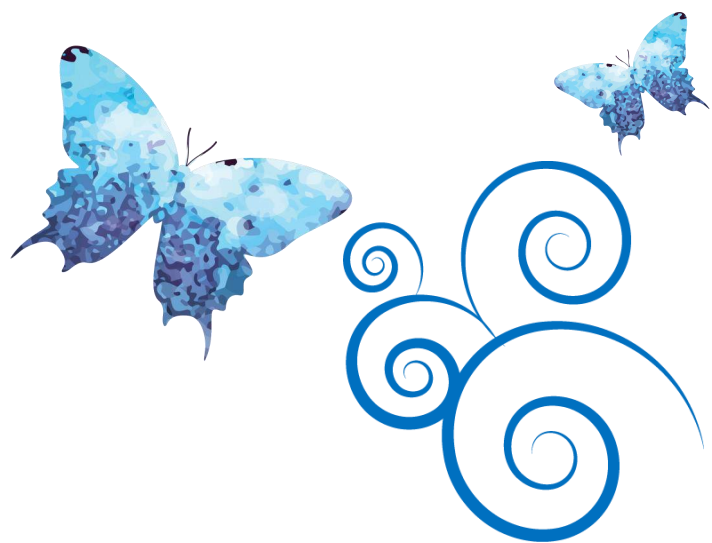




# INTERNATIONAL PERSPECTIVES





## **UnITE SpLD 2016 CONFERENCE**

Thursday, 23 June 2016  
Lifelong Learning Institute

Uniting Ideas in Teaching Excellence  
Research Worth Sharing

The UnITE SpLD Conference seeks to bring together parents, teachers and practitioners working with children with specific learning difficulties and special educational needs. This conference will be showcasing research that covers aspects of behavioural, literacy and social emotional support, intervention and assessment for children with special learning needs. Research will be presented in short, engaging and entertaining sessions accompanied by poster presentations and the chance to talk directly with researchers who are making a difference in the Asian region.

# UnITE SpLD Conference 2016

## Presentation Abstracts

Asia Pacific Journal of Developmental Differences

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*Abstracts originally published in the above Journal*

### Delayed Neural Commitment and Strengths in Dyslexia

Angela Fawcett

Dyslexia Association of Singapore

#### Abstract

How can dyslexia be both a strength and a weakness? There are a broad range of deficit theories of dyslexia, many of which are compatible with each other. Our latest theory of procedural learning deficit and delayed neural commitment in dyslexia provides a sound explanatory framework for the deficits in dyslexia. However, only these two theories and our automaticity deficit theory can account for the known strengths. Learning is based on two systems, procedural (rule based sequences) and declarative (facts and knowledge). The procedural learning deficit suggests strengths lie in declarative learning in dyslexia, with the procedural and declarative systems conspiring and competing, and the declarative system leading. Delayed neural commitment reflects the failure to automatize skills, which means that the sequence of neurons normally dedicated to a specific task is not developed and encapsulated. This allows greater breadth and flexibility of thinking – the ability to see the ‘big picture’ that has been associated with dyslexia. In this talk, the basis of those strengths and the advantages of bilingualism will be discussed.

**Keywords:** Dyslexia, Neural Commitment, Learning, teenagers

## Moving Forward with Dyslexia Support in Singapore

Geetha Shantha Ram  
Dyslexia Association of Singapore

### Abstract

The International Dyslexia Association (IDA), British Dyslexia Association (BDA) and Dyslexia Association of Singapore report that 10% of a population has dyslexia, of which 4% have severe dyslexia requiring specialised intervention. Figures provided by MOE show that in 2013 there were 6063 students with dyslexia in schools, a 83% increase from the 2009 figure of 3320 (cited in Landulfo, Chandy & Wong, 2015). Given the rising numbers of children impacted by dyslexia, a critical look into the provision for people with dyslexia in Singapore is timely to urge stakeholders to enhance systems to mirror current perspectives on dyslexia support.

Based on a 2015 study by the Lee Kuan Yew School of Public Policy, National University of Singapore (Landulfo, Chandy & Wong, 2015), this presentation will examine the available support from three perspectives: [1] Identification, [2] Intervention, and [3] Resources. While Singapore has come a long way in the past decade, the study reveals through on literature reviews, comparisons with developed countries and discussions with various stakeholders that more can be done for people with dyslexia. The presentation will conclude with an elaboration on the recommendations provided in the study.

### Reference:

Landulfo, C, Chandy, C & Wong, ZY 2015, 'Expanding the Provision for People with Dyslexia in Singapore', *Asia Pacific Journal of Developmental Differences*, 2 (1), pp.234-276.

Keywords: Dyslexia, provision, Singapore

## Reading and spelling gains following one year of Orton-Gillingham intervention in Singaporean students with dyslexia

Lois Lim

Dyslexia Association of Singapore

### Abstract

Despite the widespread use of Orton-Gillingham (OG) based approaches to dyslexia remediation, empirical support documenting its effectiveness is lacking. Recently, Chia and Houghton demonstrated the effectiveness of the OG approach for remediation of dyslexia in Singapore. As a conceptual replication and extension of that research, we report results of 39 students with dyslexia aged between six and 14 years enrolled in an OG intervention programme over a period of one year. Analyses of variance showed that students significantly improved in standardised tests of reading and spelling with moderate effect sizes (Cohen's  $d = 0.52-0.58$ ).

Additionally, an inverse relationship was found between students' ages when they began intervention and gains made during the intervention. Results thus indicate the effectiveness of an OG approach in remediating literacy difficulties in students with dyslexia and, taken together with previous studies, further suggest the importance of early identification and intervention.

**Keywords:** Dyslexia, remediation, reading and spelling, early intervention

## Blessed by Dyslexia: The Educator's Role in Developing the Potential

June Siew  
DAS Academy, Singapore

### Abstract

For many successful dyslexics, dyslexia had once forced them to a corner; they had no choice but to scramble, adapt and come up with some kind of strategy that allowed them to keep up with everyone. The end is clear; they ended up developing valuable skills which might have otherwise been unutilised. These skills and resourcefulness had allowed them to compensate for their weaknesses. They would not have been who they are without dyslexia.

The challenge for educators is to teach in such a way that helps students to be aware of their learning weaknesses and to provide guidance and inspiration as they search for strategies that can compensate their weaknesses. As educators, these are some questions we need to ask ourselves as educators: How can we teach to encourage ownership of learning? How do we teach to evoke problem solving initiative? How can we teach to encourage buy-in from students?

Drawing upon the Universal Design for Learning and executive function research, this session will provide educators with a framework of instruction that can address the questions above. Most importantly, these principles of instruction can nurture in students a sense of ownership, adaptability and a spirit of resourcefulness, all of which can help them develop compensatory skills and enable them to say that they have been blessed by their dyslexia.

**Keywords:** Dyslexia, educators, executive function

## Self Evaluations of Children with Specific Learning Difficulties

Lee Albert

Dyslexia Association of Singapore

### Abstract

This presentation is based on a study initiated in 2014 that was jointly lead by National Council for Social Services (NCSS) and the DAS Academy. It arised from a meeting organised by NCSS comprising of the Dyslexia Association of Singapore (DAS), MCYC Community Services Society, Care Corner Singapore and Students Care Service (SCS) to propose recommendations to support the socio-emotional needs of students with specific learning difficulties (LD). Children receiving therapy from the four Voluntary Welfare Organisations (VWO) were chosen to be involved in this study to provide evidence for service evaluation.

Children with LD face significant hurdles with learning compared to their normally achieving peers. While the difficulties of LD children manifest mainly in poor academic performance and learning, they potentially also have co-occurring socio-emotional difficulties. In this study, we compared self-perception and self-efficacy of LD children with their normally achieving peers. In addition, we administered a behavioural screening questionnaire to determine whether children with LD displayed more behavioural issues. Besides the LD children that were recruited from the four VWOs that provided specialist remediation for LD, normally achieving students were also recruited from various schools in Singapore as control group.

Findings showed that students with LD rated themselves as having more conduct problems compared to their normally-achieving peers. In addition, in contrast to existing works, students with LD had elevated levels of self-perception in General Intellectual Ability, Reading and Spelling compared to their normally achieving peers. Therefore, we argue that identifying children with LD and providing them with learning support through specialist remediation may result in a secondary benefit to socio-emotional domains. Moving forward, a specialised service that provides behavioural support for children with conduct problems will also be piloted by NCSS and a VWO to evaluate its viability.

**Keywords:** Specific Learning Difficulties, self evaluation, self perception, self efficacy

## Helping kindergarten children at risk of dyslexia achieve school readiness in Singapore: Is the length of intervention related to outcomes?

Wong Kah Lai

Dyslexia Association of Singapore

### Abstract

Dyslexia describes a different kind of mind, sometimes gifted and productive, that learns differently. The age of intervention for dyslexic children is critical. According to research studies, if a dyslexic child is identified and given effective teaching before age 7, he/she may improve to the point where there is little disadvantage. After age 7, a sharp fall in effectiveness of teaching intervention is noted. After 9 years old, the effects of intervention seems to stabilize rather than remedy the relative deficit in reading skill. After 11 years old, it takes four times as much teaching to produce the same degree of progress as could have been achieved before age 7.

In essence, every child matters. Let us “catch them before they fall” and offer them strategies to learning literacy leading to school readiness. This research seek to share the results of it bursary students’ progress through a comparison of pre-and-post assessments—examining alphabet and phonogram knowledge, learned sight words, reading and spelling—after they had received 20-80 hours remediation. (Programme allows for year round enrolment at any given point of time)

We hope these findings will interest and be of relevance to parents, early childhood educators, reading specialists, early intervention service providers, and anyone interested in working with young children leading to further action research and/or study, better home-school support and perhaps more services made available and dyslexia friendly.

Keywords: Preschool, early intervention

## Dyslexia and Drama in Education

Pushpaa Arumugam and Muzdalifah Hamzah  
Dyslexia Association of Singapore

### Abstract

This presentation is about how Drama can be a powerful tool to develop language skills such as reading, writing, speaking and listening and also how it can enhance the social-emotional development of a student with specific learning differences. By and large, Drama Arts can be an effective means of developing talents and self-confidence, which in turn can lead to a more positive self-concept particularly for anyone with specific learning differences. Incorporating drama activities in classroom for students with specific learning differences encourages affective aspects of literacy and offers multiple opportunities for meaningful communication, social interaction, discussion and feedback. Students participate in both guided and self-directed activities that will engage them kinaesthetically and cognitively. We look at the barriers to learning and the suggested support strategies we can use in drama classes for successful learning.

Keywords: Dyslexia, Drama, kinaesthetic learning

## Reading Comprehension Problems in Children with Dyslexia and Hyperlexia: Are They The Same?

Lim Boon Hock  
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### Abstract

Both groups of children with dyslexia and hyperlexia (also known as direct dyslexia) have problems in their reading comprehension. However, our question here is: Are these problems in reading comprehension the same or different for the two groups? In this presentation, participants will learn to differentiate between dyslexia and hyperlexia through their respective operating definitions provided by the International Dyslexia Association and the American Hyperlexia Association. In addition, these two definitions of dyslexia and hyperlexia will be examined further in terms of their etiologies, symptomatologies and nosologies. The presenter will take participants on their discovery journey through a series of evidence-based activities to find out how they can help their children with dyslexia and hyperlexia cope with problems in reading comprehension.

Keywords: Hyperlexia, dyslexia, reading comprehension

## Do Nursery Rhymes Benefit Children with Learning Disabilities? What Studies Show

Wen-Si Yang

National Institute of Education, Nanyang Technological University, Singapore

### Abstract

When you read a nursery rhyme to your little one, you open up a world of wonder. The nursery rhymes are becoming increasingly recognised by professionals whom seeking insight into diverse developmental domains of young children. Even though this is a significant dimension from the point of view of the professionals, there is little literature addressing how to use nursery rhymes to help young children with learning disabilities.

This paper represents an approach of using nursery rhymes to promote the development of young children with learning disabilities. This approach includes a detailed description of specific early stimulation activities to build on professional's knowledge of the nursery rhymes with an emphasis on exploring what kinds of intervention opportunities related to these rhymes, such as shared reading, storytelling, and chanting. In the end of this conference paper, we put together a collection of nursery rhymes aimed especially to discuss the potential in fostering learning and development.

**Keywords:** Dyslexia, Nursery Rhyme, shared reading, storytelling, chanting

## Reading Comprehension for Children with Hyperlexia - A Scaffolding Method

Patricia Mui Hoon Ng

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### Abstract

Children with language disorders can exhibit symptoms of hyperlexia, a superior level of word recognition relative to other linguistic or cognitive functioning. Language disorders have been described by the American Speech-Language-Hearing Association as deficits in comprehension and/or use of spoken, written and/or other symbol systems [1]. This study examines the effectiveness of an intervention known as the Scaffolding Interrogative Method (SIM) [2], [3] that mitigates the causal factors by leveraging on the learning style of such children. Measures of comprehension test scores using a repeated baseline-intervention method found higher scores during intervention as compared to the baseline conditions.

A second dependent measure using standardized instruments for pre-/post-test found an improvement in the comprehension age with no corresponding increase in reading age for all the subjects. Moreover, the gap between the two variables was reduced to a level below the operationalized criteria of hyperlexia for them. Hence, the SIM is recommended as an intervention for use in withdrawal sessions in school and home tutoring as it can be applied on a one-to-one or small group instruction basis.

**Keywords:** Hyperlexia, children, reading comprehension, scaffolding schemata.

## Underlying skills related to reading comprehension weaknesses among English language learners

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University of Canterbury, New Zealand

### Abstract

Reading skills are clearly important in educational attainment. Many researchers have proposed models of reading processes which focus on how reading is acquired. However, there is relatively less research when it comes to reading difficulties among those who learn English as a second/additional language. The current research investigated the potential underlying cognitive-linguistic skills related to word-level and understanding-level processes on reading comprehension weaknesses among English language learners (ELLs) at high school levels in Iran.

This research contrasted the performance of average comprehenders (N=70) with those with poor levels of performance in text reading comprehension scores (N=23) to identify underlying cognitive-linguistic weaknesses associated with text comprehension problems. Three measures of reading comprehension (one involving passage reading and question answering, another involving passage completion (Cloze procedure), and the last one involving sentence completion) were used in parallel to identify reading comprehension proficiency. Poor comprehenders were considered as those who perform within the bottom 25% of the cohort in those measures. The performance of the selected groups on measures of phonological, morphological, orthographic processing, vocabulary and comprehension skills (referential and inferential skills) was contrasted.

Results showed that poor ELL comprehenders are significantly different from those who performed at average expected levels in all areas tested except orthographic skills measured by matching words and orthographic patterns; the tasks which may require letter knowledge. Findings will be presented to discuss the underlying cognitive-linguistic skills involved in reading comprehension weaknesses in various areas such as phonological, morphological, and vocabulary skills. Implications for theoretical perspectives on reading comprehension weaknesses and classroom practices will be discussed.

Key words: Reading comprehension weakness, English language learners

## Effects of Font Properties on Reading Performance of Individuals with Dyslexia

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1. Temasek Polytechnic, Singapore,
2. Dyslexia Association of Singapore, Singapore

### Abstract

Previous studies demonstrated that font size (O'Brien et al., 2005) and text spacing (Zorzi et. al., 2012) of printed text affected reading performance of individuals with dyslexia. While the positive effects of larger font size is undisputed, there is still a debate on whether larger text spacing is beneficial or detrimental to reading performance of individuals with dyslexia (van der Boer & Hakvoort, 2015).

To the best of our knowledge, there are two gaps in this area of research:

- (a) the combined effects of both font size and text spacing has not been systematically investigated; and
- (b) a lack of knowledge on the effects of font manipulation on non-alphabetical script (e.g., Chinese).

In the current studies, we address these gaps by systematically manipulating both font size and inter-text spacing of English passages (Study 1), and also for Chinese sentences (Study 2). We also conducted error analysis to better understand the effects of manipulated text on reading errors.

When taken into context with previous studies, findings from current studies demonstrate that increased font size either improved or did not impede reading performance of individuals with dyslexia. However, the effects of increased text spacing is mixed. While it is clear that increased text spacing reduced the likelihood of omission errors, Study 1's finding suggests that it could impede reading comprehension, consistent with other findings in the literature (e.g., van der Boer & Hakvoort, 2015)

**Keywords:** Font Size, Font Spacing, dyslexia, reading performance

## Adaptation of Double-Deficit Hypothesis on reading and spelling difficulty in Japanese speaking children -Study on 3rd grade children

Fumie Shibuya and Akira Uno  
University of Tsukuba, Japan

### Abstract

Wolf and Bowers (1999) proposed the Double Deficit Hypothesis (DDH) of developmental dyslexia. In addition to phonological deficit, they put forwards naming speed deficit as second core factor of developmental dyslexia. And they reported the double deficit group (DD) showing both phonological and naming speed deficit, manifested most severe reading difficulty. In this study, we investigated the adaptation of DDH to Japanese children. The participants were 94 children in Grade 3. All children came from local public school and they speak Japanese as first language. To compare with foreign study, we used same criterion in which used in same as Sunseth & Bowers (2002) of the English area and Wimmer et al (2000) of the German area for the same third graders. As a result, in both criterion, Japanese speaking children can be classified into three subgroups based on the DDH.

In contrast, according to the severity by the criterion of Sunseth & Bowers (2002), only one out of seven tasks showed the most severe to compare with other single deficit groups and by criterion of Wimmer et al (2000), all tasks showed no-significant difference among groups. DD group was not the most severe group in all each tasks. Our findings suggest that the DDH holds partly in Japanese 3rd grade children. On the other hand, we found "the others" group which was difficult to classify in the frame of the DDH and this group has reading difficulty too. There was a lot of discussion which cognitive function contribute to Dyslexia. Especially in Japan, some researchers reported that visual cognition affected to reading difficulty. In our study, a score of visual cognition task of "the others group" showed approaching significantly lower than no-deficit group when we analyzed by the criterion of Sunseth & Bowers. Thus, the others group children who drop out from DDH framework, surely exist and they have reading difficulty, and they might relate with weak visual cognition in Japanese.

**Keywords:** Double Deficit Hypothesis (DDH), Developmental Dyslexia, Japanese children, reading difficulty

## Investigation of Cognitive Factors Affecting the English and Filipino Reading and Spelling Literacy of Third-grade Filipino Children

Lhannie Estrera and Akira Uno  
University of Tsukuba, Japan

### Abstract

There have been numerous studies regarding reading and spelling, particularly on the English language. There is also an increasing number of studies investigating bilinguals; however, there is scarce literature regarding the Filipino language on reading and spelling. The official language of the Philippines is English and Filipino. Filipino refers to the many (around 100 or more) different languages spoken all over the country, including Tagalog. Tagalog is the most commonly used language in Manila. Both English and Filipino are learned during the elementary school years of children. Both languages use the same alphabet writing system (Aa, Bb, Cc); however the two languages differ in terms of grapheme-phoneme conversion (GPC).

English is considered a highly opaque language because of its inconsistent GPC contrasting to Tagalog which is considered more transparent due to its regular GPC. As the title states, the purpose of this study is to investigate the possible cognitive factors affecting the English and Filipino reading and spelling of third-grade Filipino children. The following tests were administered to 102 Filipino third-grade children studying in Manila: paragraph, word and non-word reading, and word spelling test for measurement of their reading and spelling literacy; Raven Coloured Progressive Matrices for general intelligence; Rey-Osterrieth Complex Figure Test for visual perception and memory; Rapid Automatized Naming test for automatization; receptive vocabulary test for vocabulary knowledge; and tests for phonological processing like non-word repetition, phoneme deletion and repetition in reverse-order syllable test. Multiple regression analyses revealed that there were similarities in English and Filipino reading in which both automatization and phonological processing played a significant role; however, there were difference in the weight of contribution of these factors. In addition, receptive vocabulary played a bigger role in English reading and spelling than in Filipino reading and spelling, although phonological processing played a significant role in both languages.

**Keywords:** Reading and Spelling literacy, Tagalog, phonological processing, automatization

## Screening and Intervention for Dyslexia in Indonesia—Developing the Lexipal Program

Kristiantini Dewi Soegondo, Purboyo Solek and Muhammad Risqi Utama  
Dyslexia Association of Indonesia

### Abstract

The difficulties Indonesia has experienced are reflected in the latest PISA figures, which show that this country is 61st out of the 65 participating countries for reading. The situation is more complex for those 10-20% of children who suffer from dyslexics who are currently poorly served in general, despite the excellent work of the Dyslexia Association of Indonesia. Researches showed that intervention has been shown to effective when teacher or computer led. Until now, there have been no instrument available in Bahasa Indonesia.

LexiPal is a 'learn-to read' application especially designed for dyslexic children in Bahasa Indonesia. This application is developed for dyslexic children in the age of 5 to 7 years or pre-school of first year of elementary school. LexiPal has been designed to be use not solely by children, but with guidance from parents, teachers, therapists, an others. A key feature is that the program may be used with minimal initial training an is therefore suitable for all levels of adult guidance.

LexiPal has 4 main key features: (1). Children database, (2). Scheduling, (3). Learning Media, (4). Historical Data. This feature is designed based on three of the most important approaches in teaching dyslexic children, namely : (1). Multi sensory method, (2). The use of different media to teach one material, (3). Prioritize motivation rather than punishment. Based on the above considerations, learning media features are divided into three different types, namely : learning media, practice media and evaluation media. In addition to having different types, the learning media is also divided into twelve different categories, with all those categories stating the ability that has to be mastered by the children between the ages o 5-7 years which are : shapes and patterns; similarities, differences and comparison; short term memory; object association; direction perception; activity sequence, understanding place; time concepts; functional skills; letters; syllables and words; simple sentences. increasing complexity of school maths over the primary school years.

**Keywords:** Dyslexia, screening and intervention

## DALI: Dyslexia Assessment for Languages of India

Dr Nandini Chatterjee Singh  
National Brain Research Centre in India

### Abstract

Dyslexia is categorised as a learning disability wherein school children do not achieve adequate reading skills. It has a worldwide incidence of 5-20% and incidence of dyslexia in India is believed to be 10-15%. It is critical that dyslexia be assessed in all the languages in which a child is provided instruction. Given the education scenario in India wherein children are provided literacy instruction in at least two languages and often three, it is critical that dyslexia be assessed in all of them. In particular it is necessary that the child be assessed in the native language.

Given the absence of appropriate standardised screening and assessment tools in Indian languages, the diagnosis of dyslexia in India so far has been incomplete or even unavailable. To address this lacuna, the Dyslexia Assessment for Languages of India (DALI) was developed. DALI contains screening tools for school teachers and assessment tools in Indian Languages to identify dyslexia. DALI provides standardised, validated tests in three Indian languages (Hindi, Marathi and Kannada) and English learnt in as a second language. It has been indigenously developed, standardised and validated across a large population of 4,840 children. This talk will discuss the different tests available in DALI, its standardisation and validation.

**Keywords:** Dyslexia, Screening and Assessment tools, Hindi, Marathi, Kannada

## The Use of the Ubiquitous Bottle Caps to Enhance Phonological Processing among Struggling and Poor Readers

Dr Ong Puay Hoon

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### Abstract

A strong consensus that has emerged from various research is that a central difficulty in dyslexia is the processing of speech sounds, known as phonological awareness or processing (for example, Shaywitz, 1998; Snow et al., 1998). Phonological awareness or processing involves the ability to hear sounds that make up words in spoken language. Students with strong phonological processing skills are likely to become good readers, but students with weak phonological skills will likely become poor readers (Blachman, 1997). Blachman also showed that more than 90 percent of students with significant reading problems have a core deficit in their ability to process phonological information. Phonological processing is an umbrella term that includes six developmental levels - word awareness, rhyme awareness, syllable awareness, rhyme production, phoneme awareness, and phoneme manipulation (Lane, 2007). This paper presents the use of the ubiquitous bottle caps and other physical aids to enhance phonological processing skills among Primary 3 students of age 8-9 years old who were attending remedial classes for English language. The outcomes of a comparative analysis of pre- and post-test measures after one week instruction will be presented while taking note that any changes in post-test scores in relation to pre-test cannot be attributed solely on the use of bottle caps as other physical aids and activities were also used. In addition, the benefits of use of the bottle caps as a 3-D physical manipulative aid when compared to letter tiles or cards and narrative accounts of both students and their teachers on the use of the caps will be presented.

**Keywords:** Dyslexia, Phonological Processing, physical teaching aids

## Teachers' Perceptions on the Effectiveness of a Process Genre Approach on the Writing Skills of Students with Dyslexia

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2. University of Texas of the Permian Basin

### Abstract

The Process Genre Approach to teaching writing was developed by Badger and White (2000). The approach advocates teaching students writing by taking students through stages of writing while emphasising on the language features and context of the writing. A research study was conducted to explore teachers' perceptions on the effectiveness of the process genre approach on the writing skills of students with dyslexia.<sup>1</sup> This research study provides an overview of five Singaporean teachers' perceptions of the process genre writing approach as a method to improve the writing skills of students diagnosed with dyslexia.

The researchers conducted a case study with five teachers from the Dyslexia Association of Singapore (DAS). Teachers were selected as study participants based on purposeful sampling. Data collection for the participants included a pre-interview questionnaire and a semi-structured interview. All five teachers reported using elements of the process genre writing approach during instruction. Themes representing the teachers' view of the process genre approach to teaching writing emerged from the research including accessibility to resources, idea generation, structured instruction, familiarity, and ease of use emerged from the study. The results are discussed and suggestions are provided for further research.

**Keywords:** Teachers' perceptions, process genre approach, learning difficulties, dyslexia, teaching writing, writing difficulties, 6+1 Traits.

## The potential of working memory training on students with Dyslexia

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### Abstract

Many of us must have experienced the need to repeat a topic over and over again to our dyslexic students, and the result is that they still can't remember. Why is this so? The problem could lie with their working memory. Working memory is a vital cognitive system that helps us retain and manipulate information to support a wide variety of complex cognitive activities. It can also have important consequences on academic and daily life performance.

Working memory capacity is limited; but there has been a lot of buzz about the ability to increase working memory capacity through computerised working memory training. Though controversial, some studies have yielded positive outcomes, not just on improved cognitive functioning, but even enhanced academic performance. Like other individuals with specific learning differences, dyslexic individuals also struggle in their ability to learn and remember; thus results and learnings from these studies can have a significant impact on their lives. However, very few published empirical studies have examined the impact of working memory training on individuals with dyslexia. Could dyslexic individuals experience similar potential benefits that working memory training seems to offer? My study takes a closer look at the effects of computerised working memory training on dyslexic students, and the implications moving forward.

**Keywords:** Dyslexia, working memory, computerized working memory training.

## Reading performance using ChromaGen lens II in dyslexic children with low and high visual stress levels.

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### Abstract

#### Purpose:

To determine reading performance using ChromaGen lens II in dyslexic children with low and high visual stress levels.

#### Methods:

A total of 25 children (mean age =  $8.88 \pm 1.509$  years) with dyslexia were recruited. All subjects were free from ocular and systemic diseases and never had any intervention. The children completed a computerised visual stress test using ViSS, initially without and then followed by, with ChromaGen lens II. The ChromaGen lens II were selected by the children based on their preference when reading a text. The visual stress test comprised of visually non-stressful items and visually stressful items. Based on the search times of stressful visual items, the children were categorised into 2 groups; that is low visual stress (LVS) and high visual stress (HVS) groups. Then reading performance (reading time and reading rate) was assessed for the two groups without and with ChromaGen lens II.

#### Results:

There was a significant difference ( $t = -2.437$ ,  $p=0.022$ ) in search times for non-stressful and stressful visual items without ChromaGen lens II. However, with ChromaGen lens II, the search times reduced to become insignificant between the two. Without ChromaGen lens II, 62% ( $n=16$ ) of children had LVS and 38% ( $n=9$ ) had HVS whereas with ChromaGen lens II, 69% ( $n=18$ ) of children had LVS and 31% ( $n=7$ ) had HVS. There was no statistically significant difference in search times with and without the ChromaGen lens II within the LVS and HVS groups. Similarly, there was no statistically significant difference in reading time and reading rate with and without ChromaGen lens II within LVS and HVS.

#### Conclusions:

Using ChromaGen lens II helps to reduce search time of stressful visual items in dyslexic children. However, ChromaGen lens II does not help improve reading performance for dyslexic children with either low and high visual stress levels.

**Keywords:** Dyslexia, ChromaGen Lens II, Visual Stress.

## Dyslexia and Chinese Language in Singapore

Priscillia Shen  
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### Abstract

Dyslexia is believed to be a universal language learning disability that varies across different languages, depending on the diversity of the writing systems. Though studies on dyslexia have been mostly associated with learning difficulty in English language, there have been major achievements in the research on dyslexia in Chinese character reading but there is still no widely accepted theory or intervention for dyslexia in Chinese language. Singapore has adopted the bilingual education policy because of socio-political-economical-cultural reasons, which has put many Chinese children in a very different and unique environment in learning at least two languages of different orthographies and sound-symbol mapping systems, as compared to other

Chinese children of countries where Chinese language is the first language, such as China, Taiwan and Hong Kong. Because of the difference in both English and Chinese writing systems, there is an interest to find out whether visual perceptual skills other than phonological deficits would affect Chinese language acquisition. Furthermore, there is also an interest to explore the differences in Chinese literacy skills with the presence of dyslexia in Singapore's context, through the use of a battery of Chinese literacy tests which could lead to future validation of assessment and implications for intervention for dyslexic children.

While Chinese literacy skills and visual perceptual skills were found to be weaker in the presence of dyslexia, visual memory was found to be an underlying visual perceptual skill besides phonological processing skill and auditory memory in Chinese language processing. A grounded theory derived through the voices of Singapore Chinese children has also illustrated their perception of Chinese language and how varied level of orthographic and morphological awareness and transference of values from role models affect their understanding of and dealing with the language.

**Keywords:** Dyslexia, Chinese language, English Language, literacy skills, visual memory, visual perceptual skills, phonological processing, auditory memory.

## Speech and Language Therapy helps Dyslexic Children achieve

Ho Shuet Lian

Dyslexia Association of Singapore

### Abstract

Several studies (McArthur, Hogben, Edwards, Heath, & Mengler, 2000; Catts, Adlof, Hogan, & Weismer, 2005; Snowling, Gallagher & Frith, 2003; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998) have found evidence to explain the association between language impairment and reading difficulties. Therefore, Dyslexia Association of Singapore (DAS) recognises the importance of Speech and Language Therapy for the diagnosis and intervention of mainstream students with dyslexia in Singapore and started providing speech-language therapy service in 2009.

This study aimed to find out the distinctive speech-language needs of students at DAS as well as to assess the efficacy of speech-language therapy in helping these students to achieve. 35 students between 7 and 16 years old were randomly selected for progress evaluation. The students attended both MOE-Aided literacy programme (MAP) and speech-language therapy at DAS. 80% of the students were males and the rest were females. They attended one-hour weekly individual speech-language therapy for at least two consecutive terms in 2015.

The findings show that most of the DAS students who attend speech-language therapy had expressive language impairment and the least common deficit that they had was pragmatic deficits. The overall results achieved by these students suggest that they had benefited from attending at least two consecutive terms of speech-language therapy at DAS. Phonological awareness had the highest success rate of 90% and pragmatics had the lowest success rate of 70%. Survey result suggests that speech-language therapy helped to boost the students' self-esteem as nearly half of the participants rated their self-esteem as 'higher' post intervention.

**Keywords:** Dyslexia, Speech and Language Therapy, self-esteem, phonological awareness

## Understanding the Brain Network of Dyslexia during Verbal Working Memory: A Singapore Study.

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### Abstract

Dyslexia is a reading disability that affects 5-17% of the population (Shaywitz and Shaywitz, 2001). Extensive research has been conducted examining the neurological differences of the processing of alphabetical languages in individuals with dyslexia—three meta-analyses have been published thus far. However, little is known about the functional network of bilingual children. Singapore stands out as a unique population for the research of dyslexia as it is a multilingual society. Children are typically bilingual with English being their first language and either Malay, Tamil or Chinese as their second language or mother tongue language. Therefore the current study seeks to understand the neural network of dyslexia during verbal working memory in Singaporean children.

Using non-invasive brain imaging techniques via the MRI scanner, the present study examined the brain networks of children with and without dyslexia between the ages of 6-10 years old. In particular, the study sought to understand how verbal working memory—a core deficit of dyslexia, may be affected in children with dyslexia and how that is related to their reading ability. Through comparing typically developing children to those with dyslexia, we are able to study the brain networks involved in verbal working memory that is often utilized in reading. Additionally, the study is specifically interested in understanding the role of the cerebellum during verbal working memory in children with dyslexia. The cerebellum has been thought to be only involved in movement and coordination in the past. However, in the recent two decades, researchers have been finding that the cerebellum is also involved in higher brain functions, like verbal working memory, language, music, decision making and timing (E, Chen, Ho & Desmond, 2012) which

do not necessarily have an explicit motor function. With previous studies documenting structural abnormalities in the cerebellum, the present study seeks to uncover the functional difference.

Through the findings of the study, the study hopes to better understand the neural difference during verbal working memory in children with dyslexia and their typically developing peers in hopes of innovating strategies to further refine current interventions for dyslexia.

**Keywords:** Dyslexia, fMRI verbal working memory, cerebellum

## Dyslexia with Attention Deficit Hyperactivity Disorder: A case study

Hani Zohra Muhamad

Dyslexia Association of Singapore

### Abstract

This article is a case study of a child with dyslexia and ADHD who was provided with behavioural strategies to cope in class which proved to be effective. Children who have dyslexia and Attention Deficit Hyperactivity Disorder (ADHD) often face great challenges in school as their academic abilities are usually impeded by these two learning disorders. While dyslexia affects their literacy abilities, ADHD often affects their ability to pay attention and exercise executive functions. Children with ADHD are often found to be hyperactive, inattentive or a combination of both. On the other hand, these children often have normal to above average intelligence and can do very well academically if they are equipped with coping mechanisms. Physicians may suggest that children with ADHD be medically treated in order to curb their behaviour and perform better in school. However, these medications may contribute to undesirable side effects and this is the reason why many parents may disagree with having their children with ADHD under any form of medication.

**Keywords:** Dyslexia, Attention Deficit Hyperactivity Disorder (ADHD), school behavior, attention, coping mechanisms

## Improving the fluidity of whole word reading with a dynamic coordinated movement approach

Crispiani Piero and Eleonora Palmieri  
Psychological and Pedagogical Victor Center, Italy

### Abstract

In this talk we present an intervention approach geared towards improving the fluency of reading and processing in children with dyslexia and dyspraxia. This is an important topic, identified by the National Reading Panel 2000 as key to improving reading comprehension. The approach, the Crispiani method developed in Italy is derived from theories of cerebellar deficit and procedural learning, and adopts a dynamic approach based on a combination of whole word reading with rapid coordinated movement.

Following a literature review, an intensive case study of clinical practice with a 10-year old girl with dyspraxia and dyslexia shows marked improvement in initiating and completing tasks. Finally, an experimental study with 33 children show an average improvement of 30% in reading fluidity following a 3 months intervention designed to improve processing speed and confidence in a clinical setting. This improvement was highly statistically significant. The implications for a whole child approach to intervention are discussed.

**Keywords:** Dyslexia, Dyspraxia, reading fluency, automaticity

## Evaluating the Progress of Dyslexic Children on a Small-group Maths Intervention Programme

Rebecca Yeo

Dyslexia Association of Singapore

### Abstract

Many students with dyslexia experience difficulty with mathematics. Besides affecting the ability to read and decode, dyslexia also negatively influence other executive functions such as working memory, sequencing, and the ability to plan. These skills are needed to solve word problems efficiently and effectively. In Singapore, success in mathematics is highly valued, and doing well in the subject opens doors to better prospects later on in life. To support primary school students with dyslexia who experience difficulties with the subject, a math intervention was designed with their learning needs in mind. In designing the programme, the designers ensured that the pedagogy and syllabus were kept in line with the national curriculum in Singapore.

This programme focuses on building students' mathematical ability, specifically in conceptual understanding, procedural fluency and ability to apply concepts to word problems using a dyslexia-friendly approach. In this article, we present an analysis of the progress of 39 dyslexic children aged 7-11, enrolled with the Dyslexia Association of Singapore, who had completed 6 months support for maths. The students' performance were measured using an in-house formal assessment tool that spanned a range of ten topics: addition, subtraction, multiplication, division, time, fractions, geometry, decimals, percentage, and ratio. Results show statistically significant improvement in all topics targeted across all levels except at P2. These results are discussed in relation to the increasing complexity of school maths over the primary school years.

**Keywords:** Dyslexia, Maths intervention,

## The Impact of Morphological Intervention on Spelling and Self Esteem in Adolescents with Dyslexia

Nicole Chua

Dyslexia Association of Singapore

### Abstract

One of the key issues in dyslexia research is how can we remediate dyslexic children who do not respond to phonics intervention? Chomsky (1970) described English language as a morphophonemic language. There are a number of English words that are non-phonemic and cannot be represented by letter sound correspondence. This study aims to establish whether or not morphology should be integrated with phonics instruction to provide an effective intervention to dyslexic teenagers, thereby increasing their self-esteem. This case study of a group of three 15-year-old dyslexic learners who showed little response to the current phonics based instruction based on the Orton-Gillingham teaching approach. The researcher developed specially designed morphological instruction adapted from Bowers (2010), into the established phonics intervention, to provide a compensatory strategy (Carlisle, 1987) for the atypical group of learners. The group of learners showed an increase in confidence and accuracy when attempting spelling tasks. All students responses indicated that morphological instruction was their preferred way to spell as they remembered word parts visually more easily and they can rely on phonics (sounds) should they fail to identify any word part. This case study suggests that morphology should be incorporated earlier at secondary level as it helps them to see the relevance of the intervention programme to their academic work in school, and provides deeper understanding of language and its structure.

**Keywords:** Dyslexia, Morphological Intervention, Spelling, Self Esteem.

## Improving English Exam Skills for Dyslexics in Primary Education in Singapore

Edmen Leong  
Dyslexia Association of Singapore

### Abstract

Performing in primary education is particularly important in Singapore. Parents and teachers have high expectations for their children and students, especially when they sit for their Primary School Leaving Examinations (PSLE). This could be due to how results of the PSLE can determine a child's educational pathway following their primary school education. Students with dyslexia struggle with the English PSLE subject, and score poorly in several components of the paper. A team of curriculum developers with the Dyslexia Association of Singapore (DAS) thus developed an English Exam Skills Programme (EESP) to help dyslexic learners in the DAS overcome their difficulties in the PSLE English Paper.

The EESP focuses on teaching skills and strategies that directly helps students in the Grammar, Editing, Synthesis and Transformation, and Comprehension components of the PSLE paper. The EESP team strongly believes that some of these challenging components can be taught, and that primary school students with dyslexia can acquire necessary skills that can be translated into the PSLE paper. The team has thus designed and developed a set of curriculum to address some of these components of the PSLE paper.

Careful considerations were taken into account in the development of the EESP ensuring that the curriculum adheres to the Orton Gillingham (OG) principles, that there is sufficient empirical evidence supporting the usefulness of concepts and skills taught and that students were able to transfer concepts and skills learned in their examination papers. This presentation reports the continuous evaluation of results of students in the EESP revealing that students have been progressing and improving significantly.

**Keywords:** Dyslexia, English Exam Skills, Primary School Leaving Examinations (PSLE), Grammar, Editing, Synthesis and Transformation.



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# UnITE SpLD Conference 2016

## Dyslexia the 21st Century

Emeritus Professor Angela Fawcett<sup>1</sup> and Geetha Shantha Ram<sup>2</sup>

*1 Research Consultant*

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Dyslexia Association of Singapore*

### TRANSCRIPT OF THE UNITE SPLD PANEL DISCUSSION

The panel discussion formed the final section of the 2016 UnITE SpLD Conference – Research worth Sharing. This discussion was moderated by Geetha Shantha Ram, who is Director of the main literacy programme at the DAS – the MOE-aided DAS Literacy Programme (MAP) and the division of Staff Professional Development. Together with the moderator, a panel of prestigious speakers who are introduced below, took part in this session and Geetha had prepared a series of questions for them to address, which was combined with questions from the audience. It is our pleasure to share with you the transcript of the discussion.

**GEETHA SHANTHA RAM:** Let me introduce the members of the panel. We have professor Angela Fawcett, who is vice president of the British dyslexia association and a fellow of the British Psychological Society and the International Academy for research in learning disabilities. She's currently research consultant to the Dyslexia association of Singapore.

Next we have Dr. Tan Wah Pheow, who is the section head of the diploma in psychology studies in the school of humanities and Social Sciences at Temasek polytechnic. He received Temasek polytechnic's teaching excellence award in 2012 in recognition of his teaching excellence and since 2010, has collaborated on numerous research studies with other local researchers. We have professor Akira Uno who is professor of the graduate school of comprehensive human sciences university of Tsukuba Japan, he's also president of the Japanese dyslexia research association and president of non-profit organization LD and dyslexia centre.

Of course, last but not least we have Mr. Lee Siang who is the DAS chief executive officer and he sits on the board of the subsidiaries DAS academy and DAS international. Siang is also on the board of the US based international dyslexia association and a member of the international global partner's committee.

From a discourse that largely centered on negativity, we're now eagerly embracing dyslexia and without undermining the struggles faced by dyslexics, we are able to speak positively on what it offers to dyslexics themselves and for those around them. Educationally, there are still many pertinent questions that will enable us to reflect and better support dyslexics and not surprisingly, these include clarifications on identification, and assessment practices, issues which are made more complex due to uncertainty in the dyslexia definition. Once identified, concerns of appropriateness of intervention or evidence based practices, use of tools and strategies including technology, self esteem and teacher readiness pervade our conversations. Equally important is our understanding of the dyslexic person in the 21st Century. What are his experiences and how does the dyslexic voice effectively bring about changes to our views on education? Has he been able to adequately influence institutional practices, resulting in a desired impact to societal and cultural systems? In short, there is the social, cultural, systemic, anthropological and psychological aspects that we must continue to learn from so, let's get the views of our panel, which represents the pluralistic field of dyslexia.

Beginning first with identification, recently, there have been many concerns surrounding the definition of dyslexia and therefore, its identification. Prof. Fawcett, what are some of these concerns surrounding the definition of dyslexia?

**ANGELA FAWCETT:** While there is work coming from the UK that is beginning to say dyslexia is a myth now, that's really putting the clock back to the seventies and eighties in the UK, when people said oh it's just a middle-class excuse for failure and clearly this is wrong. We know there's a genetic component, a brain based component. The issue is on how you diagnose dyslexia and in the past it's been diagnosed on the basis of a discrepancy between the intelligence and the overall ability and the ability to read. That's not necessary to the most useful definition and we're now looking at much more complex forms of identification in terms of a teacher assessment, in terms of the multiple skills involved in dyslexia, but to my mind it misses the point because what we're looking at here is children who are struggling and it's irrelevant really the argument about diagnosis. The important thing is that we're finding those children, we're providing the support that they need, and making sure that they are allowed to fulfill their potential and not fail as they would do if left unsupported. So, the profile of the child and what they need in terms of their assessment and support are what is important here and not academic arguments about whether or not dyslexia exists that's nonsense!

**GEETHA:** Well, the DAS conducts a lot of assessments for dyslexia, what's the DAS position on profiling or even assessments for children?

**LEE SIANG:** I think in many ways it mirrors what Angela has already said. It's not a case of whether we should conduct a full assessment with both cognitive and literacy batteries or for that matter reporting with our more dynamic approach to assessment. I think what's most important is how will the assessments that are conducted instruct your intervention and that is what you should be looking for.

**GEETHA:** Yes. So if it's all about the intervention and we have a question from a member of the audience, is it time to reduce the use of the term dyslexia? What do you think?

**ANGELA:** I think dyslexia is a wonderful shorthand, what we have to see though is that rarely do we have a child who is simply suffering from a reading difficulty it's always much more complex than that - there's so much overlap between the different problems. But dyslexia is a shorthand that people will understand, they see it as a problem in reading, they don't necessarily recognize that it's much broader than that but they are also beginning to see it as something that's associated with strength, so it isn't just a problem, it's also something which will identify that you have potential as well as difficulties to be overcome. So I'm very firmly in favour, people fought for years to get that idea and I'm happy to use specific learning differences and other forms of the word but I like dyslexia myself. What do you think about that?

**WAH PHEOW:** No problem, I've generally no issues with that term although I'm not sure what the context of the question was and, maybe just second-guessing the person who asked the question if he or she meant that we need to have more politically correct views or correctness, if it is coming from that angle so I wasn't sure that will transform that...

**GEETHA:** Actually I can clarify, it's got to do with IQ and the question continues to talk about a person could have learning disorders due to lower IQ and IQ is a significant factor to determine how students learn so is the term dyslexia then useful or should we just be looking at students IQ?

**WAH PHEOW:** But I think if you look at the actually very conventional diagnosis of dyslexia, it's someone with above-average IQ and not being able to linguistically perform up to their respective level, so I feel if you think on that context, it's a very useful term. And you can talk about IQ but then if you do that, you just use dyslexia as the criteria to decide whether a person receives intervention or not, then you are effectively excluding this group of individuals from receiving intervention.

**AKIRA UNO:** Well for definition IQ, is not needed for the definition. I think that because, according to cognitive ideas, underlying reading disorder of children of who are showing normal IQ or lower IQ are the same, or so reported, but for prognosis of our training it's different, I think the normal IQ are above lower IQ children, with lower IQ as the program prognosis is not so good, based on my data and experience.

**GEETHA:** So whatever you like to achieve they might take a little bit longer however it's not that they should not receive intervention?

**AKIRA UNO:** and some of the children didn't catch up, leading the team to later...

**GEETHA:** Let's return back to intervention, now Margaret Snowling reviewed the possibility of whether children with dyslexia can be identified based on their response to good reading instruction, perhaps in place of a specific assessment. And this is an exciting prospect as more children could then be identified early to receive intervention early. Can reliable identification be achieved and do we see the possibility of us moving towards such a means of identification?

**ANGELA:** I think you can definitely identify children very early that are going to have problems and you can provide the support that they will need to help them in the early stages. That doesn't mean to say that they're not dyslexic and so as they carry on through their school career they will find some stages when they get stuck because their ability to learn is different from the other children. So the response to intervention is interesting and something they're going for in a big way in the States but it could be that you take a child to provide the support they seem to be absolutely fine and then you just dismiss the fact that they have problems and of course we all know this something that lasts throughout life and so whatever stage you're at even in university, we find in the UK people arriving they've got all their A-levels they've come through and then they fall to pieces, but they can't keep up with the workload and it's because up to here they've managed by working harder but they still need that help, they need the extra time to be able to show their potential so it's an interesting thing but it won't be a complete solution, nothing is.

**GEETHA:** That's true. Well dyslexia is considered a high incidence learning disability. We hear a lot about it which is good so that we can better support success and consequently there's been a surge in the number of new programs with claims that they can effectively support learners. So in this uncertain climate, how can parents teachers or educational organizations know what suits their learners best, perhaps DAS can explain that?

**LEE SIANG:** In many ways, I think my opening address in the morning has

addressed that. I think it's very important that any program or service that is delivered is supported by evidence from good research and I think those who are seeking the services should look out for programs that are supported by research. So evidence-based practice is critical in determining.

**ANGELA:** I think you could also say that if you have an idea that you think works make sure you have it evidence to show that it does and it's very simple to do this. You take a pre-test on something you do your intervention on, you keep it all recorded well and then you do a post test and it may be that you think it will improve something it doesn't but it may improve other aspects. So we went to a lovely talk where they were trying to improve memory and they actually improved attention and concentration but that was fabulous in itself so you know be prepared to collect that evidence and then share it with others.

**WAH PHEOW:** I'm actually very happy, very much interested and I think it's very important that whenever you run the program right, you evaluate it and as the standard pre-test -post-tests, I would like to see data that's collected right, to collect to better improve the program because it's not just saying whether the program works. Sometimes, I think when you do program evaluation right, it's not so much black-and-white, but maybe some aspects of the program work, some aspects of the program you need improvement so I think those are the kind of data that you need to collect to do a very good program evaluation and program improvement.

**ANGELA:** And I have to say I've been really struck by how beautifully the DAS evaluate their work, it's wonderful to see it tweaked all the time to be better and better. I'm really, really, impressed with it.

**GEETHA:** Thank you, thank you Angela means a lot coming from you. A question related to research...

**AKIRA UNO:** Actually, I have something to explain in relation to the situation in Japan. So it's changing, big changes occur now in Japan because the Act law will be enforced. The act is in force, enforced from April this year, it took up about three months, just the act prohibits discrimination against people with disabilities including children with developmental dyslexia so our teachers have to support assist, based on following the act, but it took only 3 months, the situation is still difficult for children with developmental dyslexia, but I think it's changing, so we sometimes we need to look at a Law.

**GEETHA:** If I could just continue with that - the topic of teacher readiness maybe, are the teachers ready in Japan to support such learning?

**AKIRA UNO:** Most teachers don't know how to teach students with developmental dyslexia. In the project of Japan's Ministry of Education and Culture, I made a video tape on how to teach in the mainstream class for children that were developmental dyslexics, and the situation in the school, in work and in the home so this video will hopefully increase understanding of dyslexia in Japan, but it's changing now.

**GEETHA:** It's wonderful to hear this. Is what you say or something similar happening in tertiary institutions? Do you think that teachers are ready to support such learners in tertiary institutions in Singapore?

**WAH PHEOW:** Unfortunately I don't think so, although within Temasek polytechnic itself, that's the institution I come from, we do have an office that looks at students with special needs, could be physical special needs or developmental specialist but unfortunately a lot of times right, this is too kind of generic office to do much, and I also feel that especially in the past few years, ok I've been there for like six seven years, in the past maybe two or four years that's a growing recognition of individuals with special needs but I can tell you when I started working at Temasek polytechnic people had no clue. I think MOE is doing a good job in pushing up awareness and getting asked to set up an office of special needs or individuals with special needs for the past 20 years, but there's still a long way to go. For my school, because I come from psychology studies, so like me people are psychologist there, so most of us are kind of aware of this disorder but when you get to like the other schools, like engineering schools or the IT schools, some of the educators may not be that aware of this situation. Yeah so that's kind of my take on that. If I could add to that there was a study done at the University of Cambridge in the UK and they found that one percent of students were dyslexic, so the students in tertiary education they are there, right?

**ANGELA:** Absolutely - sorry to interrupt - if I could add to that, we did a study in the Balkans with eight Balkan countries in the EU study looking at dyslexia in higher education and we prepared learning materials for the teachers and the students and then we had to evaluate it and in Bosnia, Serbia and Croatia they said we can't have dyslexics in our universities, they wouldn't possibly get there and I said well, in that case we need to give the money back don't we. So they said okay we'll look and of course we found dyslexics in those universities we were able to support them and we were actually able at the end of that project to change the law and we introduced legislation for higher education in Bosnia Serbia and Croatia. So you know you really just need to look everywhere there are just like dyslexics from the highest right down to the lowest of the prisons

**WAH PHEOW:** I agree with Angela because for the students with special needs at the Polytechnic, we need to make special permission for them for examination

concessions and when I look at the list of students, I mean some of them have other special needs like muscular dystrophy etcetera but if you look at the list also there's every time you get it its majority is dyslexic students.

**ANGELA:** It's the same at home in the UK in the USA and I don't know whether it sounds as if it's the same here what about Japan?

**AKIRA UNO:** You know at our university, we couldn't find any students with developmental dyslexia, but in another university we find some, but they didn't recognize the existence of development dyslexia

**ANGELA:** We have to come and visit them!

**LEE SIANG:** To add to what I was saying earlier, we know that the Ministry of Education is beginning to emphasize support for children with specific learning differences in tertiary education. I know last year, there was a significant effort to conduct talks to the lecturers of the various polytechnics and to further their awareness of the different specific differences and a disability support office had not been set up in ITE's and polytechnics as you mentioned, we are beginning to put in the support. However, as Geetha pointed out so eloquently this morning, there's still a lot more that we have to do.

**GEETHA:** Well from higher education or further education, let's go straight into the workforce. So learning doesn't stop in school we know that and learning is integral to employees upgrading themselves. It's not just about getting the job what about continuing to improve in the job so what can organizations do to better support learners with needs, Angela?

**ANGELA:** Well, first of all they need an awareness that it isn't just reading, so you can't assume that if a person could read then they won't have any dyslexia type problems. I worked with a dyslexic signalman, and he'd been working on a handheld signal system, absolutely fine, and then they put him on a computerized signal where he had to deal with six-figure numbers very small and he also had to do initials 'f' forward 'r' reverse and 'n' normal and he would freeze this whole system because he would panic. It was just after the Kings Cross Disaster in the UK where two massive trains crashed together and he would just completely panic. The company were trying to get rid of him because they felt that he was a liability and I was able to diagnose him as dyslexic and actually identify that what he had problems with was something that was a problem for all of the staff there, because six-figure numbers are very confusing it's very easy to make mistakes. The same sort of problem with a copy and a proofreader, dyslexic proofreader would you believe that as a career choice, my goodness me! He was a graphic designer originally

and then as the demands of his work changed they put him on to being a proofreader. I put him on a training system where he proofread really, really fast but he could either be really, really fast or really, really accurate - he couldn't do both at the same time. He was actually moved on to a different system where he was training other people and they changed the system within that environment so again instead of having six-figure numbers they used colour coordination charts, so you have red I'll have purple and it was much easier for everyone involved not just for the dyslexic people. So there is work to be done! Do you have discrimination for work as well as for school in Japan because our discrimination act is for work as well as for education, for the workplace so does your act cover that?

**AKIRA UNO:** In Japan, so to compare with Singapore and the UK, our history of disability didn't represent this - the investigation is short. 18 or 16 years ago, we developed our dyslexic research association, so I know only about 15 adults with developmental dyslexia, so they are working now and they know, but then only explaining their own disability to collaborators - it's secret.

**ANGELA:** And that's something we have to foster - that sense of dyslexic identity, which I think is really crucial so that instead of being a 'potato' as June described in her talk, and going no, no don't look at me, you're saying I'm an egg. I couldn't be up there but I could explain what my strengths are but also a coffee bean to meld in with your surroundings to get the best result for everyone. And that awareness of what you can do if you're dyslexic and what you find difficult is really important because as part of a team you could be the crucial element. My colleague, Rod Nicolson has produced a book on positive dyslexia and this talks about the particular strength the signature strengths of dyslexia and they are things like social skills, the communication skills the ability to see the big picture the teamwork and the resilience. The determination, if you like, to persist, because of course to be successful in dyslexia you have to have that determination to persist and to succeed. So that is something that we need to be championing - blazing from the rooftops.

**WAH PHEOW:** It's really important - that we began to properly raise awareness, that is I think there is still very much, even though that shouldn't be the case, a stigma attached to dyslexia. Speaking from my personal experience, I have had students who, when they came into the poly, we knew that, based on their history, they have a problem with reading and all that. A lot of them actually wanted to keep their secret, did not want people to know and such, and they have a right that they refuse. I think if you have dyslexia, you can apply for special exemption like the exam time but because they are so worried about how other people, and lecturers, may view them, they refuse. Even after much prodding from us on the right to apply to the register for extension of examination time. There's a lot of cases like this I know and we are talking about a school where you are supposed to be more buffered, more sheltered, you can imagine where the workplace can even be worse

**GEETHA:** Siang, did you have something to say?

**LEE SIANG:** Yes. I think this mirrors the work of DAS, think dyslexia is very accepted now I think in primary schools and secondary schools but I think the movement has not reached into post-secondary, the institutes of higher learning, and certainly then into the workplace so, this movement has not reached these areas sufficiently yet having said that I think in the past year we have seen a change. Last year, we had 17 adults approach the DAS for assessments for identification. This is the first time we had such a large number of adults approaching us and from tertiary students to adults well into their fifties and I think there is a purpose of all this increasing awareness and an increasing wish to understand why they were facing these issues in secondary education and for the tertiary students, many of them were asking for recommendations for access arrangements in the university's. So this is also happening now, we're beginning to see developments here but of course, it's still at the beginning

**ANGELA:** I think the exciting thing really is that you don't have to start from first principles, lots of work already been done that works, things like the Embrace Dyslexia meeting you had here was absolutely fantastic and you're able to take those things and run with them and this will soon have an impact, I think, across Singapore and beyond.

**GEETHA:** So we seem to have two contrasting views almost about being known as dyslexic, on the one hand there is this sense of concern about being called dyslexic and on the other hand there are people who are seeking to better understand why they have these difficulties and dyslexia, maybe the answer. So in terms of self-esteem, we know that emotional aspects of learning must work in tandem with the academic learning process and an NCSS and DAS joint study found that the self-esteem of learners with learning needs, that's almost unexpectedly, was greater when they started receiving intervention. So what do you think accounts for that, why do we wait? You sometimes feel that after having received intervention and having support they are generally more positive about themselves

**ANGELA:** I think it has to be a tribute to the work that's being done here, that because really what you have to do as a teacher is not just to teach a child but to give them a feeling that they could beat that, it was possible they can achieve and it's that change of mindset which will make all the difference. If you think there's no possibility you could ever be successful, then you will never be successful. It really is very much in the mind- self attribution, "this is a difficult task I found difficult that's okay," or "I'm useless, I can't do anything," that's not good, and so many children will take that self-attribution as being all their fault, because they aren't doing it properly, and so that is what we need to be working on and clearly what your working on so well here.

**LEE SIANG:** Well, if I could reiterate the message of our embrace dyslexia campaign, which we launched back in 2014 and that is instead of focusing on the weaknesses of our dyslexic people, and we know they have weaknesses, let's emphasize their strengths, let's try to develop their strengths and recognize that they can excel, and so that's the message of embrace dyslexia, positive dyslexia, let's focus on their strengths.

**PUVANESWARI (EMCEE):** so on that note I hate to interrupt this, but it's 4.50

**ANGELA:** thank you very much well, it's gone fast!

**GEETHA:** Yes, it has. I think we have time for two more questions perhaps we can return to the question on risk research that was asked by an audience member. Will the fact that dyslexics differ in their level of severity influence findings based on research for dyslexic individuals is a question that was posed.

**ANGELA:** That's a really interesting question and it's got to make a difference of course and it depends again how you define dyslexia. If you look for a group with phonological difficulties, test them on the phonological problems they will definitely show phonological problems, but if you look for a group without phonological problems then you'll only find subtle evidence of difficulties so the task has to be right for the group that you're working with and for the age group that you're working with. What we did in order to get round this is we chose only people who had a diagnosis of dyslexia that were still underachieving and not in terms of their ability but in terms of their age. We had children who were still performing like younger children. When you look at the subject panels very often in research it's very mixed, the group that they are working with.

**WAH PHEOW:** I'd like to add that in addition to that good work looked at aspects other than our abilities, there are other important things you speak about, language itself, the environment, social culture and finally the language environment. If you grew up in here, because in Singapore we know that is a very different environment with language, linguistic background of families, multilingual multicultural and most of us are bilingual and I think that counts like a sort of noise that influences the research, source of differences in therapies, all variables like this, does make it difficult.

**ANGELA:** And we do need to have, of course, more studies that aren't just based on English children. We need to know what children are doing across the world. That's one of the things I found particularly interesting in today's sessions

**AKIRA UNO:** You're discussing severity, yes I agree with your opinion so severity will

be affected by the resources of our intervention, in addition to severity, so comorbidity, for example a ADHD and SLI will be strong, are also affected

**GEETHA:** Thank you very much for those responses. One last question, we spoke about inclusion earlier and international studies often speak for the need for more training and better policies that govern institutions in order for inclusion to be more effective. Research in identity, however has gained in a lot of popularity in the recent years, so how critical is the development of a dyslexic's positive identity and healthy views of oneself? How critical is that to enable inclusive practice?

**ANGELA:** It's absolutely vital. You have to have a good understanding yourself in order to feel you compete particularly if you're in an inclusive situation where you're likely to be failing all the time because if you're in a classroom of your peers than the other children will no doubt do better than you in lots of written and read subjects. So it is important that we have inclusion, it's important to let everyone be taught but it does need to be positive action taken to make sure that people aren't damaged by this and that need will be fulfilled in a specialist School. So despite the fact that we have an inclusive system in the UK there are still some children that will benefit from being educated in a group of other children with similar difficulties, so that they can develop that sense of identity within that group.

**LEE SIANG:** And I guess when we discuss inclusion in education, we all should also highlight the different types of inclusion, because really there is partial inclusion and full inclusion and when we talk about a partial inclusion normally, we refer to physical integration whereas for fully inclusive schools you know they are really teaching at very, very, different levels and what of partial inclusion and full inclusion that's one of the positives and the negatives for the students. I think it's still a debate that's ongoing right we now, we have seen schools which have been very successful in integrating and including students. We've seen special schools in various countries which have also been very successful with the students, I mean recently I was in Hawaii visiting the Asset school and we met three really charming students who were 18 and they were so confident of themselves, they're really advocates for themselves and they are in a special school. So you know I think we really need to explore how we should be approaching this, whether it should be inclusion, partial inclusion or having special schools that cater specifically to children perhaps with more severe forms of dyslexia.

**GEETHA:** Thank you Siang. If we were not able to get to your question and I know I have a few here that we weren't able to get to, what we will do is we will upload answers on to the DAS website as well as the Unite SpLD website, which you will be familiar with, so that you know you will get your questions answered eventually. So through this discussion and through this whole day, I hope we've sparked curiosity in

you to find out more and to continue to empower yourselves. Conferences such as these have proved to be an excellent way to network, elaborate, gain inspiration and expand one's scope, expertise and reliability taking the words off Siang's speech this morning and we need this as we continue to work on our jobs and which is frankly quite important, too important to ignore. So I would like to invite you at this point to consider submitting papers for the next Unite SpLD conference that would be in 2017. Information on this will be available on DAS website by the start of next year so do submit so that this body of knowledge, this local and overseas knowledge on dyslexia and specific learning differences continues to reach us here in Singapore and to our friends who have come from overseas. Also, all presentation slides from this conference will be uploaded onto the website as well.

Now you're not off the hook panel because I have one last question, based on the superhero and dyslexia video we all watched today, I must ask each and every one of you if you were a dyslexic superhero what would your superpower be, who's brave enough to take this first?

**LEE SIANG:** I'll start. I would like to be 'think out of the box' man because we know so many of our dyslexics do think out of the box and I think that would be a great personality to be

**ANGELA:** I'd like to be 'communication queen' so that I can express myself to other people even if I can't get it down on paper, I can tell people that I am clever, I am smart, I could do anything if I put my mind to it, I just have a bit of difficulty with doing it and so that would be my message that I would want to get across

**WAH PHEOW:** Excellent, well I'd like to be 'movie man', maybe, so my special power is that if I have a message of text I need to let lose my power to let me play it in a movie

**GEETHA:** Wow our children will love you!

**AKIRA UNO:** I would like to be 'president' to make a good frame work for our children

**GEETHA:** Excellent and if anyone's interested, I would like to be "photographic girl", to have 'photographic memory' - I want to remember everything the first time I see it! So with that, we conclude the panel discussion this evening. My sincere thanks to the members of the panel and to end let me borrow the words of Robert Frost, "I am not a teacher but an awakener." I hope you leave this conference with the belief that you are an awakener too. Until next year, on behalf of DAS and the United SpLD 2017 organising committee, I wish you a very good evening - thank you.



*UnITE SpLD 2017 Conference Panel from left to right, Geetha Shantha Ram, Angela Fawcett, Dr Tan Wah Pheow, Akira Uno and Lee Siang, the panel in action below*



## ABOUT THE AUTHORS



### **EMERITUS PROFESSOR ANGELA FAWCETT**

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*Emeritus Professor Angela Fawcett is a leading international researcher into dyslexia and other developmental disabilities, encompassing a range of theoretical and applied contributions to this field. Angela is also an Honorary Professor at the University of Sheffield. Her approach is broad and interdisciplinary ranging from child and cognitive development to educational screening and intervention, as well as developmental cognitive neuroscience. She is the Vice President of the British Dyslexia Association and also the Former Chair and Director of the Centre for Child Research at the Swansea University, UK.*

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*Geetha has a Masters in English (NUS) and a Post Graduate Certificate in Learning and Teaching in Higher Education (Distinction) (LMU) while currently pursuing her doctorate. With over 12 years of experience supporting children and adults in the area of dyslexia, Geetha constantly aspires to provide a quality service to dyslexics that searches for and realises their true potential and provides them with a view to appreciate their own unique gifts.*

# Everyday Memory in Adults with Dyslexia

**James H. Smith-Spark**

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People do not “grow out” of dyslexia when they become an adult and its effects continue to be experienced (e.g., McLoughlin, Fitzgibbon & Young, 1994). As well as affecting skills related to those used in reading and writing, dyslexia also leads to broader problems in other areas of cognition (e.g., Nicolson & Fawcett, 1990, 2008). To ensure the continuing support of people with dyslexia into adulthood, we need to understand whether difficulties usually reported under laboratory conditions actually have an impact on the everyday lives of adults with dyslexia.

Since starting my PhD at the University of Sheffield over 20 years ago under the supervision of Prof John Fisk, Prof Rod Nicolson, and Prof Angela Fawcett, I have studied the cognition of adults with dyslexia in both the laboratory and in everyday situations. My research has taken in various facets of cognition in adults with dyslexia, namely short-term and working memory (Smith-Spark, Fisk, Fawcett & Nicolson, 2003; Smith-Spark & Fisk, 2007), cognitive failures (Smith-Spark, Fawcett, Nicolson & Fisk, 2004), long-term memory (Smith-Spark & Moore, 2009), prospective memory (Smith-Spark, Zięcik & Sterling, 2016a, b), and executive functioning (Smith-Spark, Henry et al., 2016).

Difficulties with cognition can have tremendous implications for quality of life and opportunity for adults with dyslexia. If unrecognised or unsupported, these problems can have serious implications for life chances and the ability of the individual with dyslexia to achieve his or her full potential in higher education and/or employment.

To ensure that the needs of adults with dyslexia are appropriately met (as required by legislation in some

“Difficulties with cognition can have tremendous implications for quality of life and opportunity for adults with dyslexia.”

countries, e.g., the Equality Act, 2010, in the United Kingdom), problems need to be highlighted which may be outside the popular conception of what dyslexia entails. In this article, I will focus on how dyslexia can affect adults' cognition when carrying out everyday tasks unrelated to reading and writing. In the following sections, I will consider different aspects of cognition in everyday life and indicate how adults with dyslexia experience difficulties with them.

## **COGNITIVE FAILURES**

As part of my PhD, I became interested in the notion of everyday cognition and, in particular, the types of error which accompany the performance of day-to-day tasks. The nature of these errors can give us some insight into the cognitive processes underlying them, even if the results may not be as scientifically rigorous as those generated under strictly controlled laboratory conditions. The kinds of error that I am talking about are mistakes such as unwrapping a foodstuff and putting it in the rubbish bin whilst holding onto the wrapper or getting into the shower still wearing one's socks. The idea here is that there is a significant deviation from a usual sequence of actions that usually leaves us wondering how on earth we managed to mess up and feeling a little silly! Whilst the examples I have given here are light-hearted and have no serious consequences, cognitive failures can sometimes have serious repercussions for those caught up in them (e.g., deviations from railway or airline safety procedures).

Slips of action (Reason, 1979) is the term used to describe the kinds of mistake we sometimes find ourselves making on habitual tasks, ones that we are usually able to carry out effectively and without incident. These errors often occur when we are tired or distracted. Work by Torgeson (1977) and Levin (1990) suggested that children with dyslexia are worse at organising and planning. It seemed to me that these areas of weakness might still play out in the everyday cognition of adults with dyslexia. Therefore, I decided to investigate how frequent slips of action were in adults with dyslexia compared with adults without dyslexia.

I asked my participants to keep a two-week diary, writing down any mistakes that they made when carrying out tasks and routines. Fortunately for me, my participants interpreted the instructions more broadly than I had imagined and very diligently wrote down all manner of slips that they made over the two-week period. The adults with and without dyslexia did not differ in how often they committed slips of action as defined by Reason (1979). However, the group with dyslexia reported more failures of memory, with these being approximately equally split between memory for things past (retrospective or episodic memory; such as telling a friend the same story twice without noticing the repetition or forgetting that a relative was out of the country when trying to contact them on their home telephone number) and for things

future (prospective memory; such as forgetting to return library books, buy groceries or post letters despite the intention to do so). I will return to these interesting findings later in this article when considering different aspects of memory.

As well as the diary study, I also gathered self-report questionnaire data to compare perceptions of how frequently everyday errors occurred over a more extended period of time. The results of this study are reported in Smith-Spark et al. (2004). I asked my participants to complete the Cognitive Failures Questionnaire (Broadbent, Cooper, FitzGerald & Parkes, 1982). This questionnaire asks respondents to estimate how frequently a range of different types of error had occurred over the previous six months. The adults with dyslexia felt that they experienced such mistakes more frequently. In particular, they reported errors arising from distractibility, over-focusing on a task to the detriment of noticing things around them, and word-finding. I also asked my participants to get a housemate or close family member to rate how often they felt mistakes were made by the participant. These close associates also rated the adults with dyslexia as making cognitive errors more frequently, thereby corroborating the self-reports. Obtaining similar ratings from others means that the self-reports cannot be explained away by negative self-perceptions arising from lowered self-esteem in childhood (e.g., McNulty, 2003; Riddick, Sterling, Farmer & Morgan, 1999). More recently, Leather, Hogh, Seiss, and Everatt (2011) have also used the Cognitive Failures Questionnaire. They too found cognitive failures being more frequently reported by adults with dyslexia.

## EXECUTIVE FUNCTIONING

In contrast to cognitive failures which are errors in our well-practised or habitual actions, responding successfully to novel situations or tasks calls upon another, more complex form of cognition (c.f., Norman & Shallice, 1986). Executive functioning is an umbrella term used to describe this range of complex, higher-order cognitive abilities which allow strategic behaviour. Executive functions include skills such as preventing a habitual response in favour of one that is new or less used but more relevant in the current situation, problem solving, planning, adapting our behaviour in response either to changes in the environment or what is required of us, moving flexibly between different cognitive processes or operations, staying on task in the face of distraction, and updating memory in the light of newly available information (e.g., Diamond, 2013; Fisk & Sharp, 2004; Miyake & Friedman, 2012).

Smith-Spark, Henry et al. (2016) administered a self-

“...they reported errors arising from distractibility, over-focusing on a task to the detriment of noticing things around them, and word-finding...”

report questionnaire about executive problems in day-to-day life to adults with and without dyslexia. This questionnaire is called the Behavior Rating Inventory of Executive Function – Adult Version (Roth, Isquith & Gioia, 2005). Overall, the adults with dyslexia reported more everyday problems with executive functioning in the past month. The differences were focused on three of the nine areas (or scales) probed by the questionnaire. These scales were Working Memory, Plan/Organize, and Task Monitor. The Working Memory scale, as the name suggests, assesses how well individuals feel that they are able to maintain information temporarily in memory to allow responses to be made. Short-term and working memory deficits in dyslexia have been extensively explored in the laboratory (e.g., Jeffries & Everatt, 2004; Jorm, 1983; Menghini, Finzi, Carlesimo & Vicari, 2011; Palmer, 2000; Swanson & Sachse-Lee, 2001), including adults (e.g., Smith-Spark et al., 2003; Smith-Spark, Henry et al., 2016; Smith-Spark & Fisk, 2007). It would seem that these problems play out in everyday life across a range of situations away from the fairly artificial tasks presented in laboratory settings. Questions making up the Plan/Organize scale reflected how well the individual oversees current and future task demands, anticipating future events, setting goals, and organize and understand the overall points of spoken or written presentations. The problems self-reported by the adults with dyslexia in this area sit well with the arguments of Torgeson (1977) and Levin (1990) regarding organisational and planning difficulties in dyslexia. Task Monitor reflects questions relating to how well individuals can keep track of their own performance and keep an eye on how their behaviour affects people around them.

## **LONG-TERM MEMORY**

As well as affecting adult's memory when maintenance, processing, and recall of information is short-term and temporary (e.g., Smith-Spark et al., 2003; Smith-Spark & Fisk, 2007), dyslexia may also affect the ability to lay down memories to be accessed minutes, days, weeks, or even years later. Since the literature is very small, I will cover evidence from children as an indicator of likely differences in adulthood. An important distinction to make with long-term memory is between the recall of facts about the world (known as declarative memory) and one's subjective, personally experienced memories of past events (referred to as episodic or autobiographical memory). To illustrate the point, I am currently exercising my declarative memory in recalling the various concepts and studies that I want to write about. However, I also find myself to an extent mentally reliving specific events in my life around the time that I was running a particular experiment. Indeed, I am aware of the demands on my executive functions in remaining "on task" with writing this article in the face of these distractions! These conflicting calls on my cognitive resources give an example of the way in which these different aspects of cognition are very much intertwined but tend to be separated so that research can answer manageable questions.

Returning to the point of this section, a few studies have found difficulties in long-term memory between individuals with dyslexia and those without. McNamara and Wong (2003) asked children to report the procedure involved in borrowing a library book. They found poorer memory for the sequence of steps in their participants with dyslexia. Nelson and Warrington (1980) found that children with dyslexia were poorer at recognising that words presented to them were the same ones that they had been shown a little earlier. Menghini, Carlesimo, Marotta, Finzi, and Vicari (2010) found poorer recall of lists of verbal and visuospatial items when tested immediately after the lists had been presented. Huestegge, Rohrßen, van Emingen-Marbach, Pape-Neumann, and Heim (2014) found children with dyslexia had poorer memory for the details of abstract shapes presented 45-60 minutes earlier, although their overall accuracy was similar to children without dyslexia.

Long-term memory difficulties in dyslexia may not be limited to storing impersonal or factual information to be accessed at a later date. Instead, they may also affect the way in which distinct personally experienced episodes from an individual's past are recalled. There is currently only a very small literature in this area but difficulties with episodic memory have been reported. McNamara and Wong (2003) asked children to recall details of a dance that they had watched five weeks earlier, finding poorer recall of details in a group of children with learning disabilities, some of whom had dyslexia. At a recent conference, Jucla et al. (2016) gave a poster presentation showing that children with dyslexia recalled less autobiographical information, both spontaneously and when cued by a researcher. I am looking forward to reading more fully about this work when it is published.

Self-report questionnaire data from schoolchildren have also suggested that individuals with dyslexia experience more frequent problems in remembering the detail of distinct episodes over both the short- and longer-term (Khan, 2014). Smith-Spark et al. (2016) used the same questionnaire but administered it to adults. Adults with dyslexia felt that they experienced more problems across the board. As well as testing retrospective memory, this questionnaire also assesses prospective memory (indeed, it is called the Prospective and Retrospective Memory Questionnaire; Smith, Della Sala, Logie & Maylor, 2000). I will return to these findings later.

My diary study (Smith-Spark, 2000) also picked up on a larger number of retrospective memory errors made by adults with dyslexia. These included mistakes such as forgetting previous actions (for example, where they had put down books or keys), problems with remembering details of events (either recent or more distant in the past), and forgetting names of people, films, and books. Smith-Spark and Moore (2009) argued for differences in the way that information is stored and/or retrieved in dyslexia, finding that adults with dyslexia responded differently to material that they had first learnt when young and that which they had encountered for the first

time more recently. As far as I am aware, these latter studies are the only evidence of weaker long-term memory abilities in adults with dyslexia.

## **PROSPECTIVE MEMORY**

Prospective memory is about “remembering to remember” (Mäntylä, 1994) and is a very important aspect of day-to-day life (e.g., McDaniel & Einstein, 2007). Where there is a delay (even of a few seconds) between forming an intention to do something and the opportunity arising to carry it out, prospective memory is called upon. Prospective memory allows people to complete all kinds of everyday tasks successfully, such as attending appointments, paying bills on time, meeting friends, buying items of grocery on the way home from work, returning telephone calls, remembering to send birthday cards, and taking regular medication. Before discussing my studies on prospective memory in adults in dyslexia, I will take some time to explain prospective memory in general, given that it is an emerging area of the cognitive psychological literature and may be unfamiliar to readers.

Prospective memory tasks can be either habitual (e.g., taking regular daily medication or paying one’s monthly credit card bill) or more novel or one-off in nature. Whatever the exact prospective memory task might be, there are two aspects to prospective remembering (e.g., Einstein & McDaniel, 1996). Firstly, there is a prospective or planning component concerned with ensuring that the intention is remembered at the appropriate point in the future. Secondly, a retrospective component is responsible for remembering exactly what needed to be done when the intention itself is remembered. We have all experienced times when we have experienced these two components not working successfully in concert. For example, we notice the prospective component working when we remember that we need to do something but cannot remember what that “something” actually was. Similarly, the retrospective memory component comes to the fore when we experience the sinking feeling of remembering the details of a task that we meant to perform after the opportunity actually to do it has passed!

The nature of a prospective memory task can also be classified as either event-based or time-based. An event-based prospective memory task is one where something in the surrounding environment reminds us of the intention to act; for example, seeing a post box serves as a reminder to post the letter in one’s bag. On the other hand, a time-based prospective memory task is one where an intention has to be acted upon at a specific point in time; for example, returning a telephone call in 30 minutes’ time.

Unlike event-based prospective memory, there are no obvious external cues to remind us to perform a time-based task. As a consequence, this type of prospective

memory involves more internally-driven strategies to remember to act out the intention at the appropriate point in the future. These strategies include remembering to check a clock regularly in the intervening period or mentally rehearsing the intention every so often in the interim. The need for more strategic behaviour means that executive functions are called upon more greatly when carrying out time-based prospective memory tasks than event-based ones (Martin, Kliegel & McDaniel, 2003; McDaniel & Einstein, 2000; although Huang, Loft & Humphreys, 2014, argue against this). Adults who have better executive functions have been found to be better at prospective memory (e.g., Bisiacchi, Schiff, Ciccola & Kliegel, 2009; Gonneaud et al., 2011).

Prospective memory has only recently come under the spotlight of dyslexia researchers. My diary study (Smith-Spark, 2000) identified prospective memory problems as being one type of difficulty that adults with dyslexia experienced with their everyday memory, but this was rather tangential to the focus of my PhD and, consequently, was mentioned very much in passing and not fully explored. I did, however, make a mental note to return to what seemed a fascinating area of research!

This return took some 10 years and an undergraduate psychology student, Adam Zięcik, expressing an interest in doing a PhD with me on adult cognition in dyslexia. Having kept abreast of the literature in the intervening period, I proposed the idea of studying prospective memory and he was very taken with it. Adam successfully completed his part-time PhD in 2015, co-supervised by Dr Chris Sterling. We are in the process of seeing the research published across several journals. It certainly proved to be a very interesting and fruitful subject for PhD work!

At present, there is only a small literature on prospective memory in dyslexia but it has highlighted difficulties in children (Khan, 2014) and adults (Smith-Spark, Zięcik & Sterling, 2016a, b). Certain aspects of prospective memory seem to be more affected than others. I will now describe this evidence. Currently, there is more literature on adults with dyslexia than there is on children with the condition, something of an oddity for dyslexia research! However, as I will argue later, its potential impact is greater on adults who have to rely on their own memory to get things done rather than being reminded about tasks as children often are.

We (Smith-Spark, Zięcik et al., 2016b) were the first to report prospective memory problems in dyslexia under laboratory conditions. We explored time-

“... prospective memory problems as being one type of difficulty that adults with dyslexia experienced with their everyday memory...”

based prospective memory using both a computerised task and a semi-naturalistic task. Since there are usually intervening activities in real-life between forming an intention and carrying it out, the computerised task involved an ongoing task to keep the participants busy in the meantime. Each trial of the ongoing task presented the participants with the faces of six famous people. The participants had to decide whether more of the celebrities so displayed were living or dead by making a button press. This, then, was the ongoing task from which they needed to break out to perform the prospective memory task every three minutes. The prospective memory task required them to remember to press a particular key on a keyboard to make a prospective memory response. To help the participants respond at the correct time, they were allowed to check a clock positioned behind them as often as they liked during the task, with these clock checks being recorded. We found that the adults with dyslexia were less accurate at the prospective memory task, remembering to press the key on the keyboard fewer times the adults without dyslexia. They also made fewer checks of the clock whilst doing the ongoing task. Alongside the computerised tasks, we also presented a semi-naturalistic time-based task. This required the participants to remind the experimenter to save a file 40 minutes later. Again, the adults with dyslexia were less likely to remember to remind the experimenter than the adults without dyslexia.

Are the prospective memory difficulties found on laboratory-based tasks reflected in everyday life? The semi-naturalistic task that we presented (Smith-Spark, Zięcik et al., 2016b) provided something of a bridge between cognition in the laboratory and the outside world. It certainly suggested that prospective memory might be worse in the day-to-day lives of adults with dyslexia. However, this was one specific task. The question remained as to whether greater prospective memory difficulties were present more generally, over a large number of very diverse tasks over a timespan of weeks or months. Because of this extended timespan, we needed to call upon the self-perceptions of adults with and without dyslexia. Self-report measures on typical, everyday performance allow us to understand self-perceptions of usual levels of performance rather than optimal performance on an individual task in the laboratory where the pressure may be felt to be on to do as well as possible (c.f., Stanovich, 2009).

Self-report questionnaire evidence indicates that prospective memory difficulties do indeed seem to be more frequent over longer time-frames and across a range of different types of task, in both children (Khan, 2014) and adults (Smith-Spark, Zięcik et al., 2016a). We found that the self-perceptions of the adults with dyslexia were supported by close associates of the participants who were asked to rate the memory abilities of the respondents using exactly the same set of questions. As with the Cognitive Failures Questionnaire-for-others used by Smith-Spark et al. (2004), collecting proxy-ratings is important in ensuring that any problems reported by

people with dyslexia are simply not related to a negative self-image (e.g., McNulty, 2003; Riddick, Sterling, Farmer & Morgan, 1999). If similar views are obtained from both participants and those in close contact with them, it suggests that these views are likely to reflect the real state of affairs. The ratings from close associates of the participants, therefore, corroborated the self-reports of the adults with dyslexia in indicating that they experienced more frequent difficulties with prospective memory.

Putting the laboratory and everyday results together, we can see that prospective memory seems to be poorer in dyslexia. But why do people with dyslexia experience these problems more than individuals without dyslexia? Three different explanations suggest themselves to me.

Firstly, problems in the encoding or access of phonological information in long-term memory may be responsible for the increased prospective memory lapses in dyslexia. These difficulties might be due to a failure to store the intention in memory efficiently in the first place. Alternatively, they may arise from failing to access the information about what it is that is meant to be done at the point at which it is required. This explanation suggests that problems lie in the retrospective component of prospective memory discussed previously. The role of the retrospective component in prospective memory needs to be explored in greater depth in future research.

A second explanation lies in the time perception difficulties experienced by people with dyslexia (e.g., Bruno & Maguire, 1993; Klein, 2002; Nicolson, Fawcett & Dean, 1995). This could explain why problems show themselves more on time-based tasks rather than event-based ones. There is only a small amount of research on time perception as a predictor of prospective memory performance (e.g., Mackinlay, Kliegel & Mäntylä, 2009; McFarland & Glisky, 2009).

Furthermore, none of this work has used durations which map on to the extended periods of time that usually accompany prospective memory (being instead concerned with durations in the range of milliseconds rather than minutes, hours or days). From the few studies in this area, it would seem that time perception is more strongly related to clock-checking behaviour when performing the task rather than the accuracy of prospective memory itself (Labelle, Graf, Grondin & Gagné-Roy, 2009; Mioni & Stablum, 2014). As mentioned previously, Smith-Spark, Zięcik et al. (2016b) found that adults with dyslexia made fewer clock checks on their

"... problems in the encoding or access of phonological information in long-term memory may be responsible for the increased prospective memory lapses in dyslexia."

computerised time-based prospective memory task, so there may well be a link here.

The third line of explanation lies in the prospective component of prospective memory. As I have already mentioned, stronger executive functions are associated with better prospective memory (e.g., Bisiacchi et al., 2009; Gonneaud et al., 2011). We know that executive functions tend to be worse in adults with dyslexia (e.g., Brosnan et al., 2002; Smith-Spark, Henry et al., 2016), so it is easy to see how, in general, these executive functioning problems might have a negative impact on prospective memory. More particularly, executive functions are needed to break out from ongoing activity to perform a prospective memory task (e.g., Cockburn, 1995; Van den Berg, Aarts, Midden, & Verplanken, 2004). Weaker executive functions in dyslexia should, therefore, mean that fewer successful prospective memory responses are made in dyslexia. However, the ongoing activity (from which they are less likely to break out!) should be performed at a roughly equivalent level to that of people without dyslexia. This is the pattern which is emerging from the research I have described in this article. This explanation would also seem to tally with the results of the Cognitive Failures Questionnaire paper (Smith-Spark et al., 2004) on which the participants with dyslexia reported being over-focused and not noticing or responding to other events around them. These difficulties in moving from one focus of attention to another may result in poorer prospective memory.

This third explanation seems to me to be the best candidate to explain prospective memory problems in dyslexia. Of course, it could also be a combination of all three explanations that lead to more frequent prospective memory problems! Further research is needed to determine which of these explanations is correct.

## CONCLUSIONS

This article has highlighted a number of different ways in which the day-to-day cognition of adults can be affected by dyslexia. The difficulties that I have described in this chapter cannot be explained by differences in age or IQ between my participant groups as, in all cases, these factors were matched whilst reading and spelling measures indicated clear differences between the two groups. The research which I have reviewed serves as a useful reminder that individuals do not leave their dyslexia behind when reaching adulthood (McLoughlin et al., 1994). Instead, they will continue to experience dyslexia-related difficulties which are likely to have a negative impact

“Unfortunately, despite knowing an adult has dyslexia, people are likely to be much less forgiving of their errors than they would be of a child with dyslexia!”

when going about their daily tasks, even when those tasks do not require reading and writing skills.

It is important to document areas of difficulty to ensure that adults with dyslexia continue to be supported into adulthood to give them the best possible life chances. In the usual way of things, an individual will spend more of their life in adulthood than in childhood, so whilst the effects of dyslexia may be more greatly felt in childhood, they have to be lived with for longer in adulthood. Moreover, the demands made on memory in adulthood are likely to be very different from those made on the memory of a child (c.f., McLoughlin et al., 1994), as are the consequences of it going wrong.

Attention has, quite rightly, been focused on dyslexia and childhood, with research helping to inform early diagnosis and intervention. Identifying problems early in life and providing support to improve them is very much the best approach, especially given the greater flexibility of the younger brain. However, one of the aims of such interventions should be to prepare children with dyslexia for the broader cognitive demands of adulthood, identifying methods of helping them that can be carried through life across a range of experiences. In childhood, parents, carers, and teachers act as a kind of “external memory” (c.f., Clark & Chalmers, 1998; Spurrett & Cowley, 2010) in support of the child’s everyday cognition, ensuring that particular tasks are performed or reminding the child to carry them out. Adults are not so fortunate in this regard. The onus is very placed on them to remember to carry out necessary tasks effectively at the time that they need to be done. Unfortunately, despite knowing an adult has dyslexia, people are likely to be much less forgiving of their errors than they would be of a child with dyslexia!

All of this means that it is important to study the memory of adults in its own right (c.f., McLoughlin et al., 1994), to identify where problems lie and, in the longer-term, devise ways to overcome them. The problems of adults with dyslexia are most definitely not confined to literacy and laboratory-based cognitive tasks. Instead, they have a broader impact on everyday life and this needs to be accounted for when providing support. As the present article has shown, the everyday perceptions and experiences of adults with dyslexia are useful in highlighting where these concerns lie.

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# Identifying Specific Learning Differences in Multilingual Learners

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## KEY WORDS

**Linguistic profile:** the particular combination of languages that an individual uses, has learnt or has been exposed to informally.

**Cognitive profile:** the particular configuration of an individual's cognitive functioning, including aspects such as memory, speed and accuracy of processing, spatial awareness, sequencing, etc.

When we teach multilingual (and multicultural) classes we may start to notice how the individual linguistic profiles (and cultural backgrounds) of the students affect the development of their cognitive profiles. In my experience, as an English language teacher, this can particularly affect different aspects of second / additional language development. Some of my students will find the pronunciation of English relatively straightforward, while the writing system seems impenetrable to them; others may find the English tense system most problematic while taking the quirks of English spelling in their stride. Some of this may be due to their prior experiences of how language works, and the way(s) they have been taught languages before.

Even taking cultural and linguistic differences into account there will always be a few students in each class who seem to be experiencing additional difficulties in learning, and these are the students about whom we as teachers have the most concern. In some cases we may even begin to suspect that the student has a specific learning difference (SpLD), such as dyslexia.

A formal identification may be difficult to obtain, as SpLDs can be masked by the

complexities of the language learning process, and indeed, it may not be desirable to draw attention to the learner or broach the subject with the parents, as this may cause distress or tension within the family. However, in order to find the best way to reach these learners and enable them to access the full curriculum, it is useful to build a picture of their cognitive profiles, to see where their strengths are and which areas they may need support to develop further. Unfortunately, assessment tests do not exist in every language, and it may be misleading to assess a student in a language which is not his/her strongest.

Since dyslexia is not just about literacy development, and often co-occurs with other SpLDs such as AD(H)D and dyspraxia, there are non-linguistic elements of the cognitive profile which may be more easily noticed in multilingual learners. To assist in this, *'Cognitive Assessments for Multilingual Learners - young learners' version* (CAML-y/) has been designed for use with multilingual learners aged 7 - 15 in the UK, from any language background, but could be used in many other multilingual contexts to separate the cognitive functioning from the issues of language learning. Here I will focus on the first - and most important - stage of assessment, which is gathering detailed information about the learner's family background, educational opportunities and general health. Then I will briefly outline some strategies for evaluating other aspects of a learner's cognitive profile.

*Throughout this article, some different aspects of assessment are illustrated using the case study of student C. This is a 10-year-old boy from a Thai-speaking family who came to the UK at the age of 2 and has thus had all of his education in English. However, his family continues to speak Thai at home and he felt at the time of intervention that Thai was still his strongest spoken language. C was studying in his local state primary school, which was a well-respected and successful school.*

Any evaluation of a cognitive profile begins with **observation**, and this is something that happens naturally in the classroom. Teachers cannot help but notice which of their learners work quickly, and which need more time to finish even seemingly straightforward tasks. There are a number of things that teachers should be alert to, and it is important that they keep a record of what they have seen. The following are all aspects of behaviour that may indicate a cognitive difference of one sort or another:

**Interaction with peers:** does the student find it difficult to make and maintain friendships and working relationships with peers? Perhaps s/he can establish relationships but quickly falls out with friends.

**Emotional control:** does s/he often become very upset about relatively small things,

and seem unable to manage his/her temper? Or does s/he exhibit rapid mood swings?

**Environmental sensitivity:** does the student complain about the light / temperature / noise in the classroom? Does s/he seem to prefer a slightly dim working environment? Does s/he pull at his/her clothing as if it is annoying? Are there some textures that they find unpleasant (e.g. the desk, the chair, some types of paper or other equipment?)

**Balance / spatial awareness:** does s/he seem to bump into things quite a lot, or fall over in the playground more than other children the same age? Does s/he often get lost, even in surroundings that should be familiar?

**Speed of processing:** how quickly does the student get down to tasks, and how quickly are they finished? Does s/he work quickly but inaccurately, just to finish at the same time as his/her class mates?

**Accuracy of processing:** can s/he understand instructions? Does s/he produce sounds accurately and in the right order?

**Memory:** can the student remember instructions? Can s/he remember what has been done from one lesson to the next?

**Organisation:** does the student bring the right books to the right place at the right time? Can s/he tell a story in a way that others can understand the narrative?

**Sequencing:** can s/he organise ideas? Can s/he put words in the right order in sentences, and get the letters in the right order in words?

**Awareness of time:** does the student know what time of day it is (even roughly)? Can they estimate how much time has gone by?

*C's teachers were concerned because he was finding it hard to concentrate in class and they perceived him as being a day-dreamer and a bit detached from the rest of his peers. It took him much longer to complete tasks than his classmates, and he often seemed to 'change direction' in the middle of a piece of writing. His teachers were aware that he was using English as an additional language, but even so, they felt that he did not have the range of vocabulary that his multilingual classmates had developed at this stage. He did not enjoy playing in the playground and instead spent breaks in the library, where he sometimes helped by putting returned books in alphabetical order, ready for shelving. The librarian often needed to remind him when it was time to go back to class.*

After 3 - 4 weeks of systematic and recorded observation, both by classroom staff and adults who work with the student in different contexts (e.g. the school canteen, the after-school club) some patterns of behaviour may become clear and may start to indicate which situations the student finds most challenging, as well as the coping strategies that have already been developed. At this point it can be helpful to have a conversation with the learner, and even ask him/her to complete a brief questionnaire to find out more about how s/he perceives any difficulties that have been noted.

The CAML-yl suite includes some checklists and tips about what to look out for in order to detect characteristics of five common SpLDs (dyslexia, dyspraxia, AD(H)D, Asperger's Syndrome and dyscalculia), which may be helpful in guiding the conversation, according to what has been observed. This questionnaire / conversation should sensitively cover the student's family situation, including the linguistic profile of the family members, any previous educational experiences, and the student's general health; in particular, confirmation should be sought that eyesight and hearing have been checked and corrected if necessary. If not, this could be a useful first step, although there may also be other issues that need further investigation.

*A classroom assistant helped C to work through the questionnaire. This revealed that he was aware that he worked more slowly than other children and this was why he preferred to work on his own. He felt that he was good at following instructions, doing maths and working on the computer but found writing more difficult. He acknowledged that he found it difficult to tell the time, and that he was often in trouble at home for being late, as well as for eating and dressing untidily.*

*In an informal conversation with his parents, his class teacher was able to ascertain that he had had all the usual eyesight and hearing tests and that there were no other health concerns in the family.*

If further assessment is required, this can be done in a 1:1 session, such as a tutorial, but if this is not desirable or possible, the CAML-yl suite suggests some group tasks that help teachers to explore students' cognitive profiles in more depth. These include writing activities, and games that draw on memory and phonological awareness.

**Writing:** all the students in the class are asked to write in the language they feel most comfortable using for 5 minutes. For some this will be the language which is the medium of education but for others it may be a home language, if they have had the chance to develop literacy practices in that language. Suggested topics could

include the family, hobbies or something that they have been studying recently. The main thing is that they feel free to keep writing so that their fluency and confidence in writing can be observed. During this task it is often immediately noticeable which students start straight away, who needs more time to collect some ideas, and who spends some time checking over the text and self-correcting where necessary (or at least attempting to).

*C hesitated for about 45 seconds before he started writing about his favourite computer game. He wrote in English as he has not had the opportunity to learn to write in Thai, although he can recognise a few words in Thai (such as his name). His handwriting was rather immature but legible. He demonstrated some weakness in spatial awareness: difficulty in maintaining a horizontal line and in gauging when he needed to start a new line for a new word. His spelling was accurate, but the range of vocabulary used was somewhat limited for a boy of his age; there was no description or reference to feelings or senses, despite the fact that this had been the focus of literacy classes that term. He wrote only 6 short sentences (much less than most of his peers) and did not check his writing at any time.*

**Memory Games:** there are many games that can be played as a class, or in small groups with the teacher monitoring them. One popular game is 'My aunt went to market', where each student adds an item to an increasingly long shopping list. As the students are playing, the teacher should look out for students who are lost after 3 or 4 items, or who look uncomfortable as their turn approaches. If the student who is being observed does not have a good command of the classroom language, a similar game can be played, using the names of the class members in a list (perhaps 'My aunt had a party, and she invited...').

The CAML-yl suite includes a visual memory task in which students are asked to look at coloured shapes on the screen, and then to mark on a pre-printed sheet the shapes that they saw. No language is required to complete this task, so that it provides a good indication of how good a student's visual memory is. These activities can lead into a discussion of memory strategies, where the more successful students can share how they remembered what they saw / heard, and the whole class can benefit from thinking about memory strategies that could be tried out in the future.

*In order to reinforce some new vocabulary related to a geography project, the class teacher set up small groups to play a memory game matching key words to pictures. C was in a group with 3 other children, who were all quite engaged in the game, but it became apparent quite quickly that he was not really paying attention, and had to be reminded when it was his turn. He was*

*not able to make use of the cards that the other children turned over, and when he (accidentally) found a matching pair it had to be pointed out to him. It was not clear whether this was because of weak memory or lack of engagement with the game.*

**Phonological games:** ‘Spoonerisms’ is a popular game with secondary school learners, whereby everybody in the class is given a new name, by swapping the first sounds of their first and last names (so that Tom Brown becomes Bom Trown). By watching how easily students manage this phonological manipulation it is possible to gauge the degree of phonological awareness that each learner has.

Alternatively, the old favourite ‘I spy with my little eye...’ can be adapted to encourage learners to think about the sounds in a word, rather than the first letter of the written form. The traditional beginning can be completed with (for example): ‘... something including /f/’ so that the other students might guess ‘flag’, ‘photo’ or even ‘graph’, since the spelling of the sound, and the position, may vary in the chosen word.

*In small groups the children were playing ‘I spy...’ and C seemed to be taking part within his group. He made some sensible guesses based on the information given, but was not successful in being the first to guess the right word, as it took him a long time to think of possible answers.*

## CONCLUSIONS

All of these tasks, and others included in the CAML-yl materials, enable us to get to know our students better, and to build a picture of their cognitive profiles. Even in contexts where a formal assessment is not required or desired, suspicions that there is a SpLD which is hindering educational progress may be proved correct (or shown to be extremely likely) and appropriate interventions can then be implemented which target those aspects of cognitive function that need more support and development.

*In C’s case it was decided that his difficulties were not due to classic dyslexia, as his phonological processing seemed to be sound and his memory was not noticeably weaker than his classmates. However, it was clear that he was experiencing difficulties in the areas of speed of processing, attention and focus and spatial and temporal awareness, all of which might point to other SpLDs such as dyspraxia or ADD. His attention and processing issues meant that his vocabulary had not developed as quickly as others in his class, and his reticence in social interaction meant that he had fewer opportunities to develop his second language than other multilingual learners in the class. It*

*was agreed that he would be allowed additional time for written tasks, that a classroom assistant would work closely with him to make sure he stayed on task, and that he should be encouraged to join the school's chess club as a way of making more friends. His teacher also made sure that he got a list of any specific curriculum-related vocabulary, and his parents helped him to translate it in to Thai and to practice the English terms at home.*

Alternatively, a SpLD may be ruled out, and the areas of language development that need more attention, perhaps because of first language interference, may become the focus of any additional support provided. Either of these outcomes should result in students who are experiencing difficulties in learning accessing the individualised support they need to succeed. This can only be achieved by teachers getting to know their learners well, not just on a superficial level, but by conducting investigations that include their linguistic and cognitive profiles.

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## ON-SITE TEACHING

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The Dyslexia Association of Singapore (DAS) is a non-profit organisation in Singapore which aims to build a world class organisation dedicated to helping dyslexic people achieve. It provides services ranging from screening and assessments to diagnose for dyslexia and other specific learning differences, to educational therapy and tutoring services for students with dyslexia and other specific learning differences.

# Interventions for Dyslexia and Learning Differences In the Early Years and Primary Sectors: A Movement Approach

Mary Mountstephen MA (SEN)

## Key Themes

- ◆ Indicators of Dyslexia and Neuromotor Immaturity
- ◆ The use of early screening programmes to identify these indicators and possible underlying contributory factors
- ◆ The rationale for addressing identified weaknesses through a physical intervention
- ◆ The pedagogical dilemma: Address the causes or symptoms?
- ◆ Current Small Research Project

My interest is in researching how targeted physical programmes may contribute to improvements in classroom performance for children in the early years and primary age with learning differences. In addition to the more conventional indicators for dyslexia, The British Dyslexia Association has produced 'non-language' indicators that have some similarities to indicators linked to retained primitive reflexes and associated interventions, as identified by bodies such as The Institute for Neurophysiological Psychology in the U.K. and the National Health Service in the U.K.

Is it possible that some physical programmes can exert measurable impact on classroom performance and the extent to which students are able to improve functioning in specific areas and cope with more complex processes without the need for accommodations such as software and occupational therapy resources?

I argue that in the early stages of education, time spent on the physical aspects of development can reap later rewards in terms of improving the child's cognitive

motor development, thus minimizing reliance on external accommodations and increased autonomy and locus of control. 'I can choose if I use the tablet or write my report'. However, teachers and schools then face a pedagogical dilemma and external pressure that requires decisions about how to get the best results from students: a theme I will return to later.

At the end of this article I will outline a current small-scale research project I am carrying out in England, with 15 children aged 5-11.

The British Dyslexia Association promotes the early identification of dyslexia and has been campaigning for over 40 years to raise public awareness and influence decision making at national, regional and local levels. In 2007 the BDA Annual General Meeting agreed the policy on the Early Identification of Specific Learning Difficulties that identified the ways in which legislation should empower all schools to honor their statutory duties in respect of assessing a child's specific learning difficulties 'at the earliest opportunity in a child's school career'.

Some of the key non-language indicators that appear on the BDA website for pre-school and primary children are as follows:

- ◆ May have walked early but did not crawl: May have shuffled on bottom or wriggled on the tummy instead.
- ◆ Persistent weak self-help skills (tying laces for example)
- ◆ Weak ball skills
- ◆ Weak performance in hopping and skipping
- ◆ Difficulty with clapping rhythms
- ◆ Difficulties with sequencing
- ◆ Poor sense of direction
- ◆ Often perceived as not listening/ paying attention

### **What Is Neuromotor Delay?**

Goddard-Blythe (2014) refers to this in terms of the retention of immature patterns of movement control that can act as a barrier to optimal learning readiness. Primitive reflexes develop in utero and contribute to early development, but should be inhibited and replaced by postural reflexes before a child reaches school age. Movements of the head, for example, prompt reflexive movements of the limbs that are involuntary and can impede physical control of the body. This has implications for classroom performance as a student may struggle to achieve optimal performance:

As he lifts or turns his head, his posture shifts reflexively, and needs to be kept under control. His balance and visual focus are also compromised and interfere with cognitive functioning.

From my own perspective as a practitioner, primitive reflexes are often implicated in students who are under-performing academically, when their underlying cognitive profiles suggest that they should be achieving at a higher level. Educational psychologists refer students to me when the indicators from the BDA or those below suggest that a physical approach to their difficulties would be appropriate as a component of the intervention programme. This is an important point: There is not an intention to substitute a physical approach for the more conventional approaches, rather this is intended as a 'kick start' to promote a recalibration of the ways in which information is processed efficiently by addressing the retained primitive reflexes that impede optimal performance.

### **Some Indicators of Neuromotor Immaturity**

- ◆ Missing 'motor stage' of crawling
- ◆ Difficulty in learning to dress self and tie shoelaces above age of 6-7
- ◆ Difficulties catching a ball
- ◆ Difficulties with balance and the control of slow, precise gross motor skills with eyes open and closed
- ◆ Difficulties sitting still/ attention
- ◆ Academic underachievement

### **The use of early screening /assessment programmes to identify these indicators and some possible underlying contributory factors**

I am currently researching screening and assessment programmes that can help parents and teachers to make decisions about interventions for students whose progress is a cause for concern in relation to cognitive profiling or parental/ school perceptions of academic potential.

A screening programme can be characterized as the first stage in a filtering process to identify children with potential learning issues. I am suggesting that a screening process that includes 'non-language' aspects of children with dyslexia may identify those who would benefit from a developmental movement programme that addresses sensory immaturities.

"From my own perspective as a practitioner, primitive reflexes are often implicated in students who are under-performing academically, when their underlying cognitive profiles suggest that they should be achieving at a higher level."

I am also very fortunate to be working with Professor Fawcett on trialling the new version of the Dyslexia Early Screening Test that includes observations of balance and movement.

It is important that teachers have access to knowledge and resources that enable them to pinpoint potential difficulties in young children so that the child's confidence is not eroded and their strengths are recognized. Whereas we are not necessarily able to counteract the genetic influences of dyslexia, we should not discount those factors that do lie within our control and that can be addressed through the use of exercises to develop more mature vestibular and sensory functioning.

### **The rationale for addressing identified weaknesses through a physical intervention**

Reading and writing are executive functions that are dependent on developmentally mature sensory systems. Movement programmes apply 'spiralling' principles similar to classroom overlearning practices that are repetitive and build fluidity, awareness of tempo and rhythm.

They employ a spatiotemporal adaptation frame of reference that means: 'Spatiotemporal adaptation provides an interrelated set of constructs that concern sensorimotor components of human functioning and conceptual categories that explain the adaptation process of the development of performance skills. (Gilfoyle, 1990)

Physical interventions therefore can provide the means to build or rebuild the child's perception of spatial awareness and timing that are necessary to access learning more effectively.

The Move to Learn programme maps its exercises to the hierarchical development of primitive reflex integration. Each floor based exercise addresses specific reflexes and builds a foundation for more effective functioning. Children from a very early age can engage in activities such as rolling, creeping and crawling to provide the brain with additional opportunities to revisit these fundamental learning processes that may have been missed for a number of reasons.

Primitive reflexes are present in utero and early life and are inhibited through the birth process and early floor based activities. If there are difficulties such as 'C' section births and limited access to activities such as 'tummy time', the primitive reflexes can persist and interfere with academic and general functioning by affecting posture, pencil control, concentration and ball skills for example.

The daily Move to Learn programme works over a one year period, but can be integrated as part of an on-going whole school inclusive intervention. I have seen its use in Poland, Cyprus, U.K., Malaysia, Singapore and Japan and have implemented it in schools in the U.K. and internationally.

### **The pedagogical dilemma: Address the causes or symptoms?**

The dilemma is whether to provide short-term solutions using technology and occupational therapy approaches such as slanted boards, software and wobble cushions to address the symptoms or to use the screening and assessment protocols to determine if there are causes that can be remediated. Whereas it is accepted that teachers are under pressure to produce data that shows progress, I argue that, in the early years, due respect needs to be given to the significance of recognizing and addressing the non-language indicators of dyslexia that can also be measured through improvements of basic physical exercises that most children should be capable of taking part in.

However well meaning the short-term interventions may be, they can be perceived as removing the locus of control from the child and, by their nature, characterize the child as 'different/ defective'. The occupational therapy intervention may provide a possible solution to the symptoms, not the causes and addresses potential (identifiable) issues with sensory/ vestibular processing. However, as a consequence, the student with dyslexic difficulties has no internal control over his perceived weaknesses and is handed a 'crutch' to limp with forever. Is it not preferable to determine whether we can address these immaturities and provide the student with a means to judge his own improvement in skills that not only impact on classroom but also social and emotional skills?

### **Current Small Research Project**

Treehouse School in England is a small independent primary school that charges no fees and focuses on providing an education that focuses on 'nature, nurture and nourishment'. I am currently working with the school to determine whether the daily implementation of the Australian Move to Learn programme will assist in terms of improving aspects of development, matched against performance.

All children have been assessed:

- ◆ DEST-2 (Nicolson and Fawcett, 2004)
- ◆ Neuromotor Immaturity Tests
- ◆ Visual-Perceptual Test
- ◆ Draw A Person Test (adapted Goodenough Test)

The school is being supported in the delivery of the daily programme as I visit on at least a weekly basis. Parents have been invited to a presentation and will attend a practical session where they will have experience of the movements and opportunities to provide feedback on their perceptions.

At the end of each term (December 2016, March 2017, June 2017) pupils will be re-assessed and the results evaluated.

### **What would progress look like?**

Progress will be evaluated against the following criteria:

- ◆ DEST-2 scores: changes in performance
- ◆ Scores on Neuromotor Immaturity Tests: Tests will evaluate 4 main primitive reflexes as well as aspects of fine and gross motor skills against defined scoring system.
- ◆ Independent scoring of pre/post testing of drawing and visual-perceptual tests: A specialist teacher will score drawings with no knowledge of participants' details (age/sex). There will be no information about test participants and all will be scored against agreed standardized criteria.
- ◆ Teacher and parent questionnaires relating to perceptions of performance academically, physically and general performance

### **What Do I Want to Achieve?**

I would like to raise the awareness of the potential importance of the physical dimensions to academic performance and the extent to which emotion is also implicated in this process. We are in danger, as educators, of focusing too exclusively on the cognitive systems without recognizing the subtle but powerful influence that our bodies exert on every aspect of functioning. The issue of emotion in relation to physical interventions is too large to address in this article, and I will return to it later. Suffice it to say that many anecdotal and more formal publications point to the impact of programmes such as Move to Learn on the emotional and affective dimensions of pupil performance.

This is a fascinating area of research that holds out much potential promise to those working with or associated with students with a dyslexic profile. Whilst

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we must continue to provide rigorous phonological programmes, I argue that current research urges us not to underestimate the importance of 'lower level' non-cognitive functioning.

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