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Contact:

The Managing Editor
Dyslexia Association of Singapore
1 Jurong West Central 2
#05-01, Jurong Point
Singapore 648886

Email: editor@das.org.sg

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Dyslexia Association of Singapore

Contact:

1 Jurong West Central 2
#05-01, Jurong Point
Singapore 648886

deborah.hewes@das.org.sg

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Editorial Comment

Angela J. Fawcett, Editor-in-Chief

It is a very great pleasure to publish the 14th issue of the Asia Pacific Journal of Developmental Differences, now in its 7th year of publication, which is published by the Dyslexia Association of Singapore. The response to the previous issues continues to be extremely gratifying, and we intend to maintain these high standards in this issue and forthcoming issues. We have now amassed an even stronger editorial board, including the most recent member to join, Helen Boden, CEO of the British Dyslexia Association who has been invited for her outstanding reputation internationally. We are delighted to welcome Helen who will undoubtedly enrich our editorial board further. We are grateful for the support of the academics and professionals involved in resolving any issues arising, and ensuring our journal maintains high professional and ethical standards.

The six articles featured in the current issue represent material drawn from a wide cultural background across Asia and beyond, with contributions from Singapore, UK, Japan, Thailand and China. We are particularly grateful to those contributors who have managed to revise their contributions despite the constraints of the current lockdowns internationally in response to the pandemic. We look forward to publishing further contributions from India when libraries re-open, enabling further articles to be successfully revised. Topics for the current issue cover a broad range, from two articles on adult entrepreneurs with dyslexia, to screening diagnosis and intervention for school age dyslexics.

The first two articles here feature the heightened incidence of entrepreneurs in dyslexia, with contributions from editors of this journal. The first article from Deborah Hewes, Managing Editor of this journal, features a mixed measures study of the incidence, attributes and educational experience of 88 entrepreneurs in Singapore, recruited by means of an online survey providing a range of insightful comments. This article should be of particular interest for the unique perspective it delivers on this topical theme. It is accompanied by a qualitative research study on the educational experiences of dyslexic students who are completing their degrees and planning to become entrepreneurs. This article is contributed by a team of authors led by Dr Margaret Meehan in the UK, including Angela Fawcett, Editor-in-Chief of this journal. This rich source of material highlights how schools could facilitate entrepreneurial skills further. Taken together,

these two articles are a significant contribution to what has become a seminal field of study in dyslexia.

The next study from Japan, investigates one of the key findings in dyslexia, the issue of slow naming speed which has been highlighted in studies of rapid automatised naming. The authors, Takeshi Gotoh with Professor Akira Uno, recruit a group of dyslexic students, including a number who also show evidence of specific language impairment. Their study suggests that the major contribution to the speed deficit in spoken language retrieval comes from those with co-morbidity with Speech and Language Impairment (SLI), whereas those dyslexic children with stronger verbal language skills are comparable to matched non-dyslexic controls in a discrete naming task. This again is an interesting contribution and novel to research in the area.

The next study from Kong Yun Rui and colleagues from the Dyslexia Association of Singapore (DAS), is a comparative study of the impact of intervention for Chinese on dyslexic children attending DAS for support with Chinese, and struggling learners who also participated in this support, by contrast with a control group of dyslexics who did not benefit from this structured approach. The results showed that both intervention groups show significant improvement in comparison with the controls. However, they also suggested that the problems for struggling learners were less entrenched, because they showed greater impact of multisensory support in character naming and word forming. This again provides an important insight into the effectiveness of structured support for learners of all types.

The final two articles represent a significant contribution in terms of moving forward the potential for greater awareness of dyslexia. The first study, by Chunsuwan and colleagues, evaluates the effectiveness and validity of a computerised program for screening early reading skills in Thailand, including a range of phonological skills and Rapid naming. Working with a large sample of children in 1st grade aged 6-8 the study examined aspects such as test retest reliability, and showed good correlations with reading ability, suggesting that this can provide a reliable tool for use in Thailand, where provision for dyslexia has been limited. The final article in this issue is drawn from mainland China, by Wang Lei and his colleague, and identifies the need for parental involvement in setting up a school-family-service organisation to identify and support children with dyslexia. This should begin to ensure that children with dyslexia in China can receive the support that they need in order to become successful. These approaches are particularly important for countries where dyslexia has traditionally been misunderstood and children may suffer as a consequence.

In conclusion, this is an exciting set of studies, which has something useful to contribute for readers from all backgrounds. We would also like to commend DAS for their efforts to ensure that the UNITE SpLD conference can continue online as a webinar, despite the limitations on international travel and the ongoing need for social distancing world-wide.

We look forward to a time when these restrictions may be eased and we can once again join together to celebrate the work we all contribute to supporting dyslexia across the life span.

The abstracts from this year's UNITE SpLD conference presented here illustrate the breadth, depth and complexity of ongoing work in the region, and we recommend that readers take the opportunity to join the online conference and sample some or all of these insightful presentations.

EMBRACE DYSLEXIA

One in 10 people will have some form of learning difference.



Dyslexics use the **right brain** more than the left when learning.

Many dyslexics can find **unique solutions** to problems.



Around 40% of people with dyslexia also have ADHD.



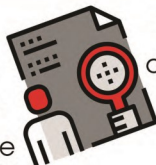
Dyslexia runs in families. Children have 50% chance of having dyslexia if one parent has it.



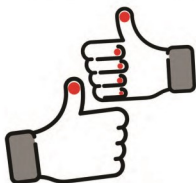
They observe things from different angles and have strong visualisation skills.



Research has found that around 35% of entrepreneurs in the United States are dyslexic.



Many dyslexics are talented and creative and they can be "big picture" thinkers.



Dyslexics do not "see" words in reverse. The "b" & "d" letter reversal occurs when they are unable to name the letter.

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Entrepreneurs with Dyslexia in Singapore: The Incidence, Their Educational Experiences, and Their Unique Attributes

Deborah G. Hewes^{1*}

1. Dyslexia Association of Singapore

Abstract

The incidence of dyslexia in the Singaporean entrepreneurial population is unknown. This study compares Singaporean Entrepreneurs who have dyslexia and those who do not have dyslexia. This research examines the education experiences and personal attributes of Singaporean Entrepreneurs, to identify the differences between those with dyslexia and those who are not dyslexic. A survey was conducted over a 12-month period and the data revealed that the incidence of dyslexia in the Singapore entrepreneurial population was 26%, this is more than 2.5 times that dyslexia would be found in the general population. The educational experiences of dyslexic entrepreneurs were significantly negative for primary and secondary education, however, in tertiary education, their educational experiences were significantly positive. Dyslexic entrepreneurs indicated two of the major factors why they were inspired to start their own business, these were to have ‘control’ over their lives, time, and success and the other was because of their ‘dyslexia’. Singapore entrepreneurial traits were explored and there is a tendency for Singaporeans to answer positively yet dyslexic entrepreneurs scored significantly less in empathy, interpersonal skills, public speaking, and memory ability compared to their non-dyslexic peers. Two attributes where dyslexic entrepreneurs scored significantly higher were visual thinking and visual-spatial ability. The findings from this research can be used to support the development of policies and support for Dyslexic Entrepreneurs in Singapore.

Keywords: dyslexia, entrepreneurship, education, positive dyslexia, specific learning differences, visual thinking, visual-spatial ability.

* Correspondence to:

Deborah Hewes, Assistant Director of Publicity and Publications, Dyslexia Association of Singapore.
Email: deborah.hewes@das.org.sg

INTRODUCTION

Research into the incidence of dyslexia in entrepreneurship found that there were twice as many entrepreneurs who had dyslexia than in the general population in the UK. (Logan, 2008). Logan (2009) subsequently identified an even higher incidence in the US of more than 3 times at 35% (Logan, 2009). Logan's research is used as a benchmark when discussing and researching dyslexia and entrepreneurship. (Adams, 2016; Alexander-Passe, 2016; AMA, 2008; Bowers, 2007; Cowen and Sherman, 2012; Coppola, 2007; de Bruyne, 2016; Eide and Eide, 2011; Economist, 2009 & 2012; Field, 2018; Franks and Frederick, 2013; Halfpenny and Halfpenny, 2012; Markowitz, 2011; Nicolson, 2015; Schneps, 2015; Schumpeter, 2012; Sunday, 2015a, 2015b; Sutton, 2012; Tickle, 2015, Warren, 2008). Logan (2011), in commentary about entrepreneurs with dyslexia, indicated that they were doing things quite differently in business and that they were particularly good at communicating their vision, harnessing people's strengths and in turn delegating to these strengths. She further indicated that they were intuitive, possibly using their right brain thinking skills to be successful in business. Logan felt that we had a lot to learn from these strengths and that all entrepreneurs could learn to harness these skills (Logan, 2011).

In Singapore, a study on entrepreneurs with dyslexia has not been undertaken. The late President of the Dyslexia Association of Singapore (DAS), Dr Daruwalla (DAS President from 1991 to 2016), called for this research to be conducted so that Singapore could recognise those with dyslexia and how they would be contributing to the economy of Singapore and its society (Daruwalla, 2014). Dr Daruwalla would quote the findings of the CASS Business School's research on Dyslexic Entrepreneurs and would emphasise the importance of the positive aspects and talents of dyslexia. At the launch of the DAS 'Embrace Dyslexia' campaign, he stated, "It has been known for some time that dyslexic business people are more likely to succeed as entrepreneurs... perhaps a study should be conducted in Singapore, and soon." (Daruwalla, 2015, p xvi).

AIM OF THE STUDY

The incidence of dyslexia in the Singapore entrepreneurial population is unknown. The Dyslexia Association in Singapore (DAS), an organisation that is considered to be an expert in the support of children with learning differences, as well as one of the leading educators of professionals who extensively support students with learning differences (Fawcett, 2014), has a significant gap in the services provided to adults with learning differences and in understanding their experiences in the workplace. Therefore, understanding the experience of adults with dyslexia in the Singaporean work environment is crucial for the organisation to create programmes and resources to support adults with dyslexia which is beyond its current scope of work (DAS, 2019b). It will also help to inform the development of policy in Singapore for adults with dyslexia.

RESEARCH QUESTIONS

This research study aims to answer the following research questions:

1. What is the incidence of dyslexia in the Singaporean Entrepreneurial population?
2. What are the educational experiences of Singaporean Entrepreneurs with dyslexia?
3. What are the unique attributes, if any, that distinguish Singaporean Entrepreneurs with dyslexia?

Examining the experience of Singaporean Entrepreneurs with dyslexia informs us of their unique experience and how these individuals contribute to Singaporean society.

DEFINITION OF DYSLEXIA AND OTHER LEARNING DIFFERENCES

The Dyslexia Association of Singapore (DAS) defines dyslexia as:

“a type of specific learning difficulty identifiable as a developmental difficulty of language learning and cognition. It is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling. Characteristic features of dyslexia are difficulties in phonological awareness, verbal memory, and processing speed. An appropriate literacy programme should include the following components: phonemic awareness, phonics, fluency, vocabulary and comprehension.” (DAS, 2019).

The Dyslexia Association of Singapore (DAS) draws upon three significant reports in its definition of dyslexia, the Rose Report from the UK (Rose 2009) and two from USA, the US Department of Education Report, (IDEA, 2011) and the National Reading Panel Report (NICHD, 2000). These reports are used to drive policymaking and funding decisions to support individuals with learning difficulties.

Alexander-Passe (2017), a dyslexic and author of numerous books about dyslexia, discusses the issue of defining dyslexia in his latest book, “The Successful Dyslexic” and writes that there is, “no single, definitive diagnosis or definition of dyslexia... [it is on] a spectrum of difficulties, with some mild and others more severe. Therefore, it is rare to find two dyslexics with exactly the same range of difficulties. However, there are commonalities in all dyslexics” (Alexander-Passe, 2017, p1). He goes on to suggest that comorbidity of other learning differences, such as dyscalculia, dyspraxia and Attention Deficit Hyperactivity Disorder (ADHD), also confuses the issue of learning differences with the overlapping of other difficulties faced with coordination, fine motor skills, balance, handwriting, and attention (Alexander-Passe, 2017).

SPECIFIC LEARNING DIFFERENCES (SPLD)

DAS defines the term, Specific Learning Differences (SpLD), to describe several learning differences and on many occasions, the term SpLD can be used in the same context as dyslexia, which is actually only one of the many learning differences defined under the term SpLD. It should also be noted that it is rare that an individual will be diagnosed with only one SpLD, as research indicates that individuals are likely to have more than one difference, hence no two individuals are the same. (Alexander-Passe, 2017; DAS, 2019a)

SpLD can impact on an individual's ability to learn and can have a negative impact on the following skills:

- ◆ Attention span
- ◆ Communication Skills
- ◆ Concentration
- ◆ Information processing
- ◆ Lack of Social Awareness (Empathy)
- ◆ Literacy, Numeracy and Oracy
- ◆ Memory, short-term and working memory
- ◆ Motor Skills, gross and fine motor skills
- ◆ Organisation
- ◆ Sense of Direction - left and right confusion
- ◆ Sequencing
- ◆ Time Management

Therefore, SpLD can have a significant impact on an individual's stress, anxiety, and self-esteem. (DAS, 2019a)

DYSLEXIA AND EDUCATION IN SINGAPORE

Research in Singapore by Landulfo, Chandy and Wong (2015), explored the provision for students with dyslexia in the Singapore Education system and made recommendations for education policy change. These were the expansion of support required, calling for an increase in the provision of support services, including the professional development of teachers so that they can better meet the needs of students with dyslexia, additional resources including the use of technology in the classroom and an initiative to increase awareness of learning differences including anti-bullying campaigns (Landulfo, Chandy and Wang, 2015).

Unfortunately, negative educational experiences are reflected by many individuals with dyslexia and they found that educators were unclear on how to support them (Alexander-Passe, 2010, 2016, 2017; Branson, 2017; Foss, 2013; Gallagher, 2014; Gwernan-Jones and Burden, 2009; Hewes, 2015; Langston, 2012; McCabe, 2002; Morris, 2002; Rooke, 2016; Scott, 2004; West, 2005, 2014). Scott (2004), explains that school can damage dyslexic children and the struggle they have in school can be harmful to them.

Recently in an interview, the Singaporean Education Minister, Mr Ong Ye Kung, indicated that the changes to the education system are reflective of Singapore's 'cultural context', that education is highly valued, especially a tertiary education (Ong, 2019). The Singapore Ministry of Education is also making changes to the streaming at the secondary level to subject based banding to reduce stigma and labelling which was associated with streaming (Lim, 2019). As the people of Singapore are its only natural resource, investment in education is highly prized, and therefore the educational achievement of Singaporeans is reflective of its society (Lee, 2011). An article by Weng, Walker and Rosenblatt (2015) on attitudes towards including students with special educational needs, identified that Singapore is classed as a world leader in education. Therefore, it is understandable that firmly held cultural beliefs exist in the attainment of excellence in education, and consequently those who struggle with education and achievement in Singapore have experienced discrimination and stigma, hence, Prime Minister Lee's call for an inclusive society and changing mindsets so all have a role to play in Singapore's future.

EMBRACE DYSLEXIA IN SINGAPORE

In Singapore, in 2014, the "Embrace Dyslexia" movement was initiated to make a conscious shift toward the positive dyslexia movement. The Positive Dyslexia movement was initiated by Rod Nicolson, Tom West, and Brock and Fernette Eide. Embrace Dyslexia aimed to acknowledge the challenges faced in learning by students served by the organisation but to celebrate their strengths too. (DAS, 2019c). As a result, DAS published a book, "A Different Kind of Mind" (Hewes, 2015), with the aim to raise positive awareness about dyslexia. The first story in the book was that of the late Mr Lee Kuan Yew, Singapore's first Prime Minister. Mr Lee revealed he had mild dyslexia in 1996 and, with this announcement, the stigma of having a learning difference was removed, helping to increase the acceptance of dyslexia in Singapore. DAS is ever thankful to Mr Lee, the late DAS President, Dr Jimmy Daruwalla, commented about Mr Lee, "[the] greatest thing he did for us was to remove the stigma". (Wan, 2017, p6).

STRENGTHS AND TALENTS OF DYSLEXIA

The study of the strengths and talents of individuals with dyslexia is abundant. Much of this evidence is as a result of the collection of individual stories of individuals with dyslexia who have been successful in life despite, or in some cases, because of their dyslexia (Alexander-Passe, 2011, 2017; Davis, 1997; Eide and Eide, 2011; Foss, 2013; Gladwell, 2014; Hewes, 2015; Gallagher, 2014; Keiser, 2016; Key, 2018; Langston, 2012; Loncraine, 2004; Malpas, 2017; McNulty, 2003; McCabe, 2002; Morris, 2002; Nicolson, 2015; Olsen, 2007; Rooke, 2016; Shandrow, 2016; Smith, 2008; Sutton, 2012; West, 2005, 2017; Yee, 2019).

The view of positive strengths of dyslexia is something that West (2014) discusses and indicates that one of the greatest paradox is the student *“who appears the most dumb in early years of schooling can be among the most capable and successful later on in the world of work – especially when the work is creative and innovative – involving the ability to think deeply, envision possibilities and see patterns that others do not see”* (West, 2014, p.178)

A recent example of this in Singapore is the story of Edward Yee, an entrepreneur with dyslexia, who defines his success was due to his dyslexia (Lim, 2018). Edward has just been awarded a Rhodes Scholarship to study in Oxford University, the first scholarship awarded in 14 years for a student in Singapore. In his interview with the Today Newspaper, he states, *“I am where I am today because of dyslexia not in spite of it.”* (Lim, 2018).

A literature review was undertaken to explore the talents of entrepreneurs with dyslexia, based on research on the positive attributes and talents of adults with dyslexia. Table 1 reflects the summary of research on talents and attributes of adults with dyslexia.

Table 1. Summary of Talents and Attributes of Individuals with dyslexia.

TALENTS	DESCRIPTION	REFERENCE
Artistic	The ability to create works of art, e.g. Painting, drawing, sculpture.	Chakravarty, 2009; Colgin, 2011; Wolff, 2011
Creativity	The ability to use the imagination to create something original.	Bartlett, Moody & Kindersley, 2010; Everatt, Weeks & Brooks, 2007; Malpas, 2017; Nicolson, 2015; Tafti, Hameedy & Baghal, 2009; Wolff, 2011
Curiosity	A strong desire to know or learn something.	Davis, 1997; Tough, 2013; Vail, 1990
Dynamic Reasoning	Intuition – the ability to solve problems quickly or the vision to anticipate future developments.	Eide & Eide, 2011; Davis, 1997; Vail, 1990
Empathy	The ability to understand and share the feelings of another.	Nicolson, 2015; Malpas, 2017; Tough, 2013; Vail, 1990
Grit	Determination and resolve – the ability to get things done!	Alexander-Passe, 2017; Duckworth, 2016; Kannangara, 2015 Nicolson, 2015; Tough, 2013.

Table 1. Summary of Talents and Attributes of Individuals with dyslexia. (Cont.)

TALENTS	DESCRIPTION	REFERENCE
Growth Mindset	Abilities can be developed through dedication and hard work.	Kannangara, 2015
Innovative Thinking Style	Vision, translating an idea into reality.	Everatt, Steffert & Smythe (1999); Logan, 2009
Interconnected Reasoning	Ability to spot connections, causality, correlation and understanding different points of view, unite information into a "Big Picture" view.	Eide & Eide, 2011; Davis 1997; Nicolson, 2015; West, 2017
Material Reasoning	Spatial Reasoning Ability - to reason about the physical characteristics of objects.	Eide & Eide, 2011; Everatt, Weeks and Brooks, 2007; Everatt, Steffert & Smythe, 1999; Vail, 1990
Narrative Reasoning	Ability to construct, mentally, visual scenes from past personal experiences, create imaginary scenes.	Eide & Eide, 2011; Davis, 1997; Vail, 1990
Non-Verbal Reasoning (Visual Thinking)	Problem-solving using pictures and diagrams. The ability to analyse visual information and to solve problems based on visual reasoning	Davis, 1997; Everatt, Weeks and Brooks, 2007; Malpas, 2017; Nicolson, 2015; Vail, 1990; West, 2005, 2014, 2017.
Proactivity	Thinking ahead to what you must do to put plans into action.	Logan, 2009; Nicolson, 2015; Alexander-Passe, 2017
Resilience	The ability to be unphased under pressure and recovers quickly from difficulties.	Nicolson, 2015; Alexander-Passe, 2017
Teamwork	Ability to work with others effectively to achieve a common goal.	Logan, 2009; Nicolson, 2015;
Vision	The ability to think and plan with imagination and wisdom.	Logan, 2009; Nicolson, 2015; Davis, 1997
Visual-Spatial Ability	The ability to identify visual and spatial relationships among objects.	Attree, Turner & Cowell, 2009; Everatt, Weeks & Brooks, 2007; Nicolson; 2015; Schneps, Rose & Fischer, 2007; Tafti, Hameedy & Baghal, 2009; Vail, 1990; Von Karolyi et al., 2003; West, 2005, 2014, 2017

DEFINING AN ENTREPRENEUR

The Business Dictionary (BD, 2018) defines an entrepreneur as, "someone who exercises initiative by organising a venture to take benefit of an opportunity and, as the decision maker, decides what, how, and how much of a good or service will be produced. An entrepreneur supplies risk capital as a risk taker and monitors and controls the business activities." Economist, Schumpeter (1883-1950) identified that entrepreneurs strive for distinction through excellence, were highly optimistic, favoured challenges with risk, valued self-reliance and were motivated by profit which they regarded as a way of measuring success (B.D., 2018).

Burns (2016) identifies that entrepreneurs are "good at developing relationships with customers, staff, suppliers and all the stakeholders in business [and] they manage informally... to develop the partnerships and networks that are part of the social capital they create. It enables them to leverage the strategic skills of the partnership" (Burns, 2016, p.7).

Bolton and Thompson (2013) define an entrepreneur, "They are people who create and grow enterprises. They see the world differently to the rest of us and so challenge the status quo. They play a major role in the development of an economy. They know what they want and how to get it" (Bolton & Thompson, 2013, p.11).

Bolton and Thompson (2013), further identify the attributes of an entrepreneur. These seven attributes are described by the acronym – FACETS.

- ◆ **F** – Focus - the ability to stay on target and not get distracted, not procrastinate, and get things done.
- ◆ **A** – Advantage – the ability to select the right opportunity at the right time.
- ◆ **C** – Creativity – the ability to come up with new ideas and translate them into opportunities or solutions.
- ◆ **E** – Ego – Inner ego has good self-esteem, creating confidence and passion. Outer Ego displays the ability to lead and be openly accountable.
- ◆ **T** – Team – the ability to pick the best people, get them working as a team and to know where to go to get help, a network of contacts.
- ◆ **S** – Social – the ability to stand up for a cause and deliver on it.

Entrepreneurial attributes were extracted from the definitions of an entrepreneur and they are collated in table 2.

Table 2. Summary of Entrepreneur Attributes

ENTREPRENEURIAL TRAITS	REFERENCE
Advantage Talent	Bolton and Thompson, (2013)
Challenge the Status Quo	Bolton and Thompson, (2013)
Creativity	Bolton and Thompson, (2013);
Economy Developers	Bolton and Thompson, (2013)
Ego	Bolton and Thompson, (2013)
Focus	Bolton and Thompson, (2013)
Initiative and Innovation	Business Dictionary, (2018), Bolton and Thompson, (2013)
Interpersonal Skills	Burns, (2016)
Mentoring	Bolton and Thompson, (2013)
Opportunistic	Business Dictionary, (2018); Bolton and Thompson, (2013)
Optimistic	Schumpeter, (BD 2018)
Risk-Takers	Schumpeter, (BD 2018);
Self-Reliance	Schumpeter, (BD 2018)
Social	Bolton and Thompson, (2013), Burns, (2016)
Strategists	Burns, (2016)
Teamwork & Relationships	Bolton and Thompson, (2013); Burns, (2016)

In Singapore, Prime Minister Lee, in his 2016 National Day Rally speech talked about promoting entrepreneurship in Singapore and said, “[Entrepreneurs] *give the society confidence*. [Entrepreneurs believe] *anything is possible... and we need that mindset in Singapore*” (Prime Minister’s Office, 2016).

There has also been amazing growth in business start-ups in Singapore which can be largely attributed to the support from the Singapore Government with matching dollar-for-dollar start-up funding made available for start-up businesses. As a result, 20% of college graduates in 2013 wanted to start their own business in comparison to 10% in 2005 (Weise, 2015).

ENTREPRENEURS WITH DYSLEXIA

Logan’s research into Dyslexic Entrepreneurs explained,

“... they start a business to control the environment around them, do what they are really good at and bring in other people to compensate for what they are not so good at. In the study we found: their ability to delegate, their ability to communicate and harness people behind their vision and, their ability to be very intuitive and to use the right brain skills which many dyslexics have.” (Logan, 2011)

Logan (2011), summarised that thinking differently is a major advantage in the marketplace and dyslexic entrepreneurs using these three abilities were demonstrating how they are different and how they could be successful with their dyslexia.

DEVELOPMENT OF THE SURVEY FOR ENTREPRENEURS WITH DYSLEXIA

To create a survey that considered all the characteristics of those with dyslexia their strengths and challenges and their possible entrepreneurial traits the following figure demonstrates the possible characteristics of an entrepreneur with dyslexia. Figure 1 combines the strengths of adults with dyslexia and traits of an entrepreneur as well as the challenges that someone with a learning difference may face. All these attributes combined demonstrates the possible unique attributes that maybe demonstrated in entrepreneurs with dyslexia.

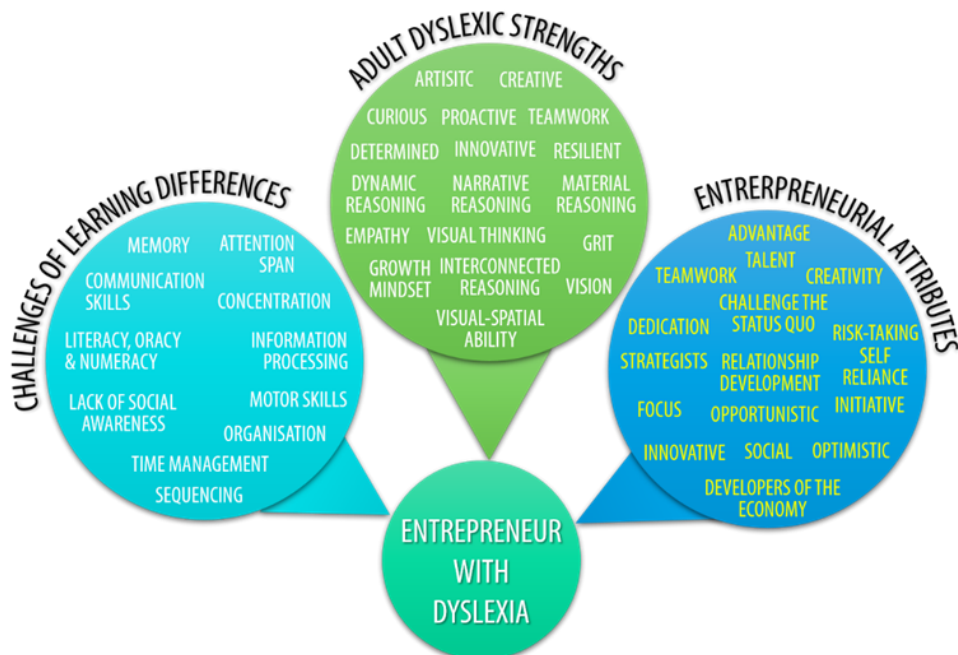


Figure 1. Dyslexic Entrepreneur Attributes

And finally, many entrepreneurs with dyslexia have indicated that the reason they went into business for themselves is the result of difficulties they had at school and their determination to succeed. (Adams, 2016; Alexander-Passe, 2016; Branson, 2017; Bowers, 2007; Field, 2018; Harrington, 2017; Keiser, 2016; Key, 2018; Logan, Hendry Courtney, Brown, 2008; Markowitz, 2011, Shandrow, 2016). The impact of their learning difficulties was the inspiration to succeed.

There is no doubt that entrepreneurs with dyslexia can make a significant contribution to Singapore society. Understanding their educational experiences and their unique attributes will inform policymakers and organisations, like DAS in Singapore, about how to support and nurture them.

The narrative of successful entrepreneurs with dyslexia is a story of positive dyslexia, one that shines the light on how individuals with dyslexia can be successful. It is a story that helps to reduce the stigma of a learning difference and provides hope for those who have been diagnosed with a learning difference as well as hope for their families.

Finally, one of the messages that came from the research into Dyslexic Entrepreneurs in the UK and USA was:

“We have a lot to learn from Dyslexic Entrepreneurs, dyslexia is not a barrier to starting a business and it is a place where dyslexics can really shine!” (Logan, 2011)

METHODOLOGY

Research Design

The research was a mixed method design collecting qualitative and quantitative data in the form of an online survey. The survey was launched in January 2018 on SurveyMonkey for a 12-month period to December 2018.

Participants

Participants were recruited by advertising on Singapore Entrepreneur social media platforms. The advertisement titled, “Are you a Singaporean Entrepreneur? Do you own your own Business?” was promoted for more than 12 months in several media avenues including Facebook and LinkedIn media platforms. An additional search was conducted within LinkedIn on “Founders in Singapore”, and these individuals were sent the survey to complete. More than 1,000 LinkedIn contacts were randomly selected and invited by the researcher to complete the survey.

In total, 125 participants responded to the online survey. Of these only 88 participants were selected for analysis. Those who were not included in the final analysis were largely due to their surveys being incomplete, many chose not to complete the last section of the survey, Adult Dyslexia Checklist. All these participants were contacted by the researcher and were encouraged to fully complete their survey. All participants who completed the survey had indicated that they were business owners.

Survey – Singapore Entrepreneurs

The survey was designed to collect information about the entrepreneur their educational and business experiences, personal attributes including talents, strengths and challenges as well as a score from the Adult Dyslexia Checklist (Smythe and Everatt, 2001). The survey consisted of 85 questions including 5 long answer questions. Most questions asked participants to self-rate their experiences, challenges, abilities and traits. A copy of the survey is in the Appendix.

Informed Consent

Participants were required to read the information about the survey and the research purpose and to provide consent. Participants were advised they could withdraw their response at any time.

Analysis

As the survey was extensive, participants were given the opportunity to review their responses. Therefore, prior to analysis their responses, in the form of a PDF file downloaded from SurveyMonkey, was sent to the participant for verification (Robson and McCarten, 2016). Quantitative data was analysed using Microsoft Excel for Office 365 MSO. Qualitative data was analysed using a thematic code approach (Robson and McCarten, 2016). Where qualitative data was required to categorise information, the content was summarised into codes for further analysis, e.g., factors for becoming an entrepreneur.

Adult Dyslexia Checklist

An Adult Dyslexia Checklist (Smythe and Everatt, 2001), was used to identify participants who may be at risk of having dyslexia or have dyslexic traits. It is important to note that the score from the checklist is not a confirmation or diagnosis and is only an indication that the participant may have dyslexia or a learning difference. This Adult Dyslexia Checklist is currently adopted for use by many organisations, including the Dyslexia Association of Singapore (DAS), the British Dyslexia Association (BDA) (Snowling et al., 2012), and Dyslexic Advantage.

Although the checklist is a simple tool to help identify individuals who may be 'at risk' of having dyslexia, this checklist does not confirm or diagnose dyslexia. Comprehensive testing, including literacy skills, intellectual functioning and behavioural issues must be conducted by a qualified professional to have an official diagnosis of dyslexia or any other SpLD. (DAS, 2019a)

Thirteen participants indicated that they held a diagnosis of dyslexia at the start of the survey. These participants were included in the subsequent analyses as dyslexic irrespective of the results from the Adult Dyslexia Checklist. This decision meant that some of the scores from the checklist for these participants were below the cut-off score of 45, some as low as 30.

RESULTS

The aim of this study is to identify the incidence of dyslexia in the Singapore Entrepreneurial population and to understand their educational experiences as well as identify if there are any unique attributes of these entrepreneurs.

What is the incidence of Dyslexia in the Singaporean Entrepreneurial population?

The data from 88 participants were analysed. The age of the participants ranged from 19 years old to 75 years old, 58 (66%) were male and 30 (34%) were female. Of the 88 participants who were selected for this research analysis, 23 (26%) participants were identified as being in the dyslexic group, this overall finding is similar to the research in the UK by Logan (2009). Of the 23 dyslexic participants, 13 participants (15%) had a formal diagnosis of dyslexia the other 10 (11%) were identified through the dyslexic checklist. Descriptive statistics of participants can be found in table 3.

Analysis of the Adult Dyslexia Checklist was completed to ensure the questions posed in the checklist returned results that were statistically significant between the two research groups. The results, in Table 4, would then provide further validation of the dyslexia checklist and its use in identifying those participants who were to be identified in the dyslexic group.

The Adult Dyslexia Checklist data was analysed by using a single factor ANOVA (analysis of variance) of the 15 questions. 14 questions returned a highly statistically significant result ($p < .001$ and $p < .05$) between the dyslexic and non-dyslexic participants. One question, "Q10. How often do you find creative solutions to problems?" the result between dyslexic and non-dyslexic participants was not significant. Considering the entrepreneurial attributes of the participants for this survey and the qualities attributed to entrepreneurs are creativity, innovation, and inventiveness it is understandable that all participants consider themselves creative problem-solvers (Bolton & Thompson, 2013).

Table 3. Descriptive statistics of participants by age, gender, and dyslexia identifier.

DESCRIPTIVE INFORMATION						
PARTICIPANTS	N	%	MEAN AGE	SD	MIN	MAX
Age	88		38.8	11.684	19	75
Male	58	66%	39.3	12.254	19	75
Female	30	34%	37.9	10.633	20	57
Dyslexic	23	26%	37.0	11.072	19	59
Male	18	78%	36.6	11.703	19	59
Female	5	22%	38.6	9.397	25	51
Non-Dyslexic	65	74%	39.4	11.911	20	75
Male	40	62%	40.6	12.443	21	75
Female	25	38%	37.8	11.035	20	57
ADULT DYSLEXIA CHECKLIST SCORE						
	N	%	MEAN	SD	MIN	MAX
Dyslexic	23	26%	52.652	13.385	30	83
Non-Dyslexic	65	74%	30.108	4.899	22	41

Table 4. Adult Dyslexia Checklist Data and Analysis

SCREENING ITEM	GROUP	N	MEAN	SD	F	P-VALUE
1. Do you confuse visually similar words?	Dyslexic	23	6.696	3.470	51.452	0.000***
	Non-Dyslexic	65	3.277	1.023		
2. Do you lose your place when reading?	Dyslexic	23	5.304	2.566	34.918	0.000***
	Non-Dyslexic	65	2.831	1.318		
3. Do you confuse names for objects?	Dyslexic	23	1.435	0.788	5.481	0.022*
	Non-Dyslexic	65	1.138	0.390		
4. Do you have trouble telling left from right?	Dyslexic	23	1.957	0.976	20.092	0.000***
	Non-Dyslexic	65	1.215	0.545		

Table 4. Adult Dyslexia Checklist Data and Analysis (Cont.)

SCREENING ITEM	GROUP	N	MEAN	SD	F	P-VALUE
5. Is map reading confusing?	Dyslexic	23	2.130	1.217	11.081	0.001***
	Non-Dyslexic	65	1.431	0.706		
6. Do you have to reread paragraphs to understand them?	Dyslexic	23	3.174	0.937	30.611	0.000***
	Non-Dyslexic	65	2.062	0.788		
7. Do you get confused when given several instructions at once?	Dyslexic	23	2.522	1.039	17.454	0.000***
	Non-Dyslexic	65	1.692	0.727		
8. Do you make mistakes when taking down phone messages?	Dyslexic	23	2.652	1.152	43.372	0.000***
	Non-Dyslexic	65	1.400	0.607		
9. Do you find it difficult to find the right words to say?	Dyslexic	23	2.391	1.033	14.424	0.000***
	Non-Dyslexic	65	1.674	0.664		
10. How often do you find creative solutions to problems?	Dyslexic	23	3.348	0.775	1.417	0.237 NS
	Non-Dyslexic	65	3.108	0.850		
11. How easy do you find it to sound out words?	Dyslexic	23	6.000	3.261	56.193	0.000***
	Non-Dyslexic	65	3.000	0.000		
12. When writing, do you find it difficult to organise your thoughts on paper?	Dyslexic	23	5.478	2.274	75.593	0.000***
	Non-Dyslexic	65	2.462	0.985		
13. Did you learn your multiplication tables easily?	Dyslexic	23	5.043	2.477	34.966	0.000***
	Non-Dyslexic	65	2.615	1.317		
14. How easy do you find it to recite the alphabet?	Dyslexic	23	2.043	1.065	40.794	0.000***
	Non-Dyslexic	65	1.092	0.341		
15. How hard do you find it to read out aloud?	Dyslexic	23	2.087	1.041	39.142	0.000***
	Non-Dyslexic	65	1.138	0.390		
TOTAL SCORE	Dyslexic	23	52.652	13.385	135.568	0.000***
	Non-Dyslexic	65	30.108	4.899		

Key *** $p < .001$; * $p < .05$; NS Non-significant

Academic Qualifications

The Singapore Education system has several stages to attain qualifications. It officially commences in Primary School for 6 years for students aged 6 to 12 years old. The qualification at the end of Primary school is the Primary School Leaving Examination (PSLE). The next stage is Secondary school for 4 to 5 years for students aged 13 to 16. The qualification from Secondary school are the General Certificate O Levels (GCE'O). In addition, Secondary school does offer an additional year to extend learning for some students who wish to improve their grades, so they will leave secondary after year 5. Students who graduate from Secondary school can attend Junior College for 2 to 3 years for students aged 16 to 18 years old. The qualifications from Junior Colleges are the A Levels (GCE-A), alternatively after secondary school students can access Polytechnic for 2 to 3 years to access pre-tertiary qualifications at diploma level. Students then move onto Tertiary Education to access university level qualifications (Ministry of Education, 2020).

The highest level of education attainment is summarised in table 5.

Table 5. Highest level of Qualification

QUALIFICATION	HIGHEST LEVEL OF QUALIFICATION							
	DYSLEXIC				NON-DYSLEXIC			
	MALE	FEMALE	TOTAL	%	MALE	FEMALE	TOTAL	%
PRIMARY	1*	0	1	4%	0	0	0	0%
SECONDARY	1	1	2	9%	1	1	2	3%
JUNIOR COLLEGE	0	0	0	0%	5	0	5	8%
DIPLOMA	5	1	6	22%	5	4	9	14%
BACHELORS	8	3	11	48%	22	14	36	55%
MASTERS	3	1	4	17%	5	6	11	17%
DOCTORATE	0	0	0	0%	2	0	2	3%
TOTAL	18	5	23	100%	40	25	65	100%

* This participant went on to vocational school after attending primary school for 8 years. Vocational School experience was not collected as part of this survey; therefore, his highest qualification is reflected as primary school.

Educational Experiences

The education experiences of participants were self-reported on a five-point Likert scale. The scores were calculated from 1 being very positive to 5 being very negative. The lower the mean score the more positive the educational experience reported by the participant. Subsequent analysis was completed by using a single factor analysis ANOVA in Microsoft Excel for Office 365 MSO. The analysis of the educational experience at different education levels by ANOVA can be found in Table 6 below.

Table 6. Educational Experiences of Participants at different school levels

EDUCATION EXPERIENCES						
SCHOOL LEVEL	N	MEAN	SD	DF	F	P-VALUE
PRIMARY SCHOOL (Age 6 to 12)						
<i>Dyslexic</i>	22 ⁺	3.591	1.297	86	36.970	0.000***
<i>Non-Dyslexic</i>	65	2.046	0.926			
SECONDARY SCHOOL (Age 13 to 16)						
<i>Dyslexic</i>	22 ⁺	3.132	1.041	86	18.521	0.000***
<i>Non-Dyslexic</i>	65	2.277	0.922			
JUNIOR COLLEGE (Age 17 to 18)						
<i>Dyslexic</i>	8	3.375	1.302	50	3.646	0.062 NS
<i>Non-Dyslexic</i>	43	2.558	1.076			
POLYTECHNIC (Age 16+)						
<i>Dyslexic</i>	10	1.900	0.876	25	0.012	0.913 NS
<i>Non-Dyslexic</i>	16	1.867	0.640			
UNIVERSITY / TERTIARY (Age 18+)						
<i>Dyslexic</i>	15	1.667	0.488	66	1.102	0.298 NS
<i>Non-Dyslexic</i>	52	1.942	0.978			
OVERALL EDUCATION EXPERIENCE						
<i>Dyslexic</i>	23	2.913	0.949	86	12.971	0.001***
<i>Non-Dyslexic</i>	65	2.138	0.864			

+ One participant could not recall their experiences in Primary school.

^ One participant highest qualification was at the primary school level, he subsequently went to vocational school to learn a trade, Vocational school was not reflected in the survey.

*** $p < 0.001$. NS - Non-significant

Overall Learning Experience

There was a highly statistically significant difference in the overall learning experience between the dyslexic group and non-dyslexic group. The dyslexic group also indicated a more negative educational learning experience compared to non-dyslexics.

Some of the comments from the survey that reflect the overall learning experiences for entrepreneurs who were dyslexic are:

NEGATIVE:

“Being dyslexic, I'm not able to cope with the standard educational curriculums during childhood. Therefore, always not able to cope the teachings.” (Dyslexic – Aged 44)

“...many took advantage...things started going downwards. Name calling, physical bullying ... there was nothing you can do but resist ...once in a while [when] the glass as filled over the brim, all hell breaks loose. Violence, anger, rage ... all these negative emotions, all these burdens was on me because I was looked down upon. In secondary, I thought my life would change but, it was like fate to be bullied for the rest of my years in school. I had lots of voices in my head, to be honest: self-doubts that I was been talked about all the time behind my back, which lead me to seek social gathering to ensure that this talking behind my back won't happen because the pain was just terrible.” (Dyslexic – Aged 19)

“Very stressful, no matter how hard I tried”. (Dyslexic - Aged 40)

“Struggling constantly, Teachers constantly calling my parents to tell them I wasn't doing well” (Dyslexic - Aged, 30)

“Struggled... getting worst of worst grades till I gave up trying” (Dyslexic - Aged 35).

POSITIVE

“A positive educational experience, but I could have been given more help overall.” (Dyslexic – Aged 40)

Primary School

There was a significant difference in primary school experience between the dyslexic group and non-dyslexic group, indicating that the non-dyslexic participants had a more positive learning experience in primary school than the dyslexic participants. All participants completed Primary School, four dyslexic participants (17%) indicated that they were retained in Primary school before moving on to Secondary. One dyslexic

participant remained in Primary school and never went to a Secondary school. At the age of 14 he went to vocational school to learn a trade. Some of the comments from the survey that reflect their learning experiences in Primary school are:

"I had a really terrible 3 years from Primary 1-3, which always gotten the last position in class... till my Principal had to speak to my mum, telling her I might be an idiot, best if can send me to see a doctor. My mum cried that day, this moment is still engraved in my heart till now... It's truly a moment of humiliation. (Dyslexic - Aged 44)

For me, primary school was very negative, and I had to attend dyslexic programmes while my classmates attended music or sports... so I always felt that something was wrong with me.... (Dyslexic - Aged 41)

The negative experiences expressed by entrepreneurs with dyslexia have also been described by Scott (2004). Scott described such experiences at school as traumatic and damaging, which seems consistent with several of the views expressed by the participants in the current study.

Secondary School

There was a significant difference in secondary school experience between dyslexic and non-dyslexic participants, indicating that the non-dyslexic participants had a more positive learning experience in secondary school than the dyslexic participants.

One of the comments from the survey that reflect a learning experience in Secondary school is:

"Secondary school was not very positive for me because the learning experience was dull and not very practical. Moreover, there was a lack of technological advancement during that time and teachers were not appreciative of using technology as an educational tool." (Dyslexic - Age 27)

The negative sentiments expressed by dyslexic entrepreneurs about how they learned at school is reflected in the research by Gwernan-Jones and Burden (2009) where it was identified that teacher attitudes towards students with learning differences showed that they did not know or understand how to support their learning. The results here indicate that a review of services provided to Secondary students with dyslexia needs to be reviewed in Singapore.

University

There was no significant difference in the University experience between dyslexic and non-dyslexic participants. Although the mean data for dyslexics indicated a more

positive experience compared to non-dyslexics, this data was not statistically significant.

Some of the comments from the survey that reflect their positive learning experiences in University are:

"[Learning] got really good at University level." (Dyslexic – Age 29)

"In university, my education was focusing not only in knowledge but towards soft skill such as teamwork, leadership, and communication." (Dyslexic – Age 27)

"During my tertiary years though, things changed, I was doing something I loved. ... things that I excelled in, making me constantly at the top of the class, even graduating with a two distinction for my Masters." (Dyslexic – Age 30)

In answer to the question, *"Is learning easier in adulthood than in childhood?"*, 20 out of the 23 (87%) dyslexic participants said it was, compared to only 55% of their non-dyslexic peers. A positive outcome in learning at tertiary level is one of the observations made by West (2014) for dyslexic adults in higher learning.

Inspiration on becoming an Entrepreneur

Participants were asked an open-ended question to discuss their inspiration for becoming an entrepreneur. The qualitative data collected in this section was analysed by using a thematic coding approach (Robson and McCartan, 2016). Reviewing the comments made by participants on the question *"What Inspired you to become an Entrepreneur?"*, answers to this question were grouped by the researcher into different themes. These themes were then summarised further into five thematic codes and were used for analysis. In addition to creating these themes, answers from other questions gave clarity to the thematic code. Answers to questions on the factors for becoming an entrepreneur aided the thematic coding for this question.

Table 7 below reflects the thematic codes used to categorise the information for the inspiration for becoming an entrepreneur.

There were four factors that inspired entrepreneurship from the dyslexic group :

- ◆ **Passion and Vision (26%)** – wanting to make a difference with their business.
- ◆ **Society (26%)** – to make a difference and create an impact on the world.
- ◆ **Control (26%)** – to have control over their own lives.
- ◆ **Dyslexia (22%)** – because of it!

Table 7 -Inspiration to become an Entrepreneur.

INSPIRATION TO BECOME AN ENTREPRENEUR									
THEMATIC CODE	DYSLEXIC	%		NON-DYSLEXIC	%		TOTAL	%	FINAL THEMATIC CODE
Education	0	0%	26%	3	5%	51%	3	44%	Passion and Vision
Business Idea	0	0%		2	3%		2		
Interest in Business	1	4%		2	3%		3		
Passion	1	4%		10	15%		11		
Self-motivated	1	4%		6	9%		7		
Vision	3	13%		10	15%		13		
Control	6	26%	21	32%	27	31%	Control		
Society	6	26%	4	6%	10	11%	Society		
Family	0	0%	7	11%	7	8%	Family		
Dyslexia	5	22%	0	0%	5	6%	Dyslexia		
Total	23	100%	65	100%	88	100%			

Each thematic code is explored below with quotes from the participants with dyslexia:

Passion and Vision

Many participants with dyslexia (26%) described their inspiration to become entrepreneurs as having passion and vision for their ideas. Comments that reflect this choice are below:

"I see there is an opportunity to apply my skillset, which is programming and data analytics, to my industry to solve problems" (Dyslexic – Aged 27)

"I have a passion for storytelling, and I wanted to build on that idea. Telling stories of human interest across the world and bringing these stories to light."
(Dyslexic – Aged 31)

"I saw the lack of impact that academic work was having on real lives. The ideas I had at university had the potential to make a difference and despite the chance to continue academics with a comfortable job, I took the work further than it could have gone." (Dyslexic – Aged 32)

Society

Another significant reason for dyslexic participants to become entrepreneurs was to make an impact on society. A total of 26% of participants with dyslexia reported this reason. Some comments are as follows:

"I think to be a business owner is to take up responsibility of how we can make lives better. How can we become better at what we do, can we change things? Can we do more?" (Dyslexic – Aged 40)

Being a changemaker, it's the best way I can see to create an impact on the world" (Dyslexic – Aged 23)

"I believe that what we do in the company can bring about change"
(Dyslexic – Age25)

"I want to build lives, a chance for people who willing to learn, a chance for people to be their own business owner, improve their lives & family values, brings impartations of my skills to them so that they can be equipped with a survival knowledge (even when next time they are no longer with me)" (Dyslexic – Aged 44)

Dyslexia and Control

Many participants express having control over their own lives, time, and success. 26% of dyslexic participants expressed wanting control. Another 22% expressed that they are in business because of their dyslexia. Both these themes are intricately connected and the following comments about their inspiration to become an entrepreneur, demonstrate this:

"I am not very good with taking orders. I am too head strong and want things done my way" (Dyslexic – Aged 50)

“Wanted freedom and flexibility in my work” (Dyslexic – Aged 36)

“I felt my skills and vision could be better put to use if I was out on my own”
(Dyslexic – Aged 30)

“I am a do’er so I did not wait until someone asked me to do. I just did!”
(Dyslexic – Aged 41)

The following individuals were classified under the Dyslexia theme as they indicated that they were in business because of their dyslexia. They reflected that the desire to be in their own business was to have some level of control over their lives, so because of dyslexia they are in their own businesses which was not expressed by those non-dyslexic entrepreneurs

“Dyslexic! My strength has been helping others to see the big picture, addressing constraints and fore sighting” (Dyslexic – Aged 45)

“[Becoming an Entrepreneur] It was like a drug to overcome my pain in school.”
(Dyslexic – Aged 19)

“I was forced into self-employment – faced many difficulties in data and figures. No understanding from top management about me. I see the bigger picture than many others don’t understand. Others are slow!” (Dyslexic – Aged 58)

“I feel like I didn’t fit anywhere. So, I must have been forced into a corner and wanted to find my own feet.” (Dyslexic – Aged 35)

What are the unique attributes, if any, that distinguish Singaporean Entrepreneurs with Dyslexia?

This section of the survey asked participants to rank their Personal Attributes, Talents, Strengths and Challenges, on a five-point Likert scale from Very High (1), High (2), Average (3), Low (4) and Very Low (5). The lower the score the more positive the participant rated themselves about an item and conversely the higher the score the participant rated themselves less positive about that item. Table 8 reflects the personal attribute data.

The participants completed self-ratings for 33 attributes, but only 6 returned a highly significant difference between the dyslexic and non-dyslexic groups. The first four attributes empathy, interpersonal skills, public speaking and memory ability, the dyslexic group returned self-rating scores that indicated they felt less positive about this trait compared to the non-dyslexic group. It should be noted that the scores, apart from

Table 8. Personal Attributes of Singapore Entrepreneurs

PERSONAL ATTRIBUTES OF SINGAPOREAN ENTREPRENEURS							
ATTRIBUTES		N	MEAN	SD	dF	F	P-value
ARTISTIC ABILITY	Dyslexic	23	2.913	1.505	87	1.764	0.188 NS
	Non-Dyslexic	65	2.508	1.161			
ATTENTION TO DETAIL	Dyslexic	23	2.609	1.270	87	2.462	0.120 NS
	Non-Dyslexic	65	2.169	1.112			
"BIG PICTURE" THINKING	Dyslexic	23	1.391	0.499	87	0.501	0.481 NS
	Non-Dyslexic	65	1.492	0.616			
COMMUNICATION SKILLS	Dyslexic	23	2.604	0.974	87	3.930	0.051 NS
	Non-Dyslexic	65	1.892	0.812			
COMPETITIVENESS	Dyslexic	23	2.000	0.905	87	0.363	0.549 NS
	Non-Dyslexic	65	1.877	0.82			
DECISION-MAKING SKILLS	Dyslexic	23	1.522	0.511	87	2.161	0.145 NS
	Non-Dyslexic	65	1.785	0.800			
DELEGATION ABILITY	Dyslexic	23	1.957	0.706	87	1.441	0.233 NS
	Non-Dyslexic	65	2.185	0.808			
DESIGN ABILITY	Dyslexic	23	2.391	1.196	87	0.191	0.663 NS
	Non-Dyslexic	65	2.508	1.062			
DETERMINATION	Dyslexic	23	1.478	0.665	87	0.012	0.913 NS
	Non-Dyslexic	65	1.462	0.614			
EMPATHY	Dyslexic	23	2.391	1.158	87	8.537	0.004**
	Non-Dyslexic	65	1.754	0.791			
IMAGINATION	Dyslexic	23	1.522	0.665	87	0.227	0.635 NS
	Non-Dyslexic	65	1.600	0.68			
INVENTIVENESS	Dyslexic	23	1.609	0.722	87	1.691	0.197 NS
	Non-Dyslexic	65	1.831	0.698			
INTRAPERSONAL SKILLS	Dyslexic	23	2.087	0.848	87	0.441	0.508 NS
	Non-Dyslexic	65	1.954	0.818			
INTERPERSONAL SKILLS	Dyslexic	23	2.391	1.076	87	7.010	0.010**
	Non-Dyslexic	65	1.846	0.755			
INTUITION	Dyslexic	23	1.826	0.887	87	0.275	0.601 NS
	Non-Dyslexic	65	1.723	0.781			
MEMORY ABILITY	Dyslexic	23	3.217	1.085	87	13.177	0.000***
	Non-Dyslexic	65	2.308	1.014			
MULTI-TASKING ABILITY	Dyslexic	23	2.565	0.992	87	3.645	0.060 NS
	Non-Dyslexic	65	2.108	0.986			

Table 8. Personal Attributes of Singapore Entrepreneurs (Cont.)

PERSONAL ATTRIBUTES OF SINGAPOREAN ENTREPRENEURS							
ATTRIBUTES		N	MEAN	SD	dF	F	P-value
ORGANISATION ABILITY	Dyslexic	23	2.435	0.896	87	1.342	0.250 NS
	Non-Dyslexic	65	2.169	0.961			
PERSEVERANCE	Dyslexic	23	1.739	0.915	87	1.180	0.280 NS
	Non-Dyslexic	65	1.554	0.613			
PLANNING SKILLS	Dyslexic	23	1.870	0.815	87	0.885	0.349 NS
	Non-Dyslexic	65	2.046	0.759			
PROBLEM-SOLVING ABILITY	Dyslexic	23	1.652	0.714	87	0.027	0.870 NS
	Non-Dyslexic	65	1.677	0.589			
PUBLIC SPEAKING ABILITY	Dyslexic	23	2.739	1.175	87	8.579	0.004**
	Non-Dyslexic	65	2.062	0.864			
RESILIENCE	Dyslexic	23	1.739	0.81	87	0.106	0.745 NS
	Non-Dyslexic	65	1.800	0.754			
RISK-TAKING ABILITY	Dyslexic	23	2.261	0.864	87	0.500	0.481 NS
	Non-Dyslexic	65	2.123	0.781			
SELF-CONFIDENCE	Dyslexic	23	2.000	0.674	87	0.139	0.710 NS
	Non-Dyslexic	65	1.938	0.682			
SELF-ESTEEM	Dyslexic	23	1.957	0.706	87	0.126	0.724 NS
	Non-Dyslexic	65	2.016	0.677			
SOCIAL SKILLS	Dyslexic	23	2.217	1.126	87	1.326	0.253 NS
	Non-Dyslexic	65	1.969	0.790			
TEAMWORK & COLLABORATION	Dyslexic	23	2.043	0.825	87	0.256	0.614 NS
	Non-Dyslexic	65	1.954	0.694			
TECHNOLOGY SKILLS	Dyslexic	23	2.043	0.928	87	1.171	0.282 NS
	Non-Dyslexic	65	2.277	0.875			
TIME MANAGEMENT ABILITY	Dyslexic	23	2.217	0.902	87	1.450	0.232 NS
	Non-Dyslexic	65	2.462	0.812			
VISUAL TALENTS	Dyslexic	23	1.652	0.714	87	2.655	0.107 NS
	Non-Dyslexic	65	1.954	0.779			
VISUAL THINKING - 'THINKING IN PICTURES'	Dyslexic	23	1.304	0.470	87	14.963	0.000***
	Non-Dyslexic	65	2.046	0.874			
VISUAL-SPATIAL ABILITY	Dyslexic	23	1.696	0.822	87	6.270	0.014*
	Non-Dyslexic	65	2.200	0.833			

Key * $p < .05$; ** $p > 0.01$; *** $p > 0.001$; NS – Not Significant

memory ability, were still positive scores where the mid score of 3 is neutral. All these scores were before the mid-point. Memory ability (3.2), however, was after 3 for the dyslexic group.

Visual thinking, defined as “seeing ideas and concepts as images”, and visual spatial ability defined as “mentally understand the relationship between objects of space” returned a score that was significantly more positive than the non-dyslexic group, although all participants scored positively, above the mid-point, for these attributes the dyslexic group recorded far more positive scores.

DISCUSSION

The purpose of this study is to gain an understanding of the experiences of Singaporean entrepreneurs with dyslexia and to explore their educational experiences, their attributes, talents, and challenges. Their experiences will help to provide a narrative for those who work with and support dyslexic adults in Singapore.

The current sampling procedure led to 88 entrepreneurs completing the survey. Of these, 26% presented evidence of dyslexia. This is 2.5 times the incidence of dyslexia that would be expected from the general population of Singapore. Although perhaps surprising, this much greater incidence of dyslexia in the entrepreneur population is consistent with other studies (Logan, 2009).

This is exciting news for the dyslexic community in Singapore. Revealing that those with dyslexia have a career pathway in Singapore. As Logan (2011) indicated that “dyslexia is not a barrier to starting a business and it is a place where dyslexics can really shine!” (Logan, 2011). This is a sentiment that we can celebrate in Singapore too!

The researcher would like to acknowledge the Dyslexia Association of Singapore and its late President, Dr Jimmy Daruwalla, in their efforts to bring this knowledge to the dyslexia community and to Singapore. It is also a study that can be built upon and expanded to understand the business experiences of the dyslexic community

However, the significant negative educational experiences reported by the dyslexic entrepreneurs indicate a high level of struggle to succeed and in many cases raises awareness of the challenges they faced in becoming business owners. Prime Minister Lee’s call for an inclusive society will play a role in changing the mindsets of those in education to ensure that all are given the support they need to succeed. (Weng, Walker & Rosenblatt, 2015)

Education Experience of Entrepreneurs with Dyslexia

The lowest level of qualification was at the primary level and this participant was identified as an individual who was diagnosed with dyslexia, having completed an educational psychological assessment in his early 40's by a Singaporean psychologist. The dyslexia screening score for this participant was 81, which classifies the participant as having signs consistent with moderate to severe dyslexia.

The educational experience of entrepreneurs with dyslexia in Singapore reveals that they had a significantly more challenging and highly negative experience in Primary and Secondary school than their non-dyslexic entrepreneurs. This finding suggests that Singapore has a long way to go to ensure that young learners with dyslexia are accepted and supported in Singaporean schools, especially when the youngest dyslexic participant, aged 19, described his education as 'painful' which included physical and mental bullying and being mocked for his lower grades. Another dyslexic participant recounted how humiliated he felt when the Principal of the school indicated to his mother that he was an idiot and needed to see a doctor.

In contrast, the experience had at university by participants with dyslexia was the opposite of this and significantly so. All dyslexic participants who achieved a University education reported the experience was a positive one with no negative reports. This is one of the observations made by West (2014) on the outcomes for dyslexic adults in higher learning that they can shine when learning at tertiary level, 86% of the dyslexic group said that learning was much easier for them as adults. West (2014) indicated that as dyslexic learners mature and study subjects in their area of passion then they have a better educational experience and can be successful in their learning.

The negative experiences of entrepreneurs with dyslexia in Singaporean schools give pause for reflection although this is not a unique issue to Singapore, these sentiments are also expressed elsewhere (Alexander-Passe, 2016; Austin, 2016; Gwernan-Jones and Burden, 2009; Shaywitz, Morris & Shaywitz, 2008; Scott, 2014). Negative experiences in education have implications for the personal development of individuals with dyslexia, (Burden, 2005; Scott, 2014). Burden (2005) also shares that the unfortunate struggles that many dyslexics have in school years does not necessarily mean a failed future and that overcoming these painful and negative experiences builds self-efficacy and positive outcomes. It is therefore important that education policy be reviewed to ensure that individuals with learning differences experience a more positive learning environment in the school system.

Singapore Ministry of Education is currently making significant educational reforms to steer away from testing and streaming with an aim that these initiatives will be conducive to supporting and including a diverse set of learners, in the words of Ong Ye Kung, Singapore's Education Minister, "I hope that within a generation, this culture will

shift to something which is more nurturing, more compassionate” (Teng, 2019). This gives hope that future generations of Singaporeans will not be subjected to the negative experiences that the dyslexic group encountered in their primary and secondary education.

The Singapore government impresses on its people that lifelong learning is essential to improve the skills necessary to meet the evolving needs of an “innovation-driven economy” (Teng, 2016a). Skills based learning is fast becoming a necessity to meet the problems of the future and to meet the changes in job scope. (Huang, 2019). Although these dyslexic entrepreneurs may have had a challenging educational experience this has not been a barrier for their contribution to the Singaporean economy and becoming business owners.

Inspiration on becoming an Entrepreneur

Exploring the factors that inspired dyslexic entrepreneurs to start their own business they indicated that their dyslexia and having control were two of the main reasons for starting their own businesses. To be able to have control over their own circumstances and be in control of their own destiny was a strong theme for non-dyslexic participants too. This is strongly linked to the theme of dyslexia because they needed to be able to have control over what they could contribute to their businesses and find the support of others to complement their weaknesses. A theme that is found in Logan’s research (2009).

Logan (2009) identified that dyslexic entrepreneurs were likely to go into their own businesses to do things their own way and create coping strategies to compensate for their dyslexia. The comments from dyslexic participants in this study reflect this sentiment. However, we see other reasons that Singaporean entrepreneurs are opening businesses and for quite altruistic reasons, too. Giving back to society was a strong theme for dyslexic group and their belief about making a difference and doing good work for Singaporean society was the focus for their business.

Attributes of Entrepreneurs with Dyslexia

Entrepreneurs have unique attributes; 33 attributes and traits were identified for the survey. Most participants rated themselves in the above average range, and there was not a significant difference between the dyslexic and non-dyslexic groups. The analysis revealed six areas of statistical significance in attributes between the two groups, these are:

- ◆ Empathy
- ◆ Interpersonal Skills
- ◆ Public Speaking
- ◆ Memory Ability
- ◆ Visual Thinking- Thinking in Pictures
- ◆ Visual-Spatial Ability

The findings suggested that, compared to their non-dyslexic peers, the dyslexic entrepreneurs reported lower levels of empathy and interpersonal skills, as well as lower self-reported public speaking ability and poorer levels of memory.

The scores for the first three attributes, empathy, interpersonal skills, and public speaking although significantly different from the non-dyslexic population were still positive scores and above the mid-point score of 3. To speculate why the dyslexic group rated themselves lower in these areas may be because of their negative learning experiences. Participants who rated themselves negatively scoring 4 or 5 in these areas had the most challenging times during their education and still struggle with literacy as adults.

The fourth attribute memory ability was also statistically significant. Of all the scores analysed in this section, this score was the only negative score registered with a mean of 3.217. Considered a negative score, this identifies that those with dyslexia have issues with memory and it is an area that can be negatively impacted by a learning difference. (DAS, 2019a)

Visual thinking or thinking in pictures was defined as 'seeing ideas and concepts as images' in the survey. Visual thinking is the ability to analyse visual information and to solve problems based on visual reasoning, a concept that is explored by numerous researchers (Davis, 1997, Everatt, Weeks and Brooks, 2007; Vail, 1990; & West, 2005, 2014, 2017). West (2017), in his latest book, writes that he is often told that individuals with dyslexia, "*could see things that others could not see*" (West, 2017, p14). As a result, West describes this as a hidden talent and advantage for those with dyslexia, with one famous example of the use of visual thinking the employment of dyslexics at the British Electronic Intelligence Agency, GCHQ, where dyslexics are employed because they see things in codes that others do not (West, 2014).

Visual thinking is intimately connected to Visual-Spatial ability, the ability to identify visual and spatial relationships between objects and space, this was defined on the survey as 'mentally understanding the relationship among objects or space'. This ability is measured in psychometric testing when assessments are completed for the diagnosis of dyslexia, and has been found to be one of the strengths reported for dyslexics (Everatt, Weeks & Brooks, 2007). In addition, Vail (1990) identified a number of traits of dyslexics and two were 'awareness of patterns' and 'heightened perception', both of which are likely to be related to increased visuospatial ability. Finally, von Karolyi (2003) concluded that visual-spatial skills can be useful in 'real-world' activities such as mechanical and carpentry skills, artistry, biology, surgery and the interpretation of X-rays and scans (fMRI). Such talents can be argued to provide a much more optimistic future for those with dyslexia.

The profile of dyslexic adults reveals a unique set of attributes and this is reflected in the industries that our Singaporean entrepreneurs with dyslexia are working in. The dyslexic

participants have business in the following industries which leverage on their individual talents and strengths:

- ◆ Advertising and Communications
- ◆ Crafts and Costumes
- ◆ Educational Resources and Design
- ◆ Fashion and Beauty
- ◆ Finance
- ◆ Food & Beverages
- ◆ Information Technology
- ◆ Interior Design, Architectural ancillary services
- ◆ Motion Picture and Video Content
- ◆ Social sector
- ◆ Sport and Exercise
- ◆ Training & Coaching Business

CONCLUSION

The future for Singapore Entrepreneurs with dyslexia is incredibly positive, they have succeeded despite the challenges they have faced in education and have been successful, in some cases because of their dyslexia (Yee, 2018). Individuals with dyslexia should know that to capitalise on their strengths and talents can see them build a career in their own businesses. However, for Singapore to continue to invest in its only natural resource, changes are necessary for the education system to encourage learners with dyslexia to strive for excellence just as much as their non-dyslexic peers. A shift in mindset to skills based rather than academic based measures may see many more opportunities for dyslexics to shine.

Singapore needs to be mindful of the experiences that learners with dyslexia are having in schools, especially Primary and Secondary School, and a review of teacher capabilities at this level would be pertinent at all levels of education (Byrne, 2018; Gwernan-Jones and Burden, 2009; Landulfo, Chandy and Wong, 2015).

LIMITATIONS

A few limitations were experienced in this research. The stigma of a learning difference was highlighted as one concern in Singapore. To ensure the research was ethical it was revealed to participants that two groups of entrepreneurs were being researched, indeed it was important that both cohorts, dyslexic and non-dyslexic participants contributed to this research so that comparisons could be made between both groups. With a stigma of a learning difference being a negative outcome in Singapore it was felt that some entrepreneurs may have decided not to complete the survey as a result. Conversely, as the research advertised that the two groups were being researched then it would be possible that entrepreneurs with dyslexia decided to complete the survey because they were dyslexic.

Survey design became a limitation for a few reasons. The survey was lengthy, a total of 85 questions, and therefore took a long time to complete, this can be a disadvantage for all participants, especially those who did not fully complete the survey. As the survey took approximately 30 minutes to complete and was quite wordy, this also put the dyslexic participants at a disadvantage. It was evident in the 5 long answer questions that non-dyslexic participants provided longer answers than their dyslexic peers.

The thematic analysis was conducted by only one researcher. For thematic coding approaches in research it would be preferable that the coding of the themes be confirmed and validated independently.

RECOMMENDATIONS FOR FUTURE RESEARCH

This research study is the first in Singapore to explore the incidence of dyslexia in the entrepreneur population as well as exploring the educational and business experiences of this population. To continue this research in Singapore, a local adult dyslexia checklist should be created to include the development of current technologies available. It would also be useful to undertake a similar study with a group who had received formal diagnoses of dyslexia.

It was also interesting to note a tendency for Singaporeans to answer positively, perhaps more so than data from other countries would lead us to predict. It would therefore be useful to also examine a non-entrepreneurial group, to ascertain whether this is also indicative of a more generalised Singaporean trait, rather than limited to entrepreneurs.

Further study is required on the business aspects of dyslexics in business. This research gathered significant data on business aspects, however, the results were not sensitive enough to identify trends or differences in the two groups. The survey, therefore, was not an efficient way of collecting data for this area of investigation. It might be appropriate to consider including a focus group or interviews in future research to clarify further aspects of this topic.

One striking aspect of this data was the high level of tertiary education of the participants generally, notably higher than that found in similar studies in the area, which suggests that despite their early struggles, the emphasis on educational attainment has been conducive to success, even for many who struggle with dyslexia. The results of the educational experiences are of significance and with the changes that the Singapore Ministry of Education are currently recommending this would be of interest to organisations such as DAS and how these changes impact those with dyslexia in the changing educational environment in Singapore.

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<h2 style="margin: 0;">SINGAPORE ENTREPRENEURS</h2> <h3 style="margin: 0;">PART 1 — Your Personal and Educational Information</h3>							
PERSONAL INFORMATION : <i>We need to verify the information you provide with you</i>							
NAME:							
EMAIL:							
PHONE:							
AGE:		GENDER:		ARE YOU LEFT-HANDED?	YES / NO		
HAVE YOU BEEN DIAGNOSED WITH A SPECIFIC LEARNING DIFFERENCE? <i>E.g. Dyslexia, ADHD, Dyspraxia, etc</i>						YES / NO	
IF YES, WHAT WAS THE DIAGNOSIS & WHEN WERE YOU DIAGNOSED?							
ACADEMIC QUALIFICATIONS: <i>Please indicate the highest qualifications achieved e.g. Bachelors Degree—Field or Name of Qualification , e.g. "Bachelor of Business and Marketing"</i>							
AT WHAT AGE DID YOU LEAVE FULL TIME EDUCATION?							
EDUCATION AND LEARNING EXPERIENCES:							
What was your school experience like from what you can remember?	Very Positive	Positive	Average	Negative	Very Negative	I Can't Remember	Not Applicable
<input type="checkbox"/> Primary School Experience?							
<input type="checkbox"/> Secondary School Experience?							
<input type="checkbox"/> Junior College Experience?							
<input type="checkbox"/> Polytechnic Experience?							
<input type="checkbox"/> University/Tertiary Experience?							
What was your overall learning experience like?							
Is Learning easier in adulthood rather than childhood?							
PLEASE DESCRIBE YOUR EDUCATIONAL EXPERIENCES.							
<i>If there is not enough space here please feel free to add additional sheets.</i>							

<h2 style="margin: 0;">SINGAPORE ENTREPRENEURS</h2> <h3 style="margin: 0;">PART 2 - Business and Entrepreneurial Information</h3>														
How long have you been a business owner?														
How many businesses do you currently operate?														
How many businesses have you had?														
Do you hold any Patents? <i>(Indicate the number of Patents)</i>														
What are the total number of employees you have been responsible for? <i>(Approx.)</i>														
How do you measure your success in business?														
Do you hold or have been presented with any business awards?														
If yes, what awards do you have?														
PLEASE RATE THE FOLLOWING QUALITIES ABOUT YOURSELF AS AN ENTREPRENEUR	Very Good	Good	Average	Poor	Very Poor									
Success as an Entrepreneur														
Prospect of Future Business Success														
Vision for your Business														
Leadership Skills														
Risk-Taking in Business														
Teamwork and Collaboration														
Self-Esteem and Confidence														
Delegation and using Employee Strengths														
WHAT INSPIRED YOU TO BECOME AN ENTREPRENEUR?														
<i>If there is not enough space here please feel free to add additional sheets.</i>														
PLEASE TICK THE FACTORS THAT HAVE INFLUENCED YOU TO BE A SUCCESSFUL ENTREPRENEUR.														
<table style="width: 100%; border: none;"> <tr> <td style="width: 33%;"><input type="checkbox"/> EDUCATION</td> <td style="width: 33%;"><input type="checkbox"/> FAMILY BUSINESS</td> <td style="width: 33%;"><input type="checkbox"/> GOVERNMENT SUPPORT</td> </tr> <tr> <td><input type="checkbox"/> SELF-DRIVEN / MOTIVATED</td> <td><input type="checkbox"/> INVENTION OR IDEA</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> BUSINESS OPPORTUNITY</td> <td><input type="checkbox"/> MENTOR</td> <td>_____</td> </tr> </table>						<input type="checkbox"/> EDUCATION	<input type="checkbox"/> FAMILY BUSINESS	<input type="checkbox"/> GOVERNMENT SUPPORT	<input type="checkbox"/> SELF-DRIVEN / MOTIVATED	<input type="checkbox"/> INVENTION OR IDEA	<input type="checkbox"/> OTHER	<input type="checkbox"/> BUSINESS OPPORTUNITY	<input type="checkbox"/> MENTOR	_____
<input type="checkbox"/> EDUCATION	<input type="checkbox"/> FAMILY BUSINESS	<input type="checkbox"/> GOVERNMENT SUPPORT												
<input type="checkbox"/> SELF-DRIVEN / MOTIVATED	<input type="checkbox"/> INVENTION OR IDEA	<input type="checkbox"/> OTHER												
<input type="checkbox"/> BUSINESS OPPORTUNITY	<input type="checkbox"/> MENTOR	_____												
PLEASE DESCRIBE WHY YOU CHOSE THESE FACTORS:														
<i>If there is not enough space here please feel free to add additional sheets.</i>														

SINGAPORE ENTREPRENEURS					
PART 3 - Your Personal Attributes - Talents, Strengths and Challenges					
HOW WOULD YOU RATE YOUR TRAITS, ABILITIES AND SKILLS	Very High	High	Average	Low	Very Low
Artistic Ability: <i>Create works of art, e.g., painting, drawing, sculpture etc.</i>					
Attention to Detail: <i>To be thorough and accurate when completing tasks.</i>					
"Big Picture" Thinking: <i>Sees total solutions for problems, "out-of-the-box" thinking.</i>					
Communication Skills: <i>Ability to communicate ideas effectively to others.</i>					
Competitiveness: <i>Having a strong desire to compete and succeed</i>					
Decision-making Ability: <i>Being able to make decisive and effective decisions.</i>					
Delegation Ability: <i>Able to delegate tasks to others who have the skills to do them better.</i>					
Design Ability: <i>Able to design unique products, create unique visual designs.</i>					
Determination: <i>Having a firmness of purpose, resolve and persistence to get things done.</i>					
Empathy: <i>The ability to understand and share the feelings of others.</i>					
Imagination: <i>Being able to form ideas, concepts, a creative ability to see things with the mind.</i>					
Inventiveness: <i>Being able to see and create unique solutions to problems.</i>					
Intrapersonal Skills: <i>Understanding self in relation to others.</i>					
Interpersonal Skills: <i>Interacting with others effectively.</i>					
Intuition: <i>The ability to understand something instinctively without the need for reasoning.</i>					
Memory Ability: <i>The ability to store, retain and recall information effectively.</i>					
Multi-tasking Ability: <i>The ability to manage multiple tasks effectively.</i>					
Organisation Ability: <i>Organising work and time schedules and prioritising tasks effectively.</i>					
Perseverance: <i>Persistence in doing something despite difficulty or delay in achieving success.</i>					
Planning Skills: <i>Implementing actions and decisions to accomplish goals.</i>					
Problem-Solving Ability: <i>Analytical and critical thinking skills help you to evaluate a problem.</i>					
Public Speaking Ability: <i>Engages, Entertains and informs audiences to deliver a message.</i>					
Resilience: <i>The capability to recover quickly from difficulties and hardship.</i>					
Risk Taking Ability: <i>Engaging in activities that may result in failure than assured success.</i>					
Self-Confidence: <i>Trusting your abilities, qualities and judgements.</i>					
Self-Esteem: <i>A positive belief in yourself, your abilities and your future.</i>					
Social Skills: <i>Getting on with and understanding others.</i>					
Teamwork and Collaboration: <i>Working together effectively for a shared goal.</i>					
Technology Skills: <i>Use of Assistive Technology and other technology solutions to succeed.</i>					
Time Management Ability: <i>The ability to use one's time effectively or productively.</i>					
Visual Talents: <i>Seeing patterns of things, or the whole thing, that others may not see.</i>					
Visual Thinking - "Thinking in Pictures": <i>Seeing ideas and concepts as images.</i>					
Visual-Spatial Ability: <i>Mentally understand the relationship among objects or space.</i>					

SINGAPORE ENTREPRENEURS

PART 4—Adult Dyslexia Checklist

Even if you have a diagnosis of Dyslexia please completed this section

ADULT DYSLEXIA CHECKLIST

Below are the questions that were found to be more predictive of dyslexia (as measured by prior diagnosis). In order to provide the most informative checklist, scores for each answer indicate the relative importance of that question. Alongside each line you can keep a tally of your score and at the end find a total. For each question, circle the number in the box which is closest to your response.

<i>Please circle the number in the box closest response.</i>	Rarely	Occasionally	Often	Most of the time	Total
Do you confuse visually similar words such as cat and cot?	3	6	9	12	
Do you lose your place or miss out lines when reading?	2	4	6	8	
Do you confuse the names of objects, for example table for chair?	1	2	3	4	
Do you have trouble telling left from right?	1	2	3	4	
Is map reading or finding your way to a strange place confusing?	1	2	3	4	
Do you re-read paragraphs to understand them?	1	2	3	4	
Do you get confused when given several instructions at once?	1	2	3	4	
Do you make mistakes when taking down telephone messages?	1	2	3	4	
Do you find it difficult to find the right word to say?	1	2	3	4	
How often do you think of creative solutions to problems?	1	2	3	4	
	Easy	Challenging	Difficult	Very Difficult	
How easy do you find it to sound out words such as el-e-phant?	3	6	9	12	
When writing, do you find it difficult to organise thoughts on paper?	2	4	6	8	
Did you learn your multiplication tables easily?	2	4	6	8	
How easy do you find it to recite the alphabet?	1	2	3	4	
How hard do you find it to read aloud?	1	2	3	4	
TOTAL SCORE					

RESULTS FROM THE ADULTS TEST - WHAT IT ALL MEANS

The research and development of the checklist has provided a valuable insight into the diversity of difficulties and is a clear reminder that every individual is different and should be treated and assessed as such. However, it is also interesting to note that a number of questions, the answers to which are said to be characteristics of dyslexic adults, are commonly found in the answers of non-dyslexics.

It is important to remember that this test does not constitute an assessment of one's difficulties. It is just an indication of some of the areas in which you or the person you are assessing may have difficulties. However this questionnaire may provide a better awareness of the nature of an individual's difficulties and may indicate that further professional assessment would be helpful.

Whilst we do stress that this is not a diagnostic tool, research suggests the following about your total score: *(see next page)*

SINGAPORE ENTREPRENEURS

PART 4 Adult Dyslexia Checklist Results

SCORE LESS THAN 45 - PROBABLY NON-DYSLEXIC

Research results: no individual who was diagnosed as dyslexic through a full assessment was found to have scored less than 45 and therefore it is unlikely that if you score under 45 you will be dyslexic.

SCORE 45 TO 60 - SHOWING SIGNS CONSISTENT WITH MILD DYSLEXIA

Research results: most of those who were in this category showed signs of being at least moderately dyslexic. However, a number of persons not previously diagnosed as dyslexic (though they could just be unrecognised and undiagnosed) fell into this category.

SCORE GREATER THAN 60 - SIGNS CONSISTENT WITH MODERATE OR SEVERE DYSLEXIA

Research results: all those who recorded scores of more than 60 were diagnosed as moderately or severely dyslexic. Therefore we would suggest that a score greater than 60 suggests moderate or severe dyslexia. Please note that this should not be regarded as an assessment of one's difficulties. But if you feel that a dyslexia-type problem may exist, further advice should be sought.

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Other Dyslexia Screening Tests can be found at these websites:

British Dyslexia Association—Adults and Employment
www.bdadyslexia.org.uk/about-dyslexia/adults-and-business.html

International Dyslexia Association—Adults Self-Assessment Tool
www.interdys.org/AreYouDyslexic_AdultTest.htm

National Centre for Learning Disabilities
<http://www.ncl.org/learning-disability-resources/checklists-worksheets/interactive-ld-checklist>

The Dyslexia Association of Singapore (DAS) is currently working towards a programme that will provide support for Adult Dyslexics, if you need further information we recommend the information on adult dyslexia support from our international dyslexia partners:

International Dyslexia Association: www.interdys.org
 British Dyslexia Association: www.bdadyslexia.org.uk

If, after completing this checklist, you would like to talk to DAS about an Adult Assessment

Please contact DAS at: 6444 5700

THANK YOU FOR COMPLETING THIS SURVEY

I will be in contact with you soon to verify this information with you and to answer any questions you may have about this research.

Deborah Hewes, email: deborah.hewes@das.org.sg



Characteristics of entrepreneurs who experience dyslexia: an interview study on the role of school in supporting an entrepreneurial mindset

Margaret Meehan^{1*}, Angela J Fawcett¹, Paul Adkins² & Barbara Pavey³

1. Swansea University
 2. Harper Adams
 3. Independent Consultant
-

ABSTRACT

In this study, 17 students who experience dyslexia, and were engaged in a business studies course at degree level or above were recruited from two Universities to participate in this semi-structured interview study on entrepreneurship. The four questions addressed included their strengths and characteristics, the obstacles they anticipated, and what further skills they needed to fulfil their aspirations. The results suggested that these students shared many of the characteristics of entrepreneurs who experience dyslexia noted in the literature, including determination, communication, people skills, and the capacity for risk taking. Moreover, that obstacles to their success related primarily to their lowered confidence in the face of failure. The comments indicated that these students were realistic about their ongoing needs to fulfil their business aspirations, and saw a stronger role for school at all stages in preparing students for an entrepreneurial future. Practical aspects and group projects, rather than a purely theoretical approach in education, were highlighted as key here, enriched with relevant experience of both successful and unsuccessful entrepreneurs, to endow this group with the knowledge that failure could be an important tool in learning throughout education and working life.

Keywords:

*Correspondence to:
Angela Fawcett, Swansea University, Email: a.j.fawcett@swansea.ac.uk

INTRODUCTION

Entrepreneurship education has proliferated internationally over the last few years since the inception of this movement in the 1980s but a number of questions remain unanswered. Entrepreneurs have been recognised across the world as a major solution to the constraints of employment in the 21st-century, taking a positive spin on the lack of secure employment as a starting point for encouraging innovation and enterprise as an alternative approach to establishing a career. In the UK, (Young, 2014), the USA, (Mead and Rotherham, 2008), as a priority in the Europe 2020 strategy, (SEECCEL, 2016), Africa, (Herrington and Coduras, 2019), and Asia (Tan, 2012) policy papers have been published and emphasised as a way forward to achieve the maximum employment for a whole range of young people, creating an environment in which entrepreneurs should thrive.

At the same time, a greater concentration on a model of sustainable innovation has become key to success internationally, with the United Nations publishing sustainable development goals, (United Nations, 2016) that have been adopted by 193 countries, leading to a continually growing need to focus on the three factors involved, the environment society and the economy, within a sustainable innovation model (Stock et al., 2017). This model has been based on the so called 'fuzzy front end' innovation, (FFE), featuring innovation drivers, led by motivation and the willingness to motivate others, leading to creativity, encompassing innovation capacity, and knowledge, which has been called the essence of innovation. Stock and colleagues (2017) note that the FFE process involved requires the exercise of problem detection, analysis, and a range of solutions, before focusing on the selected solution. A specific mode of thinking and problem solving is needed here, which is typically expressed in entrepreneurs within every society.

A key factor here is the employment of an enterprise entrepreneurial education at all levels in education but the literature suggests that this has been more successful in tertiary education than in the early stages of primary and secondary education. In the UK, for example, the emphasis on academic subjects militates against the development of entrepreneurial skills within a business environment in the individual school. Consequently, although lip-service may be paid at government level to the importance of entrepreneurial skills, in reality the opportunities for the development of these skills have been limited by adherence to a more academic curriculum. The question therefore arises, "how can more be done to create a positive environment for development of entrepreneurial skills within schools at all levels and in all countries?".

In this article we attempt to address these issues by soliciting the views of a specialist group of students with dyslexia, with an interest in entrepreneurial success. It is important to recognise why this particular group of students may have a specific contribution to make in the area of entrepreneurial education. Research over many years has suggested that dyslexic adults may have a specific tendency towards adopting an

entrepreneurial career. The initial research by Logan (2009) showed significantly more entrepreneurs in a US group than in corporate management (35% vs 1%), although it should be noted that the study has been widely critiqued because these individuals had not been formally diagnosed with dyslexia, but were simply screened with an adult checklist. This has led to a range of further studies, inspired by many anecdotal case studies of entrepreneurial skills in dyslexia (see for example West, 2009).

However, a large-scale study in the Netherlands, (Hessels et al., 2014) concluded that there was no evidence for greater incidence of entrepreneurship in dyslexia in a sample of 3319 Dutch entrepreneurs between the ages of 18 and 65. It should be noted that the definition of dyslexia in Hessels and colleagues study was broader than usual, including reading and comprehension difficulties of all types. There was, however, evidence that dyslexic individuals were more likely to be male, and less well educated, lower earners, both of which have been associated with an interest in entrepreneurship, as well as more likely to be an early stage entrepreneur than an employee, but this last finding was only significant at the 10% level, representing a trend rather than a clearly significant statistic. Interestingly, Vega and colleagues, (2016) note that an appetite for entrepreneurship is more prevalent in the young aged 40 or less, with a decrease in willingness to engage with risk taking with age, which might explain the pattern of results in the Hessels et al. paper. Nevertheless, the escalating interest in entrepreneurship and dyslexia has led to the forthcoming publication of an edited book on the topic (Pavey et al., 2020 in press) with the material here drawn from a study by Meehan et al., (2020) on the experiences of a group of dyslexic university students, their characteristics, and the impact if any, that schools might have in the process of creating an entrepreneurial mindset.

CHARACTERISTICS OF AN ENTREPRENEUR

One of the key issues here is what constitutes an entrepreneur, in particular the characteristics that have been attributed to entrepreneurs more generally. Dollinger, (2006), in the 4th edition of his influential book, considered the following elements to be characteristic of entrepreneurs, based on an analysis of changing definitions since the early 1920's. Creativity and innovation head the list, resource identification and marshalling, economic organisation, and the opportunity for gain under risk and uncertainty. Allen (2006) noted that a mindset or way of thinking that was opportunity focused, innovative and growth orientated was required. Sensitivity to change and the willingness to grasp opportunities as they present also factor as key requisites to be an entrepreneur, in addition to dealing with the unexpected and incongruous and identifying need. In the process of becoming successful, many entrepreneurs will pursue a wide range of projects that fail to reach fruition, and it would be unusual to instantly achieve success in the first venture adopted.

CHARACTERISTICS OF INDIVIDUALS WITH DYSLEXIA

In terms of the characteristics of individuals who experience dyslexia, the literature suggests a wide range of overlaps that characterise entrepreneurs with dyslexia, that go some way towards explaining the association between the two. First and foremost, the association between dyslexia and creativity has been most widely endorsed, although it must be said that attempts to prove these links experimentally have produced inconsistent findings. One of the earliest proponents of strengths in dyslexia (Vail, 1990) described it as either a strength or a bane, based on divergent thinking, seeking open ended rather than set answers, and concentrating on these to the exclusion of all else. Wolff and Lundberg (2002) attempted to unravel the links with creativity in dyslexia, with a comparative study of art students with dyslexia and matched controls. They concluded that the elements contributing to a greater incidence of students with dyslexia in this group (around 3 times higher than in the controls) were hard to pin down, and may relate to difficulties in more academic subjects. Everatt and colleagues undertook a series of studies to try and identify higher visuo-spatial abilities in 62 students aged between 18-55, and found (Everatt, 1997) evidence for greater verbal fluency and ability in visual picture construction, although this pattern of visual strengths was not evident in a later study of school children. A further study with a smaller group of students with and without experience of dyslexia identified higher self-reported creativity, problem-solving and decision making in the group with dyslexia (Everatt, Steffert and Smythe, 1999). These self-perceptions were confirmed in the same study by tests where insight was required to resolve a range of problem-solving tasks.

By contrast, a study from Lockiewicz, Bogdanwicz and Bogdanwicz, (2014) found no evidence for greater strengths in visual and creative skills, but noted the influence of personality and motivational factors to be heightened in adults who experienced dyslexia. However, even the incidence of higher visual spatial abilities has been questioned, based on a recent review (Gilger, Allen and Castillo, 2016) and a meta-analysis (Chamberlain, Brunswick, Siev and McManus, 2018), which found greater heterogeneity in individuals with dyslexia, with performance reflecting both high and low abilities. This may relate to some extent to the widespread use of university students as representative of individuals with dyslexia, when they may represent only those who have proved more successful in achieving academic qualifications. In the study reported in this paper, a similar group of university students who experience dyslexia will also be used, which naturally restricts the conclusions to be derived, because these students are at the start of their careers and can only show incipient evidence for entrepreneurship. Nevertheless, they can provide some critical evidence on the attitudes and motivation of this age range, and how closely their skills can be linked to those of entrepreneurs.

Turning now to the characteristics of school-age children who experience dyslexia, this can be largely obscured by their difficulties in achieving within an environment which emphasises the very skills with which they struggle, namely, all aspects of literacy,

memory, speed and organisation. Opportunities for them to express their creativity, and divergent thinking may be limited by the increasing demands of an academic curriculum, and there is no doubt that the feelings of failure engendered by the school environment can impact severely on the self-esteem and capacity for creative thought in this group. A recent study that provided evidence in support of this contention undertook the Torrance test of Creativity with children who experienced dyslexia drawn from a range of schools, including those that provided specialist support for dyslexia. The results indicated significantly higher scores on fluency, flexibility (the number of categories suggested) originality and elaboration, in the students from the specialist units, with a critical age for the development of creative skills between 10-15 (Kapoula et al., 2016). In these units, students were encouraged to make their own decisions, follow their individual interests and discover their abilities and limitations. Unfortunately, this is precisely the age group where education in the UK now focuses almost exclusively on examination results, particularly for those in the higher age range. It is not clear from Kapoula and colleagues' study whether it is the broader curriculum of the specialist units, or the greater understanding of the strengths and weaknesses of children with dyslexia that contribute most to these interesting results, which may be related to the increased self-esteem and feelings of competence in this group.

In order to identify the specific components of creativity in which students with dyslexia excel, a study by Cancer and colleagues, (2016) in Italy, found that it was the connecting of disparate ideas in which the group studied showed significant strengths in comparison with controls. Interestingly, in a second study forming part of the same article, the authors applied the same tests to a larger group of students who experienced dyslexia, and established a highly significant negative correlation between accuracy in reading and this connective strength. A trend towards slower speed in reading was also identified in the group who flourished in making these connections. Of course, correlation does not indicate causation, but the combination of these two experimental studies provides strong suggestive evidence for a negative link between the two skills. Interestingly, a study with a large group of 95 younger children with dyslexia aged 9-13 (Bigozzi et al., 2016), in comparison with controls, showed significantly greater originality and elaboration, although no evidence for greater flexibility in this age group. This may suggest that the development of flexibility may depend on age, or may even be dependent on the type of education received, favouring a constructive approach to dyslexia.

In terms of three other characteristics identified by Dollinger (2006), economic organisation may be the least representative of adults who experience dyslexia, given the known difficulties in memory and organisation widely associated with dyslexia, and there is little scientific evidence available on resource identification and marshalling. Nevertheless, Nicolson (2015) in a series of interview studies with successful adults and students who experience dyslexia, identified a range of social skills that characterise this group, based on strengths in teamwork, empathy and communication, as well as the

cognitive skills of big picture thinking, creativity and visualisation. For the successful adults who experienced dyslexia, (Nicolson, 2015) 87% showed the work strengths of determination, 75% resilience, in terms of cognitive strengths 87% shared a Big Picture approach, and 62% innovation and creativity. Finally, in terms of Interpersonal strengths, 62% showed teamwork and 75% empathy. Interestingly, for the students in Nicolson's studies, it is determination, proactivity and flexible coping which represent their strongest work strength skills, although many of the other entrepreneurial skills have yet to develop with experience. These characteristics have also been highlighted by Eide and Eide (2011), in aspects of their analysis of Material and Interdisciplinary reasoning, with particular strengths in interconnected reasoning, based on spotting links between seemingly unrelated areas, as well as dynamic or intuitive problem solving and anticipation of future developments. Success as an entrepreneur may relate to identifying opportunities, and building a team of people who can collectively deliver on those opportunities. A study from Sepulveda, (2014, see also Sepulveda and Nicolson, 2020 in press) corroborated many of the attributes of entrepreneurs who experience dyslexia identified by Logan (2009) adding some further unique traits, including recognising the need to ask for help, based on modesty, and the important role of the family in creating entrepreneurs.

Tolerance for risk can be related to experience of failure, which in the more successful adult with dyslexia can lead to a spirit of resilience and optimism, as a series of studies by Alexander-Passe has indicated (e.g. Alexander-Passe, 2016). In this article, family factors were identified as crucial to success, and the respondents reported a traumatic experience of school, characterised by avoiding the teacher's eye, coupled with motivation to express strengths elsewhere, as well as the tolerance for risk that characterised entrepreneurs. This author has also identified traits of post-traumatic success in the adults he has worked with who experience dyslexia, (Alexander-Passe, 2017), and it may be this tolerance for failure, based on repeated experiences of struggling in school, which makes entrepreneurship attractive to this group, as well as the difficulties in becoming an employee, based on the idiosyncratic pattern of strengths and weaknesses which may preclude success in a more traditional employment environment. Conversely, the well-known overlap between dyslexia and ADHD in children, (52%, Kaplan et al., 2001) which is not typically addressed in adults who experience dyslexia, may endow this group with an appetite for risk which can be most easily satisfied by engaging with an entrepreneurial career.

ENTREPRENEURSHIP IN EDUCATION

Despite the movement towards entrepreneurship as a key element in education across the age range, the majority of the research has been conducted with adults, particularly within the University sector internationally. Indeed, it has even been argued that entrepreneurship may not even be a teachable concept (Marram et al., 2014). In terms of the literature on entrepreneurship education, a comparative study of entrepreneurship

education with lecturers (Logan, 2008) suggested that the techniques usually employed based on lectures and case studies are those likely to be least accessible to those who experience dyslexia, that do not develop their skills. The role of a mentor, often the father in this study, seemed to be crucial, and the entrepreneurs with dyslexia, showed greater tolerance for high risk and involvement in more than one enterprise, as well as greater use of delegation. Recommendations included increased emphasis on mentoring, action learning and a more practical holistic approach. Motivation to include entrepreneurship ranges from a narrow perspective of encouraging students to start up their own business, to the more nebulous ambition of inspiring a more creative approach. These two extremes are exemplified by the UK approach of enterprise education, versus the US approach of entrepreneurial education (Lackeus, 2015). A theoretical approach is most commonly used in higher education, whereas a more experiential approach can be beneficial in terms of motivating students through involvement in practical applications, possibly across the curriculum in younger children.

A concrete example drawn from one of the universities involved in the current study was an impact report published in 2019, (Student Enterprise and Entrepreneurship impact report, 2019) and made available to all staff and students, with an initiative covering the period 2018-2023. At this early stage of the programme, 40 students started businesses, 50 students led the approach across the university, over 9000 students were engaged, and over 1500 students participated in entrepreneurial learning and skills development opportunities, achieving both national and international recognition. However, the report does not attempt to differentiate between students who experience dyslexia, and those who do not, and this it is not possible to conclude how many of these students have become involved in this initiative.

A series of recent large-scale studies from Spain have thrown considerable light on the most useful approach for older secondary school students. Garrido-Yserte, and colleagues, (2019) examined the motivation and determination to succeed, precursors of an effective entrepreneur, in a questionnaire study of 897 secondary school students aged 16-19. The results (Garrido-Yserte, Crecente-Romer, and Gallo-Rivera, 2019) demonstrated large numbers of female students with the potential for entrepreneurship, with empathy and communication key, as well as confidence in presentations, but further work needed on the ability to work within a team. A similar study with nearly 4000 subjects (Vega et al., 2016), found a more equal balance in gender, with immigrants more likely to engage in entrepreneurial tasks, as well as those who achieved lower performance. This study advocated the need for more emphasis on innovative, imagination and creativity, as well as the experience of engaging with entrepreneurs more widely, in order to encourage this type of career in a region of high youth employment. Finally, another large-scale study of 1244 15-year old students (Rosique-Blasco, Madrid-Guijarro and García-Pérez-de-Lema (2016) identified the opportunity to cultivate an entrepreneurial attitude, be proactive, innovative and learn to handle situations of uncertainty as significant factors in success for this age group.

However, in the UK, the Company Programme for Young Enterprise covers the full age range of secondary schools, from 11-18, and now reaches nearly 16,000 participants in nearly 1000 centres, with 30% of these targeting areas of multiple deprivation, in an effort to restore the economic balance to these regions through changing the mindset of pupils. The Enterprise Education Planning Framework for schools addresses the knowledge, skills and attitudes in 9 core components, problem solving, communication, teamwork, resilience, confidence, initiative, organization and creativity, with financial capability in a separate planning framework. These competences can be used to evaluate starting skill, measure progress, and to support teachers in their understanding of what constitutes enterprise and how to incorporate this within the curriculum.

In a recent Company Impact Report, (2017) which sets out to measure these competencies, plus aspirations and work readiness, 72% of students assessed improved in more than 4 competencies, with greatest improvements in work readiness and self-esteem, a 7% increase overall. Teachers and volunteers also expressed satisfaction 88% recognizing that the programme improved students' knowledge of their strengths and weaknesses, 86% that it improved students' employability skills, and 70% their career aspirations. Over 90% of the volunteer business advisors recognized that the programme had contributed to their ability to challenge and motivate others, sharing their career experience to the advantage of all involved. Further aims include the development of self-reflection to make the approach more meaningful to all those involved. Further studies in Mexico (Carcamo-Solis, et al. 2017) and the Netherlands (Huber, Sloof and Van Praag, 2014) have shown the potential for structured experience with entrepreneurship programs, suggest a positive impact on non-cognitive skills in older primary children aged 11-12, however, literature on this age range remains limited.

By contrast, any entrepreneurial involvement reported in the literature in primary school tends to be in the older children aged 11-12, and thus already on the cusp of moving to secondary school. A good example would be the Mexican study on My first enterprise with this age range from Carcamo-Solis and colleagues (2017) which established a number of mini-companies over several years, including food, jewellery, and craftwork, amongst others. A further study from Huber, Sloof and Van Praag, (2014), with this age group showed that entrepreneurial training with BizWorld in a large sample improved the non-cognitive entrepreneurial skills typically associated with entrepreneurs, although knowledge of entrepreneurship remained largely unaffected.

In summary, studying the literature on entrepreneurship education, and considering the putative links between dyslexia and entrepreneurship, suggests the need for further evidence on this topic. Students who hold an accredited professional diagnosis of dyslexia could play a key role in developing our understanding of the characteristics of entrepreneurs, as well as the role of schools in facilitating this link. This provides the motivation for the study presented here, on the potential of schools in this respect and how this could be strengthened. The study was undertaken with business students who declared an intention to start up a business, after further experience or training.

METHODOLOGY

The information gathered here was obtained as part of a larger semi structured interview study (Meehan et al., 2020 in press) conducted by the authors. The questions and their responses described in this article were not addressed in the published material to date.

The interview questions were as follows.

1. What do you see as your strengths and qualities re your aspirations?
2. Do you see any obstacles to be overcome in your plans and aspirations, if so please could you tell us what they might be?
3. Are there any specific skills and/or techniques that you believe you need to develop/learn to fulfill your aspirations?
4. What about business sense, enterprise, entrepreneurship - what would be the right sort of support, or lessons in school?

Participants

Students who experience dyslexia, and were engaged in a business studies course at degree level or above were recruited to participate in this semi-structured interview study. Students from two Universities participated, one set in inner-City Wales and another in a rural area of England. Selection of the Universities was opportunistic, and dictated by the geographical placement of the authors participating. However, it should be noted that in Wales, students would have benefitted from the Welsh young enterprise initiative from 2010-2015, (Welsh Assembly Government, 2010), when the majority of these students would have been in secondary schooling.

Invitations to participate were distributed by e-mail to students who had self-declared as experiencing dyslexia. All students participating held a formal diagnosis of dyslexia, and received the Disabled Students Allowance Interviews were recorded, transcribed and analysed based on an adapted phenomenological approach (Hycner, 1985) and validated by two colleagues. The project met the criteria for the Ethical Committees of both Universities, as well as the requirements of BERA (2004). Participants were given the right to withdraw at any time and assurances that confidentiality and anonymity would be ensured.

10 males and seven females took part, with the majority (12) completing their undergraduate degree, spread across the full range of years one to four. The remainder were drawn from the Postgraduate schools of the two universities. Their age range was 18-33, with the majority under 30. 15 participants had been educated within the UK system.

RESULTS

It was interesting to note that no one question was addressed by all the participants, although a number of key themes emerged. In the sections that follow, these are highlighted, with attempts to incorporate comments that could be seen as somewhat oblique or tangential to the question, in common with the responses of many adults who experience dyslexia. Within the broad key themes, which shared some common ground, the term 'unique themes' is used to describe comments contributed by an individual.

Question One: What do you see as your strengths and qualities re your aspirations?

In terms of strengths, a clear consensus emerged, which noted that respondents were determined, had people skills, organised, efficient, self-motivated, possessed key skills, logical, practical, possessed 'out of the box thinking' and were inventive/creative, good at maths and stats, and able to take risks.

Determination

Students who experienced dyslexia in this study thought they were determined, although this was also re-interpreted by one student as stubbornness,

"quite good at coming up with ways around things. If I could not go straight to something, I would find a different route through".

Determination was also equated with being focused on a goal. This was summed up by one student as:

"not giving up even though you have failed the last hundred times - prepared to work hard, don't mind doing long days, prefer to work slowly and work longer than others to absolutely smash it for 9 to 5."

Unique themes which were linked to determination included being very focused and being able to "weather the storm". Allied to determination, one student was quite confident.

People skills

A number of the respondents thought they had good people skills. This was defined variously as ability "to get on with people"; to have "good social and communication skills", ability "to talk to people" and work with people. One student thought that delegating was a strength. This was also framed as a necessity in order to avoid writing because, as one student commented, they "much preferred to have a dialogue". Although it was also noted by another student that social skills themselves could "be a challenge".

One student enjoyed working in a team, while another highlighted,

“networking with people in the industry and having good leadership skills”.

Personality was thought to be important, and the ability to motivate others, as well as to self-motivate. One student made this observation, and put this down to an ability to motivate other workers,

“always knew I could [motivate others] - evident when managing a team of 20 who did not speak good English and yet we were the top team of the month for meeting production and target costs, only beaten once over a period of 5-7 years”

Organised and efficient

Respondents thought they were organised, with comments related to organisation including time management and meeting deadlines, they were efficient, that is, able to find *“efficient ways to do things”* and to research for information in order to, *“make the most profit”*.

A unique theme from one student was the following,

“pretty good at taking an idea and working out how to implement or just work out a quicker way of doing something”.

This might also be interpreted as innovative (see below).

Practical

Respondents thought they were practical, were a *“hands on person”* and would learn kinaesthetically because when, as one student noted,

“learning [something] in lectures, I may get it or may not, but if I was actually doing it... it ‘clicks’ better with me”.

In the section ‘any other comments’ another student commented:

“I had a friend who experienced dyslexia who was in the same small group last year for a business strategy assignment brief, and their interpretations were different. I found that both my friend and I would interpret the assignment brief one way and the rest of the group [who did not experience dyslexia apparently] seemed to interpret it another. We would look at it with more of a practical approach whereas people without dyslexia took a more theoretical approach.

This student considered that this could just be something they had “*generally noticed*” but it was something that cropped up. It is interesting to note that the assumption here from this student was that if someone did not disclose their dyslexia, they did not experience it.

Inventive/creative and Out-of-the-box thinking

Respondents thought they were inventive/creative, and one student commented:

“good at key sort of strengths, quite inventive, like inventing things, making things and fixing things and consider myself to be creative”.

Another student stated,

“think that I have quite good ideas, and good at Out-of-the-box thinking or alternative thinking with the ability to see something from a different point of view”

A third student noted that,

“A holistic approach to things was useful sometimes”.

However, one student also recalled the following:

“a famous quote that says... if people are lazy they find better ways of doing things, which was something to do with being lazy at heart”.

Logical, Analytical and Mathematics/Statistics

Respondents thought they were good at logical thinking, and one student commented:

“Good at analytical skills, analysing data and graphs”.

In addition, two students thought they were good at mathematics or statistics. By contrast, some students, discussed further below in Question Two saw a lack of these skills in themselves as an obstacle to successfully setting up a business.

Key skills for business or having a business mind

Two respondents thought they were good at the key skills needed in the area they wish to start a business in. Such skills included, for example;

“producing and running a production line, carrying out quality control measures as well as being good at the key sort of strengths”.

Two other students thought they had a “*business mind*” because of the way they made decisions, for example, in a certain business scenario, one of these students noted that they did not shrink from making tough decisions, “*I’m quite good at sort of saying ‘Yes’... ‘No’*” which was quite important. Another student said they definitely had management qualities, liked learning things and knew that with building a new company from scratch there would be a huge amount they would have to learn, for example, planning.

Risk

The idea of risk in regard to business was raised. This meant being prepared to take risks in a hypothetical situation, but one student commented as follows,

“although as an undergraduate I might have been more gung-ho, I now realise that it’s very difficult to build a company”

On a more positive note, the same Welsh student noted that,

“if I was to start a business, it probably would be in Wales because of the WAG business start-up support – know friends who have taken that opportunity and started companies from scratch”.

A unique theme, which relates to risk and emerged in ‘any other comments’ was that disappointment and failure is a way of growth as opposed to the culture in schools that ‘kids cannot fail’. However, in the real-world people do fail and a second chance is not always possible, which in terms of post-traumatic success might encourage risk taking. This student felt that,

“any work would achieve a pass because there is a culture that students cannot fail”

This culture might be seen as patronising and encouraging a lack of effort, and also reflects a risky strategy.

Question Two: Do you see any obstacles to be overcome in your plans and aspirations, if so please could you tell us what they might be?

15 students gave responses on the obstacles they thought they might encounter as entrepreneurs. The main broad key themes were: Finance, the impact of dyslexia and business-related difficulties.

Finance

The main obstacle to a business for most respondents seemed to be financial, based on the idea of financial risk in regard to business. Initially it was thought that there might be

financial obstacles; one student commented,

“although a 1-2-week internship in a finance department would allow you to learn this aspect of a business, it would be hard to work within a limited budget”.

This seemed to be related to the constraints of adhering to a strict financial limit.

Another student said that,

“as a self-employed landlord, I have difficulty taking money off people and being ruthless is something that I would need to learn—the more people that rip me off, the more hardened to it I would become.”

This statement seems here to be more specifically related to a lack of assertiveness as a financial obstacle.

Another student also felt that they would need someone who would help them with financial dealings.

Impact of dyslexia

Perhaps surprisingly, fewer respondents noted the potential impact of their dyslexia, although they discussed the impact of their dyslexia in regard to business. One student said,

“tend to think that any difficulty in my work is due to my dyslexia, even if this may not be the case”

Another student said,

“my greatest flaw is my inability to assimilate information quick[ly] and because I’m slow at reading and assimilating knowledge, this influenced the university I’m attending”

Several students mentioned writing as a difficulty, for example, writing letters, spelling, writing emails quickly and communicating on the telephone, and one student commented,

“my dyslexia worries me, with regard to having a business in industry - my mother has not been diagnosed with dyslexia, but she’s not very good at writing and thought, - it’s not a problem that you get over but you get round it,”

They recognised that they needed to improve their writing skills, and others seemed to

equate dyslexia with difficulty in writing. This led one student to state,

“I’ll delegate writing to other people, if necessary, but I’m going to fight it, my English is improving through writing essays on my course.”

Another student even refused DSA support, for example the use of note takers, because they felt it was counterproductive and that they would be better served if they took the notes themselves and so learnt to develop the skills:

“Trying to listen and take notes at the same time, concentrating so much, I end up not hearing what the lecturer is saying. I’m listening, but it is not going in, so that I end up missing the key points. Now I feel that I’m slowly getting better at overcoming that.”

One student stated,

“Planning is an obstacle specific to my dyslexia, particularly time management. I need to be very strict with myself in order to get things done because I flick... between passions, (although I am) 100% with anything I do”.

Two students thought that their dyslexia could be an obstacle when applying for jobs particularly in answering the application question: ‘Do you consider yourself to have a disability?’ One student said,

“I am in two minds, should I state that I experience dyslexia and combat it or should I just keep shtum?”

The other student thought that their CV needed to be really good in order to get an interview because of their dyslexia. Although a third student thought that getting hired in a time of recession would be an obstacle, they did not attribute this to their dyslexia.

A number of students had received a late diagnosis, for example one student was not tested until 2009 in the first year at university,

“although my sister was tested at secondary-school age and found to be dyslexic. So, teachers wondered why I did not achieve my predicted grades in my S level results. I went privately for a diagnosis and found that I had a slow processing speed”

Another student had mixed feelings about a late diagnosis of dyslexia, stating

“I felt let down”

Reflecting on school, especially Junior School, they stated,

“I was shouted at quite a lot for demonstrating what I now know to be classic symptoms of dyslexia. This happened throughout school repeatedly -if any of the teachers had picked up on it, I could have done so much better”.

Conversely, for one student difficulties were recognised in primary school, and support put in place, in the form of readers, and extra reading sessions. This was owing to the Head of the department pursuing continual professional development and needing a student to test. This student was selected because *“they found me quite interesting”*, and they were given a diagnosis of dyslexia and a profile of their strengths and weaknesses. Despite this early support, they described their difficulties with study skills at university, noting mainly that they had never been able to take notes in lectures.

Another student thought,

“being dyslexic makes people have more drive. From my own perspective, I feel it does not really affect me, in that it’s only occasionally that I cannot spell or read as fast as others do. I also think in entrepreneurship, people with dyslexia work harder because they know they’ve got to. In my modules in human resources and organisation all wordy stuff, I have good lecturers and the module is good, but I have to write essays for coursework and in exams. Therefore, I know I have to do a lot of work on these and know what I need to write for every question. I’m good at getting straight to the point”

This student has worked hard on that, with the result that these were some of their best exams because of their work. Having said that dyslexia didn’t really affect them, later in the interview they said that,

“I know I’m dyslexic and it affects me in a bad way but if you just work at [it]....”

One of their exam strategies concerning spelling specific words was to write them on paper and stick these around the room so that they would know *“how to spell them”*.

In terms of support, students spoke about support for dyslexia, and how this impacted on their progress. One student noted that they were given reasonable adjustments of 25% extra time and a separate room for A level exams. In terms of assistive technology programmes, they had text-to-voice and mind-mapping software, as well as a Dictaphone, printer and scanner. They were also given coloured sleeves for their screens which could be taken into the exam and these were really helpful. Another student said,

“I have an appointment each week with learning support and if I don’t have my work read through it made a five percent difference to my grades by having my spellings checked”

One student explained how they learned,

“The best way that I learn is by watching a video on my right-hand monitor whilst putting it into practice on my left-hand monitor: watch the example, do the example’ learning – this is an example of free video learning, rather than learning from a text-book because I do not have the patience for that because of my difficulty with reading comprehension”.

Positive aspects of dyslexia were briefly raised by a number of respondents in ‘any other comments’ but views on this were mixed. One student said,

“Although I was told when younger that dyslexia would not ‘hold you back”, I’m quite cynical and think that parents/teachers were just ‘being nice’. Now I’m at university and doing well, it is not a problem”

Another student noted,

“nice idea to look at entrepreneurship and dyslexia- confidence is the main thing and then I don’t think it will be a stumbling block as I’d previously thought”

One student shared a good understanding of the costs and benefits of dyslexia,

I’ve developed quite strong coping strategies and a lot of people don’t realise that because they may have developed these coping strategies as well, that they are dyslexic. Having done a lot of reading about it, I think that this is a positive aspect about which awareness needs to be raised. I also find it interesting that reading in the area of dyslexia has enabled me to recognise traits of dyslexia in other people either as I talk to them or if they are reading some of their group work assignments that they’ve done”

Finally, in this section, one student thought that the reason people who experience dyslexia find entrepreneurship easier is because they are usually very good at problem solving; they have had to deal with not being able to spell or calculate a maths problem. This means they are more likely to work for themselves than in the public sector, where they would be judged for making mistakes

Business Related Obstacles

A wide range of responses were presented in this response to this question, with little overlap between the viewpoints, although there was clear evidence of some realistic concerns about the difficulties involved. Even actually starting up a business would be an obstacle in itself, for example, learning how to do it all, the *“business side of things [which was] not taught on the course”*.

One student said they also were uncertain about the timing of their current ideas,

"I might have an idea which may not be feasible in 3 years-time, or would probably be feasible in three years (after graduation)".

Another student commented,

"trying to think of an idea to give yourself that niche within the market or developing something new could be an obstacle".

Moreover, the competitiveness of having your own business would be an obstacle and related to this, one student said,

"it would be difficult to comprehend the size of a business market as I've never experienced the size of some business markets"

Other students commented, variously,

"market research would be important when developing a product" and "lack of numerical or mathematical skills could be an obstacle".

Several interesting unique themes were expressed, for example, a lack of self-confidence. One student commented,

"need to be passionate and put your whole self into a business in order to succeed well in entrepreneurship but the danger is I'd enjoy it to start off, but being devoted to one thing for a long time and following it through would be an obstacle because I like to do lots of different things."

For another student,

"Needing to be friends with everyone could be an obstacle – and gaining people's trust within the industry would also be difficult".

Other students variously contributed the following comments:

"getting people to understand what I'm doing would be an obstacle because this is not a field that is developed at home."

"the need to take the risk would be one of the biggest obstacles because I'm risk averse"

"Maintaining your reputation would be a difficulty"

while one student commented,

“need to become better at presentations, as this is a key thing if you have to do a pitch and to maintain a reputation you have to be able to do the maths, equations and calculations to verify that what the computer is giving you is correct, which would prove or add weight to your argument when making a pitch.”

Other unique themes were internal such as health, or the need to develop more out of the box thinking, one student even realised,

“I’ve not thought enough about my own strengths, which is probably a weakness”.

Other obstacles were external, and related to the environment and their familiarity and comfort within the area they worked. For example, coming from a small town could be an obstacle as they had never lived in London. Moreover, being in an office environment would be an obstacle because they would like to be out and about a lot.

One student was concerned about contacts,

*“a certain element of the ‘old boy system’ wherever you look is an obstacle which is something I’m beginning to resist, recognising that people I know have got to where they have, because of **who** they know, rather than **what** they know. Being the person on the other side of that, I find this unfair, which might represent an obstacle or possibly could become something I could network.”*

For another student environmental issues were key,

“Sourcing ingredients is a big issue. The lack of land in the UK, for example, together with an increasing population leads to sourcing issues, to reduce sea-miles is becoming a problem for retailers and manufacturers having to import so much from abroad because of the climate and other environmental factors.”

Question Three: Are there any specific skills and/or techniques that you believe you need to develop/learn to fulfil your aspirations?

A good response was received to this question, discussing the skills or techniques they thought they needed to develop, although some did not really know which skills they needed. There were five shared themes with fairly consistent responses: these were knowledge, communication, professionalism, finance and time management and organisation. A further theme of experiences has been added, relating here to experiences in university, based on a number of comments derived from the ‘any other comments’ section, where many students took the opportunity to outline what they felt was needed to smooth the path for students who experience dyslexia.

Knowledge

This was clearly valued in these respondents, perhaps not surprisingly when they were students engaging in Higher education at various levels, and so they considered different aspects of knowledge important.

One student commented,

“think learning another programming language would be useful, for example JAVA, to create Facebook applications and games which mid-sized enterprises may want in future marketing campaigns.”

Another student suggested that an MBA would help others to have confidence in them,

“a few letters after your name and that piece of paper saying “you’ve got this certificate” would help”.

Several students thought it necessary to know the different tasks that constitute one’s business and “to understand the ‘nitty-gritty’ of business” and another student stated,

“I need more of a ‘savvy business mind’ as well as knowing more about economics”.

Nevertheless, one student noted the following,

“It is possible to learn a lot of things. Before this year I wouldn’t have been able to do half the things that I’ve achieved”.

Communication

Interestingly, a number of students thought they needed to improve various facets of communication. Comments included the following;

“it’s necessary to be able to know how to communicate in a simple format that people can understand but is at a high level as well”,

“I’ve been a secretary, so I know how to talk to people”,

“writing reports for the business will be an important skill”,

“I’d also need to develop the skill of communicating to large crowds”

“It will be necessary to be able to convince others to believe in you and your business idea”.

Another student thought,

“it’s important, when communicating decisions to a workforce, to do it with explanation and understanding whilst achieving the result needed for the business.”

Professional

One student noted the importance of professionalism,

“it is necessary to be professional without favouritism, because it may be necessary to take a decision and “bulldoze it through” because it needs to be done for the benefit of the business. I think transparency is necessary when dealing with employees with regard to business changes and that staff should not be kept in the dark. I also think it necessary to develop skills to keep the business alive and maintain its reputation.”

Another student noted,

“in order to be successful in business you would need to be less attached to your own work or ideas otherwise it would get in the way of the business”.

Finance

The need for knowledge of finances was acknowledged by one student, explained as,

“balancing income/outgoings and dealing with people’s wages as well as the challenges of finding the materials without sinking the business financially”

Another student considered,

“I need to know more about economics, but acknowledge that I’m fine with finance”.

Time Management and Organisation

One student recognised that they had to develop better time management, and another student said,

“I have to develop better organisational skills. I’m improving, slowly but my method is “chaotic order”, but it would be impossible to run a business or deal (with) high level environments this way”.

Experiences in University

Although not solicited in direct response to this question, a number of statements elicited in the 'any other comments' section related to the students experience of business studies at University, with both positive and negative responses.

One students' concern was access to support,

"I know a lot of my friends couldn't get appointments for a diagnosis of dyslexia and support - they struggle but it would be nice if they could make people marking it aware -not saying give a higher mark -a discretionary thing"

Another student commented,

"a lecture from the then Head of XXX Business School, who had an interesting way of thinking, taught me entrepreneurship."

Exams were mentioned; one student noted,

"the exam I sat half way through the year was the hardest, because I like maths and my essays for HR are improving, but the finance module Exam presented challenges - net present value, the internal rate of return etc., I just could not deal with this and I had to write 'wordy' answers. I find it strange, but in some ways quite good, because it is challenging, at the same time so challenging I think I may have to retake."

In contrast, another student found,

"it was a complete surprise to do so well in one of my exams because I was awarded an 'A', but I did revise hard"

In terms of coursework, one student noted the following,

"within my PhD degree, some of the modules covered over the last few years are, for example, financial issues for management, entrepreneurship, business ethics, business management, decision making within management, value creation, and health and safety... I don't like the latter modules because there is only one answer to questions, whereas we all know there's not, but in the other modules, your opinion is required. [Students] are asked what the problems are, and what is the growth of the business. Business ethics is a [module] where one can't give a right answer, you have to justify your answers and you are marked based on the quality of your argument"

This suggests that this student is seeking a wider approach to assessment.

Finally, another student had contact with the careers service, but did not think the services were adequate.

“I don’t think the library services should do this, but instead every department should have a careers department. As I’m now applying for jobs, I feel I need to know what the people shortlisting and interviewing want to hear. I struggle with applying for jobs even though I’ve applied for well over 20 now. When I start a new application, there is a ‘wall’ that I need to overcome.”

This student also seemed to be seeking a different approach from the careers service, which may not be possible within the remit of these services, but there seems to be a need for greater dyslexia awareness.

“in a way, I don’t think that there should be any special different system for someone who has dyslexia and wants to start a business than anyone that’s non-dyslexic and wants to start a business or is interested in entrepreneurs. I don’t think there should be any...”

Question Four: What about business sense, enterprise, entrepreneurship – what would be the right sort of support, or lessons in school?

There was a clear interest in responding to this question, from the majority of the students, with an awareness that greater emphasis on practical lessons, team building for entrepreneurs and talks and workshops from business people and entrepreneurs about their experiences would be beneficial for those with an interest in business.

One of the students thought,

“entrepreneurship is innate and cannot be taught, but students might be screened to see if they have the potential. In spite of this, I recognise that there are certain subjects that can be taught, for example, marketing, personal and business finance”

Another student shared this theme,

“maths and planning should be added. Enthusiasm and a desire to improve oneself are necessary characteristics to be an entrepreneur but I believe that these are innate and although examples of entrepreneurship can be given, it cannot be taught.”

A further student contributed,

“I also think that schools are not flexible enough or, too hidebound to move ‘outside the box’” and are not aware of what is happening in the real world. Instead students have to learn from books and pass exams,”

This is a viewpoint reiterated below in the section on practical experience in schools.

Finally, one student suggested,

“Whilst learning some theory is necessary, it needs to be put into practice so there is a need for some unstructured days where students can experiment. It is necessary to establish an environment that fosters creativity and allows students to follow an idea. Entrepreneurs need to go through the process and understand how everything works in order to develop. Help with academic support will also be necessary for students who experience dyslexia.”

Practical

A main theme was that school education for entrepreneurs who experience dyslexia should have more focus on practical elements,

“because students are so busy learning for exams that there is no time for practical application of theory”

This interesting point was raised in the general introduction to this question, and respondents provided a range of well thought through applied suggestions for projects that might be utilised in developing practical skills. These included,

“a ‘make and sell’ course, either making food or woodwork (for example, a chicken hut) and selling them, learning some basic concepts of finance/profit and gaining a practical understanding of the producing and marketing of an item dealing with real money”.

“Mathematics could be taught by applying it in real world situations and in employment situations. IT could be about removing viruses and writing programmes as well as finance”.

“hands-on experience and making students take on some business responsibility, for example, running the tuck (sweet) shop for a week would allow students to try out their ideas practically”

One student pointed out,

“often practical aspects of entrepreneurship are explored in lunchtime clubs, which of course are optional. By contrast, if it was taught in Personal Social and Health Education (PSHE), a compulsory lesson, everyone would get some basic business input and it would make the lessons more interesting. During GCSEs, my class had plenty of

time and a compulsory hour on entrepreneurship would have been worthwhile”

Moreover, one student suggested,

“School students should volunteer as part of a course, in something that interests them for two hours a week because this would educate young entrepreneurs. I did charity work as well as Youth Enterprise. I think there should be 75% theoretical work and 25% practical lessons for entrepreneurship, in order to apply what is learnt in different areas, because working is the only way to develop business sense”.

Youth Enterprise

Youth enterprise was recommended by several students and one student even suggested,

“it could be compulsory because it is such a good learning experience”.

Another student said,

“I know of two groups of students (approximately 20 in total) who took part in Youth Enterprise and were able to run their own business for six months”.

Although another students’ school did not take part in Youth Enterprise, this student’s brother had benefited, which, in turn, influenced the respondent.

One student felt,

“there should be more focus on employment including the production of CVs. As a student ambassador in school, I watched some children sit down in class and it seemed as though their brains “switched off” but outside the classroom the same children could be imaginative and engaged”.

Another student believed,

“out-of-the-classroom competitions are important because, [k]ids are more interested in this than sitting in a classroom”.

Primary School

Primary school was mentioned specifically but students disagreed about the effectiveness of teaching entrepreneurship at this level. One student considered,

“children the same age as my son, that is, primary school age, should be taught entrepreneurship indirectly as fun. I encourage, not in a pressured way, my son to look for opportunities, for example, to be aware what their friends may buy and see if they can get it for them cheaper... group activities may be taught as a little home project, e.g. selling cakes – but in a very light-hearted way with perhaps a prize for the best project. It is important to establish that young school students have been engaging in business and that disappointment is part of business and perfectly normal”.

However, in contrast, another student thought primary school was too early for entrepreneurial study.

Secondary School

Several students thought entrepreneurship/business should be taught at schools, and GCSE was seen as a critical time to practice and implement these skills.

“anyone at GCSE level should be allowed the possibility of studying Business and IT courses”.

“entrepreneurship and the legal aspects of business should be taught to some level because the development of new businesses is how the economy will grow; someone who wants to start a business should have the basics.”

Another student suggested,

“business strategy planning would have been helpful and should be taught at pre-GCSE level in general secondary schools, taking an idea and planning the implementation of it. Teaching real world scenarios as part of business courses instead of ideal hypothetical scenarios would be of more practical help to someone who wanted to go into business. The ability to think, argue and defend a position would be invaluable in business. Work experience in a company such as a parent’s place of work or company would be invaluable and a class on the ‘World of Work’ would be a good initiative to promote individual thinking, confidence and business understanding.”

One student made the following suggestion,

“at GCSE level each subject could be applied to real life scenarios, for example, finance could be linked to a personal budget; reading in English Literature could be linked to reading in business etc; being ‘book smart’ is not necessary to succeed in the real world.”

College/A Level

Some respondents felt that lessons on entrepreneurship could be given at A level when students have fewer formal lessons, or even when the rest of the school was at assembly. This might allow individuals to go straight into business from school instead of going to university first.

Not all students were satisfied with the support they had received in school:

"I felt restricted at school because I was one out of 1000 students, so everything was 'homogenised' that is, development of the individual was not a priority".

There was a clear emphasis from a number of students on the importance of teamwork and practical interactive workshops. Various comments included,

"my school was good at CVs but it was all focused on a personal statement instead of offering something that would help a person in the business environment. Team building classes should be part of school curricula because although there is the possibility of teamwork in sport, this is not so in business classes currently."

"practical classes, for example, groups of A Level students could plan and organize a money-spinning task such as offering to clean cars for people as I did in the first year of university on the Enterprise Management module"

"plenty of practical, interactive workshops particularly around what students wanted to do once they left school"

"team business scenarios would be useful, where a task might be set, various parameters could be given, together with a balance sheet and after 30 minutes the different groups could be assessed".

The importance of involving established entrepreneurs in these sessions was emphasised,

"a three-day team building workshop for entrepreneurs, especially if new people are joining the school sixth form, would help to meet new students and help them transition into a new place. Talks or team building workshops from people in industry and the marketing world would encourage entrepreneurs."

"particularly talks by successful and failed entrepreneurs."

"considering what a successful entrepreneur has done in a situation could be discussed as a teaching practical."

OVERALL DISCUSSION

In this study a series of interesting responses were obtained from two small groups of students who experience dyslexia, studying business studies in two different university settings, with an intention to set up their own business over the next few years. A number of items where there was some small measure of consensus emerged, but it was notable that the responses were also characterised by a number of unique observations, that pertain specifically to dyslexia.

The first question related clearly back to the literature on the overlap between dyslexia and entrepreneurship and the characteristics of dyslexia that have been identified as particularly suited to a career of this type. The key themes identified here as strengths in relation to their aspirations were; determination, people skills, organised and efficient, practical, creative, logical and willing to take risks. Interestingly organisation and efficiency are not always highlighted in the literature on dyslexia, but it seems that these are key requirements in order to achieve success in university and later in entrepreneurship.

It is interesting to note clear instances of a number of the characteristics that have been highlighted, for example those identified by Nicolson (2015), in terms of communication and people skills, although it should be acknowledged that there is less consistency in the responses than could be expected on the basis of the literature. So, although resilience is not specifically highlighted here, there is strong evidence from the majority of the students involved for aspects of determination, and never giving up, or finding alternative ways, which could be interpreted as resilience, although one student associates this with stubbornness.

Moreover, many of these characteristics associated with entrepreneurship could be identified as positive or negative depending on the mind-set of the individual, with many of those who experience dyslexia showing poor self-esteem, which may encourage a more negative interpretation of what could be seen as relative strengths. Consequently, one student admitted to not having previously considered their possible strengths, and interpreted this as a weakness.

The whole concept of strengths in dyslexia is one that could be fraught with difficulties, because for many of those who experience dyslexia, they have learnt to focus on their failures, and the universal search for strengths may leave them feeling stressed and that they have once again failed, this time in aspects where the literature expects them to shine, which can be related back to Vail's comments on 'strength and/or bane (Vail, 1990). Interestingly, in terms of strengths in communication skills, echoing the findings of Garrido Yserte et al., (2019), they also highlighted that this was because they preferred to discuss, rather than put something in writing, so once again relating this back to a weakness.

Conversely, some of these comments that might be interpreted as indicative of low self-esteem, and a focus on their weaknesses, might also be interpreted in terms of asking for help and modesty, unique features of successful entrepreneurs who experience dyslexia identified by Sepulveda, 2014 (see also Sepulveda and Nicolson, 2020).

Their ability with people skills and motivating others could also be associated with working in a team and delegating, although these issues were not always specifically addressed. Creativity and out-of-the-box thinking (Nicolson, 2015, West, 2009, Eide and Eide, 2011) also came through clearly, and here this was seen as largely positive, although one respondent even interpreted this positive trait as a form of laziness. Finally, a willingness to engage with risk came through from a number of students, which could be related back to their experience of failure and post-traumatic growth (Alexander-Passe, 2017). In terms of potential links with ADHD (Kaplan et al., 2001) and impulsivity, it was clear that several students not only shared the intense focus that characterises entrepreneurs, but also the heterogeneity in the projects they were undertaking, which might suggest elements of comorbidity.

The second question on the obstacles that might prevent a satisfactory outcome, similarly tap into the pattern of strengths and weakness. Interestingly here, the concept of financial risk, rather than risk more generally, seemed paramount in presenting obstacles to successfully developing their entrepreneurial expertise further (Alexander-Passe, 2017). Although only a handful of students discussed the impact of their dyslexia, it was clear that their experiences of both diagnosis and support within the education system had influenced their self-concepts for better or worse. One student had support from year 7, replacing Latin, and it is interesting to note that this student comes up with a wide range of interesting suggestions in terms of entrepreneurship, However, they showed continued lack of confidence, expressed in a need to be friends with everyone, and to build trust in those with whom they were involved.

Many of the comments in this section can be related to the literature, most specifically the studies from Alexander-Passe, emphasising the potentially destructive impacts of continued failure. (Alexander-Passe, 2016; 2017). To summarise the disparate responses to this question, they seem to reflect lowered self-esteem in this group, despite their relative success in education, which leads them to question whether they have sufficient ability and motivation to overcome the obstacles. It is interesting to note the differences between those who internalise the obstacles, seeing them as intrinsic to themselves, in contrast with those who home in on extrinsic features of the situation, features which might be applicable to anyone, not just those who experience dyslexia.

The third question analyses how prepared the participants feel to engage with entrepreneurship and what they feel may be lacking. Interestingly, it was thought that the skills needed by those who experience dyslexia would be no different from any other student setting out to become an entrepreneur. It may be, therefore, that

entrepreneurship should be encouraged in the student population and others without favour, in response to the changing economic situation in the world.

The responses here might indicate that the students were aware of how much they had already learned but were ready to engage with further challenges. Knowledge was seen as particularly important here, with the need for certification, as well as an awareness of much they had already learnt. This suggests that despite the strengths that have been highlighted as linked to this skill in adults who experience dyslexia, these respondents are aware of a heightened need to improve in this area.

Their comments here on the ongoing need for communication skills may also represent elements of empathy (as highlighted by Sepulveda, 2014) towards a potential audience. This would be predicted to stand them in good stead in these endeavours, despite an awareness that written reports might remain problematic. Respondents identified finance as an ongoing need for further development, as well as the need for greater professionalism, and both time management and organisational skills. The 'chaotic order' identified here reflects the issues with everyday memory identified by Smith-Spark et al., (2004).

The responses here may be a further example of instances where the 'big picture' thinking that has been associated with dyslexia provides another strength. Writing CV's and interview techniques may well be a clear instance of a skill that students who experience dyslexia need to acquire systematically, in order to develop their confidence in job applications. Knowing that they would be able to deal with any questions that arise, would help them to overcome many of their confidence issues in this situation.

The heterogeneity of responses here may suggest that some respondents do not necessarily share the innovative thinking that has been shown to characterise adults who experience dyslexia, and that this may be a further instance of the literature on strengths providing a challenge in itself.

Finally, the last question considered, what could school have provided to enhance these aspirations further, links to the model of sustainable enterprise, in ensuring that the environment can be tailored more closely to the needs of budding entrepreneurs (Stock et al., 2017). This question echoes the debate from Marram and colleagues, (2014) on whether or not entrepreneurship can be taught. There is clearly more scope for the use of entrepreneurial education throughout the schooling system, with differences between regions in the adoption of this approach, as well as a role for bringing in practical experience at an earlier age. Certainly, the data from the Company Impact Report (2017) discussed in the introduction, highlights the success of this scheme for everyone involved, although it should be noted that attempts to differentiate those who experience dyslexia were not undertaken here.

It is also interesting to note that differences emerge between some students who experience dyslexia and those who do not, in terms of their approach to this type of exercise. This is evident in a greater emphasis on practical aspects for the group who experience dyslexia, by contrast with the theoretical approach of the majority of students. Thus, there was a clear recognition that more aspects of business could be subsumed within a more general curriculum, with practical experience in the underlying components likely to engender success, such as finance, Maths, even learning to programme and eliminate viruses in IT sessions.

Most of the students interviewed here thought primary school would be too young to initiate this approach, although it would be possible to introduce fun ideas focusing on what this age group would be interested in buying for themselves. A key aspect here would be acceptance that failure was not a total setback but part of the experience of learning, something that could be applied to both practical and applied aspects of the curriculum. However, the secondary school curriculum was seen as a natural focus for more structured training for all students, with specific GCSE's focusing on practical applications of both business planning and finance for business, using real-world rather than hypothetical case studies.

Interestingly, the key period for a stronger focus on this type of approach was seen to be A level and college, when the teaching day was less constrained by the curriculum. A more targeted approach to developing CV's to foster business experience was recommended rather than the current emphasis on personal statements, with entrepreneurial group projects carried through and evaluated in all aspects including planning, finance and success. A key requirement here was suggested to be workshops and presentations from entrepreneurs themselves, including not only those who were successful, but also those who struggled and experienced failure.

Returning to the key themes from the semi-structured interview, a number of points emerge that are clearly recognisable as consistent with the profile of dyslexia. Despite the support they were receiving, a number of respondents continued to struggle with aspects of their university course. They were aware of limitations in their study skills, and recognised that they benefitted when allowed to demonstrate their strengths. This meant they challenged methods of evaluation which demanded set answers dependent on memory. More specifically, they valued those courses that gave them an opportunity to present a reasoned argument, in which they recognised their strengths. Above all, they recognised the need for further training and qualifications in aspects of learning key to entrepreneurial success. Moreover, some of their suggestions seem to be equally applicable to all those with an interest in entrepreneurship. The level of self-awareness demonstrated throughout might suggest that dyslexic students should be more involved in the structure and design of their own courses. Given the appropriate tools, they would be more than able to fulfil their own needs, and further research in this area would be appropriate.

In terms of the strengths and weaknesses of the study, the material here was directly gathered in response to a semi-structured interview from a relatively wide range of students who experience dyslexia within two different environments, one rural and one urban. All the students accessed for this study had received a clear diagnosis of dyslexia, based on psychologists' reports/specialist teacher reports enriched with assessments of aspects of literacy. This has avoided the potential limitations of some of the earlier studies, and may help to resolve some of the issues arising.

There is no doubt that a different set of questions might have elicited different responses from those reported here, but nevertheless, the use of the 'any other comments' allowed students to lead the interview into directions that they found particularly relevant to them, which represents an added strength for this study. There is clear evidence here for these students as innovation drivers, led by motivation and the willingness to motivate others, leading to creativity, encompassing innovation capacity, and knowledge, which has been called the essence of innovation, in line with Stock and colleagues (2017) model for sustainable innovations.

Further research comparing these findings on entrepreneurship to students with no evidence of specific problems, would help to ascertain how much of their responses can be attributed to their experience of dyslexia, rather than a more generalised need to adapt to new projects and ideas that may not have previously featured in their ongoing plans. It might be considered for example, how much their move towards self-employment was voluntary, rather than based on the changing economic climate, coupled with their own difficulties in academic subjects, as well as the daily constraints on memory and organisation (Smith-Spark et al., 2004).

Moreover, it is not currently possible to clarify what the ongoing effect of the Covid-19 coronavirus pandemic will be on these particular students, in common with other self-employed young entrepreneurs during this period of prolonged self-isolation world-wide. Responses could also have been sought from a wider range of universities, where different experiences might be predicted to pertain. Nevertheless, this study has produced a considerable quantity of data, which represents a novel and important contribution to the literature on entrepreneurship and dyslexia.

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Word Sound Retrieval Abilities in Japanese Children With Developmental Dyslexia - Report Based on the Use of Picture Naming Tasks in Discrete Condition -

Takashi Gotoh ^{1, 2*}, Akira Uno ^{2, 3} and Noriko Haruhara ^{1, 2}

1. Faculty of Health Sciences, Mejiro University, Japan
2. LD/Dyslexia Centre, Japan
3. Faculty of Human Sciences, University of Tsukuba, Japan

Abstract

Developmental dyslexia (DD) is assumed to be partially caused by word sound retrieval difficulty. We analyzed the word sound retrieval abilities in Japanese children with DD with and without developmental language disorder (DLD) using picture naming tasks in discrete conditions. The participants in this study were 28 children with DD (9 with and 19 without DLD) and 18 children with typical development from third to eighth grades. All groups were matched for chronological age. We evaluated the number of correct responses and reaction time of picture naming tasks using 10 colors and 100 objects. Picture naming stimuli were selected from the Test of Lexical Processing in Aphasia (TLPA), Standard Language Test of Aphasia (SLTA) and Supplementary Tests for Standard Language Test of Aphasia (SLTA-ST). Children with DD and DLD, showed lower scores in the object naming task than those in children with typical development and with DD alone ($p < .000$). Children with only DD manifested scores in the normal range. Our results suggest that picture naming connects with spoken language development. Japanese children with DD without DLD have no problem in word sound retrieval abilities in discrete conditions.

Keywords: developmental dyslexia, developmental language disorder, picture naming task, vocabulary

* Correspondence to:

Takashi Gotoh, Department of Speech, Language and Hearing Therapy, Faculty of Health Sciences, Mejiro University, 320, Ukiya, lwatsuki, Saitama, Saitama, 339-8501, Japan. E-mail: goto@mejiro.ac.jp

INTRODUCTION

A word sound retrieval deficit theory is hypothesized as a cause for cognitive disorders, which is a factor for developmental dyslexia (German, 1985; Fawcett & Nicolson, 1994; Korhonen, 1995; Swan & Goswami, 1997; Oishi, 1997; Oishi & Saito, 1999; Cohen, Morgan, & Vaughn, 1999; Faust & Sharfstein-Friedman, 2003; Hanly & Vandenberg, 2010). Many researchers have examined the word sound retrieval abilities of children with developmental dyslexia using object and color naming tasks in discrete conditions (Swan & Goswami, 1997; Oishi, 1997; Oishi & Saito, 1999; Faust & Sharfstein-Friedman, 2003; Hanly & Vandenberg, 2010). For children with developmental dyslexia, there is strong evidence that their reading difficulties are underpinned by weak phonological skills (Snowling, Van Wagendonk, & Stafford, 1988; Snowling, 1991). The difficulty that children with developmental dyslexia experience when naming pictures has also been interpreted as a symptom of weak phonological skills.

It has been reported that in the task of naming an object or its color, children with developmental dyslexia showed a lower number of correct answers and longer reaction time compared to children with typical development (Swan & Goswami, 1997; Oishi, 1997; Oishi & Saito, 1999; Faust & Sharfstein-Friedman, 2003; Hanly & Vandenberg, 2010). For example, Swan and Goswami (1997) showed that children with developmental dyslexia were particularly poor at naming pictures that have long, phonologically complex and unusual names (e.g. protractor, harmonica, binoculars) in accuracy, even when compared with young children matched for reading age. Oishi & Saito (1999) conducted a color naming task with children with developmental dyslexia, and all of the children with developmental dyslexia showed lower scores in the color naming task compared to children with typical development in Japanese.

Faust & Sharfstein-Friedman (2003) used the “tip-of-the-tongue” (TOT) experimental paradigm in a picture-naming task to explore the naming deficits of adolescents with developmental dyslexia reading in Hebrew. In a TOT experience, the speaker is able to provide semantic information about the word but is unable to access the word’s phonological representation and direct the assembly of the spoken word (Brown, 1991). As compared with a control group of typically developing readers, the adolescents with dyslexia had fewer correct responses and more TOT responses. However, previous studies have not sufficiently evaluated the vocabulary size of the children being studied (Swan & Goswami, 1997; Oishi, 1997; Oishi & Saito, 1999; Faust & Sharfstein-Friedman, 2003; Hanly & Vandenberg, 2010).

Furthermore, there have been reports of a co-existence of spoken language developmental disorder among children with developmental dyslexia (Oishi, 1997; Oishi & Saito, 1999). Studies about word sound retrieval abilities in children with developmental language disorder alone showed slower and more errorful performance, in comparison to age matched group, in discrete conditions (Menyuk, 1975; Wiig, Semel,

& Nystrom, 1982; Messer & Dockrell, 2006). Based on the above reports, the possibility that word sound retrieval abilities are involved in the development of spoken language in children with developmental dyslexia cannot be denied. Gotoh et al. (2016) analyzed word sound retrieval abilities in Japanese children with developmental dyslexia with and without developmental language disorder using word fluency tasks. As a result, the scores for word fluency tasks connected with spoken language development and were in the normal range in Japanese children with developmental dyslexia without developmental language disorder. Whereas, relationships between the word sound retrieval abilities and the picture naming tasks in Japanese children with developmental dyslexia with and without developmental language disorder has not been fully investigated yet.

In this study, a picture naming task was conducted to examine the word sound retrieval abilities of children with two types of developmental dyslexia, a typical Japanese speaking group with developmental dyslexia and a group with developmental dyslexia accompanied with developmental language disorder.

METHODS

Participants

Children with typical development

The participants with typical development comprised 18 children from third to eighth grades who attended a regular class [age: 10.4 ± 1.9 (mean \pm standard deviation) years; age range: 8-13; 2 boys, 16 girls].

The participants with typical development scored at least -1 standard deviation (SD) or higher than the mean in all of the tests of Raven's Coloured Progressive Matrices (RCPM) (Raven, 1976), the Standardized Comprehension Test of Abstract Words (SCTAW) (Haruhara, Kaneko, & Uno, 2002), and the Kanji writing accuracy task in the Standardized Tests for Assessing the Reading and Writing (Spelling) Attainment of Japanese Children and Adolescents (STRAW-R) (Uno, Haruhara, Kaneko, & Wydell, 2017), and the children scored within +1 SD of the mean in the reading fluency tasks in the STRAW-R, showing that their general intelligence and spoken language development were within the normal range and they did not have any delay in reading and writing attainment levels.

Children with Developmental Dyslexia

The participants with developmental dyslexia comprised 28 students who visited an institution designated to providing support for children with learning disabilities, and ranged from third to eighth grades [age: 10.8 ± 1.6 (mean \pm standard deviation) years; age range: 8-13; 23 boys, 5 girls; 27 right-handed, 1 left-handed]. The results of cognitive

Table 1
Results of Cognitive Tests and Tests Related With Reading and Spelling in the Children With Developmental Dyslexia (n=28)

		DD ^a (n=19)	DD +DLD ^b (n=9)
General intelligence tests			
Wechsler Intelligence Scale for Children-Third Edition (WISC-III) or Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV)		mean ± SD	mean ± SD
Verbal IQ (VIQ) or Verbal Comprehension Index (VCI)		104.0 ± 10.5	77.5 ± 4.64
Performance IQ (PIQ) or Perceptual Reasoning Index (PRI)		94.5 ± 13.1	96.0 ± 6.80
Full scale IQ (FIQ)		99.4 ± 10.9	88.3 ± 8.80
		mean z scores	mean z scores
Raven Coloured Progressive Matrices (RCPM)	(n = 36)	-0.40	-0.65
Vocabulary test			
Standardized Comprehension Test of Abstract words (SCTAW)	(n = 45)	0.61	-0.65
Reading and writing tests			
Standardized Tests for Assessing the Reading and Writing Attainment of Japanese Children and Adolescents (STRAW-R)			
Reading accuracy			
Hiragana words	(n = 20)	-0.30	0.14
Katakana words	(n = 20)	-0.62	-1.90
Kanji words	(n = 20)	-0.60	-2.70
Writing accuracy			
Hiragana words	(n = 20)	-0.40	-1.00
Katakana words	(n = 20)	-1.30	-1.70
Kanji words	(n = 20)	-2.00	-3.60
Reading fluency			
Hiragana words		2.57	3.56
Katakana words		2.73	3.46
Hiragana non-words		2.18	1.27
Katakana non-words		2.40	1.17
Paragraph		1.54	3.68
Phonological ability tests			
Nonword Repetition	(n = 10)	-0.57	-1.70
Word Repetition in Reverse Order			
Number of correct answers	(n = 20)	-1.01	-1.16
Duration (s)			
Three-morae words	(n = 10)	2.78	3.09
Four-morae words	(n = 10)	2.49	4.30
Visual cognitive ability tests			
Matching Familiar Figure Test (MFFT)			
Number of correct answers	(n = 12)	-0.33	-0.10
Number of errors		0.32	0.30
Reaction time (s)		0.61	1.21
Rey-Osterrieth Complex Figure Test (ROCF)			
Copy drawing		-0.67	-1.44
Immediate recall		-0.74	-0.93
Delayed recall		-1.12	-1.16
Automatization test			
Rapid Automatized naming (RAN)			
Duration (s)		1.99	2.43

Note. WISC-III or IV indicates mean ± SD and all other tasks indicates mean z scores.

^a The developmental dyslexia group

^b The developmental dyslexia with developmental language disorder group

tests and tests related with reading and spelling observed from the first examination of the 28 children with developmental dyslexia are shown in Table 1.

The children in the developmental dyslexia group met the following three conditions:

- (1) They scored 85 or above in the Verbal Intelligence Quotient (VIQ) or Performance Intelligence Quotient (PIQ) of WISC-III (Wechsler Intelligence Scale for Children-Third Edition) or in the Verbal Comprehension Index (VCI) or Perceptual Reasoning Index (PRI) in WISC-IV (Wechsler Intelligence Scale for Children-Fourth Edition), or had a score of at least -1.5 SD in RCPM (Raven, 1976).
- (2) They scored under -1.5 SD of the mean in reading or writing accuracy of any one of the Hiragana words, or Katakana words, or Kanji words, or had a duration time of longer than +1.5SD of the mean in reading either Hiragana and Katakana words or Hiragana and Katakana non-words or sentences in the reading fluency tasks in the STRAW-R (Uno et al., 2017).
- (3)
 - (a) They scored below -1.5 SD of the mean in the number of correct answers in the non-word repetition task or word repetition in reverse order, the time it took to correctly answer the word repetition in reverse order was +1.5 SD of the mean or longer, or
 - (b) the duration in the Rapid Automatized naming task (RAN) (Kaneko, Uno, & Haruhara, 2004) was +1.5SD or longer, or
 - (c) below -1.5SD in the number of correct answers or over +1.5SD in the number of errors and reaction times in the Matching Familiar Figures Test (MFFT) (Yokoi, Uno, Kaneko, & Kanbayashi, 2014), or they had a score of under -1.5 SD either in the copy task, immediate recall task, or 30-minute delayed recall task in the Rey-Osterrieth Complex Figure Test (ROCF) (Osterrieth, 1993).

Nine out of the 28 children with developmental dyslexia (age: 10.8 ± 1.8 years; age range: 8-13; 8 boys, 1 girls; 9 right-handed) had a score of below 85 in the VIQ of WISC-III or in the VCI of WISC-IV and/or a score of below -1.5SD of the mean in the number of correct answers in the Standardized Comprehension Test of Abstract Words (SCTAW) (Haruhara et al., 2002). Thus, this group was designated as the developmental dyslexia with developmental language disorder group.

There was no statistically significant difference in chronological age ($\chi^2 = .584$, $df = 2$, $p = .747$) among the typical development group (TD, $n = 18$, 10.4 ± 1.9 years), the developmental dyslexia group (DD, $n = 19$, 10.7 ± 1.6 years) and the developmental dyslexia with developmental language disorder group (DD+DLD, $n = 9$, 10.8 ± 1.8 years).

Procedure

In this study, the color naming task and object naming task were administered to the participants in discrete conditions.

Color naming task

Color naming had 10 tasks. 10 colors were selected from the Test of Lexical Processing in Aphasia; TLPA (Fujita et al., 2000) (see Appendix). The stimulus used was a Japan Color Enterprise colored paper with different tones and a size of 5 cm (length) × 6 cm (width). As a side note, preliminary research with 12 typically-developing children aged between 3 and 6 years was conducted in advance, with the mean correct response rate being 79.2%. The test implementation and scoring method followed TLPA (Fujita et al., 2000). We counted the number of correct answers within 10 seconds.

Object naming task

Object naming had 100 tasks. 20 nouns were used in the Standard Language Test of Aphasia; SLTA (Japan Society for Higher Brain Dysfunction, 1997) naming task and 80 words were used in the Supplementary Tests for Standard Language Test of Aphasia; SLTA-ST (Japan Society for Higher Brain Dysfunction, 1999) naming task (see Appendix). The stimuli were monochrome line drawings and its size was 10 cm (length) × 10 cm (width). The implementation and scoring method followed SLTA and SLTA-ST (Japan Society for Higher Brain Dysfunction, 1997, 1999). We counted the number of correct answers within 15 seconds.

Analysis

In this study, the number of correct responses and reaction time (seconds) in the naming tasks were analyzed, with the number of correct responses and reaction time of each task being compared across the typical development (TD), developmental dyslexia (DD) and developmental dyslexia with developmental language disorder (DD+DLD) groups. For analysis, a one-way analysis of variance (one-way ANOVA) was used. Bonferroni's multiple comparison test was used when the main effect was found to be significant in a one-way ANOVA (IBM SPSS Statistics ver.23, Tokyo, Japan).

Ethics

Participation by subjects in this study was determined based on the informed consent of both the child and his/her parent or guardian. After explaining the outline of the study, the tasks were performed only if both the child and his/her parent or guardian gave their approval. Sufficient explanation was also provided regarding the fact that participants could drop out of the study at any time and that they would suffer no disadvantages by

doing so. This study was approved by the Research Ethics Committee of the Human Sciences at the University of Tsukuba (ID No.23-73).

RESULTS

Color naming task

There was no significant difference between either correct responses ($F(2,43)=2.238, p=.119, \eta^2=.09$) or reaction time ($F(2,43)=.097, p=.908, \eta^2=.01$) on the color naming task among the typical development (TD), children with developmental dyslexia (DD), and children with developmental dyslexia and developmental language disorder (DD+DLD) groups. In order to examine gender differences, two boys and 16 girls in the TD group were analyzed. There was no significant difference between either correct response ($F(1,16)=2.844, p=.111, \eta^2=.15$) or reaction time ($F(1,16)=.669, p=.425, \eta^2=.04$).

Furthermore, 15 boys and four girls in the DD group were analyzed. There was no significant difference between either correct response ($F(1,17)=.098, p=.758, \eta^2=.01$) or reaction time ($F(1,17)=.315, p=.582, \eta^2=.02$).

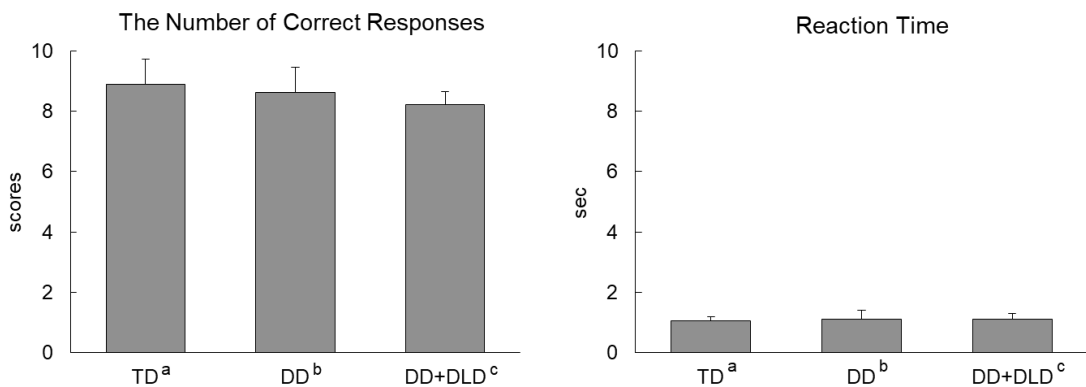


Figure 1. Results of color naming task

Note. ^a The typical development group; ^b The developmental dyslexia group; ^c The developmental dyslexia with developmental language disorder group

Object naming task

In the object naming task, a significant difference was found between the three groups ($F(2,43)=17.89, p<.000, \eta^2=.45$). When a multiple comparison was conducted to examine the difference between the groups, a significant difference was found between the TD and DD+DLD groups ($p<.000, r=.75$) and between the DD and DD+DLD groups ($p<.000, r=.71$). However, there was no significant difference between the three groups in terms of reaction time ($F(2,43)=.865, p=.428, \eta^2=.04$).

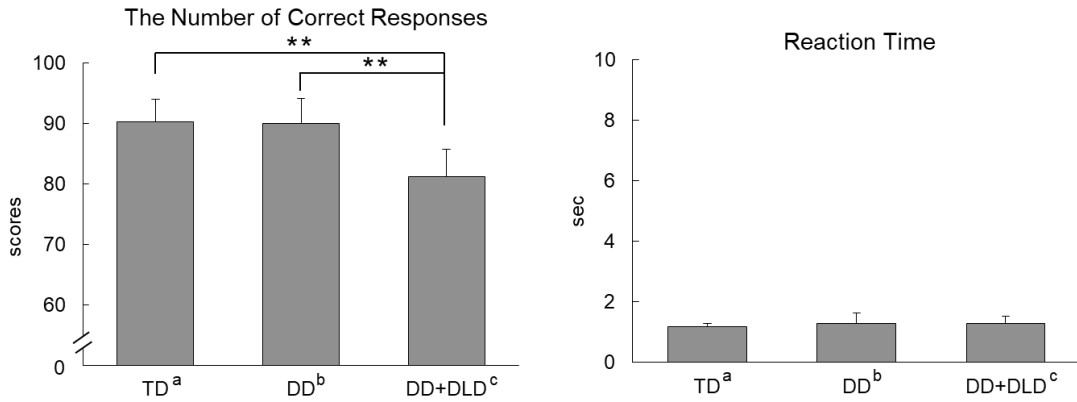


Figure 2. Results of object naming task

Note. ^a The typical development group; ^b The developmental dyslexia group; ^c The developmental dyslexia with developmental language disorder group
 ** $p < .01$

In order to examine gender differences, two boys and 16 girls in the TD group were analyzed. There was no significant difference between neither correct response ($F(1,16) = 2.659, p = .122, \eta^2 = .14$) nor reaction time ($F(1,16) = .252, p = .622, \eta^2 = .01$). Furthermore, 15 boys and four girls in the DD group were analyzed. There was no significant difference between neither correct response ($F(1,17) = 3.451, p = .081, \eta^2 = .17$) nor reaction time ($F(1,17) = .845, p = .371, \eta^2 = .05$).

DISCUSSION

Word sound retrieval deficit hypothesis in Japanese children with developmental dyslexia

In this study, the typical developmental dyslexia group (DD) did not show a lower score in either the color or object naming tasks. This supported the results of the study by Gotoh et al. (2016) that the scores for word fluency tasks did not decrease in DD and DD did not cause issues in word sound retrieval abilities.

Previous studies have consistently reported that the number of correct responses in the object naming task was lower among children with DD compared to children with typical development (Swan & Goswami, 1997; Faust & Sharfstein-Friedman, 2003; Hanly & Vandenberg, 2010). Snowling et al. (1988) pointed out the deficit with the activation of phonological representation toward pictures as a cause for this. In our study, the DD showed a phonological disorder in the results of the non-word repetition task and word repetition in reverse order, although they did not show lower scores in the color naming or object naming tasks. On the other hand, the developmental dyslexia with

developmental language disorder group (DD+DLD) showed lower scores in the object naming task. Gotoh et al. (2016) examined the word sound retrieval abilities of children with DD in a verbal fluency task (alliteration fluency tasks with a given sound / a / and / ka /) and stated that spoken language development was involved with the verbal fluency task scores. In this study, the score of the object naming task is likely to be related with the development of spoken language. Issues with the development of spoken language, in particular with vocabulary, are believed to impact the decline in the word sound retrieval abilities of the DD+DLD group.

Oishi & Saito (1999) conducted a color naming task with seven Japanese children with developmental dyslexia, and all of the children with developmental dyslexia showed lower scores in the color naming task compared to children with typical development. Oishi (1997) hypothesized that the degree to which the semantic network is accessed in the color naming task is lower than that in the object naming task, and that the phonological representation had to be retrieved directly from the phonological lexicon. Therefore, it was assumed that children with developmental dyslexia with word sound retrieval disorder have lower scores in the color naming task. In our study, DD and DD+DLD showed normal scores in the color naming task. Oishi & Saito (1999) conducted a naming task with 10 colors including the basic and intermediate colors, and the mean correct response rate of 10 typically-developing children aged five years was 70.0%. On the other hand, in this study, eight out of 10 colors were composed of the basic colors, and the only intermediate colors were beige and navy blue. Also, preliminary research with 12 typically-developing children aged between three and six years was conducted in advance, with the mean correct response rate being 79.2%. In our study, DD and DD+DLD did not show lower scores in the color naming task, which was different from the results of Oishi & Saito (1999); it was suggested that the stimuli used in the color naming task were different, and the difficulty of the color naming task might be lower than that of Oishi & Saito (1999).

The relationship between the reaction time of the picture naming task and RAN (Rapid Automatized Naming)

In previous studies, it was reported that children with developmental dyslexia showed a longer reaction time in a single picture naming task, compared to children with typical development (German, 1985; Fawcett & Nicolson, 1994; Oishi, 1997). However, the children with DD and DD+DLD showed no significant extension in reaction time in either the color nor object naming tasks. On the other hand, the children with DD and DD+DLD who were examined in this study showed longer duration in Rapid Automatized Naming (RAN).

There are serial conditions and discrete conditions in the format of the naming tasks. In previous studies, only serial RAN is related to reading because both involve serial processing and oral production of the names of the stimuli (Bowers & Swanson, 1991;

Chiappe, Stringer, Siegel, & Stanovich, 2002; Georgiou, Parrila, Cui, & Papadopoulos, 2013). Additionally, increasing the number of items to be accessed and produced in a RAN task in object and digit naming resulted in an increase in the difference in duration between normal readers and children with developmental dyslexia (Di Filippo, Zoccolotti, & Ziegler, 2008). Therefore, we suppose that the reaction time of the picture naming task was influenced by the type of format of the naming task and DD and DD+DLD did not show a longer reaction time in the picture naming tasks in discrete conditions. We discussed the results of this study from an educational point of view. Children with developmental dyslexia showed longer duration in the picture naming task in the serial condition. Therefore, it was thought that picture naming training in the serial condition focusing on fluency might improve word sound retrieval abilities in children with developmental dyslexia.

LIMITATION

The participants of this study were 18 in the TD group, 19 in the DD group, and nine in the DD+DLD group. Since the sample size is not large, a larger sample size may be needed in the future.

CONCLUSION

In this study, picture naming tasks in discrete conditions were conducted to examine the word sound retrieval abilities of Japanese children with developmental dyslexia. It is likely that object naming connects with spoken language development. Japanese children with typical developmental dyslexia without developmental language disorder may not show a lower score in the picture naming tasks in discrete conditions.

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APPENDIX : STIMULUS LIST USED IN THE PICTURE NAMING TASKS**Colors (n=10)**

1	green	6	white
2	yellow	7	blue
3	black	8	yellow-green
4	purple	9	beige
5	red	10	navy blue

Objects (n=100)

1	book	35	refrigerator	69	cup
2	pencil	36	key	70	cake
3	dog	37	meat	71	pot
4	clock	38	bowl	72	bag
5	rice	39	milk	73	mouth
6	spinning top	40	scissors	74	slippers
7	mountain	41	chair	75	mirror
8	newspaper	42	pants	76	Shamisen
9	airplane	43	pillow	77	lighthouse
10	goldfish	44	egg	78	inkstone
11	medicine	45	foot	79	Go
12	drum	46	handkerchief	80	guitar
13	desk	47	apple	81	Tabi
14	crocodile	48	calendar	82	Sumo ring
15	lantern	49	fish	83	chicken
16	Tori-i	50	house	84	butterfly
17	bamboo shoot	51	coffee	85	folding fan
18	deer	52	briefs	86	paints
19	Fusuma	53	glasses	87	sandals
20	pine decoration	54	stairs	88	shoehorn
21	television	55	beer	89	Shogi
22	money	56	spoon	90	boat
23	phone	57	Udon	91	abacus
24	bath	58	umbrella	92	telephone pole
25	shoes	59	tangerine	93	glove
26	wallet	60	nose	94	racket
27	toilet	61	notebook	95	swing
28	nurse	62	Sushi	96	fire extinguisher
29	car	63	curtain	97	bench
30	chopsticks	64	rice ball	98	Bonsai
31	socks	65	ear	99	candle
32	Futon	66	nail clipper	100	thumbtack
33	bread	67	dish		
34	window	68	towel		



CHINESE PROGRAMME

Specialised
Educational
Services
UNLOCKING POTENTIAL

Specialised Educational Services (SES) is a division of Dyslexia Association of Singapore.

OUR AIM

The aim of the Chinese Programme is to help students with dyslexia become independent, inquisitive learners in the Chinese language. Chinese as a language is more complex as compared to English. In Chinese, many words can be read the same way and each word has a different meaning. There are also many strokes involved in writing Chinese words and a child with sequencing difficulties will find it even harder to do so. A good understanding of part-whole relationship is also required in writing the characters as the proportion of the parts to make the word is vital. Due to the complexity of the language, it poses itself as a difficulty for the child to recognise how to read and write in Chinese.

中文

COMPONENTS COVERED IN A TYPICAL LESSON:

- Word Recognition
- Vocabulary Instruction
- Teaching of Sentence Structures

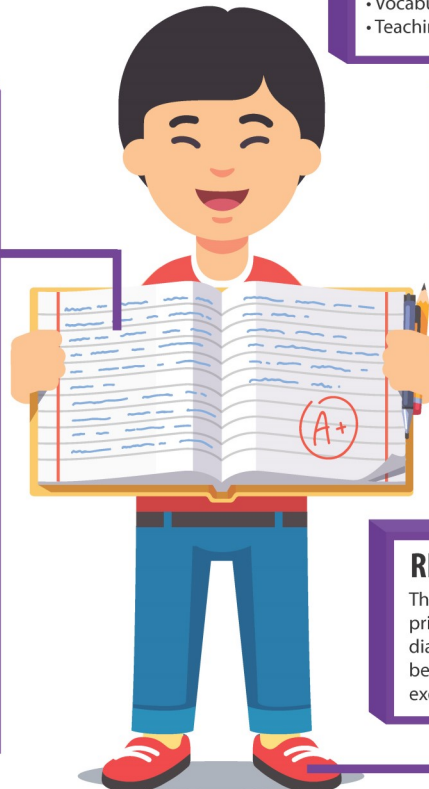
OUR APPROACH

The programme helps to foster student's interest in the language through thematic-based teaching. In this way, vocabulary covered is relatable and can be used on a daily basis, allowing them to express themselves better in the language.

Students are taught interactively with the use of stories, educational games and hands-on activities to make language learning a fun and memorable experience for them. This helps to minimise their stigma towards the Chinese language and build up their confidence and motivation to learn the language.

Lessons are also structured in a way to increase efficiency in learning the language through the instruction of character structure, radicals, stroke pattern, word recognition strategies and understanding how words are combined together.

Comprehension and writing activities are also carried out for students who have good oracy skills in the language.



RECOMMENDED FOR

The application is open only to primary school students with the diagnosis of dyslexia. Priority will be given to students who are not exempted from Chinese.

For more info, visit www.das.org.sg



Evaluating the effectiveness of intervention in Chinese for dyslexics and struggling learners

Kong Yun Rui^{1*}, Sha Lan¹, See Lay Yen¹, Kwan Cailyn¹ and Li Dong¹

1. Dyslexia Association of Singapore

Abstract

In this article, an intervention for Chinese literacy designed for dyslexic children was applied to a group of dyslexic children, struggling learners, while a group of dyslexic children who served as controls, received alternative support for their difficulties in Chinese. Interestingly, the results showed that the controls made little or no progress, but both groups undertaking the intervention showed improvement. Moreover, the struggling learners made more significant improvements than the dyslexic intervention group in character reading and word forming, suggesting that their problems may be less entrenched than the dyslexics, and they would benefit from ongoing support using this structured multisensory approach. Results were supported by qualitative feedback from parents, learners and educational therapists.

Keywords: Dyslexia, Chinese, Quantitative, Qualitative, Struggling learners.

* Correspondence to:

Kong Yun Rui, Senior Educational Therapist and Associate Lecturer, Dyslexia Association of Singapore Email: yunrui@das.org.sg

Dyslexia is a specific learning difficulty that affects literacy development, namely in the areas of reading, writing and spelling. It mainly affects the skills involved in acquiring accurate and fluent word reading and spelling (Rose, 2009). Brunswick (2010) pointed out that the depth of the orthography plays a part in determining the extent of the impact on language acquisition because of the difficulties a person with dyslexia encounters with the written form of words. In shallow languages, there is a more direct correspondence between sound and print, which facilitates reading development. On the other hand, languages that have a deep orthography, such as Chinese, where one is unable to pronounce a word based on how it is written, are more complex. Given these linguistic differences, strategies for effective intervention across languages may differ. Hence, the way dyslexia presents itself in each language may differ according to its writing system.

Consequently, children with dyslexia learning to read in Chinese face a very different task from those learning to read in English, because of the nature and structure of the language, based on pictograms. Chung & Ho (2010) in their study pointed out that most of the work on research-based diagnosis and effective intervention has been centred on alphabetic languages. As such, the work done may not be applicable to Chinese which is a non-alphabetic language.

CHARACTERISTICS OF THE CHINESE LANGUAGE IN RELATION TO DYSLEXIA

Relatively few studies to date have focussed on dyslexia in Chinese, however, this situation is now changing. Interestingly, a review of the literature on Chinese dyslexic students, learning to read with Chinese as their first language, derived from studies in China and Hong Kong, suggests that the pattern of difficulties for Chinese speakers is similar in many ways to children learning in English, with subtle differences in the pattern of difficulties. In particular, there is less clear cut and stable evidence of phonological deficit, which typically characterises dyslexia in English, although sensitivity to acoustic cues has been identified as linked to phonological awareness, but not reading skill (Zhang, Meng, Wu, & Zhou, 2017). Good visual orthographic skills are more important to recognise the Chinese characters and identify the radical positions which dictate meaning. Visual-orthographic skills relate to the strategic attempt to split Chinese characters into parts when reading, and the ability to identify the character structure and position of radicals. These skills are needed to allow for accurate reading of Chinese characters which are visually similar such as 他 'he' and 地 'ground'. When learning, a person may write characters that are disproportionate or read and write characters wrongly.

Moreover, morphology is also important in order to differentiate between the large number of homophones/homographs occurring in Chinese. Good morphological awareness helps students to discriminate characters that sound the same but differ in meaning, form words with characters and break down sentences into words and

phrases to read accurately and fluently. For example, when a person hears 'jiǔ', a lexical decision has to be made if it was referring to wine, long or nine. The presence of homophones requires the provision of context to clarify the intended meaning conveyed. When writing the characters, a person may substitute it with another character with another tone or write a similar-sounding character that he is more familiar with how to write. Another characteristic of the Chinese language is that a character can be compounded with another character to give different meanings. The character 大 'big' can form the words 伟大 'noble' and 大象 'elephant'. However, a person with dyslexia has difficulty in recognising that the characters in the two words are actually the same. A combination of visual and morphological deficits have been identified in combination in Chinese dyslexics (Kalindi & Chung, 2018; McBride-Chang, 以及其他, 2011), with visual skills developing further in tandem with improvements in reading, and a link between morphology and naming speed (Chung K. K., 2017; Tong, McBride-Chang, Lo, & Shu, 2017)

In addition, the learning of Chinese characters is usually done through repetitive copying. McBride-Chang, Chung, & Tong (2011) proposed that copying skill itself may be useful in understanding the development of literacy skills in Chinese. Fundamentally, visual-motor integration skills affect one's ability to copy and write. In order to write Chinese characters correctly, writing in the correct strokes, sequence, direction and proportion are required. A wrong proportion can change the meaning of the character entirely, such as 天 'sky' could become 夫 'male adult' when a stroke is longer than it is supposed to be. At times, it may result in a non-word with the reversal of the dot in 头 'head'. It was observed that children with dyslexia would copy significantly slower with greater average character size, variation in size and lower in accuracy, with missing and concatenated strokes (Lan, Au, Leung, & Li-Tsang, 2011).

The bilingual policy in Singapore mandates all to learn English and the language of their ethnicity, namely Chinese, Malay or Tamil (Dixon, 2005). A person with dyslexia may face difficulty when learning to read and write in either or both languages. Hence, the provision of literacy support in the learning of languages is particularly vital. While there has been an increase in support for English literacy (Ho, 2015; Toh, 2018; Brookes, Ng, Lim, Tan, & Lukito, 2011; Lim & Oei, 2015), research in testing and intervention in Chinese for learners with dyslexia in Singapore has remained limited. With the Chinese ethnicity making up about 74% of the entire population in Singapore (Singapore Department of Statistics, 2016), the development of a suitable intervention is important. Although children with dyslexia are entitled to apply for exemption from Chinese examinations, in practice the majority of parents are keen for their children to become proficient in Chinese in view of their cultural heritage.

Moreover, over the years, there have been parents who have approached the Dyslexia Association of Singapore (DAS) to seek support for Chinese learning for their child, even

when they have not been labelled with dyslexia based on psychological assessments. Typically, these students are coping well with other areas of learning in school and have no other specific learning difficulty. However, they appeared to share similar traits to dyslexics with their learning of Chinese such as reversals, mirror images and being unable to retain what they have learnt.

However, because there is currently no standardised testing tool for learning difficulties in Chinese in Singapore, children who are struggling are unable to access support in their learning. Unfortunately, assessment tools from China, Hong Kong and Taiwan cannot be directly applied to our setting due to differences in the language environment, and differences in the written script. Research into intervention in these countries has also been scarce (Chung & Ho, 2010). In Singapore, English is the more dominant language while Mandarin or Chinese dialects are the dominant language in these other Chinese speaking countries. Differing in language exposure and expectation of what they are required to learn, it is not possible to directly apply what has been evaluated elsewhere to our context. Furthermore, Taiwan and Hong Kong use the traditional script for Chinese writing while here in Singapore, the simplified script is used. To support this group of struggling learners, it is imperative to understand their areas of learning difficulties and how similar they are to a learner with dyslexia. Given similarities, the question arises, will the intervention then be effective in supporting them in their learning of Chinese?

In an earlier study in Singapore, Shen, Liu, Kong, See, & Sha's (2014) compared learners with dyslexia and those without for differences in their sublinguistic skills in the learning of Chinese. Learners with dyslexia were found to be weaker in their visual-orthographic awareness, morphological awareness and visual-motor integration skills. Based on these findings, coupled with feedback from parents, a Chinese intervention programme was designed at the Dyslexia Association of Singapore (DAS) to support learners with these areas of weaknesses. Teaching principles from the Orton-Gillingham approach were adopted, making the instruction dyslexic friendly. Shen et al., (2014) then evaluated the effectiveness of this intervention programme at the Dyslexia Association of Singapore to help children with dyslexia in Singapore to learn Chinese, with each child acting as their own control. In their study, within-samples t-tests found a significant improvement in overall Chinese literacy scores for the 16 dyslexic students aged between six to twelve. Specifically, these learners showed significant improvement in the areas of character orthographic awareness, character learning and retrieval, character reading and vocabulary knowledge reading. Although there was an increase in scores for writing and oral tests, these were not statistically significant. These suggested that the intervention had been effective for these students with dyslexia while there is a need to continue exploring strategies to develop their spelling and writing abilities. In making suggestions for future study, Shen, et al., (2014) noted the importance of capturing students' view on the Chinese language to evaluate if such intervention does build interest in language learning and the attitude of these learners. There is solid evidence from Shen's study of

improvement for children with dyslexia who have undergone this intervention. It is then imperative to ensure that this progress was not achieved by simple maturation or natural schooling. A control group is normally required for an intervention study of this type to reduce or eliminate gains achieved by schooling or natural maturation. With the introduction of a control group, it is intended to determine if the intervention is truly effective in helping learners with dyslexia in Chinese as compared to other remediation support. At the same time, it is also intended to investigate if learners with dyslexia and those who are struggling to learn Chinese share a similar profile in the areas of weakness (Yap & Van Der Leji, 1993). Consequently, if the intervention will also be beneficial in helping them learn. Conversely, the profiles may differ, and require a range of different approaches, as outlined by Snowling & Hulme (2012) in their review of interventions for language and literacy difficulties.

RESEARCH QUESTIONS

This study seeks to investigate the following:

1. Is the intervention effective for learners with dyslexia?
2. a. Do learners with dyslexia and struggling learners have similarities in their learning difficulties?
b. Will the intervention also benefit struggling learners?

METHODOLOGY

The design featured a mixed measures approach. Quantitative measures were used in this study to measure the literacy gains and compare profiles of students at pre and post-test. Qualitative measures were derived from questionnaires and interviews with parents, learners and educational therapists.

Participants

There were a total of three groups of participants in the study – students with dyslexia, struggling learners and the control group who were also dyslexic but not receiving support with Chinese. All participants, aged between six to eleven, were studying in a mainstream primary school and had difficulties in learning Chinese.

Students with dyslexia were recruited from the Dyslexia Association of Singapore (DAS) to form the experimental and control group through letters sent out to the parents. Parents who were interested then registered their interest with the researchers. Students in the control group were informed that they could withdraw from the study to receive intervention at any point of time if they wanted to. While the participants in the experimental group received intervention from the DAS, the control group received other forms of support such as enrichment centres and private home tutors.

The struggling learners were recruited through referrals from DAS psychologists and primary school teachers. They were informed of a trial for struggling learners and registered their interest following a short briefing on what the intervention was about. The criteria for inclusion for struggling learners were failing or getting borderline pass results in spite of other remediation support in the presence of no other known learning difficulties.

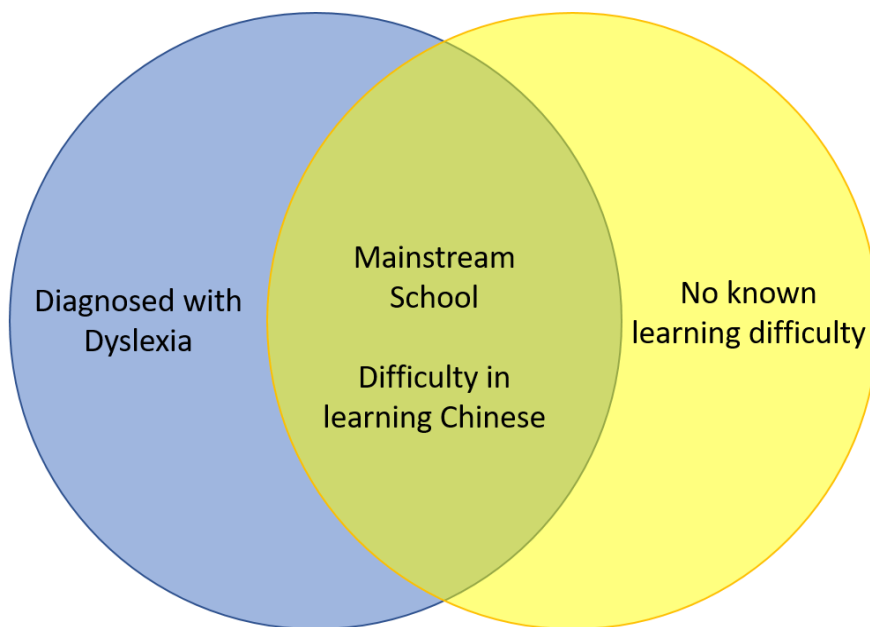


Figure 1. Comparison between learners with dyslexia (left) and learners who are struggling (centre)

Approval for data collection for this study was obtained from the DAS research committee. Informed consent was given by parents for the students to participate in the study. The parents were informed that they could withdraw the child from the study at any juncture and this would have no impact on their access to intervention.

The participants were profiled using the Revised Battery of Chinese Literacy Tests, developed by Shen, et al., (2014) to determine their suitability for the programme. The results were then used to group students with a similar profile together, which is to say students with dyslexia and struggling learners could be in the same group, receiving intervention together.

There were a total of 51 participants in total – 20 learners with dyslexia (M=117.85 months, SD=13.23), 14 struggling learners (M=116.64 months, SD=13.43) and 17 controls (M=112.17months, SD=17.07).

All participants were required to fill in a language background questionnaire to ensure that they had a similar exposure to the language outside school and also if they were receiving additional support.

DESCRIPTION OF INTERVENTION

Students were grouped according to their age and performance in the character reading and spelling tasks from the Battery of Chinese Literacy Tests (Shen et al., 2014) in order to receive intervention. Both learners with dyslexia and struggling learners underwent at least 18 hours of structured literacy intervention, one hour once per week. The intervention is conducted in a small class size of two to four students in each class. The intervention was targeted to the needs of the participants, specifically targeting visual-orthographic awareness, morphological awareness and visual-motor integration. The key aspects of the intervention are oracy skills, through vocabulary building and sentence structure instruction, and teaching of word recognition strategies. The intervention also places an emphasis on teaching word recognition strategies in a structured, sequential and cumulative manner with the intent of helping students improve their spelling and writing of characters, as discussed in Shen et al.'s study (2014). Reviews of what was taught in the intervention through card drill and spelling tasks were also a key aspect of the intervention and took place on a weekly basis. The educational therapists who conducted the intervention were all familiar with the teaching principles of the Orton-Gillingham approach of cognitive, language-based, simultaneously multi-sensory, diagnostic and prescriptive, structured, sequential and cumulative, and emotionally sound teaching.

MEASURES AND DATA COLLECTION

The Revised Battery of Chinese Literacy Tests was used before and after the intervention period on all three groups of participants to form the pre- and post-test measures. The Revised Battery of Chinese Literacy tests was developed by adaptation from test kits in Hong Kong and Taiwan. The measures used in this study were character reading, word forming and spelling. There were a total of 200 test items on the character reading and word forming tasks. These items were based on the Ministry of Education Primary School Syllabus for Chinese and selected according to the different school levels. Participants were first asked to read the character then form words with the character. The spelling task had a total of 20 test items where participants were required to fill in the missing character in a given word. These items were also pegged to their school level. The test items in the post-test were reordered from the pre-test. Error analysis is also performed to understand the nature of errors committed by both groups – those with dyslexia and those who are struggling to learn.

The results were used to determine the current language ability of the participants, the similarities and differences in the learning profiles of the dyslexics and struggling

learners, as well as, the effectiveness of the intervention in helping students read and write in Chinese.

Due to the smaller sample size, triangulation of data was done to increase the reliability and validity of the results collected. Data was collected from the perspective of the learner, the parent and the therapist.

Parents had to complete a Language Background Questionnaire before the start of the intervention so that we could understand the duration of Chinese language support given to learners outside of the DAS as well as to ascertain the effectiveness of the Chinese intervention received at the DAS

Both parents and the learners had to complete a Parent and Learner Questionnaire before and after the intervention so that we could investigate the learner's language attitudes towards the learning of Chinese, ease in recognising and writing Chinese characters before and after intervention, in order to determine the effectiveness of intervention from both parent and learner's perspective. This was intended also to compare interest and attitude towards the Chinese language.

Educational Therapists were also asked to provide qualitative feedback if there were any differences in the provision of intervention between the learner with dyslexia and the struggling learner based on classroom observations and to raise any other concerns or issues which could not be captured by the pre- and post-test.

RESULTS

Scores on the Battery at pre-test and post-test were tabulated and analysed statistically. Analysis of variance showed no statistically significant difference at the $p < .05$ level in character reading, word forming and spelling scores for the three group of participants prior to intervention. Error analysis showed that the reading and writing errors committed were similar across all three groups, which mainly consisted of visual, phonetic and semantic errors. At the end of the study, analysis of variance showed marginally significant difference in character reading at the $p < .1$ level for the three groups: $F(2, 48) = 2.55, p = .08$. Post-hoc comparisons using the LSD indicated that the mean score for the control group ($M = 39.88, SD = 27.37$) was significantly different from the struggling learners ($M = 61.79, SD = 30.35$) and marginally significant from the learners with dyslexia ($M = 56.40, SD = 28.73$). It also showed a marginally significant difference at the $p < .1$ level for word forming for the three groups: $F(2, 48) = 2.93, p = .06$. Post-hoc comparisons using the LSD indicated that the mean score for the control group ($M = 35.05, SD = 26.80$) was significantly different from both the struggling learners ($M = 57.43, SD = 30.92$) and learners with dyslexia ($M = 54.90, SD = 29.90$). There was no significant difference in spelling found between the groups.

Table 1. Means on the Measures of Character Reading, Word Forming and Spelling for all participants at pre and post-test

Participants	n	Character Reading		Word Forming		Spelling	
		Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Dyslexic Group	20	54.00	56.40	50.15	54.90	3.60	4.90
Struggling Learners	14	54.93	61.79	51.36	57.43	4.71	4.64
Control Group	17	38.35	39.88	35.88	35.06	3.18	3.06

Paired sample t-tests were carried out to compare the progress each group made over the course of the study by comparing the means on each measure at the start and end of each intervention. There was no statistically significant difference in the scores on all three measures for the control group. There was also a slight dip in their word forming and spelling scores.

For the group of learners with dyslexia, they showed improvement in all three areas although it was not found to be statistically significant except for the spelling score. Spelling scores were significantly higher after intervention ($M = 4.90$, $SD = 3.13$) as compared to prior intervention ($M = 3.65$, $SD = 2.13$), $t(19) = 2.92$, $p = 0.008$.

For the struggling learners, they showed statistically significant improvement in their character reading and word forming scores after receiving intervention. The character reading scores were significantly higher post-intervention ($M = 61.79$, $SD = 30.35$) compared to before intervention ($M = 53.57$, $SD = 25.97$), $t(13) = 3.60$, $p = .003$. The word forming scores were also significantly higher after intervention ($M = 57.43$, $SD = 30.92$) as compared to before intervention ($M = 49.93$, $SD = 25.67$), $t(13) = 2.86$, $p = 0.01$.

Within each group, there is some variability in terms of the distribution in their character reading ability, with a larger group of students who are poorer in the control group.

Table 2 Distribution of Character Reading Scores (Within Group)

Character Reading Scores	Very Weak 0-25	Weak 26-50	Moderate 51-75	Strong Above 76
Dyslexic Group	20.0%	15.0%	35.0%	30.0%
Struggling Learners	14.3%	28.6%	35.7%	21.4%
Control Group	41.2%	29.4%	17.6%	11.8%

One-way ANOVA showed that there was significant difference in performance in the areas of character recognition, word forming and spelling between the learners of different ability within each group of students at both pre- and post-test for the both dyslexic and struggling learners that received intervention.

Table 3 Significant Difference found across Abilities at pre- and post-test (Dyslexic)

Dyslexic	Character Reading								Word Forming								Spelling							
	VW		W		M		S		VW		W		M		S		VW		W		M		S	
Ability	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Time																								
VW					Y	Y	Y	Y					Y	Y	Y	Y					Y	Y	Y	Y
W					Y	*	Y	Y					Y	Y	Y	Y							Y	Y
M	Y	Y	Y	*			Y	*			Y	Y					Y	Y					Y	Y

For the dyslexics who were receiving intervention, there was no significant difference found for the very weak and weak group for character reading, word forming and spelling. For character recognition, the mean difference between the weak and the moderate group was found to narrow and there was no significant difference between the two groups at post-test. This was also observed between the moderate and strong group.

Table 4 Significant Difference found across Abilities at pre- and post-test (Struggling Learners)

Struggling Learners	Character Reading								Word Forming								Spelling							
	VW		W		M		S		VW		W		M		S		VW		W		M		S	
Ability	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Time																								
VW			Y	Y	Y	Y	Y	Y			Y	*	Y	Y	Y	Y							Y	Y
W	Y	Y			Y	*	Y	Y	Y	*			Y	*	Y	Y							Y	*
M	Y	Y	Y	*			Y	Y	Y	Y	Y	*			Y	*							Y	*

For the struggling learners, there was a significant difference between the different abilities for character reading and word forming at pre-test but no such difference was found between the very weak, weak and moderate ability learners for the spelling task. Similar to the dyslexic group, the mean difference between the weak and the moderate group for character recognition was found to narrow and there was no significant difference between the two groups at post-test. In terms of word forming, there was a narrowing of performance difference between the very weak and weak group, weak and moderate group and the moderate and strong group such that there was no significant difference found at the time of post-test. For spelling, only the difference between the very weak group and strong group remained significantly different.

By comparing the survey done with the students prior and after the intervention, the students who underwent intervention found Chinese characters easier to learn and were able to use different methods to help themselves learn Chinese, such as with the use of pictures and short stories. They were also more confident to write in Chinese. This is consistent with the improvements shown by these students in their character recognition and word forming.

In addition, the learners with dyslexia who received intervention also reported increases in retention, being able to remember the Chinese characters they have learnt better and found them not as difficult as before. It was also reported that they started to enjoy reading Chinese books and would borrow books to take home to read. These results were consistent with what parents reported in the surveys. The parents of both groups of parents also agreed that their children had shown improvement in their Chinese language ability and were no longer as resistant to learning the language. They were also willing and looked forward to coming for classes every week.

Qualitative feedback was collected concerning the learning progress of 12 struggling learners. The educational therapists pointed out a few areas of observed similarities between the struggling learners and the learners with dyslexia who received intervention. The key areas that were identified were the inability to recognize characters and retain what they have learnt in school, not able to identify word parts and their meaning and disproportionate writing. However, word recognition strategies taught during intervention were found to help them recall characters that they have learnt when they came back for intervention in the following weeks. In terms of their learning pace, 7 of them were found to be comparable with their intervention group while three were advancing at a faster pace. The remaining two that were found to be needing more support were from a non-Chinese speaking family and suspected to have dyslexia but not labelled due to resistance from parents. While most have real difficulties in recognizing characters to read in Chinese, the additional observed reasons for the difficulties of the struggling learners includes poor motivation, no or little confidence in their ability in the language, need for attention and absence of language exposure in the home setting.

DISCUSSION

A study of the impact of intervention on 2 groups of learners showed that their performance improved after intervention, although there were no significant differences between the groups. In terms of our main research questions, this suggests that both dyslexics and struggling learners benefitted from participating in the intervention. Most strikingly, this could not be attributed simply to maturation. This is an endorsement for the intervention, which seemed to be equally effective with those struggling with Chinese, whether dyslexic or non-dyslexic.

There were no significant differences in the measures of character reading, word forming and spelling for all three groups prior to the start of intervention. This means that all three groups had a similar baseline. Although there were no significant differences found between the three groups of participants prior to the intervention, it is important to note that the control group had a lower mean score for character reading ($M = 38.35$, $SD = 28.23$), word forming ($M = 35.88$, $SD = 25.30$) and spelling ($M = 3.18$, $SD = 2.63$) as compared to the other group of participants with dyslexia and struggling to learn Chinese who took part in the intervention. We double-checked our data, because it was surprising that the controls were not significantly different at pre-test, but we concluded that this was attributable to the high degree of variability within all three groups. This meant that scores for character recognition ranged from 11 to 112 in the dyslexic group, 7 to 94 in the control group and 7 to 106 in the struggling learners. The distribution of scores within each group was also not equivalent, with more in the lower scoring bands for the control group.

The weak and moderate group of learners in the dyslexic group were found to have made more progress in their character recognition as compared to the very weak and strong learners. This is consistent with literature suggesting that very weak learners possibly need additional support for them to access learning, even in an intervention setting while the strong learners have a smaller margin for making progress.

It is interesting to note that the struggling learners were having similar performance in their spelling ability while there is a significant difference in their character reading ability. This may suggest that the link between reading and writing in Chinese is not as direct as compared to other languages that may be more transparent in its orthography. It may also be worthwhile to further investigate the skills undergirding spelling in Chinese.

While this study has given preliminary insights on the similarities of both groups in terms of errors made when reading and spelling, it is essential that a standardised literacy assessment tool be established in Singapore to accurately classify the learning difficulties a child may have when learning Chinese. Given the similarity in their learning

profiles, it is also suggested that there are possible limitations with current assessment tools in assessing for dyslexia and its application across languages.

By comparing the participants who received intervention and those who did not, the study has mitigated improvements made due to natural growth and school. The group of learners with dyslexia who received intervention showed improvement in all measures of literacy, with the difference in spelling score being statistically significant, while the control group deteriorated in their word forming and spelling scores. The Chinese intervention to some extent is effective in helping learners with dyslexia in their learning of Chinese. The gains in the literacy skills of character reading, word forming and spelling suggested that the intervention is effective in helping both students who are struggling or who had dyslexia in their learning of the Chinese language.

However, it was also notable that one of the children in the intervention groups showed a severe deterioration from pre- to post-test, which may have been attributable to a change in order at the post-test. It is possible that children lose confidence in their abilities if they fail to make progress in the early stages of the test, and may then continue to make errors, which would depress their scores. It seems that the skills of the dyslexic group, in particular, remain more fragile despite good quality support, a factor that has been identified in studies with English speaking participants. One of the children was noted to be particularly nervous during the post-test, which possibly affected the performance.

The data also suggests that the group of struggling learners were better at recognising characters and generating words from characters while only the group of learners with dyslexia showed improvement in their spelling scores. Although there was an increase in the participants' spelling scores in Shen, et al.'s study (2014), it was not found to be statistically significant. In this study, the learners with dyslexic showed a statistically significant improvement in their spelling scores. This suggests that a more structured literacy setting with reviews is important and necessary to develop their ability to spell and write characters. This difference in areas of progress between both groups that received intervention needs to be further investigated in a future study to examine if there are differences in the cognitive deficits of both groups.

No significant improvement was found on the spelling task for the struggling learners although they made statistically significant improvements in their character reading and word forming scores. This is a key difference between the two groups of learners that received intervention. This suggests that there could be other areas of weaknesses and other sublinguistic skills necessary that underpin the retrieval and writing of characters. On the intervention level, there could be a need for a clearer and more explicit instruction in getting them to write characters. It is also possible that the struggling learners were able to spell better than the learners with dyslexia at the beginning and hence, not making much progress.

It is striking that given structured and consistent support, the struggling learners were able to make greater progress than the dyslexic intervention group. It is also interesting that their starting level was equivalent to the dyslexic intervention group who had been receiving support from the DAS. This does suggest a difference in their pattern of learning, with dyslexic children showing more entrenched difficulties and taking longer to reach an equivalent stage to non-dyslexic children, including even those who are struggling learners. This mirrors the findings of Yap and Van der Leij, 1994 with Dutch children, which suggest that problems in automaticity in learning differentiate the profiles of children with dyslexia and struggling learners matched for literacy levels at pre-test.

It was also noted that participants who were struggling in their learning of Chinese were found to commit similar errors to the participants who had dyslexia, signifying similar difficulties when reading and spelling. The character reading errors committed by participants could be classified into three main types – visual, semantic and phonetic errors. Visual errors arise when one part of the character is similar to another. This is consistent with their weaknesses in visual-orthographic skills. An example is 也, 他, 地 where the characters differed in the semantic radical, which in turn gives a different meaning to the character. Another example would be 问 and 闻 which the difference of a stroke provided with an entirely different meaning. Phonetic errors refer to the mispronunciation of the character. This included the use of the wrong tone, additional sound or deletion of sounds when reading. Semantic errors constituted the third largest group of errors. A learner could confuse the characters in a word with the other, such as confusing 动 with 物. It could also happen for characters that are related in meaning.

LIMITATIONS AND FUTURE STUDY

The character reading task had 200 test items while the spelling task only had 20 test items. This would have made it more challenging than reading to show progress. Moreover, to write a character is considered a higher-order literacy skill as compared to reading. It is important to note the need to have more test items for each difficulty level to determine progress more accurately and representatively.

Through the study, it was also observed that exposure to the language at home plays an important role to the progress that a learner makes. Those with little or no exposure to Chinese in the home setting on a regular basis showed limited growth and progress. Apart from a suitable intervention, it is pivotal that the learner is also exposed to the language regularly.

The sample size in this study was small considering that the participants spanned from ages seven to eleven. It would be useful to replicate the study by increasing the number of participants for each age band to take into consideration developmental differences at different ages and compare if intervention is more effective at a younger age (Ferrer

et al., 2015). The wide spread of scores at pre-test was also notable, and a more consistent and significant result might have been obtained if the groups had been split into good and poor at pre-test.

Noting the improvements made by the struggling learners, the intervention is effective in supporting them to read better in Chinese while support for spelling needs to be looked at more closely. This opens up the possibility of extending support to a wider population of at-risk learners in the absence of a standardised Chinese literacy assessment tool.

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Using Kidarn Application to Assess Thai Early Reading Skills: Evaluating Validity and Reliability

Issarapa Chunsuwan^{1*}, Nichara Ruangdaraganon², Kanokporn Vibulpatanavong³, Supiya Charoensiriwath⁴ & Apatha Peethong⁴

1. Department of Pediatrics, Faculty of Medicine, Thammasat University, Thailand
2. Department of Pediatrics, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, Thailand
3. Faculty of Education, Srinakharinwirot University, Bangkok, Thailand
4. National Electronics and Computer Technology Centre, Thailand

Abstract

Early reading skills assessment can detect children at risk of reading disorders. Kidarn is a child-friendly application designed to help clinicians and teachers conveniently and quickly assess young children's reading skills in Thai. It consists of five subtests: letter-sound matching, phonological awareness, rapid automatized naming, blending, and segmenting. We evaluated Kidarn's validity and reliability for use with grade 1 students. Content validity analysis by experts revealed the overall scale content validity (S-CVI) as good (S-CVI/UA = 0.92); scale validity at 0.88, 0.80, 0.73, 0.95 and 0.98 for Subtests 1 to 5, respectively, was also good. Test-retest reliability displayed each subtest's intraclass correlation coefficient (ICC) to be between 0.6-0.85: within acceptable range. Spearman's correlation and total reading scores revealed $r = 0.35, 0.59, -0.45, 0.61, \text{ and } 0.60$ for Subtests 1-5, respectively. In conclusion, Kidarn was found to be an acceptable validated instrument for early reading skill screening in Thai. With its minimal evaluator workload, it shows promise for use in the Thai education system.

Keywords: reading disorder, screening, Thai, application, Kidarn

* Correspondence to:

Issarapa Chunsuwan, Department of Pediatrics, Faculty of Medicine, Thammasat University, Thailand
Email: issarapa104@gmail.com

INTRODUCTION

Learning written language remains a foundation of standard school systems; however, some children have difficulties due to Specific Learning Disorder (SLD). SLD has a global occurrence of 3 - 10% for all school age children (Altarac and Saroha, 2007, Katusic et al., 2001, American Psychiatric Association, 2013), with reading disorders (RD) being the most common, comprising 80% of SLD (American Psychiatric Association, 2013). In Thailand, it is estimated 6.3% of children may have some kind of learning challenge (Roongpraiwan et al., 2002).

Reasons for RD are multifactorial, determined by both child and environment: studies have shown children with RD use different brain functions while reading (Shaywitz et al., 1998; Shaywitz et al., 2002). These children face challenges with basic reading skills, including phonological awareness (ability to discriminate sound elements in words), alphabetic knowledge, phonic concepts, rapid automatized naming (RAN: the ability to name letters in a quick and automatic manner), and general comprehension (the ability to interpret reading results) (Snowling, 2013; Vellutino et al., 2004; Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2000; Peterson and Pennington, 2015). Weakness in these leads to further literacy problems in terms of accuracy and fluency (Vellutino et al., 2004; Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2000; Peterson and Pennington, 2015). If not properly assisted in the early stage of these disorders, further challenges may occur such as academic underachievement, low self-esteem, other behavioral and emotional problems, and perhaps psychiatric disorders (Arnold et al., 2005; Conti-Ramsden et al., 2013; St Clair et al., 2011).

Early childhood education or kindergartens start from age 3 or 4 in Thailand, and children usually attend for two or three years. Thai citizens are to be enrolled in school by age 7 and complete lower secondary school at minimum. Basic education is divided into six years of primary and six years of secondary education, and nominally without fee. (State Gazette, 2002; Wikipedia 2019b). In Thailand at present, children with RD receive assistance far later than they should; they are often referred to specialists for diagnosis and support when their reading ability is already lagging behind peers. There also looks to be minimal systematic support for children with RD in the school system; for example, Pathum Thani province has only 40 special educators for 195 schools (Pathum Thani Special Education Center, 2019; Wikipedia, 2019a), and not all are experts in RD. In several countries, the Response to Intervention (RTI) strategy has been adopted to assist children with RD at school (Fuchs and Vaughn, 2012; Barnes and Harlacher, 2008). During the RTI process, screening aims to identify young children with challenges early on. Basic reading skills are often used to assess if children are at risk of developing RD, as weakness in reading is usually quickly apparent. There are a number of tools around the world which test basic reading skills in multiple languages (Invernizzi et al., 2004; Goffreda and DiPerna, 2010).

Thai is the official language of Thailand and used by over 90% of the population (National Statistic Office, 2018a). Thai is both alphabetic and tonal, and both vowel intonation as well as length altering word meaning (Viboonpatanawong and Evans, 2019; Yampratoom et al., 2017); any basic screening tool should attempt to account for most, if not all, of these variables. Some Thai researchers have developed traditional paper-based methods for assessing basic reading such as Viboonpatanawong et al., who designed a basic reading skills test for Bangkok teachers assessing students from kindergarten 3 to grade 3 (Viboonpatanawong and Evans, 2019; Viboonpatanawong, 2016). Another instrument has been created to identify grade 3 students with RD (Mitrnun, 2016). However, these tests have inherent limitations for widespread use as they are paper-based, and teachers themselves must assess and interpret each child's results. Thai classrooms are relatively large with 25 - 35 students, and normally have one homeroom teacher responsible for several subjects and other extracurricular duties. Paper tests, their training for use, and scoring all appear as an extra burden to already overworked teachers.

Computer programs, whether off or online, are increasingly used for psychological and learning assessments in children and adolescents (Berger, 2006). Ideally, this technology reduces assessor workload, allowing many children to do tests simultaneously; scores are calculated with test results delivered instantly. For English and other languages, there are many computer-based reading and writing skills assessments with good accuracy and ease-of-use. For example, The Lucid Rapid Dyslexia Screening, a brief computer-based assessment for children aged 4-15 years developed by Singleton et al., has been validated and standardized on large representative UK populations revealing high significant correlation with later literacy skills (Singleton et al., 2015). Lucid Rapid was later adopted for use for in Singapore, and 81.9% of children at risk for dyslexia were correctly identified (Brookes et al., 2011). The "eMaDay" and "VLEMA" computerized screening batteries, developed by Protopapas and colleagues for students in grade 7 and 3 - 4 in Greek, demonstrated good sensitivity (75 - 90%) and specificity (80 - 82%) to detect at-risk children (Protopapas and Skaloumbakas, 2007; Protopapas et al., 2008).

Very inexpensive internet access is widespread in Thailand: 70% of children aged 6 - 14 years use the internet regularly, 90% of those children via smartphone (Office of National Statistic, 2018b). Thai researchers have started to develop online basic reading tests such as "Rama Pre-Read" (Developmental and Behavioral Pediatric Unit, Ramathibodi Hospital, 2010); however, this program has not yet been tested for accuracy for at-risk children. Kidarn, which is a made-up compound word and pun in Thai meaning "think (kid) and read (arn)" or "kid reads" in English, is an application for early Thai reading skill assessment. It was created by developmental pediatricians working with special educators and a programming team. Five areas are assessed: phonological awareness, letter-sound matching, RAN, phoneme blending and phoneme segmenting.

Kidarn was designed to be child-friendly, with a cartoon character facilitating each step. Children can be tested with only minimal supervision via tablets, and the test is only 10 - 15 minutes long. After completion, assessors can check scores in real-time via its Kiddiary platform. We aimed to evaluate the accuracy and validity of Kidarn as a basis for further large-scale screening.

METHODS

The research was approved by Human Research Ethics Committee of Thammasat University (Faculty of Medicine). Validity and reliability testing was done in two phases. In Phase 1, five experts checked Kidarn content accuracy and appropriateness to find the content validity index (CVI); experts included one developmental and behavioral pediatrician, two teachers with experience in teaching Thai for early grade students, and two special educators. In Phase 2, Kidarn was used with grade 1 students to find test-retest reliability and correlations between basic reading skills and children's reading ability.

Populations

The Phase 2 population consisted of grade 1 students living in the Pathumthani and Bangkok areas, studying the general curriculum of the Ministry of Education. They were between 6 - 8 years old, able to proficiently communicate in Thai, never diagnosed with any developmental disorders (i.e. autism spectrum disorder, developmental delays, and intellectual disabilities), and did not have vision or hearing problems.

Although kindergarten attendance is not required in Thailand, almost all children in this study (99%) attended kindergarten. Grade 1 children were chosen as this is the initial year for Thai compulsory education, thus, a good starting point for screening at-risk children. We assessed students in the second semester since our pilot study found children had very different reading abilities entering the first semester of grade 1. This may be because Thai kindergartens do not have any mandatory curriculum: some schools do not teach reading, while others have taught it intensively. We found reading ability began to show normal distribution patterns in the 2nd semester, after students had attended school for 5 - 6 months.

Recruitment was done by purposive sampling of ordinary curriculum schools in Pathumthani and Bangkok. Four schools located near Thammasat University were selected, with each school being from different education affiliations: Office of Basic Education Commission (OBEC), Office of Private Education Commission (OPEC), Local Administrative Organizations, and Bangkok Metropolitan Administration Department of Education. We deliberately selected schools from many affiliations to more accurately represent our population. Although all schools use the core curriculum from the Thai Ministry of Education, school administration varies greatly among affiliations. For

example, OBEC schools are managed directly by the Ministry of Education via OBEC, whereas local schools are administered by local area committees. Other Thai schools are sometimes managed by the private sector. However, the Ministry of Education is the central authority, overseeing all of levels of study and schools, from early childhood to higher education.

The children's demographic data indicates they are from families whose average income per household is at the same level as the national average income (National Statistic Office, 2018a), 26,915 THB (approximately 900 USD). Most of the fathers (84%) and mothers (88%) finished grade 9, the last grade of Thailand's compulsory education system, also similar to national data with 87% of all Thais completing grade 9. However, the proportion of parents with tertiary education was about one-third, higher than the national average of 8 % (National Statistic Office, 2018a).

The researchers contacted the schools for permission to collect data. Two classrooms of grade 1 in each school were randomly selected, and each student was invited to participate, i.e. cluster randomization. Each child was tested with both Kidarn and a paper-based reading assessment. Research assistants explained how to use Kidarn then allowed children to do the test by themselves under observation. If the students had any problems during the test, the assistants helped them. Students were next tested via the paper-based reading test.

Measurements

Kidarn

As mentioned, Kidarn has five subtests based on the skills considered crucial for learning to read and literacy development (Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2000).

Subtest 1 (letter-sound matching) assesses ability to recognize letters and their sounds with 20 test items worth 20 points. Each question consists of a simple image, as well as the name of this object vocalized by the animated character in the clear voice of a Thai child, male or female in accordance with user selection. Monosyllabic words were chosen, and four Thai letters are given as options. The Kidarn character then instructs children to choose which letter corresponded to the initial sound of the object's name.

Subtest 2 (initial-sound matching) tests the ability to distinguish sounds in words, also having 20 questions worth 20 points. For each, a picture with three different images are given as answer options; the image names are then spoken in order. Children must choose which picture has the same initial sound as the primary image.

Subtest 3 (RAN) evaluates the reading speed of various numbers. The program shows a series of six numbers arranged in alternate patterns; children are instructed to read aloud as quickly and accurately as possible. During the test, a research assistant reminds the child to press the timer record button and also listens whether the child is reading correctly. Less reading time demonstrates better RAN capabilities.

Subtest 4 (phoneme blending) checks ability to listen to sounds that blend into words, with 28 test items equalling 28 points. The application plays the initial and middle sound (+/- the final sound) of each word separately, then it blends and plays all sounds into a word, which may be the right or wrong blending. Children have to choose whether the blended sound is correct or not. The words used for this subtest were monosyllabic non-words i.e. words without meaning.

Subtest 5 (phoneme segmenting) measures ability to distinguish sound components in words and spelling, using 14 test items totalling 14 points. A monosyllabic non-word is played, then children have to select which letters would make up the words they hear. For example, if the application plays "/pee/", the student should pick the letters representing sounds "/p/ and "/ee/".



Figure 1. The kidarn user interface

At the beginning of Subtests 1, 2, 4, and 5, there are three practice examples, and the application reveals whether the answers are correct or not with an explanation. During the actual test, children have 10 seconds to choose the answer. With no answer, Kidarn skips to the next question. At the beginning of Subtest 3, there is an example of a six-number series for children to read aloud to check whether they know all the numbers or not and help them understand the test method, i.e. reading the numbers as quickly as possible.

Reading test

We used excerpts from the instrument designed by Viboonpatanawong et al. (Viboonpatanawong and Evans, 2019). This consisted of two subtests: short passage and word reading. The latter contained 90 one- to four-syllable words from a grade 1 curriculum vocabulary bank, presented in order of ascending difficulty. The short passage reading test also used grade 1 vocabulary. Children were instructed to read the word list and short passage aloud as fast and accurately as possible in one minute. The research assistants timed the children and counted how many words were correctly read. The final score was converted into the number of words read in one minute.

Statistical analysis

The content validity index (CVI) was analyzed with the item-content validity index (I-CVI) and scale-content validity index (S-CVI/UA). Test-retest reliability was calculated by intraclass correlation coefficients (ICC), and a two-way mixed-effects model was used to find absolute agreement (Koo and Li, 2016b). The correlation coefficient was calculated to determine the correlation between Kidarn and the paper-based reading test scores.

RESULTS

Content validity analysis by our experts demonstrated this version of Kidarn has overall S-CVI = 0.92, with S-CVI subtest values ranging between 0.80-0.96:

Table 1: *Kidarn* scale-content and item-content validity

Subtest	Basic reading skills	S-CVI	I-CVI range
1	Letter-sound matching	0.88	0.6-1
2	Initial sound matching	0.80	0.6-1
3	Rapid Automatize Naming	0.80	0.6-0.8
4	Phoneme blending	0.95	0.8-1
5	Phoneme segmenting	0.96	0.8-1

Phase 2 initially had 223 grade 1 students; however, three students previously diagnosed with developmental delays were excluded along with three students without signed parental consent. Of the 217 students participating, 116 (53.5%) were girls. The average age of students was 7.15 ± 0.34 years (6.1 - 7.9 years). Demographic data is shown in Table 2.

Table 2. : Student and family demographic data

Demographic data		N	%
Gender	Female	116	53.5
	Male	101	46.5
School affiliation	Local Administration Organizations	58	26.6
	Office of the Basic Education Commission (OBEC)	70	32.3
	Department of Education, Bangkok	55	25.4
	Office of Private Education Commission (OPEC)	34	15.7
Maternal education	Grade 6	23	11.8
	Grade 9	40	20.6
	Grade 12	60	30.9
	Post-secondary diploma, bachelor's degree or above	71	36.7
Paternal education	Grade 6	29	15.8
	Grade 9	49	26.6
	Grade 12	43	23.3
	Post-secondary diploma, bachelor's degree or above	63	34.3
Family income (THB) (1USD ~ 30THB)	< 10,000	29	15.3
	10,000 – 30,000	101	53.1
	> 30,000	60	31.6
Prior kindergarten attendance	Yes	192	99
	No	2	1

Test-retest reliability intraclass correlations coefficients (ICC) for each subtest are given in Table 3. Children from the same classroom were tested two weeks apart.

Passage and word reading scores were 56.77 ± 32.22 and 29.17 ± 17.03 , respectively. Kidarn subtests 1, 2, 4 and 5 mean scores were 19.56 ± 1.17 , 12.33 ± 4.86 , 21.87 ± 3.87 and 11.69 ± 2.77 , respectively, with Subtest 3's mean time score being 26.47 ± 7.47 .

Table 3: Kidarn intraclass correlations coefficients (ICC)

Subtest	Basic reading skills	ICC	95% CI
1	Letter-sound matching	0.77	0.47 - 0.92
2	Initial sound matching	0.60	0.17 - 0.84
3	Rapid automatized naming	0.78	0.48 - 0.92
4	Phoneme blending	0.85	0.41 - 0.95
5	Phoneme segmenting	0.82	0.57 - 0.94

Kidarn scores are shown by box plot in Figure 1. Subtest 1 has a ceiling pattern implying mean score was almost as same as total score.

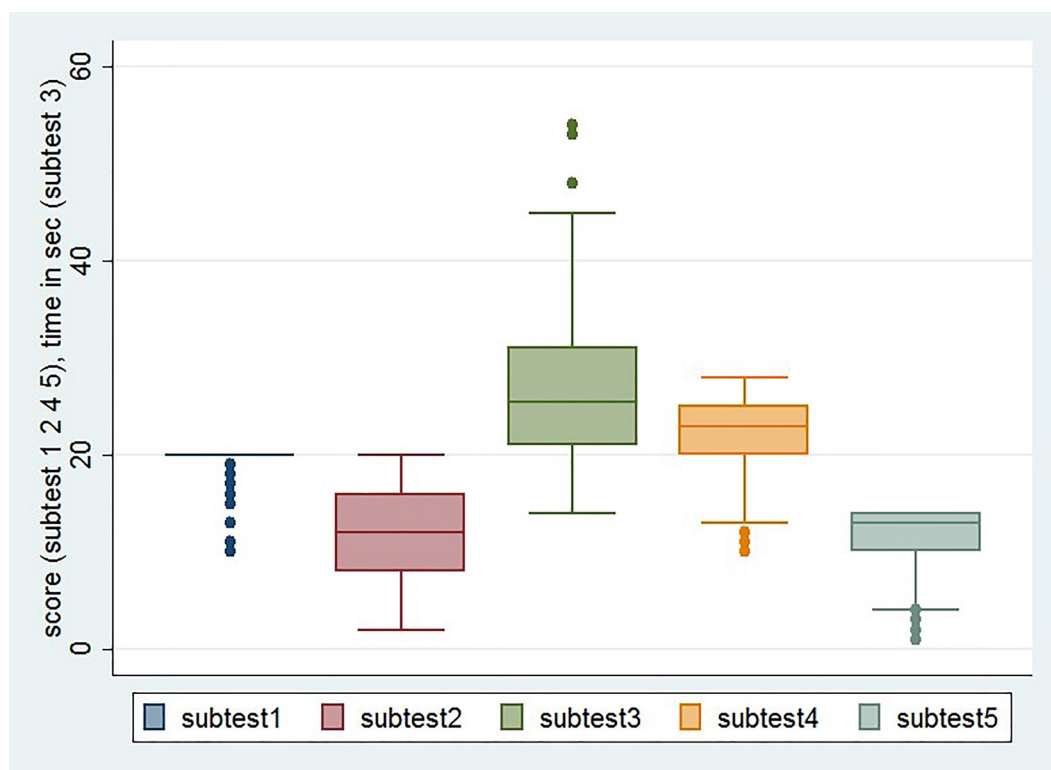


Figure 1. Box Plot of Subtests

Kidarn subtest score correlations with reading ability are in Table 4. The total reading score was passage and word reading scores summed. Subtest 1, 2, 3, and 4 revealed positive correlations, children scoring well on these subtests had good reading scores, while Subtest 3 found a negative relationship meaning children who spent less time performing RAN had better reading abilities.

Table 4: Correlations between Kidarn subtests and reading ability

	Total reading score	Passage reading	Word reading	Subtest 1	Subtest 2	Subtest 3	Subtest 4	Subtest 5
Total reading score	1.00							
Passage reading	0.99	1.00						
Word reading	0.95	0.90	1.00					
Subtest 1	0.35	0.33	0.37	1.00				
Subtest 2	0.59	0.58	0.58	0.31	1.00			
Subtest 3	-0.45	-0.45	-0.42	-0.17	-0.29	1.00		
Subtest 4	0.61	0.60	0.58	0.29	0.48	-0.30	1.00	
Subtest 5	0.60	0.57	0.62	0.52	0.42	-0.29	0.53	1.00

DISCUSSION

An evaluation of the Kidarn computer assessment program was undertaken with a strong sample of children in Grade 1 and results compared with paper based reading assessment. Firstly, it was important to check whether or not each subtest was appropriate for the age group selected. The analysis of Kidarn by our experts revealed the overall scale content validity (S-CVI) was at a good level (S-CVI/UA = 0.92), and scale validity of all subtests also had good S-CVI > 0.8 (Polit and Beck, 2006). For each item,

the I-CVI ranges were acceptable to excellent (I-CVI = 0.6-1). Two experts suggested Subtest 1 was too easy and could be adjusted to be more challenging, such as using Thai letters that resemble each other (for example น น ๓) or using letters with similar sounds for answer options. In Subtest 3, it was also recommended research assistants should press the timer record button when children finish reading, as children sometimes forgot. As all items were in acceptable I-CVI ranges, no test items need to be completely eliminated. The test-retest reliability found that the Subtests 1, 3, 4, and 5 had good reliability with an ICC of 0.77 - 0.85, while Subtest 2 had moderate reliability with an ICC of 0.6 (Koo and Li, 2016).

Subtest 4 (phoneme segmenting) and Subtest 5 (phoneme blending) revealed moderate positive correlations with reading scores. In English language skill research, there is widespread agreement children's ability to segment and blend sounds into words is an important step toward becoming a proficient reader. Other reading intervention studies also noted instruction focusing on phoneme segmenting and blending skills conveyed significant and positive benefits on reading and spelling capabilities (Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2000; Invernizzi et al., 2004; Bus and van Ijzendoorn, 1999; Lie, 1991). To date, the relationships between these skills in Thai have not been studied very much. At this point, it is simply a hypothesis that such skills should be as important for reading competency in Thai as they are in English, since both languages share alphabetic characteristics. Previous research in Thailand (Viboonpatanawong and Evans, 2019), as well as our study, appear to agree demonstrating phoneme blending and segmenting skills to be correlated with the reading ability of Thai children.

Subtest 3, our RAN test, also demonstrated a moderate negative correlation; as mentioned, children who spend less time on this kind of task have a good grasp of interpreting symbols and usually speak well for their age. There are extensive cross-linguistic studies of RAN, including ones in Thai, that state RAN is related to and can accurately predict children's reading ability (Norton and Wolf 2012; Viboonpatanavong, 2016; Kirby et al., 2003; Parrila et al., 2004). Kidarn's RAN subtest provides some additional data to support the relationship of RAN with reading skills in Thai.

Subtest 1 showed the correlation between letter-sound knowledge and reading ability to be low ($r = 0.35$), which was not as expected because alphabetic knowledge has long been considered one of the best predictors of later reading ability. Failure to acquire this is an important risk indicator for later reading challenges (Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2000; Piasta and Wagner, 2010; Foorman et al., 1998). This low correlation could be explained by a possible ceiling effect as most students scored high with an average score of 19.6; many children could achieve the full marks.

This is perhaps because the children had attended kindergartens where they already learned this skill. Many Thai kindergarten teachers believe children should memorize all

consonants before enrolling in grade 1, helping the children proceed to the next stage of mixing consonants and vowels into words. English reading skill research has also found alphabet learning ceiling effects for uppercase letter recognition at the beginning of grade 1; however, lowercase letter recognition and letter-sound matching continues to develop in elementary school (Lonigan et al., 2000; Invernizzi et al., 2004; Paige et al., 2018; McBride-Chang, 1999).

A previous study in Thailand found higher-grade kindergarteners can remember 68% of the total alphabet (Yampratoom et al., 2017), but as far as we know, no research had been conducted to study the ability of letter-sound matching in grade 1 students. As Thai is more phonetically rendered than English, with consonants usually depicting one sound, letter-sound connections in Thai may be easier to learn: this also may have helped create our ceiling effect. However, the Kidarn Subtest 1 did not test all letters in the Thai alphabet. All of the aforementioned, along with the convenient answer options for children to choose, may have made this section too easy, as experts suggested.

Subtest 2, checking initial sound matching, revealed a moderate positive correlation, similar to previous international and Thai studies (Viboonpatanawong and Evans, 2019; Kirby et al., 2003; Paige et al., 2018; Piasta et al., 2010). In English, phonological awareness skills are highly correlated with primary school children's reading ability. Initial sound detection tests appear to be difficult for Thai children, according to both our study and other previous research. Thai children score lower in this area than English-speaking children, who are able to perform this task earlier and seem to have stronger skills in this. This may be explained with an examination of different teaching styles. Thai has more orthographic (phoneme-grapheme) transparency, and teachers usually start teaching sounds with characters versus focusing on the units of sound alone. In English, teachers usually focus on sub-units of sound first then teach alphabetic connections; therefore, these children develop phonological awareness skills first (Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2000).

In Subtest 2, we found some children did not understand the question of identifying initial sounds for the word represented by the image. Even with three sample tests and explanations, many children chose pictures without the same initial sound but instead a potentially context-related picture, such as pairing images of a spoon with one of a fork. These factors may explain why Subtest 2's correlation with reading ability was not as high as expected, and why the test-retest reliability revealed only moderate ICC.

LIMITATION AND FURTHER RESEARCH

As this research was done solely in the provinces of Pathumthani and Bangkok, it does not represent the entirety of the country. In central Thailand, our spoken and written language is the same as the official state language. However, the northern, north eastern, western and southern regions have several distinct dialects as well as different

languages (Office of the Royal Society, 2007), which could affect the reading skills in Thai acquired in school. Further research incorporating other regions and demographics in Thailand should be done.

Before Kidarn was applied to the sample group in phase 2, piloting was undertaken with children at a developmental and behavioral clinic in hospital, which revealed that some children obtained a low score in subtest 1. However, children in the clinic usually have a weakness in reading ability compared with typical children. Therefore, when Kidarn was applied in the schools, the ceiling effect phenomenon of subtest 1 was exhibited. Further study may be conducted in future to test Kidarn subtest 1 with younger children in Kindergarten, to find correlations with their reading ability.

The application, as it stands, has some limitations such as not testing for tone recognition; this could be added in future updates of Kidarn. Notably, Subtest 3 is not yet a task children can perform without tester assistance, as the voice recognition feature does not function consistently with the somewhat uneven nature of children's voices in Thai. It is likely this will be fixed in the next version.

CONCLUSION

Kidarn's ability to evaluate early reading skills in Thai was good on the overall scale content validity index (S-CVI). Test-retest reliability revealed moderate to good ICC, and all subtests of Kidarn appeared to correlate appropriately with results from the paper-based assessment. However, Subtest 1 displayed a ceiling effect for our grade 1 students, and its questions may need to be adjusted to truly challenge students. Kidarn shows potential to be a helpful tool for educators in the Thai classroom: the data collected may also add to the growing field of Thai language acquisition studies.

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A Multi-Dimensional Service System for Children with Dyslexia Based on Family Education

Wang Lei^{1*} and Liang Yueyi²

1. Shenzhen Sparkling Education.
2. Shenzhen Weining Dyslexia Education Center

Abstract

Children with dyslexia are usually misinterpreted as being lazy or intellectually impaired, because their behavior seldom reveals obvious symptoms in daily life. The authors have established a “school-family-service organization” system based on experience of dyslexia remediation. The system centers on family education, and detects the signs of dyslexia in time. With the contributions of these three parties, children with dyslexia will improve their academic achievements and reduce their reading difficulties.

Keywords: family education; dyslexia; “school-family-service organization” system; children’s education

* Correspondence to:

Wang Lei, General Manager of Shenzhen Sparkling Education Email: wangleivv88@126.com

INTRODUCTION

In the current intervention patterns for children with dyslexia in mainland China, parents tend to send them directly to professional service organizations, and leave them to the therapists or teachers; meanwhile, few parents participate in the training courses. The weak connection among schools, parents, and service organizations leads to an unexpected situation: family education has been extremely marginalized in dyslexia remediation.

Since the symptoms of dyslexia are usually invisible to many people's knowledge, a large number of children with dyslexia missed the best time for remediation. Moreover, people have a low awareness about dyslexia in Mainland China, which leads to more difficulties to identifying potential children. By the time that the parents realize that their children are potentially dyslexic, they are already in middle school, or even drop out of school.

Quite a number of parents do not have a basic knowledge of dyslexia, and unfortunately, they support the children in the wrong way, such as forcing the children to do too much homework, or unhelpful communication with them. What's more, some parents are increasingly anxious when confronted with dyslexia, even losing their temper with family members, for the reason that they have not yet been equipped with systematic methods to deal with it.

Little relevant action has been carried out for children with dyslexia in schools in Mainland China. To be precise, it is hard to find integrated education for children with special needs, or teaching according to different levels of literacy in campus. In fact, it turns out to be the barrier against children with dyslexia, and causes more misunderstanding with teachers and schoolmates.

Aimed at the problems above, we hope to connect school, family, and service organization as a team, and therefore identify the children with difficulties in literacy in time, so the parents could play a positive role in the remediation. Based on the family education oriented idea, we are trying to establish a "school-family-service organization" system as an exploratory concept in mainland China, and hope to help the families of children with dyslexia. In this system, parents would play a leading role for children with dyslexia, and therefore regard family education as the core of dyslexia intervention.

In the following paragraphs we are going to introduce the multi-dimensional service system. The emphasis is on how family education improves the training effect, and how parents are enabled to play a crucial part.

1. "SCHOOL-FAMILY-SERVICE ORGANIZATION" SYSTEM

A "school-family-service organization" system allows all the participants to take an active part in dyslexic interventions, including schools and families. In the traditional one-way system, only the service organizations undertake most training, and families receive the intervention services passively. Schools and families are encouraged to perform the more important functions of connection.

However, school is the place where students spend the longest time, and it has a great influence on their development. In the "school-family-service organization" system, school will inform parents with knowledge of dyslexia, detect the early symptoms of dyslexia, offer professional accommodations and a better learning environment. School plays the starting role in the system, which is expected to increase the children's literacy directly.

Family should be the harbor of love for dyslexic students, where the children are able to flourish. Family education is influential to improve communication between parents and children, and therefore children will become more confident, which will help reduce the barriers of dyslexia. It is an important point connecting school and service organization.

Service organizations should provide children with dyslexia with professional intervention including a comprehensive assessment for children with dyslexia, a professional training program, and specific support for parents. The Service organization is the key point connecting schools and family.

A "school-family-service organization" system relies on sufficient communication among the three parties for timely detection, early intervention and targeted services, so as to minimize the impact of dyslexia on schoolchildren.

Our "school-family-service organization" system had played an important role in spreading knowledge of dyslexia as well as screening targeted group with dyslexia. The service organization has developed a set of screening tests on WeChat, which assesses the children's literacy briefly, as well as covers more potential users on the platform of WeChat. Compared with assessments on site, the online test system is designed to keep children's private information from leaking, and therefore parents are willing to accept it as the preliminary screening test. In the meantime, when teachers have a basic knowledge of dyslexia, they could discover the targeted students in time and inform parents that the students may be potentially dyslexic.

In the service system, parents are required to take courses at parents' school, in order to master the training skills as a positive role in the dyslexia remediation. By increasing their actual time of participation every week, parents are able to help reduce the barriers of reading and writing instructions, and achieve better parenthood. With more confidence, the children will have a better training results in literacy.

A “school-family-service organization” system should be constructed on active and timely communication. Being fully aware of dyslexia, we can discover the potential children and arrange specific interventions and services, as well as keep an up-to-date record of students’ academic achievements, and eventually minimize the impact of dyslexia on the children.

2. THE INFLUENCE OF FAMILY EDUCATION ON THE MULTIPLE DIMENSION SERVICE SYSTEM

Family education is correlated with the training results of children with dyslexia. In the multi-dimensional support system, we shall maximize the strength of family education and change the one-direction service style into multi-dimensional service.

According to the results of the literacy assessment, parents can make corresponding adjustments to family education. A comprehensive understanding of the children with dyslexia is the foundation for intervention training and new family education. An appropriate family education program should be developed based on the characteristics of the child's language proficiency, by the parents with the assistance of professionals. Moreover, the language ability training within family education follows the system of language acquisition and progressive learning. Parents can solve different problems at different stages of children’s language acquisition. Meanwhile, parents are expected to encourage the children with more guidance. When the children make progress, their efforts will be appreciated, and the praise should help enhance their confidence.

Service organizations can support the parents with professional skills and knowledge, and therefore establish the family education system together. The system of ShenZhen Sparkling Education as an example, builds a family education system including literacy assessment, family education consultation, parents’ school, family education program, student training system, and academic achievement tracking. Based on the children with dyslexia’s needs, the parents school video library consists of various modules. Within the family education support system, the children with dyslexia are assessed for literacy, and then they will be provided with a customized training program according to their assessment performance. As for the parents, they are required to learn from the customized training program videos, acquire the training skills in corresponding units, and finally help train the relevant abilities of the children with dyslexia at home with the help of the service platform. The family education support system provides parents with professional support for family education through video learning, breaking the barriers of space and time. In the meantime, professional tutors on the platform will help parents tutor children with dyslexia with more specific instruction, so as to keep a professional family education and service quality.

Introduction of Family Education Service System

1. Fast screening tool

With low public awareness, it is difficult for parents to find out whether their children have dyslexia, so they need a tool to help them identify their children's problems directly. One of the main features of the tool is the convenience of dissemination, for example, the fast screening tool can be carried in Wechat, and ordinary people can quickly screen only by using Wechat to scan the two-digit code. In addition, it should be noted that when disseminating, it is necessary to set keywords that are easy to attract the attention of parents, rather than words with dyslexia directly. For example, if your child has frequent spelling mistakes, missing words or skipping lines while reading, parents will be interested in scanning the QR code to learn about their children's abilities and then find out their children's problems.

2. Parent tutor training course (parent school)

The main contents of the parent tutor class include: understanding dyslexia, how parents can deal with children's dyslexia, the basic methods of family counseling and so on. Through the training courses, parents can not only understand children with dyslexia as a whole, but also master some basic skills of tutoring children with dyslexia, so as to lay a foundation for family counseling.

3. Capacity evaluation and program development

Before making a targeted plan, we need to have a comprehensive understanding of the child's reading and writing ability. According to the characteristics of simplified Chinese, we have developed an evaluation system, which can understand children's problems from 21 dimensions, such as Chinese application, phonetic ability, reading fluency, glyph structure and writing ability, visual perception, writing posture, pen holding posture and so on. With the results of the evaluation, we can formulate a targeted training program according to the characteristics of the child's ability.

4. Daily training

Daily training usually takes up 4-5 hours a week. It mainly consists of two parts. The first part is carried out by students under the guidance of their parents. When carrying out the training, the parents first learn the training video according to the training program, and after the parents master the training methods, they guide their children to do the training, and input the training results into the learning system. The second part is for the students to train by themselves through the

electronic training platform, the platform has designed the training content into games, students can complete the training by playing games, and the platform can record the results of game training.

5. **Learning status tracking and feedback**

The system can track the effects of students' training and give feedback to parents in time. At the same time, through the training records recorded by the system, we can form an analysis report for the parents. At the end of a stage of training, we can analyze the points that have not been improved, and thus adjust the training program.

3. **IN DAILY TRAINING, WE SHOULD BE GOOD AT USING TEACHING AIDS TO HELP CHILDREN.**

Teaching aids can be used skilfully in family education for children with dyslexia's literacy training. The most important principle of intervention is to motivate in children with dyslexia an interest in learning, because it is their nature to enjoy playing. So, we design games in family education in which parents and children enjoy making teaching aids together. On the one hand, they will have a closer parent-child relationship by making teaching aids together. On the other hand, dyslexic students are likely to have more interest in learning by making teaching aids, which can be used in the training course and school class in the future.

Here is an example of training case, making Chinese with plasticine. This game is aimed at training the strength and flexibility of hand muscles, and increasing students' interest in Chinese characters. Before we start, a few hollow Chinese characters are prepared. Then we rub the plasticine into strips, and fill them into the hollow Chinese characters above. Read this aloud and feel the strokes of the plasticine Chinese characters with fingers. Finally take away the hollow characters and encourage the children to repeat the plasticine characters. In this game different part of Chinese characters can be represented by various colours of plasticine. We may also make more Chinese characters, and then cover the eyes, guessing the characters by touch.

4. **THE KEY ROLE PLAYED BY PARENTS IN THE SERVICE SYSTEM**

First of all, parents could detect the symptoms of dyslexia. According to scales designed for children of different ages, parents are able to discover the specific performance which is similar to dyslexia, by comparing with children of the same age. Parents are required to pay attention to children's hand muscles and fine operation, large muscles and large movements, language proficiency, hand-eye coordination, sensory integration and so on. As for the pupils, they have more word processing tasks, and their parents shall begin to observe the reading and writing performance, to confirm whether they can

memorize the words within an efficient time, to focus on reading fluency and errors.

Apart from observing children with dyslexia's literacy and behavior, parents are expected to communicate with multiple parties for support. Having discovered any symptoms of dyslexia, parents must communicate with schools, hospitals or professional organizations, so that they can fully understand what happens to the children. A good connection between parents and other people will definitely help them to understand the difficulties the children with dyslexia suffer from, and seek extra support from their school teachers. In addition, parents can argue for an appropriate adjustment to their children's homework, find learning style suitable for their own children, and help release academic stress, in order to create an inclusive environment.

Last but not least, parents' emotional management is actually supportive to the dyslexic students. Parent who do not have any idea of dyslexia and are informed that their children might be dyslexic for the first time, usually become panicked. However, as parents, your children with dyslexia need you. Difficult as it is, parents need to put aside panic, doubt, and denial, and try to understand and accept dyslexia. In fact, once parents are capable of emotional management, they will be contributing their efforts to better training effects. Once the children feel that their families understand and support them, they will concentrate more in the training days. Children with dyslexia are in need of ongoing support. Parents who make quick adjustments to their emotions and face the facts of dyslexia, will eventually be the strongest supporters for the children.

This approach of involving parents in developing dyslexia awareness is not new and has been effective in other countries. These include the USA, where the Orton society (now the International Dyslexia association) combined professionals and parents, in the UK, with the foundation of the BDA, largely driven by an anxious parent of a dyslexic son whose dyslexia had not been recognised, namely Marion Welchman. Over time, a number of dyslexia associations have been set up world- wide, which have transformed awareness of dyslexia, with the most effective combining parents and professionals. The Dyslexia Association of Singapore, DAS, for example has provided ongoing training for parents and ensures their involvement in understanding and supporting their children's needs.

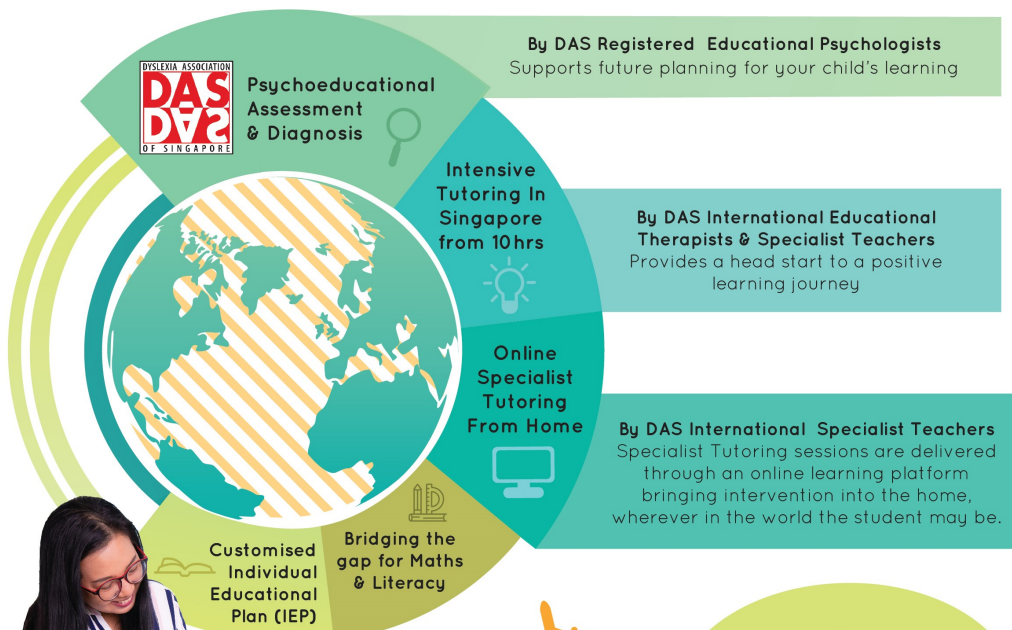
The unique aspect of the current approach is the ability to use modern media to ensure that awareness is disseminated, which should provide a wide and sustainable reach for all involved. These positive steps in China have the potential to create a greater understanding of dyslexia throughout society and improve outcomes for the whole family.

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The Curious Case of ADHD

Fintan O'Regan^{1*}

1. Behaviour Management Training & Consultancy

Abstract

This presentation will consider the issue of Attention Deficit Hyperactivity Disorder and will present the case for difference over deficit. It is a paradox that business and industry require innovation and creativity however schools seek compliance where students should follow a set curriculum and are expected to conform to the rituals and routines of learning.

Individuals who have traits of ADHD are often viewed in schools as difficult because they display symptoms of lack of attention and can often appear easily bored. Boredom has for many years has been seen as a taboo subject in schools where teachers have often been defensive about the issue and have placed the responsibility fully on the student who appears generally disinterested and distracted. Instead of seeing the negatives of this teachers need to understand these traits as more of an alert system than a challenge to authority and that boredom is an emotion that is simply saying that we aren't meaningfully engaged in what we are doing.

Individuals with traits of ADHD are most often highly creative and when stimulated and interested in what they are doing they can be extremely productive and innovative which is exactly what business and industry require. In this presentation we will consider how education and employment should review individuals with traits of ADHD and consider systems and strategies of how to best to support them towards fulfilling their potential..

Keywords: ADHD, boredom, teaching, creative, innovative, employment

* Correspondence to:

Fintan O'Regan, Fintan O'Regan Behaviour Management Training & Consultancy Email: fin@fintanoregan.com



Componential Model of Reading: Implications for the Assessment of Instruction of Dyslexia and Related Reading Problems

Malatesha Joshi^{1*}

1. Texas A&M University

Abstract

Literacy development may be influenced by various factors such as family background, classroom instruction, and type of orthography. Based on the findings, we developed a model called the Componential Model of Reading (CMR), which includes three components: cognitive component, which is based on the Simple View of Reading, psychological component, consisting of motivation and interest, and ecological component, which includes home environment, dialect, teacher knowledge, and orthography. In this talk, I shall present our research on literacy development based on CMR and how it can be applied to assess and instruct individuals with dyslexia and other related reading problems.

Keywords: Componential Model of Reading (CRM), dyslexia, classroom instruction, reading, dialect, teacher knowledge, orthography, literacy development

* Correspondence to:

R. Malatesha Joshi, Ph.D., is a Professor of Reading/Language Arts Education, ESL and Educational Psychology at Texas A&M University Email: mjoshi@tamu.edu



Addressing the Literacy Needs of Children Who Speak Non-mainstream Dialects

Julie Washington^{1*}

1. Department of Educational Psychology - Georgia State University

Abstract

When children come from different language backgrounds learning to read can be impacted significantly. Research demonstrates that the more dialect children use the more difficult their reading and writing development will be. It has been hypothesised across languages that this greater linguistic distance from the written standard creates a kind of cognitive dissonance for children as they must manage the mismatch between their spoken variety and the language of books. This presentation will focus on dialect differences, their impact on both reading and writing and the impact of these differences on teaching and learning.

Keywords: literacy, reading and writing, dialect, teaching and learning

* Correspondence to:

Dr. Julie Washington, Professor, Language and Literacy Initiative, Department of Educational Psychology - Georgia State University Email: jwashington@gsu.edu



Finding the Positives! How a pandemic has offered technology positives and reduced anxiety for many Dyslexic Learners?

Carol Allen^{1*}

1. *DfE Assistive Technology Expert Group and BETT Advisory Team*

Abstract

If you find two of the four basic foundations of communication, that is, reading and writing, problematic and yet others seem to face no discernible issues then your daily struggle impacts upon you, your self-esteem and your mental health and well being. We are currently finding our way through unprecedented times causing increased levels of anxiety and social pressures. Remote learning has become a given for many students world wide. This session will take the key issues that have presented during this period and seek to establish what features worked to support our students and crucially, how this evidence can be translated into changed practice as we return to the new normal.

Keywords: reading and writing, self-esteem, mental health, remote learning, pandemic

* Correspondence to:

Carol Allen, DfE Assistive Technology Expert Group and BETT Advisory Team Email: carol.allen.work@gmail.com



A literature review of empirical studies on reading motivation and struggling readers

Edmen Leong^{1*}

1. *Dyslexia Association of Singapore*

Abstract

The topic of reading motivation and struggling readers ignites interest in the field where educators strive to support these learners who require additional support and encouragement to read. Groups of struggling readers are typically generalized as unmotivated to read since it requires them a lot more effort to read. This literature review aims to consolidate the findings of empirical studies on reading motivation and struggling readers for the purpose of revealing patterns or gaps in past empirical findings. Past research revealed three categories of findings. The first category of findings evaluated the influence of motivational constructs on struggling readers. These have suggested that struggling readers are generally rated poorly in reading motivation scores with low Self-Efficacy and Value most often observed. The second summarized the literature revolving around the relationship between reading motivation and reading achievement comparing groups of struggling readers and typical readers. These revealed differing patterns on how reading motivation impacts reading achievement. The third summarized the literature revolving around strategies including extensive reading, positive reading experiences, or social interactions that can that impact reading motivation. The consolidation of these findings through the literature review provides practitioners with a clear direction in providing meaningful guidance in supporting struggling readers in growing into learners who love to read. .

Keywords: Reading Motivation, self-efficacy, social interactions, struggling readers

* Correspondence to:

Edmen Leong, Director of Specialised Educational Services, Dyslexia Association of Singapore, Email: edmen@das.org.sg



Dyslexic Entrepreneurs in Singapore: The Incidence, Their Educational Experiences and Their Unique Attributes.

Deborah Hewes^{1*}

1. *Dyslexia Association of Singapore*

Abstract

The incidence of dyslexia in the Singaporean entrepreneurial population is unknown. This study compares Singaporean Entrepreneurs who have dyslexia with those who are not dyslexic. This research examines the education experiences and personal attributes of Singaporean Entrepreneurs and to identify the differences between those with dyslexia and those who are not dyslexic. A survey was conducted over a 12-month period and the data revealed that the incidence of dyslexia in the Singapore entrepreneurial population was at 26% more than 2.5 times than the general population. The educational experiences of dyslexic entrepreneurs were significantly negative for primary and secondary education, however, in tertiary education, their educational experiences were significantly positive. Dyslexic entrepreneurs indicated two of the major factors they started their own business was to have control over their lives, time, and success and because of their dyslexia. Dyslexic entrepreneurs' traits were explored, and they scored significantly less in empathy, interpersonal skills, public speaking, and memory ability compared to their non-dyslexic peers. Two attributes where dyslexic entrepreneurs scored significantly higher were visual thinking and visual-spatial ability. The findings from this research can be used to support the development of policies and support for Dyslexic Entrepreneurs in Singapore.

Keywords: dyslexia, entrepreneurship, education, positive dyslexia, specific learning differences, visual thinking, visual-spatial ability.

* Correspondence to:

Deborah Hewes, Assistant Director of Publicity and Publications, Dyslexia Association of Singapore Email: Deborah.hewes@das.org.sg

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Hacking the Text: Empowering Reading Comprehension through Annotation

Isabelle Shanti Benjamin ^{1*}

1. *Founder & Principal Consultant of ELCOT Consultants*

Abstract

Annotation, while a highly regarded teaching strategy in many English Language classrooms, is frequently not well-executed or understood. Often what passes for teaching annotation is reduced to a teacher-dominated session of explaining meanings of words in the text with students mechanically noting down these 'announced' meanings. In my consultation work with EL departments, I have observed that annotation is often focused only on the semantic level i.e. content words. This approach often results in students giving up whenever they encounter unknown words because they have not been trained to note and exploit contextual clues that indirectly or directly point to the meaning intended by the writer. Competent readers rarely know the meaning of every single word in the texts they read but they do know how to 'hack' the grammatical structure and contextual details to theorize potential meanings to be confirmed or eliminated with further evidence and arrive at the meaning intended. This workshop session will help participants develop the linguistic knowledge base needed to identify critical annotation 'targets' to effectively train their students to independently notice and exploit pertinent textual clues to clarify or guesstimate the meaning intended by writers.

Keywords: reading comprehension, text processing, exploiting textual features, annotation technique

* Correspondence to:

Isabelle Shanti Benjamin, Founder & Principal Consultant of ELCOT Consultants Email: elcot_consultants@yahoo.com



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A Picture of Success: The Imagery-Language Foundation for Teaching all Children to Read and Comprehend

Angelica Benson^{1*}

1. *Lindamood-Bell, United States of America*

Abstract

This session explores the nature and role of imagery in reading and comprehension for all readers, including struggling learners and those with dyslexia. Many children experience weakness in creating imagery, resulting in poor literacy skills. New research suggests that the dual-coding of imagery and language is a critical factor in language comprehension and in word reading. Supported by key behavioral and neurological research findings, and 35 years of instructional experience, this session reveals that imagery is a primary sensory-cognitive power source that can be developed for reading independence in all children, including those diagnosed with dyslexia.

Learning Objectives:

Through interactive discussion designed to reinforce key ideas, participants will:

1. Identify the two types of imagery (symbol and concept) and the symptoms of weak imagery underlying the component parts of reading
2. Examine behavioral and neurological research supporting the role of imagery for students weak in word reading and comprehension, including students with a range of learning difficulties and highlighting those diagnosed with dyslexia
3. Demonstrate the ability to apply the conceptual framework from the discussion to best support a range of individual student learning needs (examples/case studies provided).

Keywords: reading interventions, dyslexia, imagery-language connection

* Correspondence to:

Angelica Benson, Director of International Development for Lindamood-Bell Email: angelica.benson@lindamoodbell.com

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Breaking Down Barriers: Dyslexia & Accommodations.

Suthasha Kelly Bijay^{1*}

1. Dyslexia Association of Singapore

Abstract

Using a mixed study design of both qualitative and quantitative data analysis, The study looked at educational therapists' implementation of shared e-book sessions, projecting e-books onto a screen to extend the shared reading experience, and the impact this had on struggling readers' early literacy skills and comprehension. Participants included a diverse sample of 20 children and 5 Educational Therapists (EdTs). Following a brief training session to ensure consistency of approach across the sample, teachers conducted 10 e-book shared reading sessions, over a 10-week period. A pre and post informal curriculum-based measure was used and compared with a control group to assess learning. Results suggest that the use of Raz-Kids e-books had helped in improving pupils' comprehension skills and complemented teaching, learning and reading engagement. It concluded that there is similar effect from shared reading using print books to shared reading using e-books, and that both support children's learning of discrete literacy skills, and that it is beneficial to expose children to both types of books. Literature generally points out that struggling readers experience reduced motivation to read. E-books would therefore add to the importance on engaging such readers and increasing their interest in reading. This research did not show unilaterally that the gains from the e-books programme was above that from the use of printed books but it concluded that a good shared book reading programme would best incorporate both types of books.

Keywords: Early Intervention, Technology

* Correspondence to:
Suthasha Kelly Bijay Preschool Programme Manager, Dyslexia Association of Singapore. Email: Kelly@das.org.sg

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Lived experiences of learners with special educational needs at university in Singapore

Damaris Carlisle^{1*}

1. Doctoral Student, The University of Western Australia

Abstract

Often cited for its academic success, Singapore is in the throes of shifting towards a social model of inclusive education. Since 2003, the Singapore government has incorporated facilities and resources into schools with the aim of helping learners with special educational needs (SEN) integrate into mainstream school (Hean, 2000). With greater accessibility to mainstream schooling, increasing numbers of students with SEN are continuing to tertiary education. In 2014, in recognition of this growth, the Singapore government announced that publicly funded institutes of higher learning would be furnished with a Disability Support Office to support these learners (Siau, 2014). This presentation discusses the initial findings of a qualitative interpretive study set in Singapore. Individual interviews were conducted with second and third-year university students in Singapore who have an assessed SEN. Participants were asked to reflect on their first-year experiences, support, coping strategies, and successes as they transitioned from school to university. After cycles of coding the data, themes were identified. The lived experiences of these learners presenting a wide range of differing needs provide insights into their realities and perspectives (Punch & Oancea, 2014). This, in turn, has possible implications for policy and practice at the tertiary level in Singapore.

Key words: university, special educational needs, first-year experiences, transition

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* Correspondence to:

Damaris Carlisle, Doctoral Student—The University of Western Australia Email: deecee.d@gmail.com

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Breaking Down Barriers with Assistive Tech: Dyslexia & Accommodations.

Jack Churchill^{1*}

1. Scanning Pens, UK

Abstract

The most common disability is dyslexia. In recent years quite rightly greater focus has been given to supporting invisible learning difficulties. I was diagnosed with dyslexia at school and given the necessary extra support to help level the playing field for me. I have taken my experience and developed the technology business Scanning Pens which now supports tens of thousands of young people and adults access text independently. The power of being able to quickly and simply access text using a pen scanner is changing the way people learn today. There is now no need to have an adult sit with you all the time.

I intend to show how pen scanners are being used around the world to break down barriers in both dyslexia & testing and I'll highlight the latest evidence and best practice. The most common disability is dyslexia. In recent years quite rightly greater focus has been given to supporting invisible learning difficulties. The power of being able to quickly and simply access text using a pen scanner is changing the way people learn today. There is now no need to have an adult sit with you all the time. This session will show how pen scanners are being used around the world to break down barriers for individuals in school, workplace & exams and highlight latest evidence, best practice and product developments.

Keywords: Assistive Technology, Scanning, Smart Pens, Reader Pen, Exam Reader

* Correspondence to:
Jack Churchill, Co-Founder of Scanning Pens. Email: jack@scanningpens.com



Perspectives of Mainstream Students with Special Educational Needs on Inclusion

Jessica Colleu Terradas^{1*}

1. Como Secondary College (Western Australia)

Abstract

Since 2013, the Intensive Learning Team (ILT) at Como Secondary College has strived to lift literacy and numeracy outcomes in academically at-risk students by running an effective targeted evidence-based intervention. In 2019, we launched a project in alignment with the school's pedagogical framework that aims at improving the transition of these students to mainstream classes by applying explicit direct instruction features in mainstream classes for a greater impact on students' learning and behaviour. To ensure changes in practices and increase teacher capacity, the project involves instructional coaching, on-site professional learning activities and the creation of a Professional Learning Community. Focused on based measures, instructional coaching is a differentiated, collaborative process that involves an expert working closely with teachers to improve classroom practice, and ultimately student outcomes. The coach acts as a guide or facilitator and draws on a repertoire of instructional practices, knowledge and experience to bridge teacher capacity related to individualised improvement goals. In implementation, the results expected are an effective, consistent pedagogy across teachers within the school and sustainable improvements in all students' achievement, especially the most at-risk students.

Participants in this session will identify the features of the Instructional Coaching Cycle based on Jim Knight's work. They will explore classroom observation and feedback as strategies to school improvement which informs collaborative discussion and support for inclusive schooling. We will also analyse the data collected used to drive facilitated reflection on the effectiveness of the pedagogical practices which were enacted.

Keywords: instructional coaching, teachers' capacity, individualised professional learning, collaboration, reflection

* Correspondence to:

Jessica Colleu Terradas, Intensive Learning Team, Como Secondary College (WA). Email: Jessica.Colleu@education.wa.edu.au

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Singapore Math: Supporting Students with Dyslexia in Math

Siti Mariam Binte Daud^{1,2*} and Agaisteen Rebecca Shalinah^{1,2}

1. Dyslexia Association of Singapore
2. DAS Academy

Abstract

Dyslexia is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling. However, despite it being a language-based difficulty, about 50% of students with dyslexia display difficulties in Math as well. One difficulty that these students have when it comes to Math is its language. They struggle to read and understand the vocabulary in Math questions and therefore have difficulties completing their tasks. Deficits in executive function such as poor working memory, also cause these students to struggle with Math.

It is then vital to understand these difficulties and adapt a structured and systematic approach to teach Math to these students. In Singapore, the Concrete-Pictorial-Abstract (CPA) approach, which was developed by American psychologist Jerome Bruner, is an essential technique of teaching Math for mastery. However, the CPA approach can also be used to support students with dyslexia in the common areas of difficulty in Math, such as word problems. These students find it difficult to understand word problems without concrete or pictorial representation. They need sensory experiences to develop their understanding. Using concrete manipulatives, such as unifix cubes or blocks can help them 'see' and break down the word problems, and eventually translate the problems to diagrams.

This presentation therefore aims to address the difficulties students with dyslexia have with learning and understanding Math. Participants will also explore how the CPA approach can be used to help students with dyslexia better understand Math concepts and handle the subject with more confidence.

Keywords: Singapore Math, dyslexia, Concrete-Pictorial-Abstract Approach (CPA), working memory, manipulatives.

* Correspondence to:

Siti Mariam, Lead Educational Therapist, Dyslexia Association of Singapore Email: mariam@das.org.sg

Rebecca Shalinah, Senior Educational Therapist, Dyslexia Association of Singapore Email: rebecca.shalinah@das.org.sg



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Raising community awareness of dyslexia by empowering parents and teachers as important components of society

Kristiantini Dewi^{1*}

1. *Dyslexia Association of Indonesia*

Abstract

Dyslexia awareness among Indonesian's people is still low. As an archipelago country, that has many islands, our challenge to raise awareness equally in every part of the country is really tough. Due to limitation of manpower resource, Dyslexia Association of Indonesia (DAI) committed to empower parents of dyslexic children with evidence-based knowledge about dyslexia, and encourage them to teach and share this knowledge to other parents in their communities. These parents gathered in a so called "Dyslexia Parent Support Group" (DPSG) that sited in every big island. DPSG has been such significant help in creating awareness and promoting inclusive education services in Indonesia. On top of that, Dyslexia Association of Indonesia also reached teachers as one of important component in the society to raise dyslexia awareness among them. A series of Educational Classes and Scholarship of Dyslexia Workshop has been done on Bandung, Jakarta and Aceh that delivered the knowledge of child developmental milestone, dyslexia and its related condition. Those teachers who had completed all courses got credit as Dyslexia Friendly Teachers and they had to spread their knowledge and skill to other teachers in their own communities.

Keywords: dyslexia, awareness, community, parents, teachers

* Correspondence to:

Krisiantini Dewi, Chairman of the Indonesian Dyslexia Association. Email: kristiantinidewi@gmail.com



Serial Case of Twice Exceptional Cases

Kristiantini Dewi^{1*}, Rina Elizabeth¹ and Purboyo Solek¹

1. Dyslexia Association of Indonesia

Abstract

“Twice-exceptional” or “gifted LD” students have unusually high aptitude or achievement in one area and meet criteria for “giftedness”, however their level of achievement will be discrepant with their advanced abilities, and often not low enough to be detected or to warrant identification as LD. The concept of “gifted” LD becomes controversial when an achievement discrepancy exists relative to IQ or another cognitive assessment, or if it is based on cognitive assessment with no evaluation of achievement levels but is above an identified threshold for low achievement. Twice-exceptional person may show extremely strong visual processing skills despite being only average or struggle in phonological awareness.

First case was a 7 years old boy who initially diagnosed as Autism when he was 1 year old by one center, presenting very poor speech delayed, unable to articulate his ideas and feelings, except by shouting and uncontrolled crying, and many tantrum events. At 3 years old we diagnosed him as Twice Exceptional (Gifted and Dyslexia) as he showed high capability in his specific interests. Second case was a 6 years old girl who was initially diagnosed as Expressive Language Disorder and Gifted when she was 3 years 5 months old as she showed global reading ability started in very early of life, nevertheless she did not comprehend what she read. She was able to recite short prays, naming things in (mostly) English, and other languages. However she continued showing difficulties in spelling, phonemic awareness, social interaction, functional communication, as well as executive function skills.

Twice exceptional shown in both cases were very different in their gift. The first case showed excellent visual memory, while the latter one showed amazing skill in composing ideas of stories. Different identification and evaluation strategies for Twice-exceptional children had been proposed, including IQ- achievement discrepancies, ability subtest scatter-based on IQ test profiles, profile analysis based on patterns across cognitive tests. A comprehensive individualized evaluation that employs an intra-individual, rather than an inter-individual approach toward ability and achievement analysis is critical because they may still require interventions and accommodations to manage increasing educational demands.

Keywords: twice-exceptional, gifted, LD, dyslexia, language

* Correspondence to:

Kristiantini Dewi, Chairman of the Indonesian Dyslexia Association. Email: kristiantinidewi@gmail.com

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Embrace Dyslexia: Accentuate the Positives

Angela Fawcett^{1*}

1. *Dyslexia Association of Singapore*

Abstract

For too long research and practice in dyslexia has focused exclusively on the associated deficits. In this talk, I shall present the case for a 'dyslexia 360' approach, considering the whole child and adult, and identifying strengths in order to build success. Building on the framework of positive psychology, a series of studies were undertaken with colleagues in Sheffield, led by Prof Rod Nicolson, to identify the 'strengths decathlon' in dyslexia. New evidence is presented from working with adult students, in a comparative study of social, mental and work strengths in dyslexics and controls, providing converging support on the significance of these aspects of skill. A theoretical framework that can address both strengths and weaknesses in dyslexia in terms of automaticity deficits and delayed neural commitment is highlighted. Finally, the talk identifies the importance of attitudes and the role of school, teacher, parents, society, the university, the workplace and dyslexics themselves in creating a better future for dyslexics worldwide.

Keywords: strengths, positive dyslexia, self-esteem, attitudes

* Correspondence to:

Angela Fawcett, Editor-in-chief *Asia Pacific Journal of Developmental Differences*, Research Consultant, Dyslexia Association of Singapore. Email: angela@das.org.sg

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From Failure to Fulfilment, the Route to Success.

David Fawcett^{1*}

1. Regional Sales Manager, Honeywell Controls, United Kingdom

Abstract

As an undiagnosed dyslexic, David found himself a miserable failure at school on almost everything they tested. Leaving school with no formal qualifications, he had no alternative but to take a non-academic career, during which he was 'surprisingly' successful at each of the roles he was given. In this talk, the keys to success will be discussed, highlighting the importance of following your passions and identifying your own strengths, developing your niche throughout life to ensure that you reach fulfilment. The key role of advocates and mentors in ensuring a positive outcome will be highlighted, in conjunction with insights into the importance of self-belief and never giving up in the struggle to be recognised.

Keywords: positive dyslexia, success, fulfilment, strategies

* Correspondence to:
David Fawcett, Regional Sales Manager, Honeywell Controls, United Kingdom Email: prof.angelaawcett@gmail.com

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Dyslexia in Different Orthographies

Malatesha Joshi¹

1. Texas A&M University

Abstract

Even though various factors such as home and school environments as well as type of instruction may influence literacy development in children, recent studies also have shown that type of writing systems and orthographies may also play an important role in becoming a fluent reader. In this presentation, I shall present research on dyslexia in different orthographies and how this can be applied to identification and instruction of dyslexia and related reading problems.

Keywords: Dyslexia, reading problems, orthographies, writing systems

* Correspondence to:

R. Malatesha Joshi, Ph.D., is a Professor of Reading/Language Arts Education, ESL and Educational Psychology at Texas A&M University Email: mjoshi@tamu.edu



Concrete-Representational-Abstract and Multisensory Strategies: An Inclusive Approach to Mathematics

Mazarrat Khan^{1*} and Rameeza Khan¹

1. Maharashtra Dyslexia Association, Mumbai

Abstract

Mathematics, for some reason, comes across as a challenging subject for the majority of the students, particularly for those with learning differences. This is especially so as the concepts and instructional methods become more abstract. As per Piaget's Four Stages of Mental Development, till 11 years of age, children are at the concrete operational stage - thinking still tends to be tied to concrete reality, and ideas are obtained from action on concrete objects. The National Council of Teachers of Mathematics, USA, makes it known that all students benefit from the use of manipulatives and visual aids.

The Concrete-Representational-Abstract strategy is an intervention for mathematics instruction that research suggests can enhance the mathematics performance of students in a classroom as well as of those with learning disabilities. It is a three-part instructional strategy, with each part building on the previous instruction to promote student learning and retention and to address conceptual knowledge (American Institute for Research, 2016). The CRA strategy uses demonstration, modeling, guided practice followed by independent practice, and immediate feedback, and is compliant with the Universal Design Learning.

Learning should be multisensory in nature, i.e., all learning pathways in the brain should be used simultaneously. Learning at the concrete stage becomes more meaningful when students touch, see, do, describe and hear their own voice or the voice of others simultaneously.

Through this hands-on workshop, using various manipulatives, the importance and application of CRA and multisensory strategies will be highlighted.

Keywords: CRA, multisensory, Piaget's Theory, Universal Design Learning

* Correspondence to:

Mazarrat Khan, Maharashtra Dyslexia Association Email: masarrat@dyslexiaindia.com

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The Impact of a Structured Chinese Literacy Programme for Dyslexics: Character Reading and Writing

Kong Yun Rui^{1,2*}, Lee Mei Yu¹ and Loo Chieng Ling¹

1. Dyslexia Association of Singapore
2. DAS Academy

Abstract

The Orton-Gillingham method is a multisensory and structured language approach conventionally used in reading programmes for learners with dyslexia to support them in their learning of English. This study aims to explore if a Chinese literacy intervention based on the Orton-Gillingham approach would benefit school-aged learners with dyslexia in their learning. More than 100 participants between the ages of six to twelve received an average of 75.4 hours of Chinese intervention over the course of two years, with 25 hours focusing on word recognition skills. Literacy gains are measured using subtests from the Chinese Literacy Assessment Tool. Participants were measured on their character reading, word forming and spelling prior and after each year of intervention. Paired sample t-test was conducted for analysis and showed significant improvement in all measures. Further analyses were done to compare the improvement between the ages of six to nine and ten to twelve for developmental differences. Future studies should consider measures on higher literacy skills such as reading comprehension and writing.

Keywords: Dyslexia, Chinese Literacy, Orton-Gillingham

* Correspondence to:
Kong Yun Rui, Lead Educational Therapist Dyslexia Association of Singapore & Associate Lecturer, DAS Academy
Email: yunrui@das.org.sg

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Traditional Games and its impact of learning in children

Swetha Krishna^{1*} and Sanskruti Shah¹

1. Madras Dyslexia Association, Chennai, India

Abstract

“Play is the only way the highest intelligence of humankind can unfold”, said the famous American author Joseph Chilton. Play can be considered to be the most important aspect of a child’s development. It provides an enriching foundation of skills, that becomes the rich canvas on which a child builds his academic and life skills. Through play, a child processes real life experiences. Play is the only process in which cognitive and physical functions develop at the same time. India, with its rich culture of traditional games and practices of engaging children from the time they’re infants has positively impacted generations of children in their overall development. Sadly traditional games and practices, which were an integral part of our and our parents’ childhood, have almost vanished. These games did not require expensive props and everyone could play, regardless of age or gender. They catered to specific developmental aspects needed for children keeping the geographical and cultural background in mind.

The paper will focus on

- ◆ The impact of traditional games on children
- ◆ The hidden benefits and learning behind each game
- ◆ Incorporation of traditional games in school and home routine.
- ◆ Using the traditional multi-sensory and multi-modal techniques in remediation
- ◆ Enable children to learn skills in a fun and healthy way.

The presentation will be targeting specific traditional games and activities that have been native to Tamil Nadu for several generations. We hope to demonstrate some of them, and connect them very specifically to aspects of a child with Specific Learning Differences that it impacts.

Keywords: Traditional Games, learning in children

* Correspondence to:

Swetha Krishna. Special Educator, Madras Dyslexia Association, Chennai, India Email: naandaan@gmail.com

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Supporting Learners with Attention Deficit Hyperactivity Disorder (ADHD)

Fintan O'Regan^{1*}

1. Behaviour Management Training & Consultancy

Abstract

One teacher recently said with regards to a student with ADHD that “he is like a computer without a printer attached, he knows exactly what the answer is in his brain but he cannot give me the hard copy i.e. the answer on paper”. This presentation will consider a range of systems and strategies in order to address successful learning, behaviour outcomes for children with ADHD. The presence of ADHD in children are easily observed and well documented in literature. Today, there is greater awareness of ADHD among parents and school teachers.

Keywords: Attention Deficit Hyperactivity Disorder (ADHD), challenging behaviour

* Correspondence to:

Fintan O'Regan, Fintan O'Regan Behaviour Management Training & Consultancy Email: fin@fintanoregan.com

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A Curriculum-Based Approach: Bridging the Secondary School Chinese Learning Gap

Elizabeth Ow Yeong Wai Mang^{1*}

1. *Early Childhood and Special Needs Education, National Institute of Education*

Abstract

Research shows that collective teacher efficacy is positively related to improved performance of learners. This is a secondary data analysis study on the local and international studies done on teachers' provision of support for students with special educational needs. When teachers believe that together, they are capable of developing students to achieve a higher potential. Collective teacher efficacy (CTE) refers to the educators' shared belief that through their collective action, they can positively influence student outcomes, including those who are disengaged and/or disadvantaged. Educators with high efficacy show greater effort and persistence, a willingness to try new teaching approaches, set more challenging goals, and attend more closely to the needs of students who require extra assistance. In addition, when collective efficacy is present, educators are better equipped to foster positive behaviour in students and in raising students' expectations of themselves by convincing them that they can cope and do well in school. The study concludes that teacher power in terms of Collective teacher efficacy is an important factor in enabling students with special educational needs to fare well in mainstream schools.

Keywords: Collective Teacher efficacy, Special educational needs

* Correspondence to:

Dr Elizabeth Ow Yeong Wai Mang, Teaching Fellow, Early Childhood and Special Needs Education, National Institute of Education . Email: elizabeth.owyeong@nie.edu.sg



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Developing Curriculum-Based Measures in Marathi: A Promising First Phase

Prajakta Phadake^{1*}

1. Dr. Anjali Morris Education and Health Foundation (AMF)

Abstract

Anjali Morris Foundation (AMF) is a 11-year-old nonprofit entity working with struggling learners in Pune, India. Students who enroll with AMF for intervention support primarily attend schools where the language of instruction is either English or Marathi. The latter is the local language of the region. At AMF, students are first assessed in areas of need and intervention support is provided based on obtained data. Several assessment tools, both formative and summative, are available in English and used regularly at AMF. Progress monitoring is an integral part of the existing practice. Currently there are no technically sound assessment tools available in Marathi and because there is such a dire need, during the 2016-17 school year, AMF embarked on developing formative assessments for universal screening and progress monitoring in reading in Marathi. This multi-year research project is in collaboration with Drs. Roland Good and Ruth Kaminski of Acadience Learning and developers/ authors of DIBELS, and as a first step, tools to measure Nonsense Word Fluency (NWF), Oral Reading Fluency (ORF) and Retell in first grade, as well as ORF and Retell for grades 2 and 3 have been developed. This presentation will describe the development of the tools as well the strong preliminary results obtained from administration of the tools to students in grades 1 and 2 during the 2017-18 and 2018-19 school years. Limitations, challenges with establishing validity and future directions will also be discussed.

Keywords: Assessments, curriculum, intervention, reading fluency, native language

* Correspondence to:

Prajakta Phadake, Assistant Manager at Dr. Anjali Morris Education and Health Foundation (AMF) Email: prajakta@morrisfoundation.in



Tamizh Vazhi Payirchi - A Comprehensive Remedial Program for Tamil

Harini Ramanujam^{1*}

1. Dyslexia Association of Singapore

Abstract

Dyslexia being a language processing disorder, would have an impact on learning in vernacular as well. The design of the Indian education system is such the government run schools teach in the vernacular in the primary classes. People from other states migrate for employment and are unfamiliar with the language. This adds to the complexity in getting educated. Madras Dyslexia Association has been actively working towards disseminating information on dyslexia and remedial strategies to primary school teachers. While addressing the teachers from Tamil medium school (which include the Tamilnadu government schools), specific queries related to teaching Tamil to children with dyslexia are discussed. These forums established the need for equipping the teachers with remedial strategies for coping with reading, writing, spelling and learning difficulties in Tamil language. Statistics from the TamilNadu government establish that there are nearly 2 million primary school going children, out of which 200 thousand could be struggling with academics due to Specific Learning Difficulties. This makes it a very stark issue that requires focused solution; what better solution exists than to equip to the teachers to help the children within the classroom. This paper discusses the pressing need for remediation in Tamil, then goes on to discuss the objectives of the programme-Tamil Vazhi Payirchi (TVP). Madras Dyslexia Association has taken the Evidence-based approach based on the Orton-Gillingham approach to develop this comprehensive solution. Tamil Vazhi Payirchi has been successfully practiced in over 10 schools. Case studies from these schools are presented in this paper to present evidence of improvement not just in the performance levels of their students but also in their interest levels. Further on, the salient features of Tamizh Vazhi Payirchi are delineated-the solution includes screening tool to identify the child in a class room environment, a remedial kit, a training programme for the teachers to help the child with in the class room and the support system of a resource room to minimise full time pull out from the school. The implementation process of the replicable and scalable solution is discussed in detailed. The paper concludes with a description of the plans to reach out to the Tamil medium schools across the state of Tamil Nadu in an economical and effective manner such that society gains from such an impact in terms of increased productivity of the children

Keywords: Remedial techniques, Tamil, Indian Language

* Correspondence to:

Harini Ramanujam is the CEO of Madras Dyslexia Association (MDA) Email: hariniramanujam@gmail.com

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Using Digital Tools in Qualitative Research

Mohamed Samunn^{1*}

1. Dyslexia Association of Singapore

Abstract

As society transforms, the introduction of digital technology in every aspect of human life has created new contexts for research and has introduced new tools to conduct qualitative research. As a result, qualitative research practices that are used for decades are being redefined by the use of electronic tools, systems, devices, and digital resources to generate, store, and analyse data. This transformation helps us to understand that the social world can no longer be limited to in-person observations, interviews and face-to-face relationships. Instead, researchers are directed to explore the online self – how the communities work with use of various technologies in their daily lives. This exploration has made every researcher either to be an early adopter or a resister of digital technologies or he/she can still be somewhere in between using some of the digital tools consciously to search databases, write thesis or research articles, check grammar and plagiarism, etc. This presentation / workshop attempts to give an insight to the participants on how they will be able to mix and match various digital tools available to them considering the affordances and constraints of these tools to conduct an entire research. The participants will be able to grasp how digital tools can support creative conversations between collaborators; meeting and networking; resource sharing and collaborative writing; conducting literature reviews; collecting researcher-generated data; digital recording and transcribing interviews and meetings; computer-assisted data analysis – text, image, audio, and video; data storage and security; citation and document management.

Keywords: qualitative research, digital technology, digital tools, qualitative data analysis.

* Correspondence to:

Mohamed Samunn, Senior Educational Therapist, Dyslexia Association of Singapore. Email: samunn@das.org.sg



After-school remediation-journey from skills to independency

Meenakshi Sriram^{1*}

1. Madras Dyslexia Association

Abstract

Learning disability has been a growing problem over the past couple of decades in most countries. The same is the situation in India also. With 2/3rd of children facing difficulties, Extensive efforts have been on for quite a while in the form of teacher training, resource rooms etc. In this endeavour, with its mission and vision on life long management of Dyslexia MDA has come up with full time pull out program, teachers training programs and resource rooms within the school campus. The remedial centres provide for children with mild, moderate and severe difficulties. Where such a facility is not available the trained teacher provide support within the class room situation for children with mild to moderate difficulty. Despite these continuous support, due to lack of time or for children with severe difficulties or when the gap between the skill and the requirement is large there is a need for afterschool remediation for repetitive and additional reinforcement.

The paper showcases:

1. How a one on one after school remediation program of MDA acts as a bridge between the pull out program and integrating the child into a main stream requirements wherever existing efforts need constant reinforcement
2. Children who need extra support other than that provided by the school are given the continued support to build his skills and integrate him into his class room.
3. Schools where such a facility is not available the children avail the benefits of the after school remediation program.

The paper moves on to showcase how the program moves gradually from building the skills to supporting the child with his school syllabus in a main stream environment and continue the support till he becomes an independent learner. With such a program it can be ensured that no child is left out without intervention and the journey from remedial learning into mainstream education is smooth and the child blossoms into a confident and independent individual

Keywords: After-school, remediation

* Correspondence to:

Meenakshi Sriram has been a Special educator, with Madras Dyslexia Association. Email: meenakshisriram1989@gmail.com



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Development of a Bilingual (English-Mandarin) Language Assessment Tool

Tan Wah Pheow^{1*}, Gabrielle Lai¹ & Beth O'Brien²

1. Centre for Applied Psychology Behavioural Insights Collaboratory, Temasek Polytechnic
2. Centre for Research in Child Development (CRCD) National Institute of Education

Abstract

Singapore is a multilingual society, and most Singaporeans are bilinguals. However, no proper bilingual and culturally relevant linguistic proficiency assessment tool has been developed for Singaporeans, especially for English-Mandarin bilinguals (i.e., majority bilingual type). The difficulties of developing an appropriate assessment tool are exacerbated by the fact that both languages are extremely different. In 2009, the Bilingual Language Assessment Battery (BLAB) was developed locally by researchers in NUS. For this task, participants were asked to select a target image amongst distractors based on an auditory playback of the target word. However, subsequent examination of BLAB found that several issues with it: (a) target and distractor words were not created systematically to allow for error analysis; (b) illustrations of visual stimuli lacked cohesiveness; and (c) the Mandarin portion of the task was developed by non-Chinese speaking individuals, affecting word selection and perceived difficulty level. Thus, the English-Mandarin Language Assessment Battery (EMLAB) was developed to address the issues found in BLAB systematically designing targets and distractors, by matching trial difficulty across both languages and by ensuring the visual stimuli's cohesiveness. Since 2016, EMLAB went through several rounds of refinement through repeated testing and piloting. EMLAB is currently being validated through a large scale data collection, with further plans to develop similar bilingual language assessment tools based on similar principles for other bilingual types (e.g., English-Malay, English-Tamil). In the current presentation, we will provide a description of the developmental history of EMLAB, and also how it is applied to measure bilingual proficiency.

Keywords: Bilingualism, Assessment, Vocabulary, English, Mandarin

* Correspondence to:

Dr Tan Wah Pheow, Head of the Centre for Applied Psychology, Behavioural Insights Collaboratory, Temasek Polytechnic. .

Email: TAN_Wah_Pheow@tp.edu.sg

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Selective Mutism in Children

Sara Xu^{1*}

1. Community Psychology Hub, Singapore

Abstract

Selective Mutism is a clinical disorder where a child consistently does not speak (or becomes "mute") in certain situations, despite being able to speak in other situations. While Selective Mutism usually gets noticed in children when they start school, the condition can be present at all ages, including adolescence. Anxiety is at the root of Selective Mutism, but individuals with this condition may seem to be deliberately oppositional in withholding speech in certain situations or with certain people. Hence, it is important for professionals who work with these children and youths to be aware of this condition and be equipped with knowledge on how they can support individuals with Selective Mutism.

This sharing will cover:

- ◆ a brief overview of Selective Mutism
- ◆ its signs and symptoms
- ◆ a summary of intervention strategies
- ◆ classroom supports

Keywords: Selective Mutism, Preschoolers, Children

* Correspondence to:

Sara Xu, Senior Clinical and Educational Psychologist, Community Psychology Hub Email: Sara.Xu@cph.sg



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Parental Involvement in School in Mainland China

Kitty Yuen Han Mo^{1*}

1. Caritas Institute of Higher Education

Abstract

Parents is seen as important partners in the formal education of their children. There is a considerable body of studies in Mainland China regarding the problems of parental involvement in normal schools. However, there is a dearth of study concerns parental involvement of children with dyslexia in Chinese educational context. Under the Compulsory Education Law, Chinese students with disabilities have the right to enjoy and receive compulsory education. Although there is an effort by the government to encourage inclusive education in mainstream school, student diversity is viewed as problematic in a school setting. In a recent qualitative study, a total of 21 parents of children with dyslexia or hyperactivity attention deficit were interviewed. Children ranged in age from 7 to 12. The findings revealed that parents raised problems about school arrangement such as school curriculum and approach were not flexible enough and could not accommodate different learning styles; and all students were evaluated in a standardized test or exam for which it could not allow a student with dyslexia to show his or her acquired knowledge. Parents expressed concern about the current situation of school education. But most parents said that they had no way to express and participate. This presentation intends to reveal the underlying structure, the causation of the observed events, the interacting factors embedded in school environment, and the reflections for improvement.

Keywords: parental involvement, inclusive education, parents of children with dyslexia

* Correspondence to:

Dr Kitty Yuen Han MO, Assistant Professor of Caritas Institute of Higher Education. Email: yhmo@cihe.edu.hk

Asia Pacific Journal of Developmental Differences

Guidelines for Contributors

Overview

The Asia Pacific Journal of Developmental Differences (APJDD) will be unique in addressing a range of special educational needs including dyslexia, autism, dyspraxia, dyscalculia, ADHD in the Asian context. The journal will cover theory into practice and will provide a showcase for research in the Asian context as well as highlighting research areas which have implications for further research within Asia and beyond.

Frequency of Journal

The Journal will be published twice a year in January and July.

Contributions Considered for the Journal

Primary consideration for publications will be given to manuscripts that are focused on developmental differences within the Asia Pacific region. Manuscripts will be peer reviewed and included in the journal on the following criteria:

- ◆ They contribute to the further understanding of developmental differences as well as the applications and implications in the educational, social and cultural environments.
- ◆ They include sound research methods, interpretation and validity of results
- ◆ They contain organised and clarity of writing
- ◆ They contribute to the local Asian context
- ◆ They should be original papers that have not been submitted to other journals or publications.

Editorial Policy—Retractions

The APJDD takes the issue of retractions very seriously. In line with requirements of major academic journals the APJDD will continue to monitor publications for retractions. No future citation will be permitted for articles that have been retracted and a correction will be issued if any such article is published in error. In the case of citations prior to retraction no such correction will be issued, in line with the policy for other journals of this type. Please contact the editor in the first instance if there are any concerns. COPE guidelines have been accessed in preparing this guidance.

Articles published in the APJDD should be original work that has not been published in this form elsewhere. In rare instances where previous publication has been made, this will be fully acknowledged.

Scientific Review Committee

In common with a number of other academic journals, we are now setting up a scientific committee of reviewers to assist the editor and editorial board in the review process.

- ◆ *Dr. Shaimaa Abdelsabour, Ministry of Education, Kuwait*
- ◆ *Dr Yousuf ALmurtaji, Public Authority for Applied Education & Training, Kuwait*
- ◆ *Shakthi Bavani D/O Sathiasilan, Dyslexia Association of Singapore*
- ◆ *Dr Amanda Denston, University of Canterbury, New Zealand*
- ◆ *Pei Yi Fong, Dyslexia Association of Singapore*
- ◆ *Dr Janet Hoskin, Special Education, University of East London, United Kingdom*
- ◆ *Kwok Fuyu, National Institute of Education, Office of Education Research, Singapore*
- ◆ *Edmen Leong, Dyslexia Association of Singapore*
- ◆ *Shaian Lim Jia Min, Dyslexia Association of Singapore*
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- ◆ *Suvarna Rekha, International Institute of Information Technology & Moolchand Neurocenter, India*
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- ◆ *Perle Seow, Dyslexia Association of Singapore*
- ◆ *See Hui Zi Emilyn, Dyslexia Association of Singapore*
- ◆ *Dr Pawadee Srisang, Science and Arts, Burapha University, Thailand*
- ◆ *Thomas Wilcockson, Loughborough University*

Submission of Manuscripts

All manuscripts are to be sent in electronic copy (MS WORD) as well as a PDF copy of the final edited document. PDF copy is required to verify the word copy and for publishing purposes. There is no need to submit hard copies of manuscripts.

Images, charts and diagrams should be sent separately where possible to ensure high quality reproductions.

Submissions are to be emailed to the editor at both email addresses below:

Angela Fawcett
DAS Academic Director
Dyslexia Association of Singapore,
Emeritus Professor, Swansea University,
angela@das.org.sg

Deborah Hewes
Managing Editor
Dyslexia Association of Singapore
www.das.org.sg/publications/journal
deborah.hewes@das.org.sg

Preparation of Manuscripts

It is expected that all manuscripts be submitted using the American Psychological Association (APA) standard of referencing and publication. APA style is detailed in the Publication Manual of the American Psychological Association (6th ed), which offers sound guidance for writing with clarity, conciseness and simplicity. Authors should follow the APA style in preparation of their manuscripts.



DYSLEXIA ASSOCIATION OF SINGAPORE (DAS)

Our Mission: Helping Dyslexic People Achieve

Our Goal: To build a world class organisation dedicated to helping dyslexic people and those with specific learning differences in Singapore.

Our Aims:

- ◆ To put quality first in delivering a comprehensive and effective professional service for dyslexic people and those with specific learning differences on a not-for profit basis.
- ◆ To provide an assessment service for individuals at risk of having dyslexia and/or specific learning differences.
- ◆ To provide educational programmes and other support services for individuals with dyslexia and/or specific learning differences.
- ◆ To raise public and professional awareness of the nature and incidence of dyslexia and specific learning differences.
- ◆ To enable others (teachers, parents and professionals) to help dyslexic individuals and those with specific learning differences.
- ◆ To assist and elicit financial and other support for people with dyslexia, those with specific learning differences and their families.
- ◆ To promote and carry out local research into dyslexia, specific learning differences and to disseminate results.
- ◆ To network with other organisations in Singapore and internationally to bring best practices to the DAS and Singapore.

DAS as a Social Enterprise

- ◆ We provide high-quality, professional, innovative and client-focused solutions to create and sustain services for the dyslexic community in Singapore and the region.
- ◆ We operate as a financially viable and cost-effective business which at the same time ensures that no dyslexic person is unable to access our services because they cannot afford it.
- ◆ We generate social returns on our investments through the development of a dynamic, motivated team of highly qualified and experienced professionals.
- ◆ We have a heightened sense of accountability to stakeholders through our professional management team.

Registered in 1991, the Dyslexia Association of Singapore (DAS) is today a vibrant voluntary welfare organisation with over 250 full-time staff who provide a wide array of services for dyslexics not only in Singapore but in the region. DAS Specialist Psychologists conduct assessment and diagnosis for preschool students to adults. DAS Educational Therapists, Speech and Language Therapists and Specialist Teachers provide support for over 3,500 preschool, primary and secondary school students in 14 venues all over Singapore. Increasingly, DAS provides support for dyslexics who also suffer from other Specific Learning Differences such as ADHD, Dyspraxia, Dyscalculia and Non-verbal Learning Differences.

The DAS Academy is a Private Education Institution (PEI) registered with the Council for Private Education (CPE). It is a wholly-owned subsidiary of the Dyslexia Association of Singapore (DAS). Like DAS, the Academy is also a registered charity with the Commissioner of Charities. DAS Academy delivers a wide range of workshops and courses including a Master of Arts in Special Educational Needs. DAS Academy provides the bridge that links professionals, caregivers and people with special needs.

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