysia and is used as a medium of instruction for Science and Mathematics subjects in schools. Mandarin and Tamil are also used as media of instruction in national type primary schools. This means that Malaysians are either bilingual or trilingual.

The Malaysian writing system is based on similar 26 letters in the English alphabet. However, unlike English, Malaysian is a highly transparent language with an almost perfect spelling-sound relationship. Even though the writing system is phoneme-based, syllables are salient units in Malaysian as most words are bi- and multisyllabic with clear syllable boundaries. For example 'cat' in Malaysian is 'kucing' which is made up of the syllables 'ku + cing'. The language also has a rich transparent system of affixation. For example the word 'running' in Malaysian is 'berlari' which is made up of the the prefix 'ber' and a two syllable root word 'lari' (which means 'run').

Preschool education is accessible to most children between the ages of 4 to 6 and is provided by many organisations, namely the private sector, the Ministry of Education, other government organisations as well as non-government organisations. Generally, the languages used in preschool settings are also reflective of the multi-lingual situation in the primary schools. Formal reading instruction starts at preschool level and most children especially those in the urban areas know the letter names by the time they are enrolled in Year One.

Dyslexia in Malaysia

Dyslexia awareness in Malaysia has been steadily increasing in the past ten years. There are currently a few dyslexia associations and support groups formed in urban areas which are spearheaded by parents of children with dyslexia. These support groups are quite active in promoting dyslexia awareness but only a very small number provide assessment and intervention services. The government, under the Ministry of Education, also initiated the National Dyslexia programme in 2001 (Gomez 2004). The Ministry of Education defines children with dyslexia as children who are experiencing significant difficulties in reading, writing or spelling despite having a mental ability which is comparable to or above those of average children (Haniz 2003). A screening checklist has been developed by the Ministry of Education to screen for dyslexia among Year One children whose average age is 7 years. Screening is conducted by the school teachers and children at risk of dyslexia are sent for formal assessment at government hospitals. The Ministry of Education has also set up the Specific Reading Difficulties Programme to provide intervention for children with dyslexia based on the pull-out delivery system model. However, this programme is only available in a limited number of schools throughout Malaysia. Dyslexia awareness is high in these schools but it is not widespread in other schools in Malaysia. Most school teachers are currently still not aware of the signs and symptoms of dyslexia even though they might have heard of the term dyslexia. The situation is also quite acute at the preschool level as currently there is no systematic identification of children who are at risk of dyslexia at preschool. There are currently no screening checklists or tools to help teachers identify children at risk of dyslexia at the preschool level.

Signs and Symptoms across Different Cultures

In this paper, the behavioural signs and symptoms of three children with dyslexia in Malaysia are compared with the signs and symptoms found in the British Dyslexia Association Handy Hints (checklists) for

preschool (Peer 2002a) and primary school (Peer 2002b). Sam, Teik Seng and Ken's signs and symptoms were described by their mothers (Lee, 2004). All three mothers reported that their children had great difficulty in reading, writing and spelling, even though their children appear to be bright and intelligent. The children's problems came to light after they had started formal schooling in Year One. Despite almost a year of formal primary school instruction, they still had great difficulty in reading, writing and spelling. The search for answers inevitably led them to dyslexia and these three children were subsequently diagnosed with the problem of dyslexia. Sam was diagnosed at the age of nine, Ken at age eight and Teik Seng at age seven. As there were no instruments in Malaysian to assess for dyslexia, information for diagnosis conducted by doctors and psychologists in Malaysia is usually gathered using instruments in English which have not been normed for Malaysian children.

Comparison with the BDA Preschool Checklist

The signs and symptoms are grouped into developmental areas that are affected by dyslexia. The results of the comparison with the BDA preschool and primary school checklists are shown in Tables 1 to 9 below. The author would like to thank the BDA for their approval in allowing the reproduction of the preschool and primary school checklists in this article.

Table 1: Signs and symptoms related to phonological awareness

BDA	Sam	Teik Seng	Ken
Has difficulty learning nursery rhyme	Does not like nursery rhymes from young.	-	-
Has difficulty keeping simple rhymes	-	-	-
Gets words muddled e.g. cubumber, fluterfly	-	Confuses 'banana' as 'bamama', 'kepala' as 'kelapa'.	-
Finds difficult to select the 'odd one out' in groups of either objects, pictures or words	Cannot hear the difference between '70' and '17', '50' and '15'.	-	-

Table 2: Signs and symptoms related to memory

BDA	Sam	Teik Seng	Ken
Finds it hard to carry out two or more instructions at one time, but is fine if tasks are presented in smaller units	Cannot remember a list of instructions. Cannot understand if 4 or 5 instructions are given together.	-	-
Forgets names of friends, teachers, colours etc	Forgets names of friends, teachers and family members and will use phrases like 'that boy', 'that auntie' as substitute.	-	Forgets what is being taught the moment the back is turned.

Table 3: Signs and symptoms related to motor skills

BDA	Sam	Teik Seng	Ken
Has difficulty cutting, sticking and crayoning in comparison with their peers	-	-	-
Has persistent difficulty in dressing	-	-	-
Puts clothes the wrong way round	-	-	-
Has difficulty with catching, kicking or throwing a ball	Has difficulty catching a ball.	-	-
Often trips, bumps into things and falls over	Appears clumsy.	Tends to fall over when young.	Clumsy, often trips or bumps into things, like Mr Bean from the TV show.
Has difficulty hopping or skipping		When asked why, he'll say 'don't know why'.	

Comparison With The BDA Primary School Checklist

Table 4: Signs and symptoms related to reading

BDA	Sam	Teik Seng	Ken
Makes poor reading progress, especially using look and say methods	Poor in reading	Will memorise the words in order to read it aloud.	Very poor in reading. Parent downgraded child back to Year One.
Finds it difficult to blend letters together	-	Difficulty joining the sounds of the letters to form words, example 'saya' is read as letter names 'S', 'A' and 'Y', 'A'	-
Has difficulty in establishing syllable division or knowing the beginnings and endings of words	-	Does not know where to begin to break the word to read, for example 'menggunakan', does not know where to start.	-
Pronunciation of words is unusual	-		
No expression in reading-comprehension poor	-		
Is hesitant and laboured in reading, especially when reading aloud	Inaccurate word reading which gets worse under pressure.	Deterioration of reading skills when under stress, for example, when called to read aloud in class.	-

Misses out words when reading, or adds extra words		-	
Fails to recognise familiar words	Confuses simple small words such as ‘dia’ and ‘dan’. High proportion of errors in reading, for example, cannot differentiate between ‘contoh’ and ‘ciri’.		Cannot recognize even simple words. When it was first discovered, he could not even read ‘cat’.
Loses the point of the story being read or written	-	-	-
Has difficulty in picking out the most important points from a passage	-	-	-

Table 5: Signs and symptoms related to writing

BDA	Sam	Teik Seng	Ken
Has poor standard of written work compared with oral ability	His new science teacher had thought he was playing the fool when he handed in his report with all the wrong answers because he was the one who had asked all the right and intelligent questions during the experiment. Does not know how to put his thoughts into words.		A talkative and expressive child, so did not suspect anything was wrong until he started to fail all his subjects in Year One.
Produces messy work with many crossings out and words tried several times	-		
Is persistently confused by letters which look similar, particularly b/d, p/g, p/q, n/u, m/w	-	Confused by letters ‘b/d’ and ‘j/g’ when writing .	Problems differentiating between ‘b/d’ and ‘j/g’ .
Has poor handwriting with many ‘reversals’ and badly formed letters	-	Problems forming letters, example ‘b’ is written as ‘c l’. Often writes in reverse.	-
Spells a word several different ways in one piece of writing	Inconsistent spelling errors, for example ‘tissue’ can be spelt differently at different times such as ‘tusi’ or ‘tisu’.	-	-

Makes anagrams of words, e.g. tired for tried	-		-
Produces badly set-out written work, doesn't stay close to the margin	-	Words are all joined together with no space in between.	-
Has poor pencil grip	-	-	-
Produces phonetic bizarre spelling, not age/ability appropriate	Makes spelling errors.	Makes spelling errors.	Makes spelling errors.
Uses unusual sequencing of letters or words			

Table 6: Signs and symptoms related to numeracy

BDA	Sam	Teik Seng	Ken
Shows confusion with number order, eg. units, tens, hundreds	-	-	-
Is confused by symbols such as + and x signs	-	-	-
Has difficulty remembering anything in a sequential order e.g. tables, days of weeks, the alphabet	Cannot understand if 4 or 5 instructions are given together. Cannot remember a list of instructions.	Cannot remember the months of the year in sequence.	-

Table 7: Signs and symptoms related to the concept of time

BDA	Sam	Teik Seng	Ken
Has difficulty in learning to tell the time	-	-	Tells time wrongly. Two o'clock becomes ten o'clock.
Shows poor time keeping and general awareness	Prefers not to tell time or to wear a watch.	-	-
Has poor personal organisation	-	-	
Has difficulty remembering what day of the week it is, his/her birth date, seasons of the year, months of the year	-	Keeps asking when is his birthday.	
Difficulty with concepts- yesterday, today, tomorrow	Cannot comprehend the duration of time, for example, his birthday is 37 days away, but he cannot comprehend how long that is.		What happened a week ago is comprehended as happening just yesterday.

Table 8: Other signs and symptoms

BDA	Sam	Teik Seng	Ken
Has poor motor skills, leading to weaknesses in speed, control and accuracy of the pencil	-	-	-
Has a limited understanding of non-verbal communication	-	-	-
Is confused by the difference between left and right, up and down, east and west	Confuses left and right.	Will say right when he meant left.	Confuses between front and back.
Has indeterminate hand preference	-	-	-
Performs unevenly from day to day	-	-	-

Table 9: Signs and symptoms related to behaviour

BDA	Sam	Teik Seng	Ken
Employs work avoidance tactics such as sharpening pencils and looking for books	-	-	-
Seems to 'dream', does not seem to listen	-	-	-
Is easily distracted	Easily distracted.	-	Hyperactive with short attention span.
Is the class clown or is disruptive or withdrawn	-	-	Can be disruptive and runs around the class.
Is excessively tired due to amount of concentration and effort required	-	Cannot read for long because of eyestrain and headache. Reddish black ring will appear below the eye when reading for a longer time.	-

Discussion

Based on the descriptive comparisons above, it can be seen that some of the items in the BDA checklist such as 'having difficulty in keeping to simple rhymes' is not reported by any of the three parents even though it is a significant early indicator of poor phonological awareness. This could be because unlike in UK, nursery rhymes are not emphasized in Malaysian preschool settings, hence it would not be a symptom that would have stood out as significant. In addition, it is also not a widespread habit among Malaysian parents to read together with their children and hence it is not surprising that items such as 'no expression in reading-comprehension poor', 'loses the point of the story being read or written' or 'has difficulty in picking out the most important points from a passage' were not reported by the parents. However, there are enough other behavioural signs and symptoms which are similar to the items in the BDA checklists. These signs and symptoms can be summarised to indicate that these three children have weaknesses in similar developmental areas that are indicated in the BDA checklists: phonological processing, memory, reading, writing, time, directional and motor coordination deficits. It would appear that

there are enough similar behavioural signs and symptoms across the two different cultures and languages to suggest the possibility of similar underlying causes of dyslexia.

The phonological representation deficit hypothesis has been put forward as a way of integrating the disparate signs and symptoms of dyslexia (Hatcher & Snowling 2002). There is evidence to show that these children have deficits in phonological processing. For example, at the more primitive level of processing, Sam could not differentiate between '17' and '70' nor '15' and '50', and at the higher level of processing, Teik Seng indicated an inability to blend the letter sounds of S+A+Y+A to form the word 'saya' (which means *me*) or to segment words such as 'menggunakan' (which means *using*). However, Ken's mother did not know how to describe his problems based on phonology and only reported that Ken did not even know how to read simple words like cat. The importance of phonological processing in reading and spelling is already well established in developed countries (eg. Wagner & Torgesen, 1987). However, this knowledge domain is still not widely known or understood by most educators or lay persons in Malaysia. This lack of understanding could be one of the major reasons why dyslexia is still not a widely understood phenomenon in Malaysia. In addition to phonological awareness, the children also indicated weaknesses in verbal short-term memory (cannot remember a list of instructions) and long-term memory (cannot recall familiar names and months in a year).

Even though Malaysian is a much more transparent language compared to English, as is suggested by Ziegler and Goswami (2005), the signs and symptoms above indicate that a transparent language does not necessarily prevent dyslexic features emerging. If a child has problems in phonological awareness, phonological memory or short term memory, then the child is likely to have problems in reading, writing and spelling across different languages and cultures. In other words, if a child cannot blend or segment, then the child cannot read regardless of the transparency of language. Recent research conducted by Lee (2008) indicated that phonological awareness is the most significant predictor of word-level literacy skills in Malay with rapid naming making independent secondary contributions. This research provided evidence to support the phonological processing deficit as an explanation for dyslexia in Malaysian.

Conclusion

The results from this comparison imply that the BDA Handy Hints can be of potential use to screen Malaysian children for dyslexia. However, there is evidence to suggest that the checklists need to be adapted in order to be more sensitive towards local practices and contexts. For example, some items especially those related to deficits in phonological processing need to be illustrated with more examples which are locally relevant. Brief explanations would also be necessary to be included into the checklists as it cannot be assumed that teachers, especially preschool teachers, are aware of the underlying constructs of the items. This would help teachers make better decisions. A valid screening checklist would help to increase early identification and prevention. This is imperative as there is strong evidence to suggest that children who start poorly in reading rarely catch up (Torgesen 1998). Early identification would also help to prevent emotional trauma and loss of self-esteem.

Lay Wah Lee

Lay Wah Lee is a senior special education lecturer at the School of Educational Studies, Universiti Sains Malaysia. Her area of specialisation is in dyslexia studies. Lay Wah can be contacted at lwah@usm.my or at mydyslexia@gmail.com

References

Gomez C (2004)
Dyslexia in Malaysia.
In I Smythe, J Everatt & R Salter (Eds), Supplementary materials of the International Book of Dyslexia: A guide to practice and resources.
UK Wiley.
Retrieved March 13, 2004, from
http://www.wiley.com/legacy/wileychi/dyslexia/supp/Malaysia.pdf

Haniz I (2003)
Programme bermasalah pembelajaran spesifik disleksia Kementerian Pendidikan Malaysia.[Programme for dyslexia specific learning disability, Ministry of Education].
Paper presented at the 3rd National Special Education Seminar, Special Education Department, Ministry of Education, KL (Oct)

Hatcher J & Snowling M J (2002)
The phonological representations hypothesis of dyslexia: From theory to practice. In G Reid & J Wearmouth (Eds) Dyslexia and literacy: Theory and practice pp 69-84
West Sussex UK Wiley.

Lee L W (2004)
Understanding Dyslexia in Malaysia from the Parents' Perspective
Proceedings of the Hawaii International Conference on Education 2004 pp 3709-3722

Lee L W (2008)
Development and validation of a reading-related assessment battery in Malay for the purpose of dyslexia assessment.
Annals of Dyslexia 58 pp37-57

Peer L (2002a)
How can I tell if a pre-school child may be at risk of dyslexia? Handy hints for educators working with pre-school aged children (3 to 5 years)
In M Johnson & L Peer (Eds) The dyslexia handbook 2002 pp 89-91
The British Dyslexia Association
London UK

Peer L (2002b)
How can I tell if a primary school child may be dyslexic? Handy hints for primary school teachers pp 92-97
In M Johnson & L Peer (Eds) The dyslexia handbook 2002
The British Dyslexia Association
London UK

Torgesen, J K (1998)
Catch them before they fail: Identification and assessment to prevent reading failure in young children
American Educator Spring/Summer pp 1-8

Wagner R K & Torgesen J K (1987)
The nature of phonological processing and its causal role in the acquisition of reading skills
Psychological Bulletin 101 pp 192-212

Ziegler J C & Goswami U (2005)
Reading acquisition, developmental dyslexia, and skilled reading across languages: A psycholinguistic grain size theory
Psychological Bulletin 131 pp 2-29

Accessibility Strategies Survey

Dyslexia Action is conducting an on-line survey on the accessibility strategies used by dyslexic students in schools and colleges. We need at least 100 students between the ages of 14 and 20 to take part. If you are working with students of this age and would like to help us please contact mrooms@dyslexiaaction.org.uk for details. We need students working across the range of institutions: maintained and private sector, FE, comprehensive, academies.

The survey will take place in the first week of October 2008 and the results will be profiled at the Dyslexia Guild Symposium on November 22nd and in Dyslexia Review.

Margaret Rooms
Head of Educational Development
Dyslexia Action

Neurodiversity in Higher Education

Edward Griffin & David Pollak

BRAIN.HE (Best Resources for Attainment and Intervention regarding Neurodiversity in Higher Education) is a National Teaching Fellowship Scheme project funded by the Higher Education Academy. The project started in 2005 and combines qualitative research and analysis with an active support and resource website for neurodiverse students and staff teaching them (www.brainhe.com). The website also provides support for neurodiverse staff teaching in higher education (HE).

There is a substantial amount of literature which describes people with learning differences as if they are afflicted by some terrible disorder. The use of words like 'suffering from' and 'severely dyslexic' do little to empower such people. The BRAIN.HE project is about celebrating learning differences, and encouraging students to explore and develop their strengths, even though current educational environments do not always provide the best arena for this. We prefer the term learning difference to what is often referred to as 'specific learning difficulty' (UK) or 'learning disability' (USA); we find it a more socially acceptable and less judgemental term, and believe that its use is becoming more widespread.

Medical and social models of disability

Two main models have influenced modern thinking about disability: the medical model and the social model. Both can be applied to learning differences (Cooper 2006) and have had a powerful influence on how people with impairments are treated by society. The most dominant has been the medical model, which focuses on identifying and treating deficits. The medical model of learning disabilities regards disability as a direct result of the cognitive impairments within the individual. Oliver (1988) proposes a social model of disability, which argues that disability is constructed by the practices of society, and it is often the barriers of society which disable people. We believe that this is partly the case in the educational system in the UK and whilst things are getting better, we are still seeing examples of the educational system disabling students with impairments. The BRAIN.HE project supports and promotes the social model of disability and the concept of neurodiversity.

Neurodiversity

'Neurodiversity' is an umbrella term for many types of learning difference. It encapsulates the more positive and empowering notion of 'difference' as opposed to 'deficit'. Neurodiversity is both a concept and a civil rights movement, developed by online groups of autistic individuals in the late 1990s. It argues that learning differences arise out of natural human diversity, characterised by atypical neurological wiring, and should be tolerated and respected by society in the same way as any other human difference. Stein (2006) believes that learning differences such as dyslexia are highly hereditary. He asserts that if the existence of neurodiverse brains were entirely disadvantageous to the human race, evolution would have eliminated them over the course of time.

BRAIN.HE website

BRAIN.HE.com was launched in January 2005 and is a non-commercial/non-profit making resource website managed at De Montfort University, Leicester, UK. It is (to the best of our knowledge) the first and only website to assist and support students and staff in HE with a wide range of learning differences. These include AD(H)D, Meares-Irlen syndrome, Asperger's syndrome, Tourette's syndrome, autism, dyscalculia, dysgraphia, dyslexia, dyspraxia and mental health difficulties. The website also supports HE staff teaching students with learning differences.

Websites are an effective way of reaching out to large numbers of people all over the world. Computer and internet usage is very prominent within most HE courses and an easily accessible website provides an excellent platform for the delivery of information. The inspiration behind BRAIN.HE.com was that it would pull together, evaluate and make accessible a mass of information about learning differences, which was previously scattered. It would also encourage networking and communication between likeminded students and staff, by the use of weblogs and forums.

Accessibility

A main consideration when designing the website was to ensure that it would be accessible for its users. Informal discussions with neurodiverse students indicated that many experienced problems using conventional websites. Many of these problems seemed to conflict, not just between different types of neurodiversity, but also within the different types. Some favoured particular types of text, others preferred audio to text. Some favoured simplicity, whereas others felt that simple designs were not stimulating enough to retain attention. A balance was achieved when creating the website. A simple and clean design was combined with a bright and colourful logo, which did not distract from the logical organisation of each page. A software package was also added to the website which allows users to effortlessly

redesign the pages to suit their viewing preferences. The Textic Toolbar and Talkbar (www.textic.com) entitles viewers to adjust the typeface, the size and colour of the text, and the colour and design of the background. The product also enables viewers to have the page read to them, and supplies an audio dictionary and thesaurus.

Many neurodiverse students prefer multi-sensory learning to a linear text delivery of information. Whilst the nature of the BRAINHE website requires it to be somewhat text-heavy, it has made attempts to reduce this by including a large amount of audio and video. This includes neurodiverse students and staff talking about their experiences in HE, videos about different types of neurodiversity and recordings of relevant conferences. Visual mind maps have also been incorporated into the website. They display the key sections on each webpage in a diagrammatic form. These mind maps were further developed to include hot links which direct the user to the various sections of the page, by clicking their mouse on the appropriate box. Other accessible features were generated from feedback left by users, including a site-specific search engine, and colour co-ordinated sections.

Resources, usage and implications

BRAIN.HE.com has grown into a sizable resource, with over 100 pages of information. For students the site offers information about learning strategies, legislation, identification, models of learning differences, real stories, links to any new information within the field and much more. For Staff, BRAINHE also offers information about inclusive learning and teaching, how learning differences may affect students in HE, and the strengths often associated with neurodiversity. Statistics have revealed that the website is ever increasing in popularity. The latest report from April 2008 indicated that the average number of daily visits had passed 200. Two years ago the average daily visits was just 25. With advertising leaflets being distributed to many higher educational institutions, and prominent websites reciprocating links to BRAIN.HE.com, it is anticipated that the number of visits will continue to increase.

Feedback from users has been very positive and encouraging, particularly about the site's accessibility. BRAIN.HE.com is frequently cited as a good example of an accessible website. Many users have also reported positively relating to the video and audio interviews with neurodiverse students, notably where the students discuss their difficulties and the strategies used to overcome them. Other positive feedback has been about the philosophical stance the website takes and the 'useful' learning strategies guide. It is exciting to hear that the BRAINHE website is helping students both nationally and internationally, and it is hoped that other institutions will embrace positive approaches to neurodiversity.

BRAIN.HE Research project

The BRAIN.HE research project is currently being reviewed for publication, and therefore only a summary will be presented here. The implementation of the website and interaction with its users indicated that there were elements associated with neurodiversity in HE that would be interesting to explore. Firstly, 'being neurodiverse' seemed to consist of considerably more than possessing deficits in certain areas; for many students it encompassed a whole life style. Secondly, there seemed to be comparable similarities in how neurodiverse students interacted with the educational system, and the meanings they derived from these interactions. This inspired the development of a qualitative research project exploring the student experience of neurodiversity.

HESA statistics have shown that increasing numbers of British students identified with dyslexia and autism are enrolling on UK university courses (HESA, 1995, 2004, 2005, 2006). Universities have responded to disability legislation by offering general support to all students who declare learning differences and many support tutors have acknowledged greater numbers of students coming forward with other types of neurodiversity including dyspraxia, dyscalculia and ADHD. Riddell et al. (2005) report research which has evaluated initiatives based upon the academic achievements of students with learning differences in HE, but surprisingly there has been very little research aimed at qualitatively understanding the lives of such students. A handful of publications have examined the experiences of students with a particular type of learning difference, such as dyslexia (Pollak 2005), and Asperger's Syndrome (Jamieson & Jamieson 2004). To the best of our knowledge, there have been no studies to date exploring such experiences amongst students with a range of learning differences. The BRAIN.HE research project aims to build theory about the life experiences of neurodiverse students in HE, and their development of identity. The research questions were:

1. How do these students deal with their identity as being neurologically diverse, and how has their identity developed?
2. What are the commonalities between the HE lives of students identified with various learning differences?
3. What are the lessons for the sector?

Interviews and analysis

Twenty seven participants took part in the investigation. Semi-structured interviews allowed respondents the flexibility to explore their ideas, whilst maintaining focus on the topics to be covered. Open-ended questions encouraged the interviewee to talk about a broad range of experiences. The data was analysed using thematic analysis (Braun & Clarke, 2006) with the help of the qualitative research software package NVIVO 7.

Results and Discussion

Being neurodiverse meant that many of the participants interviewed for this project entered HE with extra emotional 'baggage' from their school days, a finding which was highlighted by Pollak (2005). Many students reported feeling inferior to their peers at school and indicated that their educational environment was not giving them the chance to develop their strengths. This was particularly relevant to those who were not identified until they entered HE. They frequently experienced negative criticism from their teachers, and some were often branded as 'lazy', 'thick' and as 'oddballs'. The older participants talked of more harrowing ordeals, particularly those who were in education before disability legislation was introduced. Whilst it is clear that HE institutions have become more accommodating over recent years, there were still current students who talked about experiencing negative attitudes from university staff towards their neurodiversity. Whilst attitudes towards neurodiversity are generally improving, there is still some way to go.

The research explored identification and what 'having a label' meant to the student. There seemed to be two general and distinct ways in which the students viewed their neurodiversity; most of the participants adhered to one of these ways. Ten participants adopted a 'medical/deficit' view of their neurodiversity. They indicated that they viewed their learning difference(s) as an entirely negative matter, either a single deficit, or several deficits. When asked about strengths and weaknesses related to their neurodiversity, they would readily talk about their weaknesses but found it very difficult to identify any strengths. If these participants were pushed to talk about strengths, they would not associate them with their neurodiversity. These participants frequently used medical discourse and terminology. Most of the students in this group also used language which indicated a low academic self-esteem, and whilst a limited number acknowledged that they had achieved against all odds, most had limited ambition and career prospects, expressing confusion, uncertainty and minimal optimism about their future. Of the participants who expressed a dislike of their label, most belonged to this group.

Pollak (2005) found similar subgroups within his cohort of students with dyslexia. Whilst Pollak made distinctions within this subgroup, he noted that there was a lack of self esteem associated with the negative medical discourse. The participants seemed to be mirroring the language and discourses which have been presented to them, and those readily available in the media and on the internet. The UK media still tend to portray stereotypical negative representations of people with learning differences and use negative language such as 'suffering from word blindness', or 'she does not let it hold her back', which imply that learning differences are basically a problem. A medical label and discourse is also a requirement for obtaining the Disabled Students Allowance (DSA), which can help the student purchase funding for any support.

Eleven of the participants viewed their neurodiversity in a more positive and empowering way. This group viewed their neurodiversity as a difference which provided them with both strengths and weaknesses. These participants were keen to talk about strengths associated with their neurodiversity, and two of the participants started by talking about strengths when asked what their label meant to them. These participants generally avoided (although not entirely) negative medical terminology and deficit discourses. They also indicated higher academic and social self-esteem and many had positive and clear career ambition. Surprisingly, these participants were more likely to have experienced unpleasant epithets from teachers and lecturers, and were prone to show elements of the 'campaigner' discourse of dyslexia identified by Pollak (2005). It is possible that negative experiences at earlier educational levels may have given the participant a more determined approach to education. Interestingly, many of these participants initially viewed their neurodiversity as a deficit, and their views changed by joining groups such as the Developmental Adult Neurodiversity Association (www.danda.org.uk), or just by meeting other people with a similar type of neurodiversity.

The participants in this study who had a medical/deficit view of their neurodiversity were clearly less confident in their ability and showed lower self esteem than the participants who viewed their neurodiversity as a difference. This raises questions as to whether the processes of formal identification and the processes for obtaining the DSA are too focused on encouraging the medical/deficit model.

Many of the students were happy that their 'condition' had been 'diagnosed', and were excited that they were receiving support from the DSA. Essentially the DSA compensates neurodiverse students for their disability, but does little to make the educational system more inclusive. The 'severity' of their deficits often determines the amount of additional funding obtained. However, many of the students felt that the support via the DSA was paramount to their success on their course. The participants in the study also indicated that there were positive aspects of psychological assessment. Intelligence testing often affirms that the student is not 'thick', and a recognised label gives the student more options and a greater self understanding.

A striking finding which occurred throughout many of the themes was that the interviewees, irrespective of their type of learning difference, shared many similar experiences. These participants interacted with the

education, social and medical systems in similar ways and generated comparable meanings in response to these interactions. These included similar experiences at school and leading up to formal assessment, similarities in how the participants constructed their identity as being neurodiverse, parallel experiences with university support and comparable preferences for certain teaching and learning styles. Grant (2005) and Deponio (2004) have noted that there are considerable overlaps between the various types of neurodiversity in terms of their indicators. Whilst most of the similarities reported by participants in this study were experiential, a preference for visual learning styles, and organisational strategies may indicate similar visual cognitive processes. These overlaps may suggest more similarity between types of neurodiversity than a separate categorisation system allows.

Participants had a mixed response about university support. For some it seemed that the support came from individual areas within the institution, but there was a lack of unilateral support. Those who received support from the disability offices, support tutors and mentors were generally pleased with it, and for many it exceeded expectations. A large proportion of the interviewees experienced inconsistency in the level of support offered by the lecturers and tutors on their courses. The general perception was that some lecturers and tutors were well informed about neurodiversity and made all efforts to model inclusive learning and teaching. Some even talked of lecturers recognising that the student may have had a learning difference, and starting formal procedures. This recognition of neurodiversity certainly seems to be an encouraging development. Unfortunately most of the interviewees also experienced a small number of lecturers and tutors whose approaches were unsatisfactory. Criticisms included a lack of awareness and 'ignorance', inaccessible teaching, lecturers ignoring learning support agreements (or equivalent) and in some cases lecturers denying the existence of certain learning differences.

HE institutions have become more accommodating over recent years and probably on paper, they would be seen to have adequately responded to disability legislation. There is however a need for greater communication between various departments, and a better understanding of neurodiversity and inclusive learning and teaching amongst academic staff. New government targets aim to increase numbers of young people at university. This will unquestionably mean that HE will encounter greater numbers of neurodiverse students. Whilst course delivery and assessment procedures are slowly becoming more accommodating, certain aspects of HE are still largely inaccessible.

National projects such as AchieveAbility (www.achieveability.org.uk) and InCurriculum (www.incurriculum.org.uk) are encouraging the 'mainstreaming' of inclusive learning and teaching practices for all. The BRAIN.HE website complements these by providing a wealth of information about neurodiversity and helping to increase the recognition and understanding of learning differences amongst students and staff. The BRAIN.HE research project has shown that there is more to the lives of neurodiverse individuals than just their label. Findings have indicated that identity as being neurodiverse is related to the educational system, procedures of identification and self esteem. It would be particularly interesting to examine whether discourses of neurodiversity are related to academic success. Awareness among academic staff can be inadequate, but there is a very good reservoir of knowledge in learning support and disability units. This 'glass wall' should be demolished and ultimately, inclusive learning and teaching practices should be built in to all courses.

Edward Griffin and David Pollak

Edward Griffin is a Doctoral Research Student at De Montfort University, Leicester, UK

David Pollak is a Principal Lecturer in Learning Support at De Montfort University, Leicester, UK

References

Braun V & Clarke V (2006)
Using thematic analysis in psychology
Qualitative Research in Psychology 3: 77-101

Cooper R (2006)
Social Model of Dyslexia
London South Bank University

Deponio P (2004)
The co-occurrence of specific learning difficulties: implications for identification and assessment
In Reid G & Fawcett A, Dyslexia in Context: Research Policy and Practice
Whurr London.

Grant D W (2005)
That's the Way I Think: Dyslexia and Dyspraxia Explained
David Fulton London

HESA (1995, 2004, 2005, 2006)
Students and Qualifiers data table: disability
www.hesa.ac.uk. (accessed January 5th 2008).

Jamieson J & Jamieson C (2004)
Managing Asperger Syndrome at College and University: A resource for students, tutors and support services
London Fulton

Oliver M (1988)
The Social and Political Context of Educational Policy: The case of special needs
In Barton L (Ed) The Politics of Special Educational Needs
Lewes Falmer Press

Pollak D E (2005)
Dyslexia, the Self and Higher Education: Learning life histories of students identified as dyslexic.
Stoke on Trent Trentham

Riddell S Tinklin T & Wilson A (2005)
Disabled Students in Higher Education: Perspectives on widening access and changing policy
London Routledge

Stein J (2006)
Dietary supplements and specific learning difficulties: myth or magic?
Public lecture, De Montfort University, 14 June 2006

Have Your Say: Two chances to influence government policy on dyslexia

A website for teachers, parents, young people and others with an interest in dyslexia was launched in July by Sir Jim Rose as part of his review into how children with dyslexia learn best. Sir Jim is asking for personal accounts and experiences as well as details of published research to help inform his development of recommendations to the Secretary of State for Children, Schools and Families. The website will also contain regular updates and information about the review.

Many members of the Dyslexia Guild will know, having heard his presentations at our Symposia, that Sir Jim Rose is committed to improving practice to support those with dyslexia. Launching the new Review, Sir Jim commented:
"Many years ago I read an article entitled: 'Dyslexics of the world untie.' In those days, the nature of dyslexia was little understood. There were many who believed that dyslexia was not only hard to define but also questioned whether it existed at all. Nowadays we know better. Dyslexia is no joke. I am pleased to be asked by the Secretary of State, Ed Balls to look at the current position on tackling dyslexia and to make recommendations about the identification of this learning difficulty and the teaching needed to overcome it. I will be drawing strongly on the help of expert advisers and we will look at other learning difficulties, such as dyscalculia and dyspraxia, which may overlap in some respects with dyslexia. Whilst research evidence is very important I'm eager to hear personal accounts and I would urge parents, teachers, children and young people to have a look at my website and tell me what has worked well, and what has worked less well, to improve the progress made by children with dyslexia."

The website address is: www.dcsf.gov.uk/jimroseanddyslexia/ or you can access it from the Home screen of Dyslexia Action's website www.dyslexiaaction.org.uk
Accounts of experience and details of research evidence can be e-mailed to dyslexia.jimrose@dcsf.gsi.gov.uk

John Rack is one of the members of Sir Jim's Expert Advisory Group and has been asked to look at a number of specific questions about screening and assessment as well as the evidence concerning early intervention. John would be very grateful to collect the views of Dyslexia Guild members in relation to these issues and therefore we are setting up a web-link so that information can be provided online and collated. John's view is that a clear message that reflects the consensus views of expert practitioners will carry considerable influence. For details of this link (live by the end of August) please email johnracksurvey@dyslexiaaction.org.uk to receive directions to the survey.

Supporting Adults with Dyslexia at Work

Katherine Kindersley

Abstract

The article looks at how adults with dyslexia can be supported at work through assessment, the implementation of reasonable adjustments (including specialist training and assistive technology), and the creation of dyslexia-friendly workplaces. It emphasises how important it is to make links between the employee, the manager/s, and the organisation as a whole if there is to be an understanding of dyslexia in the workplace, an acceptance of different ways of achieving results, and a successful outcome.

Introduction

Most of the adults that are seen at Dyslexia Assessment & Consultancy have been referred by their organisation because of the problems they have been experiencing at work. Often there is a performance/ capability procedure in progress or there is some form of conflict or dispute between the employee and the managers.

The particular causes of disputes around dyslexia can be as varied as the world of employment itself. Consider the variables in any given situation: the workplace environment, the range of operational and management styles, the complex mix of individual personalities working alongside one another, and the work and organisational culture. Yet when I look at the reasons for the varying conflicts which arise, some clear themes emerge. I believe that if these themes are recognised, then timely action can often be taken to prevent conflict and disputes arising.

Below I am going to explore what I consider to be the most dominant theme, that of *change*. I have chosen a particular case, a recent one, which illustrates why changes at work can cause such difficulty for people with dyslexia, and how conflicts can be resolved by a timely intervention.

However, let us look first at the demands of the workplace.

In general:

- it is assumed that employees are literate
- most jobs require some degree of literacy
- there is a focus on memory, communication and time-management skills
- help is only given if requested or if there are performance problems
- workplace relationships are often long-term

Further, workplaces have become more pressurised over recent years and so can be difficult environments for people with dyslexia, or other neuro-diverse profiles. Particular demands commonly include:

- working to short timescales / tight deadlines
- strong / speedy written and verbal communication skills
- long hours with a heavy workload
- multi-tasking skills

There is emphasis on:

- process rather than outcome
- performance management and surveillance

Change at Work

In the context of such demands, change is a major cause of the difficulties that arise: it affects both the work performance and the emotional well-being of an employee with dyslexia. Various changes which may occur are:

Change of Job

A change of job may bring new and challenging responsibilities.

Promotion

Promotion is not always good news for a dyslexic employee. For example, an employee who had excelled in a previous post with his good practical problem-solving skills may suddenly find himself in a role which makes increased demands on literacy. He may be required to keep accurate written records, manage his own correspondence and write reports.

Restructuring

As a result of re-structuring, there may be a new line manager. The manager perhaps introduces a very different style of management which is less sympathetic to a dyslexic employee. This leads to clashes with the employee, who has been accustomed to doing his job in a particular way: he may have been masking his difficulties by taking work home, working longer hours, or avoiding a task or activity altogether.

Change in appraisal systems

New appraisal systems may record performance in a more detailed way. More monitoring and supervision can highlight weak performance.

Loss of a Support System

A particularly supportive colleague has moved on - for example, the secretary who was willing to proof-read all the e-mails and documents before they were sent out.

Or a change in a relationship outside work may mean that there is no longer someone at home who can check documents for the employee.

Case study: a conflict arising from change

Herbert is a structural engineer who has dyspraxic difficulties. These were recognised when he was at school but he has never received any specialist help for them. For sixteen years, he seems to have coped reasonably well with his job, yet suddenly he finds that, with the appointment of a new line manager, his usual coping strategies and support mechanisms are swept away. He has now instigated a grievance procedure, claiming harassment and unfair treatment.

My initial contact was with Herbert's line manager, Margaret, who asked me to advise on his case. I attended a meeting with Margaret and Stephano, the HR manager.

Points to consider. *Where exactly were the difficulties? What were the attitudes? Where was the clash?*

Stephano acknowledged that Herbert had worked for the firm for a long time and, although he did not know all the details, had the impression that Herbert had previously managed projects satisfactorily. Over the past year, however, his performance had sharply declined; and he had become uncharacteristically moody and uncooperative.

Margaret's perspective

Margaret was crisp and efficient. She said that Herbert's survival for sixteen years was due to the fact that he had never had proper supervision and management. In her opinion, the department had been run in an inefficient and unprofessional way. Arriving as a new manager, she had wanted to introduce different systems. She had reorganised work allocations so that engineers were now responsible for managing individual projects, instead of sharing the responsibility between design teams. She was now able to monitor individual performance.

Margaret said that the truth was that Herbert was simply not up to his job. Now that he had to work more independently, it was clear that there were many problems with his performance:

- he miscalculated figures
- he was unable to plan schedules and organise outside suppliers
- he could not communicate clearly with draftsmen and technicians
- he could not work at speed - in fact he worked exceptionally slowly

I asked Margaret why she thought that after sixteen years Herbert had become so difficult and uncooperative, and had felt the need to take out a grievance procedure. Margaret thought that he was simply upset that his weaknesses had been exposed, and she was confident that, if the case came to court, it would be seen that all her monitoring and supervision had been necessary and fair.

She herself had offered him additional support through extra meetings and supervision sessions. She had arranged to have his desk moved to a more secluded part of the office so that he could work without interruptions. She had sent him on computer training and CAD courses because he was still producing his drawings by hand.

Point to consider. *How far was Margaret's perspective accurate? How much had her 'support' really helped Herbert?*

Margaret seemed to have already dismissed Herbert as a hopeless case. I noticed that she was an extremely quick-thinking, rapid-talking person with a brisk, possibly slightly abrasive manner. She complained that she found Herbert very frustrating in supervision sessions. He would begin a sentence and stop, and so she would finish off his sentence, or move on to the next topic - otherwise, she said, they would be there all morning. He contributed little to the discussion and he was slow to catch on. He always seemed rather bewildered as if he could not quite absorb what she was saying.

Point to consider. *Did Margaret's brisk, perhaps rather impatient, manner cause a further problem in her relationship with Herbert - given that Herbert was described as being generally slow both in his work and in communicating with people?*

Following this meeting with Stephano and Margaret, it was arranged that I would carry out a re-assessment of Herbert's difficulties and also conduct a workplace needs assessment.

Herbert's perspective

I met with Herbert who was pleasant and cooperative but seemed slightly depressed. He gave his perspective on the situation:

Change in working methods:
Herbert had not welcomed the change from team responsibility to individual responsibility. He complained about the loss of team comradeship, shared knowledge and collaboration.

Supervision:
He felt from the beginning that Margaret was hostile to him - she was always hovering over him and checking to see what he was doing.

Meetings:
Margaret never gave him time to present his ideas; she was always taking over.

Desk position:
Without proper discussion, she had moved him into a different part of the office and this made him feel isolated and without support. Previously he had been able to gain advice and help from his colleagues, who were quite happy to support him.

Computers:
He said he liked to draw by hand, as this allowed him to see the whole drawing more clearly, and he was able to think about it as he went along. He found computers confusing with their busy screens and multiple tool bars.

Training courses:
These had not helped. The pace had been too fast, and in a large group he had not felt able to ask questions. The trainers had talked a lot about what to do, but they had not shown him how to do things.

Post-assessment meeting

At a further meeting with Stephano and Margaret I gave feedback, explaining that Herbert did indeed have dyspraxic difficulties, but that he also had some dyslexic difficulties and a very severe problem with visual stress, which made it difficult for him to track numbers and letters on a computer screen.

I explained why he felt rather humiliated about his desk being repositioned without any discussion. I also talked about the problems with training courses which did not take account of people with dyspraxia or similar difficulties. In particular, I explained to Margaret that Herbert couldn't help being slow in processing information, and the fact that he needed time to formulate his ideas verbally did not mean that he was unable to find a good solution to design problems or complete projects successfully. I also pointed out that Herbert had felt under pressure during the last year to do everything quickly, and so had become increasingly stressed, which had further impaired his performance.

Stephano and Margaret both showed themselves ready to try to gain a fuller understanding of Herbert's difficulties, and to find better ways of managing him.

I then made specific recommendations for a programme of individual specialist training as well as IT support for Herbert. We also discussed the possibility of arranging an awareness day for managers so that they too could also become better informed about 'hidden' disabilities or differences, and how to develop a best-practice approach.

Outcomes

There were further meetings, and the outcome to date is:

- Herbert is making good progress with his training
- Margaret is making equally good progress with her dyspraxia awareness. She recognises that her impatience had made Herbert more stressed and that she had perhaps missed hearing some of his creative design solutions
- Herbert has been moved back to his old position in the office close to his colleagues
- the number of his projects has been reduced while his training continues
- he is becoming more able to talk openly about his difficulties to colleagues and managers, enabling further adjustments to be made
- it seems likely that this story will have a happy ending - Herbert has dropped his grievance procedure.

In conclusion

Disputes around dyslexia often arise when there are changes at work which uncover or highlight an individual's difficulties. Specialist training and assistive technology support may be needed. The line manager needs to understand the nature of hidden differences, so that he/she can effectively manage the employee. Further, it is vital that awareness of hidden differences spreads beyond a particular manager or team and extends to the whole organisation, thereby creating an inclusive workplace.

Inclusive workplaces are those where there is a whole organisational understanding that adjustments may be needed to support people who have difficulties or who work differently. In fact we need to embed the understanding of difference in the culture of an organisation, so that adjustments are accepted as the norm, and all employees are able to work to their strengths and to the best of their abilities. It is then that disputes around dyslexia will drop away.

Katherine Kindersley

Katherine Kindersley is the director of Dyslexia Assessment & Consultancy.
katherine@workingwithdyslexia.com

Broadening Access to Specialist Dyslexia Tuition Using Freely Available Web Based Video Tools

by Jane Dupree

The case for web based video lessons

There are an increasing number of specialist dyslexia courses that provide training for teachers and tutors with the skills to deliver an individualised structured multi-sensory language programme. However, there are still a large number of students who require specialised dyslexia tuition but who have no access to qualified specialists. Over the last few years there has been a proliferation of low cost tool sets, such as Skype and MSN video, which, with increasing access to broadband, now make e-learning an alternative solution. Combined with most students' natural flair and confidence for using such tools, I have successfully trialled this method of providing tuition and this article discusses the practicalities, strengths and pitfalls of this method of teaching.

E-learning, incorporating web based video links has enormous potential for supporting students with dyslexia and widening access to provision. Most homes now have access to reasonably priced broadband facilities and students confidently use tools such as MSN and Skype as part of their daily communication with friends and family. Whilst adults are mostly 'IT immigrants' and hence may consider this method of tuition a second best alternative, many of our students are 'IT natives' and do not find the idea of lessons delivered through E-learning anything other than normal; the student and tutor can see each other and hear each other clearly; worksheets can be sent to and fro in an instant using the 'Send File' facility; so that tutors can provide instant feedback; video cameras can be angled carefully to enable tutors to watch even the youngest of students as they practise their letter formation and handwriting skills, and emoticons ☺ can be used to give instant praise.

The set up and usage costs for individuals are very low. In addition, there are an increasing number of new applications being designed for web based video tuition. (Skype can get very busy in the evening thus reducing video quality and speed.) Elluminate© offer virtual classrooms with facilities which allow 3 users to work together. Tools, such as Unyte©, allow shared control of protected sections of the teacher's computer thus giving the student access to the same range of the tutor's resources and teaching software as students receiving face to face lessons.

In my opinion e-learning can be used in all 1:1 tutoring situations. Students are not required to travel to lessons, therefore, widening access, reducing travel expense and time commitment for parents and producing less fatigue for students. In addition parents can choose to learn alongside their children, thus creating additional support for their child in a stress free environment. E-learning can also be used in school situations. For example, allowing one LA specialist teacher to reach more students, whilst at the same time training learning support assistants and ensuring the integrity and quality of the teaching and learning outcomes. Lessons can be recorded and played back, allowing over-learning by students, and consolidation of teaching points by learning assistants for transfer across the curriculum. This maximises the effectiveness of the intervention.

So how did this new teaching situation emerge for me?

A parent approached me to ask for specialist tuition for her child. We lived 40 miles apart, and I was the nearest specialist tutor. The parent could not drive. I suggested we trialled using MSN or Skype to deliver lessons. The lessons were successful and after an initial trial other students asked to use e-learning for their lessons. Some students have all lessons through e-learning. Others have a combination of face to face and e-learning lessons. Using their disabled students' allowance other students at university do not have regular lessons, but 'book' a lesson through e-mail when required and use it to help organise, research, plan and re draft course work assignments.

In summary here are the strengths and weakness that I have discovered so far.

The strengths of web based video tuition

For the student

- Relaxed in their own environment
- No travel time
- Utilises technology they are comfortable with
- Allows them more control of their learning
- Accessibility - They will sometimes Skype you a question whilst doing their homework
- Develops self assessment skills
- Develops key board and technological skills alongside literacy, numeracy and study skills

- Provides flexible support for students at University who can book lessons as required

For the teacher

- There appears to be no difference in the working relationship with students that develops remotely or face to face
- There appears to be no difference to the development of skills
- You can have several aspects of the lesson open on the screen at once.
- Evidence is easily saved and recorded
- You do not get their colds
- You can be shown pets at a safe distance (I was shown a student's pet snake!)

Weaknesses of using web based video tuition

- At busy times of the day the call can drop out. (You have to keep ahead of the majority by using new software.)
- Younger children are dependent on parental IT skills
- For some students the relationship needs to be developed face to face first.
- Parents can interrupt and disturb the teacher/student relationship; you need an agreed set of rules about the lesson environment in their home before you start. I learned this the hard way.
- I can't find any others. For me - it is the way forward. It is very adaptable.

I have now been using web based video tuition with several students for over one year. I am still learning, trialling and adapting my teaching techniques to this new method of tutoring. It can work extremely well. As one of my students, who has only ever seen me virtually and from the waist upwards, said last week ¨Jane's lessons rock!¨

Training courses are now available to enable you to begin using this method of tutoring. For more information e-mail Jane@brainwaveseducation.com or brainwaves@hillfarmbarns.org
Jane Dupree

Jane Dupree is a specialist dyslexia consultant

Book Reviews

Teaching Children with Dyslexia - a practical guide

by Philomena Ott

Publisher: Routledge
ISBN: 978-0-415-32454-0
Price: £34.99

I approached reading this book with great enthusiasm, having been a great fan of Philomena Ott since reading her previous, very accessible volume 'How to Detect and Manage Dyslexia'.

From the title, I had expected lots of ***practical*** ideas for teaching dyslexic children. Instead what I found, for example, was an outline of the history of educational practices which although interesting, is not essential for teaching purposes. Similarly, there is a large section on approaches to spelling but little practical advice.

Another criticism is that there are only eight short references to multisensory methods. Although dyslexia specialist teachers would take this 'as read', I feel that the 'parents, carers, teachers and professionals' this book is aimed at may not be specialists and thus not present materials appropriately. Surely, what we want for our dyslexic children is that teaching and learning are effective?

But enough of this negative feedback! Perhaps there were good reasons for being repetitive. You can select any section without having to read the whole volume and the outlines and summaries are useful. The parts in shaded boxes give practical 'Hints and Suggestions' or focus on 'Guidelines', so again you can just 'dip in' to find your solutions.

A bonus is that a lot of space is given to discussion of dyspraxia, which is useful, as we recognise there can be overlaps with dyslexia. Dyslexia- and dyspraxia-friendly environments are discussed, with plenty of practical advice. I had not expected that from the title!

Would I recommend this book? Yes, if you are new to dyslexia and need background information. Yes, if you want practical suggestions and are prepared to skim-read to find solutions. And yes, if you want to find out more about dyspraxia!
Helen Boyce

Helen Boyce is Central Regional Principal for Dyslexia Action

Helen has a dyslexic daughter and is watching her first grandchild (who is not quite two years old) for any signs!!

How to Manage Spelling Successfully Activities for Successful Spelling

by Philomena Ott

Publisher: Routledge
ISBN: 978-0-415-40732-8
978-0-415-38574-9
Price: £39.99
£34.99

I have for many years used and recommended Philomena Ott's book How to Detect and Manage Dyslexia so I was looking forward to reading her two latest books. How to Manage Spelling Successfully is a described as an essential handbook for anyone teaching spelling and covers the theory and practice of spelling, as well as giving spelling rules. The accompanying book, Activities for Successful Spelling, describes how to teach the various aspects of spelling and includes many photocopiable activities.

The first seven chapters of How to Manage Spelling Successfully deal with the underpinning history and theory, covering the history of the English language, the phonics debate, the role of phonological awareness and the various types of spelling instruction. These are wide-ranging and interesting chapters, packed full of information from research, with all the references carefully listed. This would be useful for someone on a literacy course as it gives a good overview of the subject.

The next six chapters discuss teaching methods, spelling rules, segmentation and affixing. The basic concept is good: spelling needs to be taught using phonics in a structured multi-sensory way, teaching the common spelling patterns first before moving on to the rarer variations. Unfortunately this message is rather lost in the confusion of lists and rules. The final chapter is on ICT. This is a useful addition to a book on spelling and it covers a wide range of software, not all relevant to spelling.

There is a massive amount of information in these books and it is unfortunate that is presented in such a way that it could well muddle a teacher or teaching assistant. A teacher needs to be clear about the difference between phonemes and graphemes and this distinction is not made clear in these books. The coding system that is used could also lead to confusion.

Ott observes that "To spell well, children need to learn the rules." This is true, but the rules need to be presented much more simply and in a clearer fashion than in these books. A new teacher looking for spelling rules would be better advised to refer to Ott's first book, How to Detect and Manage Dyslexia.
Sue Lomas
Sue Lomas teaches at Dyslexia Action Leeds Centre

Proust and the Squid: The Story and Science of the Reading Brain

By Maryanne Wolf

Publisher: Icon Books
ISBN: 978-184046867-0
Price: £12.99

Maryanne Wolf, neuroscientist, always tells a good story whether you are lucky enough to hear her speak at a conference, on radio 4, or whether you read 'Proust and the Squid'. This is her first book aimed at the general public and as such it has a more relaxed style than is usually associated with academic texts. However, she provides extensive chapter notes at the end of the book for those readers who wish to explore the subject area further or who require more formal references.

Wolf explores the dynamic relationship between reading and brain development from three directions. The first part considers the development or evolution of reading as a human skill; taking the reader on a journey of over 2000 years from the early forms of writing, including Sumerian cuneiform and Egyptian hieroglyphs, to the first formal alphabet of the Greeks. The second discusses the acquisition of reading within the individual, i.e. how the brain adapts and develops as an individual learns to read in ever more complex ways. The third reflects on what happens when learning to read doesn't follow the usual scheme of things i.e. dyslexia.

Wolf draws on a mixture of science and observations in order to stimulate the reader to reflect on what lessons can be learnt from these approaches in terms of the teaching of reading and of becoming proficient readers.

This book provides a useful overview of the processes and development of reading from the historical, 'intra', and 'inter' brain perspectives. It would be of particular use to specialist teachers/practitioners and mainstream teachers wishing to expand their understanding of reading, and of those individuals for whom reading is problematic. It also provides an accessible introduction to the field of reading for fledgling researchers from any discipline.

Dr Lisa Lynch

Dr Lisa Lynch BA, Ph.D., Dip., has worked as a researcher, practitioner, and post graduate teacher trainer in the field of reading and dyslexia over the last 10 years.

Dyslexia Action

Assessment • Education • Training

Dyslexia Action Directory

Bath	01225 420554
Bolton	01204 395500
Bristol	0117 923 9166
Chelmsford	01245 259656
Coventry	02476 257041
Darlington	01325 283580
Derby	01332 365359
Egham	01784 222325
Harrogate	01423 522111
Hull	01482 329416
Leeds	0113 288 8144
	0113 288 8155
Leicester	01162 511525
Lincoln	01522 539267
Liverpool	0151 428 6987
London	0207 730 8890
Newcastle Upon Tyne	0191 281 8381
Nottingham	0115 948 3849
Peterborough	01733 234956
Sheffield	0114 281 5905
Stone	01785 818783
Sutton Coldfield	0121 354 6855
Tonbridge	01732 352762
Wilmslow	01625 530158
Winchester	01962 856195
York	01904 432930

Scotland

Glasgow	0141 334 4549

Wales

Cardiff	02920 481122

National Training Office

Egham	01784 222344

The Dyslexia Guild 2 Grosvenor Gardens, London SW1W 0DH
T 020 7730 9202 **E** guild@dyslexiaaction.org.uk

Dyslexia Action Park House, Wick Road, Egham, Surrey TW20 0HH
T 01784 222300 **F** 01784 222333 **E** info@dyslexiaaction.org.uk **www.dyslexiaaction.org.uk**
Registered in England Company No. 1179975 Charity No. 268502

Dyslexia Action is the working name for the Dyslexia Institute

ISSN 0308 6275