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Asia Pacific Journal of Developmental Differences

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Editorial Comment

Angela J. Fawcett, Editor-in-Chief

It is a very great pleasure to introduce the latest issue of the *Asia Pacific Journal of Developmental Differences*. This edition is characterised by a different approach in inviting a guest editor, Professor John Everatt from New Zealand, to review and recruit submitted articles. It is particularly apt to invite John because he has a very strong academic reputation in terms of bilingual research. This is of course a key aspect for dyslexic learners in the Asia-Pacific region. John has published widely on bilingualism including both theoretical and applied aspects and he is Executive editor of this journal. Moreover, I have worked with John for many years in my previous role as editor-in-chief of *Dyslexia: An International Journal of Research and Practice* where he has also served for many years as Executive editor. His work is characterised by sound academic judgement and attention to detail and it is a very great pleasure to welcome him as Guest editor to introduce the articles selected for the current issue of this journal.

Editorial Comment

John Everatt, Executive Editor

It has been a pleasure to edit this issue and I thank Professor Fawcett for the invitation. I am also delighted to be one of the editorial team for this journal. In my experience, the Asia Pacific region is showing rapid and exciting growth in many areas of research related to education. Hopefully, issues related to developmental differences will become one of those expanding areas of research and research-informed practice; indeed, the work published in this journal should help advance research on developmental differences in the region. The range of languages and orthographies within Asia and the Pacific region means that there is also great opportunity for research in one of the aspects of developmental differences that specifically interests me: i.e., the ways in which reading and writing development varies across different orthographies. In terms of developmental differences, this interest particularly focuses on how difficulties in the acquisition of literacy (such as for those with dyslexia) may vary across different orthographic and language contexts.

Given the focus of interest outlined above, it may not be surprising to find this as a theme running through many of the papers in the current issue – though it could also be argued to be an important feature across many papers published in the journal. Each of the papers in this issue focuses on an aspect related to literacy learning, and most consider this from the perspective of learning a language other than, or in addition to, English. However, English (the language of this journal) is also a focus of much of the work, either directly as part of the research conducted, or indirectly as part of the interpretation and background to the research. Although this leads to the risk of English-centric interpretations of findings, this contrast with the English language is useful since many of the current models of literacy development, as well as models that propose reasons for problems with reading and writing acquisition, have developed from studies of English speakers. Therefore, this contrast allows us to consider the data against these models, which provides both a framework for interpretation but also an assessment of the usefulness of the models. Studies of non-English languages and orthographies, therefore, should improve our understanding of the underlying mechanisms that support literacy learning, which should in turn inform the development of strategies to reduce learning problems that may be associated with the developmental differences that are the target of this journal.

The development of models that take account of different languages is also vital for work with the growing populations of multilingual (and multi-literate) children and adults. Again, research in the Asia Pacific region is well placed to lead the way in investigations of variations in learning between different multilingual cohorts. Models of multilingual learning also will inform teaching practice, as well as ways to support those who may struggle with literacy learning. We cannot assume that multilingual learning will simply be understood by a combination of monolingual models of learning. The languages (and possibly orthographies) that an individual is acquiring may lead to a range of differences in the way reading and writing develops, and this may provide potential opportunities for teaching that cannot be practiced within a monolingual learning context. Further research should help us understand and utilize these multilingual developmental differences.

The present issue of the journal comprises a set of three papers based on work in Singapore (the home of the journal) and work from four other countries within Asia or bordering the Pacific (Iran, Kuwait, New Zealand and Thailand). The papers cover a variety of issues related to the study of developmental differences. These range from considerations of children with early reading and writing problems to older children with an assessment of dyslexia; and from students with weaknesses in single word reading and spelling, to those with reading comprehension deficits. Papers also consider research questions related to negative behaviour and poor self-concept, as well as skills that can support reading, such as the ability to make inferences. The studies also cover issues that are more practice-based in focus; particularly educational assessment and intervention practices, several with the relatively novel perspective of targeting speakers

of more than one language. They, therefore, cover a range of topics that should be of interest to those studying developmental differences within the region, as well as those from other parts of the world.

The first paper, by Almurtaji on 'Misbehaviour and educational achievement among Arabic children', is an example of research in a language that is relatively under-researched despite its importance; and despite the orthography having a long and influential history. In addition to its use in Arabic speaking communities, the Arabic orthography is used and experienced in many additional contexts as the orthography used in the holy book of the Moslem religion (the Koran/Quran) or as a representation of a language that has been influenced by the spread of Islam: for example, Persian languages typically use a modified version of Arabic – modifications being necessary since Persian belongs to a different language family from Arabic. The paper in this issue by Almurtaji focuses on a particularly educational issue: the influence of negative behaviours on learning in schools. Negative behaviours (either off-task behaviours that may interfere with learning, or misbehaviours that can also have negative social consequences) have often been seen as a problem for learning within a classroom environment. However, such behaviours are socially/culturally and contextually interpreted. Therefore, data that consider the effects of such behaviours across different educational systems, which stem from a range of cultural backgrounds, will inform our understanding of the impact of such classroom behaviours on achievement. Almurtaji's findings of relationships between certain negative behaviours and educational achievement (particularly in literacy) within the cultural and educational context of Kuwait is a useful addition to our understanding of what can influence learning across classrooms.

The second paper by Tan, Shen, Kong, See and Lan on 'Assessment of the effectiveness of a Chinese literacy assessment tool for school learners in Singapore', also focuses on a major world language: Chinese – again highly influential in the Asia Pacific region and beyond. Although English is the main language of education in Singapore, Chinese is spoken by many. Tan et al., discuss the need for a standardised literacy assessment tool for bilingual children from a Chinese background in order that specific difficulties in learning Chinese literacy can be identified. Consideration of Chinese as an additional language to that used within the public education system should also be a growing area of interest for those working in multi-language contexts. The work reported in this paper covers issues related to bilingual learners (Chinese-English) and assessments of literacy learning problems (dyslexia). The authors discuss a range of literacy measures in Chinese and data obtained from children in Singapore using such measures. Although further work is needed for a full assessment battery, the paper covers some important points about the development of such literacy assessment tools and how to measure Chinese reading and writing skills.

The third paper by Wong and Sathiasilan on 'Evaluating an early literacy intervention in Singapore', also involves research undertaken in Singapore, though this time focusing on interventions for children with early literacy learning difficulties who are at risk of dyslexia. The intervention targeted 5 to 6 year old children prior to their entry into the first year of primary school and, therefore, adds additional data to the important field of early intervention research. The authors discuss the benefits of a phonics-based intervention that uses Orton-Gillingham principles, and so mixes two of the main intervention strategies that have become relatively common in the field of supporting those with literacy learning difficulties. The language of focus in the work is English, given its use in public education in Singapore; and data showing the benefits of early intervention for English literacy is growing. However, showing benefits within different education systems adds to the generalisation of such intervention approaches, as well as providing practical tools for the Singapore context.

The fourth paper by Nair, Ram & Kurusamy on 'Evaluating reading and spelling performance of students with dyslexia using curriculum based assessments and teacher perception', is similar to the third in that it involves intervention research conducted with staff and students at the Dyslexia Association of Singapore (DAS). The intervention also involved individualised teaching/learning procedures that followed Orton-Gillingham principles. In contrast to the previous paper, however, the intervention was targeted at older children with an assessment of dyslexia. Therefore, together with the previous two papers, this article adds to the current body of practice-based research on assessment and intervention – and does this within the educational (and language/cultural) context of Singapore. The paper focuses on data showing improvements in literacy areas across different groups of children undergoing the intervention, but also considers teacher perceptions of student progress, which provides a relatively novel perspective in this research.

The fifth paper by Mollaali & Sadeghi on 'A comparison of incidental and intentional vocabulary learning in English language learners with reading comprehension deficits', focuses on second language acquisition. In this case, the learning of English in the context of children brought up in Iran who will have Farsi as their first/dominant language and who will also be learning to read and write in the Arabic orthography used to represent the language. The learning of vocabulary is a vital component of proficient second language acquisition. Therefore, this study looks at ways in which such learning can be supported, though with the interesting focus on those who show evidence of struggling with reading comprehension. Why individuals show deficits in comprehending written text is still an important area of research on developmental differences, but vocabulary weaknesses may themselves be one of the reasons for poor reading comprehension. Therefore, Mollaali & Sadeghi's data indicating benefits from incidental learning of vocabulary should inform work with second language learners, but should also add to our understanding of how to support those with comprehension weaknesses.

The sixth paper by Denston on 'The influence of a general literacy intervention on the psychosocial development of students with literacy learning difficulties', also includes intervention work focused on supporting reading comprehension, this time conducted in New Zealand. The work also considered whether an academic-focused intervention that involved explicit instruction of general literacy skills could influence the psychosocial development of students with literacy learning difficulties. Many children show negative affective and behavioural consequences of poor levels of literacy acquisition. Showing that appropriate interventions can not only lead to improvements in literacy but also reduce these negative consequences should lead to long-lasting positive outcomes for learners. Denston's findings that the level of the intervention's influence on self-concept was dependent on initial pre-intervention level of self-efficacy and resilience argues that these are relatively early developed characteristics and that a range of interventions strategies may be required to support both literacy and psychosocial development.

The seventh paper is the final one in this issue by Srisang, Fletcher, Sadeghi & Everatt on 'Impacts of inferential skills on reading comprehension in Thai (L1) and English (L2)' – (and I am again grateful to the Professor Fawcett for dealing with the review of this paper given that I am one of the authors). It returns to the issue of second language reading comprehension, and investigates whether the ability to make inferences during reading comprehension can show cross-language influences. In this case such influences were investigated between Thai (the individuals' first language) and English (the second language), which have very different orthographies. Making inferences while reading is an important skill, but has not been extensively studied within multilingual populations. Finding that such skills show cross-language influences suggests the potential for learning in one language to support the development of the same skills in another. Hence, faster development in one orthography may support the acquisition of the same skills in an orthography with which the student is struggling. Similarly, if a skill is easier to teach in one language/orthography compared to another, appropriate bilingual teaching strategies should show positively outcomes on learning when difficulties are encountered. Obviously, such teaching procedures need to be developed and tested, but such data show again how Asian-Pacific contexts are well placed to inform the field of developmental differences and multilingualism, both in terms of theory and practical teaching and learning strategies.

EMBRACE DYSLEXIA

Raising awareness about **dyslexia** and to highlight the **strengths and challenges** that individuals with dyslexia face everyday.

Students with dyslexia are struggling in the education system each and every day. We believe that each student is **unique** in their own way and have the strengths that will see them through their education and into a successful career.

One way to provide **hope** is to raise awareness about dyslexia and to have role models for them to **aspire** to. Another is to have companies advocate for dyslexics in Singapore and to actively support DAS and its students.

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Misbehaviour and educational achievement among Arabic children

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ABSTRACT

Poor levels of behaviour can have deleterious effects on the prospects of children, as well as on fellow students and the ability of teachers to carry out their duties. Relationships between behavioural problems and educational achievement have been identified; however, perceptions of negative behaviours are culturally loaded, and a child's age (school grade) may influence effects since development (or school systems) can lead to variance in behavioural responses. This study set out to measure such relationships across school years in a cultural context (Kuwaiti Arabic) that has received relatively little attention. Participants were children, and their parents and teachers, from primary school grades 4 and 5 and intermediate school grades 6 and 7. Parents/teachers completed an attention-hyperactivity questionnaire, designed specifically for an Arabic setting, and the Strengths and Difficulties Questionnaire, which has been widely used internationally. Children performed measures of literacy and mathematics, scores on which were associated with the questionnaire data. The results showed associations between educational measures and negative behaviours (particularly hyperactivity/inattention and emotion problems) across parent/teacher data, but a potential focus on influences in the primary grades. Findings are discussed in terms of the need for intervention strategies, and similarities with other studies varying in cultural contexts.

Keywords: misbehaviour, educational attainment, cultural context, Kuwait

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INTRODUCTION

The issue of behaviour and problems associated with it has received, and continues to receive, considerable attention and this is particularly true when patterns of misbehaviour are associated with a diagnosed psychological impairment and/or poor educational outcomes. Associations between behaviour and educational achievement have been investigated, with results, while varied, generally consistent with a relationship between measures of educational achievement and negative behaviours that can lead to prolonged off-task activities. In a study concerned with attention deficit hyperactivity disorder (ADHD), for example, McConaughy, Volpe, Gordon, & Eiraldi (2011) found that children diagnosed with ADHD were significantly impaired in five measures of academic performance and in six measures of social behaviour. Similarly, Gutman and Vorhaus (2012) found that ADHD diagnosis is a consistent predictor of low educational achievement in UK primary schools. McEvoy and Welker (2000) concluded from a comprehensive review of the relevant literature that low levels of academic achievement were related to poor levels of behaviour, whereas refraining from misbehaviour, and interventions targeted at reducing misbehaviour, improved educational attainment. A study with 901 British secondary school students as participants set out to investigate associations between negative traits that led to poor behaviour (neuroticism, extraversion and psychoticism) and academic achievement (as measured by national tests) and negative relationships were found between the results of these tests and extraversion and psychoticism (Petrides, Chamorro-Premuzic, Frederickson & Furnham, 2005).

While the focus of this paper is on associations between behaviour and educational achievement within a specific cultural context and in primary and intermediate school grades, it is relevant to consider a wider perspective in terms of the causes and longer term consequences of behavioural problems and their effects both on individuals concerned and on those around them, including peer students and society at large. Giallo and Little (2003) make the salient point that negative effects may not be limited to the individuals in question but also to the learning of children around them, since the efforts of their teachers may be spent on dealing with misbehaviour rather than teaching a lesson.

The consequences for individuals and for the wider society can be seen from studies that have found children with both emotional (internalised) and other behavioural impairments were less likely to complete schooling, were more likely to have lower scores in mathematics and reading, and were also more likely to have been involved in crime and to have required support from mental health services and welfare systems (Groom & Rose, 2004). Such patterns of problem behaviour can be set at an early age and tend to have an impact on learning throughout the school years and onwards to later stages of life. Metsapelto, Pakarinen, Kiuru, Poikkeus and Lerkkanen et al. (2015), for example, found that children with high levels of externalised behaviour (aggression, hyperactivity, inattention etc.) in grades 1 and 2 had lower levels of educational

achievement in later primary school grades. Vitaro, Brendgen, Larose and Tremblay (2005) found that aspects of misbehaviour identified in pupils in their kindergarten years were related to their non-completion of high school.

A further aspect that adds, perhaps, to the complexity of the issue of behaviour is the sometimes unforeseen consequences of diagnosis, particularly when diagnosable disorders exist across a given spectrum. A child that is diagnosed will generally be treated accordingly, either in a special school or within a mainstream environment, will be likely to be provided with appropriate levels of attention from specialists and will learn in a scenario where special measures and levels of tolerance will assist in their learning and may moderate their behavioural patterns. Children who are not diagnosed but who have behavioural issues, whether these stem from being on a spectrum (but not within the diagnosable area of it), or whose propensity to misbehave stems from a potentially wide array of influences, some of which may be interconnected, will be positioned as being 'normal' and will be dealt with and judged by whatever the designated parameters of 'normality' within the social, educational and cultural context in which they are being schooled are.

Thus, the influences on behaviour are manifold and it is relevant to note theories of learning based on self or socially centred constructivism, an important aspect of which is that while numerous groups and agencies will bear upon the learning processes of an individual, particularly in the formative years, the outcome will be determined by how such influences are interpreted. As Bandura (1971, p. 2) suggested, there will be a "continuous reciprocal interaction between behaviour and its controlling conditions." The numerous factors of influence on behaviour are categorised by Otyek (2000) into five general areas and these are individual differences, variant family patterns, impairments and disabilities, environmental and psychological factors. Each of these general areas will be influenced by a range of factors, such as gender, intrinsic intelligence, physical differences and variant patterns of emotions in the case of individual differences.

Accepting that a relationship between behaviour and educational achievement is likely leads to a more detailed discussion of influences on human development, described by Bronfenbrenner (1994, p. 37) as an "ecological system." It suggests multiple truths that exist in seeking to understand how and why people interact in society and the effects that the interactions have on behaviour (Ford & Lerner, 1992). The broadening of approaches in educational psychology led by Bronfenbrenner and others sets out a web of influences, social subsystems ranging from the micro (family, school etc. environments) to the macro (institutions such as the economy, customs, patterns of behaviour etc.). With specific regard to social, emotional and behavioural difficulties (SEBD), Garner, Kaufmann and Elliot (2014) not only place emphasis on social marginalisation but also on approaches to the subject area, which must necessarily "consider the complex interaction of biological, social and psychological factors involved in the etiology of (S) EBD" (Garner et al., 2014, p. 2).

It is clearly important to consider the wide array of influences that will have an impact on behaviour but it can also be contended that, without seeking to adopt a reductionist tone, one which crosses, and even determines, many of the boundaries is culture. In seeking to define culture and the importance of its influence on behaviour, Hofstede (2003) suggests three levels of human mental programming and these are individual, collective and universal. The first (individual) is that which makes people unique; it distinguishes one personality and the behaviours displayed from another. The third (universal) comprises behaviours that are common to all people (laughing, crying etc.). The second (collective) is that which is learned within a cultural context, set at a very young age, but which continues throughout life. It is culture that allows us to know and understand others from a similar background and culture is often a determinant of values, beliefs and attitudes that will have a strong influence on behaviour.

The importance and relevance of culture can be seen in many ways and one is in how teaching and learning takes place and the policies that underpin them. In this regard, Maras and Kutnick (1999) suggest that too little attention is often paid to the social aspects of learning when considering behavioural issues. Hongboontri and Keawkhong (2014, p. 66) emphasise the importance of school cultures, noting that they are “created and recreated” by people, including “teachers, students, communities and parents,” influencing what they “think, feel and do.” The wider cultural context in turn will have a major bearing on the nature and expectations that exist within schools from the perspectives of parents, teachers, students and communities.

Placing such emphasis on culture and cultural contexts provides a necessary prelude to the rationale for this paper and its importance. While some work has been undertaken with regard to behavioural problems and their potential to have an impact on educational achievement, much of it has been within a Eurocentric cultural context while relatively little has been undertaken within a Middle Eastern and Arabic one (although see Alazmi, 2010; Everatt, Al-Sharhan, Al-Azmi, Al-Menaye and Elbeheri, 2011; Everatt, Almurtaji, Al-Sharhan and Elbeheri, 2017). This paper, therefore, seeks to contribute to work in this area by providing further insights into relationships between behavioural problems and academic achievement and by extending the cultural boundaries of that knowledge. It further seeks to do this within a frame that includes measures of behaviour and educational attainment at different levels of progression through the school system. With these aims in mind, the cultural context of Kuwait and the educational system that is positioned within that context forms the following section of this work.

Kuwait cultural context

In economic, demographic and political terms Kuwait can be described as being a rich oil dependent nation with a population of approximately 4 million (of which 69% are foreign nationals), which is highly (98%) urbanised. Its system of government is described as being a constitutional emirate and the wealth of the nation is redistributed in a

number of ways, for example through a comprehensive system of social welfare and free healthcare and education (El-Katiri, Fattouh & Segal, 2011). Although it can be positioned as being an Islamic nation, and this fact clearly has cultural influences, it has unique features that set it aside; indeed, as Salem (2007) suggests, it would be misguided to propose a common Islamic or even Arabic cultural context.

One way of considering Kuwaiti culture is through research that has produced a measure of cultural dimensions for individual nations. This suggests a high score for power distance, which means that people tend to be willing to accept social status and inequalities based on such status. It is highly collectivist, which is suggestive of high levels of extended families and formed social groups, and people tend towards seeking consensus and involvement of others in decision-making (as opposed to confrontation). High levels of uncertainty avoidance are also proposed, which means that people are more comfortable within strict behavioural codes and systems of belief (Hofstede, 2017).

Features of at least some aspects of these cultural dimensions can be seen in descriptions of contemporary Kuwait; Ali and Al-Kazemi, (2007), for example, point out that while there have been many changes as the country evolved in a relatively short period from one that was poor and underdeveloped to its present position, there is a feeling of unease among nationals with changes that have come and intrinsic society continues to be highly stratified and tribal. Although there is a relative lack of research into the culture of Kuwait, it is important to place some emphasis on a belief that societies exist through moral agreements made between groups within them (Bagnoli, 2011) and the impression is of a society and a culture that has made these agreements by retaining a homogeneity that is based on conforming to traditional values, collectivism and tribal values. These values in turn are likely to have influenced the education system and those within it.

The education system of Kuwait

The education system of Kuwait was established in 1954 and has remained largely intact since that time. Structured under the Ministry of Education into districts, kindergarten is optional (ages 4-6), elementary and intermediate school is compulsory (ages 6-10 and 10-14 respectively) while secondary school is also optional (Al-Azemi, 2000). Depending on the grade point average achieved in secondary school, students may be admitted to Kuwait University or one of a number of private institutions, including vocational colleges (Al-Manabri, Al-Sharhan, Elbeheri, Jasem, & Everatt, 2013). Aspects of the curricula are influenced by different sources, with the teaching of Arabic, religion and social studies being strongly guided by Islamic culture and other Middle Eastern countries, while the curricula for mathematics, science and computer studies is based on those of western nations, particularly the UK and the US (Al-Manabri et al., 2013).

Most Kuwaiti teachers are trained at the College of Education in Kuwait University or the

Public Authority for Applied Education and Training. They graduate from four year courses with a bachelor degree as well as a teacher training qualification (Al-Sharaf, 2006). However, some concerns have been raised concerning the quality of teacher training and some of these concerns are centred on the experiences of teachers when they have completed their training and embark on their careers. One indication of this comes from a case study undertaken by Al-Sharaf (2006), who found that a significant number of newly qualified teachers felt humiliated by more experienced staff suggesting that “what they studied in the university is not necessary or suitable for the school’s curriculum plans and teaching methods” (Al-Sharaf, 2006, p. 108).

Such a finding perhaps resonates with the cultural dimensions noted above, particularly with regard to power distance and uncertainty avoidance, as well as with a resistance to change and the retention of traditional cultural and even tribal values. Such values with regard to education are emphasised in Ministry of Education guidelines, which promote instructional classroom methods across the age ranges and schools. A typical lesson structure would involve the teacher providing instruction and writing summaries on white boards for students to read and copy down (Al-Sharhan, 2012). Apart from emphasising the continuance of culturally nuanced traditional teaching methods and the cultural traits discussed, this further suggests low tolerance for behaviours that do not conform with anticipations. Such a proposition is supported by Al-Manabri et al. (2013), who emphasise that the school supervisory system seeks to support the maintenance of such practices and that a teacher who might seek to provide support for children with particular needs may be subjected to criticism by supervisors.

Further cultural aspects that have an impact on the education system include the point that social contact between boys and girls is strongly discouraged (and they are therefore taught in separate schools) and by other expectations based in Islamic culture and even tribalism – “parents and tribe provide the external control mechanisms that affect an individual’s behavioural choices” (Everatt et al., 2011 p. 128). An important question that this paper seeks to address is whether such important influences may have an impact on any relationship between behaviour and educational achievement in Kuwaiti primary schools.

METHOD

Participants

The education system of Kuwait is divided into six districts and a total of eight schools from the state system were selected from these districts. As has been noted, boys and girls are educated in separate schools in Kuwait, so four of the schools were for girls and four for boys. A demographic analysis of the areas from which they were selected established that the districts and the schools selected within them were typical of Kuwait, containing predominantly Kuwaiti nationals and with no non-typical distribution patterns

of tribal groups. The typicality of the schools was further considered in terms of the results of tests administered for progression through the grades and these were found, in all of the schools, to be consistent with national averages.

The grades chosen for the study were 4 and 5 (primary stage, with children aged 10 to 12) and 6 and 7 (intermediate stage, with children aged 12 to 14). Some guidance from existing literature was consulted in making this choice. In terms of motivation to learn, a range of studies (for example Gottfried, Fleming and Gottfried, 2001) have found that intrinsic motivation begins to decline from Grade 3 and continues to do so through the primary school years (Lepper, Corpus & Iyengar, 2005). Such findings have consistency with a proposition that the minds of children are most explorative in earlier years of development. As this diminishes, other factors become more prominent, based on extrinsic motivation, and differences are likely to become apparent in terms of behaviour and levels of achievement. This is supported by Yuksel (2013), who found that levels of antisocial behaviour increased from Grade 3 onwards and positions grades 4 and 5 as being a period of transition when behavioural patterns become established. In contrast with findings for later years, research conducted in earlier grades suggests that measures of behaviour are "generally insignificant predictors of later academic performance, even among children with relatively high levels of problem behaviour" (Duncan et al., 2007, p. 1428).

A total of 181 children from classes in grades 4, 5, 6 and 7 of the schools selected were the participants (20 males and 22 females from Grade 4; 23 males and 26 females from Grade 5; 18 males and 27 females from Grade 6; 18 males and 27 females from Grade 7 – the differences in numbers of males and females reflected the constituent numbers in each class). Two questionnaires were distributed to their parents and teachers (AHQA and SDQ – see below for details) and these were subsequently completed and returned. All children involved in the study undertook a total of six tests to assess attainment levels in literacy (dictation and comprehension) and mathematics (addition, subtraction, multiplication and division).

Strengths and Difficulties Questionnaire (SDQ)

The strengths and difficulties questionnaire (Goodman, 2001) has been extensively used in studies concerned with assessing behavioural problems with children and adolescents. Such work has been undertaken predominantly within Europe; however, it has been used elsewhere, including in the Middle East (Woerner, Fleitlich-Bilyk, Martinussen, Fletcher, Cucchiaro et al., 2004). This international use has led to various language versions of the scale been developed, and provided the current study with an Arabic language SDQ scale. The SDQ has also been shown to have satisfactory levels of validity and reliability across contexts (Elander & Rutter, 1996): reliability (alpha) scores range from 0.59 to 0.73 for the parent sub-scales and from 0.72 to 0.86 for teacher sub-scales (Koskelainen, 2008). A total of 25 items form the SDQ questionnaire and these can be combined to

represent five distinct dimensions: hyperactivity, emotional symptoms, pro-social behaviour, conduct problems and peer problems. Each dimension has five items; for example, hyperactivity includes being restless, constantly fidgeting and being easily distracted in terms of negatively judged behaviour, thinks before acting, and sees tasks through in terms of positively judged behaviour. For the present study all five scales were used in the analyses. Each item was scored 0, 1 or 2 depending on the responses to each of the statements (1 indicative of partial agreement and 2 with full agreement). For each of the five scales, a total score was then generated by summing the scores for the five items that make up that scale (scores thereby ranging from 0 to 10). A high score for the hyperactivity, emotional symptoms, conduct problems and peer problems scales was indicative of more perceived problems by parent or teacher; whereas a high score on the pro-social scale was indicative of positive behaviour.

Attention-hyperactivity questionnaire (AHQA)

The attention-hyperactivity questionnaire has been developed specifically for an Arabic speaking/cultural context (see Al-Sharhan, 2012) and was based on criteria for the diagnosis of Attention Deficit Hyperactivity Disorder (ADHD). These criteria were those included in clinical publications at the time of its development (such as DSM-V from the American Psychiatric Association), and the scale included items consistent with attention/behaviour problems that have been associated with lower learning in educational contexts (Barkley, 2006; Hinshaw, 1994) and which have been used in diagnostic assessments of ADHD within the Arab world (Farah et al., 2009). The questionnaire comprises nine indicators/items for inattention and nine for hyperactivity. A high score in the nine items for inattention would indicate that a child is inattentive to detail, does not pay attention to school work or when playing, appears not to be listening, does not complete assigned tasks, is often forgetful, is disorganised and is easily distracted. A high score for hyperactivity would be indicative that a child is generally restless, a frequent leaver of their seat, is active when it is expected that they would be still, is rowdy during lessons and when playing, talks incessantly and inappropriately, answers quickly without proper thought and is reluctant to turn-take when conversing (often interrupts). Each item in the questionnaire was a statement related to one of these areas of potential problems, followed by a culturally relevant example to explain the concept. Different questionnaires were given to parents and teachers so that different examples could be used to explain concepts (i.e., home versus school examples). Items related to hyperactivity versus attentional problems were totalled separately with higher scores indicating more areas of difficulty related to potential off-task behaviour.

Reading comprehension

This Arabic reading test was developed by the Centre for Children Evaluation and Teaching in Kuwait. The aim of the test was to assess reading comprehension fluency and it has been shown to be related to other measures of reading comprehension in

Arabic and to show good levels of reliability (Elbeheri, Abu Al Diyar, Taibah, Everatt, Mahfoudhi & Haynes, 2013). The test presented the child with 50 incomplete sentences. Each sentence was followed by four words and the child's task was to choose (by circling) the word that completes the sentence in a meaningful/sensible way. Children were given a time limit of 150 seconds to complete as many of the 50 sentences as possible, and the score for the measure was the number of correctly completed sentences.

Spelling to dictation

This measure assessed the children's ability to accurately spell Arabic words (see Elbeheri et al., 2013, for previous work using such an Arabic measure, and for evidence for reliability and correlations with other measures of literacy). The test consisted of a passage of meaningful/connected Arabic text that contained 56 words. Arabic is a cursive script and, therefore, writing in context was seen as more realistic/typical for these grade 4 and 5 children. The passage was read to the students at a relatively slow pace in order that the students could write down what was being dictated, but could also gain necessary context from that passage to add recognition of words: the speed of speech was based on previous pilot work independent of the current data collection. Completed papers on which the students had written the passage were collected and marked for accuracy of spelling. The score for the task was the number of correct spellings out of 56.

Mathematic calculations

Four forms of arithmetic calculations were used for the test of mathematics ability. These involved subtraction, addition, multiplication and division – and have been used in past work on mathematics ability within Kuwaiti children (Everatt, Elbeheri & Al-Manabri, 2012). A total of 36 calculations were developed for subtraction, addition and multiplication, and 33 were set for division. These were presented separately and the children were asked to complete as many as possible within one minute (for subtraction and addition) or two minutes (for multiplication and division). Performance in mathematics was assessed based on the number of calculations completed correctly in the time allocated. These scores were then combined to produce one score.

RESULTS

Descriptive statistics for the measures can be found in Tables 1 (for the educational achievement measures) and 2 (for the behavioural measures). Scores for educational achievement (reading comprehension, spelling to dictation and mathematics calculations) can be found in Table 1, and these show the predicted higher scores for children in grades 6 and 7 (intermediate school) compared to those in grades 4 and 5 (primary school).

Table 1. Average scores (with standard deviations in brackets) for the education measures.

	Primary school (grade 4 + 5)	Intermediate school (grade 6 + 7)
Reading comprehension	20.68 (10.86)	29.88 (10.22)
Spelling to dictation	39.57 (17.17)	41.98 (13.69)
Mathematics calculations	53.76 (23.82)	70.13 (24.64)

Table 2. Average scores (with standard deviations in brackets) for the behaviour measures

	Parent questionnaires		Teacher questionnaires	
	Primary school	Intermediate school	Primary school	Intermediate school
AHQA: inattention	3.00 (1.96)	2.98 (2.16)	3.22 (2.34)	4.22 (2.63)
AHQA: hyperactivity	3.46 (2.59)	4.23 (2.56)	3.24 (2.56)	3.22 (2.81)
SDQ: hyperactivity	3.96 (2.29)	3.84 (2.10)	3.13 (2.28)	3.69 (2.94)
SDQ: emotion problems	3.18 (2.30)	3.26 (1.87)	2.30 (1.93)	2.33 (2.49)
SDQ: conduct problems	2.25 (1.65)	2.65 (1.86)	1.72 (1.65)	1.62 (2.04)
SDQ: peer problems	3.68 (1.70)	3.26 (1.59)	2.69 (1.40)	3.50 (1.47)
SDQ: pro-social*	7.68 (2.05)	7.88 (2.04)	6.57 (2.22)	6.19 (2.23)

*A high score for this subscale is reflective of positive behaviour

Table 2 indicates that for the AHQA ratings, parent ratings for AHQA hyperactivity increased considerably from primary to intermediate grades, while those of teachers were virtually identical. In contrast, whereas parent ratings for inattention were similar across primary and intermediate school grades, those of teachers increased by approximately 30%.

For the SDQ measures, hyperactivity showed the highest negative behaviour ratings from both parents and teachers across both primary and intermediate grades (note the pro-social scale is the reverse of the other scales). Similarly, both teachers and parents gave the conduct problems scale the lowest rated scores. Parent ratings were generally higher than those of teachers, including in all categories indicating poor behaviour, with the exception of peer problems at intermediate grades; though, they were also higher for the pro-social scale, which suggests more positive behaviour. In terms of differences between the school groups, intermediate grades were overall rated as showing more behaviour problems than primary grades. These points are considered in more detail in the discussion.

Table 3. Partial correlations controlling for grade and gender (with p-values in brackets) between measures of educational attainment and ratings of behavioural dimensions.

	Parent responses			Teacher responses		
	Reading	Spelling	Maths	Reading	Spelling	Maths
AHQA: inattention	-.17 (.095)	-.19 (.064)	-.24 (.018)	-.46 (.001)	-.55 (.001)	-.50 (.001)
AHQA: hyperactivity	-.11 (.282)	-.09 (.377)	-.16 (.130)	-.02 (.839)	-.11 (.272)	-.12 (.260)
SDQ: hyperactivity	-.35 (.001)	-.34 (.001)	-.32 (.001)	-.42 (.001)	-.41 (.001)	-.51 (.001)
SDQ: emotion problems	-.25 (.013)	-.18 (.077)	-.27 (.007)	-.34 (.001)	-.33 (.001)	-.33 (.001)
SDQ: conduct problems	-.18 (.080)	-.21 (.037)	-.22 (.029)	-.11 (.279)	-.23 (.024)	-.31 (.002)
SDQ: peer problems	-.13 (.219)	.00 (.999)	-.17 (.089)	-.30 (.003)	-.27 (.007)	-.27 (.009)
SDQ: pro-social	.17 (.101)	.04 (.709)	.11 (.302)	.26 (.011)	.32 (.001)	.26 (.012)

Note: figures in bold are significant at the .05 alpha level

The main aim of the paper, though, was to consider relationships between measures of behaviour and educational attainment. Table 3 presents the results of partial correlations (controlled for grade and gender) between the dimensions of behaviour and educational achievement test results.

It is noteworthy that a significant relationship was found between all measures of educational achievement and the behavioural ratings of both parents and teachers for SDQ hyperactivity and between conduct and spelling and mathematics (both parents and teachers). On the other hand, while there was significance between teacher ratings of inattention and all educational measures, this was only so with regard to mathematics for the parent ratings. Teacher ratings, furthermore, indicate significance with emotional and peer problems and the pro-social scale, while those for parents do not. Possible reasons for such differences are discussed in more detail in the following section.

Table 4. Partial correlations controlling for grade and gender (with p-values in brackets) between measures of educational attainment and parents ratings of behavioural dimensions

	Primary grades			Intermediate grades		
	Reading	Spelling	Maths	Reading	Spelling	Maths
AHQA: inattention	-.15 (.266)	-.14 (.313)	-.09 (.527)	-.11 (.488)	-.16 (.304)	-.29 (.067)
AHQA: hyperactivity	.06 (.657)	.09 (.538)	.15 (.289)	-.21 (.188)	-.20 (.219)	-.33 (.034)
SDQ: hyperactivity	-.34 (.013)	-.27 (.045)	-.17 (.228)	-.30 (.055)	-.39 (.011)	-.43 (.005)
SDQ: emotion problems	-.23 (.094)	-.20 (.156)	-.20 (.146)	-.27 (.092)	-.16 (.328)	-.40 (.009)
SDQ: conduct problems	-.11 (.445)	-.14 (.320)	-.09 (.536)	-.16 (.308)	-.29 (.065)	-.28 (.072)
SDQ: peer problems	-.23 (.098)	-.08 (.557)	-.11 (.449)	-.02 (.908)	.11 (.481)	-.31 (.046)
SDQ: pro-social	.05 (.707)	-.09 (.504)	-.11 (.411)	.30 (.059)	.19 (.228)	.30 (.054)

Note: figures in bold are significant at the .05 alpha level

Table 3 combines data for both primary and intermediate level students, while one aim of this paper was to consider differences between these two levels. Therefore, Tables 4 and 5 present partial correlations separately for these levels: Table 4 for parent responses and Table 5 for teacher responses.

Consistent with Table 3, more areas of significant relationships were identified with the teacher ratings than for the parent responses. For parents, again SDQ hyperactivity seems to be the factor most related to the children's scores on literacy and mathematics. This seems to be the case across primary and intermediate grades. However, there is also a trend for medium level relationships between different behavioural ratings and mathematics scores in the intermediate grades data (particularly, AHAQ hyperactivity, and SDQ emotional and peer problems). For the teachers, splitting between primary and intermediate grades indicates that, generally, larger correlations between educational

Table 5. Partial correlations controlling for grade and gender (with p-values in brackets) between measures of educational attainment and teachers ratings of behavioural dimensions

	Primary grades			Intermediate grades		
	Reading	Spelling	Maths	Reading	Spelling	Maths
AHQA: inattention	-.58 (.001)	-.67 (.001)	-.63 (.001)	-.29 (.071)	-.30 (.051)	-.36 (.017)
AHQA: hyperactivity	.09 (.538)	-.13 (.349)	.06 (.698)	-.08 (.627)	-.04 (.807)	-.20 (.189)
SDQ: hyperactivity	-.53 (.001)	-.50 (.001)	-.60 (.001)	-.26 (.106)	-.26 (.104)	-.44 (.005)
SDQ: emotion problems	-.40 (.003)	-.25 (.070)	-.33 (.016)	-.25 (.124)	-.38 (.017)	-.30 (.057)
SDQ: conduct problems	-.18 (.205)	-.28 (.047)	-.30 (.033)	-.01 (.955)	-.10 (.531)	-.29 (.069)
SDQ: peer problems	-.18 (.213)	-.11 (.441)	-.07 (.610)	-.28 (.077)	-.31 (.055)	-.33 (.036)
SDQ: pro-social	.36 (.009)	.48 (.001)	.34 (.013)	.22 (.168)	.18 (.276)	.31 (.050)

Note: figures in bold are significant at the .05 alpha level

measures and behavioural ratings were evident in the responses of primary teachers and their children – this is most obvious in the large correlations between the educational measures and AHAQ inattention and SDQ hyperactivity. Though, as with the parent data, there is also a trend for medium level correlations to be found with the teacher's behavioural rating and the children's mathematics scores in the intermediate grades.

DISCUSSION

The main finding from the current study is the evidence for associations between measures of reading, spelling and mathematics and rated levels of behaviour-related difficulties within this relatively understudied cultural context of Kuwait. The data also argue for associations across environments in Kuwait (i.e., home and school), particularly in terms of hyperactivity levels; although there are differences between ratings of parents versus teachers. The ratings of parents were generally higher than those of teachers, including for the Pro-Social scale, which indicates positive behaviours. One potential reason for this is that teachers have the advantage of being able to make comparisons between children within a much wider group of children than is possible for parents. Therefore, parents may have more concerns about behavioural problems through a somewhat different (possibly less nuanced) view than teachers, and to have a more directed and personal perspective on an individual child rather than within a wider group setting (Maras & Kutnick, 1999): for example, peer problems can be judged from a much wider group perspective by teachers compared to parents. Equally, the priorities and judgements of teachers (as opposed to those of parents) will be based on behaviour within an educational setting (see also Mooij & Smeets, 2009), which will be influenced by cultural norms and traditional educational practices. In a Kuwaiti cultural context these may be based on expectations of conforming behaviour and instructional learning. Behavioural expectations will be different across the two environments (school and home) and children will surely recognise this and respond accordingly (see Gutman & Vorhaus, 2012). Therefore, reports from both parents and teachers should be seen as important in defining the wellbeing of children (Fauth & Thompson, 2009).

A main aim of the study was to consider relationships between behaviour and academic achievement in Arabic (Kuwaiti) children. The findings suggest relationships between literacy and mathematics levels and some specific areas of behaviour reported by both parents and teachers (i.e., hyperactivity, emotional problems and conduct as measured on the SDQ scale). Recognition of these issues and the difficulties faced by children in terms of their learning has been noted previously by researchers: see, for example, Barkley (2006) on issues related to hyperactivity, and Walker, Robinson, Adermann and Campbell (2014) on the well-established negative impact emotional problems have on educational attainment. The current data, therefore, suggest that negative impacts of off-task behaviours and negative emotional reactions may impact on learning within the current research context (the Arabic cultural context of Kuwait) as much as it does in

other cultural contexts and different educational systems. Research identifying ways to reduce such negative influences, therefore, would seem to be useful across these different contexts.

The present study shows such academic achievement and negative behaviour relationships in a relatively under-researched cultural context, and it is useful to contrast the findings across such contexts. A UK study by Lindsay and Dockrell (2000) considered the relationship between behavioural traits as measured by parent and teacher SDQ and educational attainment for a group of students aged 7 to 8 years. The dimension that was given the highest mean score by both groups of raters was hyperactivity, and conduct problems the lowest, with emotion and peer problems falling between; findings similar to those in the current study. Hayes (2007), in a study conducted in Australia, identified hyperactivity as gaining the highest rank on the SDQ scales, with conduct been given the lowest, and emotion and peer problems in-between. Studies conducted by Niclasen et al. (2012) in Denmark with children aged 10-12, and on 7th Grade Finnish children by Koskelainen (2008), showed the same pattern: hyperactivity given the highest scores, conduct problems the lowest, emotion and peer problems in-between. These studies showed similar patterns of rated difficulties on the SDQ as the current study. Although this pattern is not always found: a study by Horiuchi et al. (2014) looked at parent rated SDQ measures for Japanese control children aged 10 to 12 and found that conduct problems produced the second highest scores after hyperactivity.

A further aim of the study was to consider differences in terms of relationships between education measures and the behaviour of children at primary versus intermediate levels. The main finding here was that the late primary years seem to be a potential focus of concern in terms of relationships between negative behaviours and educational achievement: the large relationships between the teacher ratings of inattention and hyperactivity are particularly note-worthy, though medium effect sizes for emotional problems should also be considered in future research. Therefore, at least for the current educational context, this late primary period may be an important period within which to target interventions aimed at reducing negative influences of behavioural problems. However, there may also be an influence at intermediate grade levels of behavioural problems and mathematics ability. This specific focus is worthy of further research but may be consistent with the perceived complexity of mathematics (see Chinn, 2015) paired with the need to pass formal assessments of mathematics in order to progress to high-value high-school/college courses. However, further research contrasting larger groups of students across a wider range of grades would also be useful in order to identify specific points of association between educational skills and negative emotional-behaviour factors; for example, assessing younger grades in primary schools as well as higher grades in post-primary education school contexts to determine if the focus of the effects are at a particular developmental stage within Arabic students, or if they are more associated with important educational transition points (e.g., from primary to secondary and from secondary to post-secondary). Such extended data collection is

ongoing in Kuwait and has increased the number of schools involved so as to reduce the potential impact of one teacher view on the findings: a larger number of teachers will lead to less effect of individual differences in ratings.

CONCLUSIONS

A number of points, related to its aims, can be made in conclusion of this work. One is that relationships are likely to exist between some dimensions of behaviour and educational achievement in Arabic (Kuwaiti) children, particularly in the areas of hyperactivity, inattention and emotional symptoms. Variations in such relationships due to cultural context are difficult to assess, but the similarities in findings for the SDQ scale between this and other studies suggests some level of consistency across contexts. However, further research that focuses on the relationship between behavioural problems and academic achievement across different cultural contexts would be worthwhile. Finally, the current data argue for important differences in the relationship between behaviour and academic attainment as children mature and progress through school. The results of this study argue that additional work in the late primary grades (at least within the current educational context) would be justified, along with research that considers influences on specific educational areas (such as mathematics) in later grades.

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Assessment of the Effectiveness of a Chinese Literacy Assessment tool for School Learners in Singapore

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Abstract

As more school learners face difficulties in learning Chinese and requests for exemption in school, there is no standardised Chinese literacy assessment tool in Singapore that can enable educators to assess and ascertain the learning needs of these learners. Consequently, educators are unable to provide the most appropriate learning support for these learners. Hence, the purpose of this study is to assess the reliability and validity of a Chinese Literacy Assessment tool which could be standardised in future to ascertain a learner's language ability and learning difficulties. The Chinese Literacy Assessment tool (CLA) consists of five components: visuo-orthographic awareness, word recognition and morphological awareness, spelling, reading comprehension and copying. A total of 149 learners between the ages of nine to eleven years old participated in this study and underwent the CLA testing. Test of Cronbach Alpha shows that the orthographic awareness, morphological awareness, word recognition, spelling and copying tasks are reliable test items. Using one-way ANOVA, the CLA is valid in differentiating students with learning difficulties and of different ages and abilities. The results of this study suggest for revisions to be made prior to standardisation with a larger sample of students and potentially be used to inform instruction.

Keywords: Chinese Learning Difficulties, Chinese Literacy, Assessment, Singapore
Mandarin, Second Language

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INTRODUCTION

There are four official languages in Singapore - English, Malay, Mandarin and Tamil. Apart from English, the rest are languages corresponding to the major ethnic group in Singapore. The bilingual language policy in Singapore requires all school learners to learn English and their mother tongue language, which is the language of their ethnic group (Mother Tongue Languages Review Committee, 2011). In special cases, learners are exempted from studying their mother tongue language. One of the reasons for exemption could arise from special education needs of a child, such as dyslexia (Chan, 2016). Dyslexia is a specific language learning difficulty that manifests itself differently in different languages (Siok, Spinks, Jin and Tan, 2009).

In Singapore, primary school learners with dyslexia may apply for exemption from studying their mother tongue language, for them to get support to cope with the learning of their other academic subjects, namely English Language, Mathematics and Science. However, difficulties in learning Chinese are not exclusive to learners with dyslexia. Bilingual learners may face difficulties learning either language due to poor foundation in language skills to cope with increasing academic demands in the classroom (Fierro-Cobas and Chan, 2001). Given that English and Chinese languages are fundamentally different (Koda and Zehler, 2008), the current existing assessment tools in Singapore may be insufficient to inform of the difficulties learners face when learning Chinese. In addition, there is currently no standardised tool in Singapore that can be used to assess the difficulties learners face when learning Chinese. Consequently, learners are unable to get the appropriate support required for them to succeed in their learning. Even though there are standardised assessment tools from Hong Kong and Taiwan, they are not suitable for use in the Singapore context as they were developed according to their norms of Chinese being their first language (Shen, Liu, Kong, See and Sha, 2014). Besides language use, the countries also differ from Singapore in the phonetic system used to support Chinese learning. For instance, Taiwan adopts the 'zhuyin fuhao' (a collection of symbols) while Singapore uses the 'hanyu pinyin' system represented by letters in the alphabet. In terms of writing, both Hong Kong and Taiwan uses the traditional Chinese script while the simplified script is used in Singapore.

The interest of this study is then to develop a literacy assessment tool for bilingual learners of Chinese ethnicity. That is, to develop a Chinese literacy assessment tool for school learners in Singapore to help educators to identify learning needs of bilingual learners who struggle with learning Chinese language to provide a more targeted intervention to support these learners. The design of the literacy assessment tool was based on a review of the literature which shows that pertaining to Chinese, children with dyslexia face difficulties with cognitive and literacy-related skills, which include word recognition, phonological sensitivity, morphological awareness, copying, spelling and comprehension.

According to Shu and Li (2012), studies have found that dyslexic children in Chinese mainly suffered from the accuracy and speed of word recognition and spelling, just as in alphabetic languages. Hence, reading measures widely used in distinguishing dyslexic from normal children are single character or word recognition measures. Yeung, et al. (2014) pointed out that word recognition is one of the major measures in the screening and diagnostic tools used in identifying children with dyslexia among Chinese children in mainland China and Hong Kong.

McBride and Wang (2015) argued that phonological sensitivity, rapid naming and morphological awareness are cores for Chinese learning. Morphological awareness is usually measured by the ability to form vocabulary words with characters, which is also known as single words. In addition, visual-orthographic abilities may be associated causally with Chinese literacy skills over time. The authors pointed out that phonological awareness and naming speed are the two deficits shared by both dyslexic children in Chinese and in alphabetic languages, and that the specific aspects of reading acquisition in Chinese are related to the characteristics of Chinese language and orthography. They concluded that morphological and orthographic awareness are particularly important to consider in understanding Chinese reading development and dyslexia.

With respect to word dictation or spelling (听写) in local context, children with dyslexia performed significantly worse than children with typical development (Cheng-Lai, et al., 2013; Chung, et al., 2011; He et al., 2011). Chung et al. (2011) also found lower performance in Chinese adolescents with dyslexia, indicating that spelling difficulties persist into adolescence. The differences in word dictation performance could be associated with morphological awareness (Chung et al., 2011; He et al., 2011) and weak orthographic representation of characters (Chung et al., 2011; Ho et al., 2006). In addition, Chung et al. (2011) found differences in visual-orthographic knowledge between adolescents with dyslexia and with typical development. Ho et al. (2006) showed that children with dyslexia tended to confuse orthographically similar characters and made higher proportions of orthographic errors.

Lam et al. (2011)'s investigation of Chinese handwriting performance of primary school children with dyslexia, they found that children with dyslexia wrote significantly more slowly with greater average character size and variation than typical children of the same age group. They also wrote with significantly lower accuracy. Missing strokes and concatenated strokes were commonly observed writing errors. From the discriminant analysis, it was found that writing speed and accuracy could discriminate students into two groups with accuracy of over 70% for every grade.

The study by Chik et al. (2012) found that children with dyslexia performed significantly less well than the chronological age controls but similarly to reading level controls in most measures. Word level skills such as oral vocabulary and word semantics were

found to be strong predictors of reading comprehension among typically developing junior graders and dyslexic readers of senior grades, whereas morphosyntax, a text-level skill, was most predictive for typically developing senior grades. It was concluded that discourse and morphosyntax skills are particularly important for reading comprehension in the non-inflectional and topic-prominent Chinese system. Leong et al.(2007) supported the significance of the role of verbal working memory in reading comprehension, just as in English.

Based on the literature review, a literacy assessment tool that measures orthographic awareness, word recognition, copying, morphological awareness, comprehension and spelling will provide an overview of the learners' literacy-related skills. The tool is then able to assess learners who are having difficulties learning the language.

The purpose of this study is to develop and assess the effectiveness of a Chinese Literacy Assessment tool (CLA) in determining the literacy ability of a learner in relation to the population.

The aims of this study involves the following areas:

1. Is the CLA a valid tool developed to ascertain learners' language ability?
2. Is the CLA a reliable tool developed to ascertain learners' language ability?
3. What are the differences in Chinese literacy skills between learners with and without learning difficulties/differences?

The findings from this study could serve as evidence that the CLA is a reliable and valid tool in determining the learner's Chinese language ability and identifying specific difficulties in learning Chinese. In addition, the CLA is intended for future use to inform teaching pedagogy and instructional materials to cater to the needs of students with learning difficulties in Chinese.

This will shed light for educators on the development of appropriate intervention and support to be given to struggling learners. This study also serves to inform guidelines to the Ministry of Education when planning and developing curriculum and as a platform for standardisation testing in time to come.

METHOD

Development of assessment tools

The CLA is built on the foundation of the Battery of Chinese Literacy Tests, which was first adapted and revised by Shen, Liu, Kong, See and Sha (2014). The Battery of Chinese Literacy Tests consists of orthographic awareness, word learning and retrieval, stroke copying, word recognition, word forming, spelling, passage copying and oral picture

description. Development of the CLA is made with reference to this Battery of Chinese Literacy Tests and existing literature as discussed above. Subtests of the CLA comprise of orthographic awareness, word recognition, morphological awareness, spelling, reading comprehension and word copying. Description of the subtests are as follow. The developed test items were pre-piloted with a group of students and adjustments were made based on the feedback collected. The revised test was used in this study.

Orthographic Awareness Test

McBride and Wang (2015) considered orthographic awareness as a particularly important factor to consider in understanding Chinese reading development and dyslexia. The orthographic awareness test was designed with reference to commonly used character structures as proposed by 谢锡金 (2002) and the commonly used character list released by the National Assembly of People of Republic of Chinese in 2013 (在线新华字典, n.d.). In order to minimise influence from prior learning, the 30 characters selected were considered rarely and had character structures that were commonly seen in daily life to allow for generalisation. For each structure, there is a correct character, a reversed character and one with wrongly placed radicals. Participants are given a time limit of 5 minutes for this test.

Word Recognition and Morphological Awareness Test

Word recognition was pointed out by Yeung, et al., (2014) as one of the major measures in the screening and diagnostic tools used in identifying children with dyslexia in Chinese. The word recognition test measures participants' ability to recognise characters while the morphological awareness test is used to measure participants' ability and verify further if the word read in the word recognition task was accurate. The 100 items on the word recognition and morphological awareness test was selected from the 新加坡学生日常华文用字频率字典 (林、吴 and 赵, 2014) as it reflects the use of the language in the Singapore setting. Every fifth character was chosen till the 100th test item was selected. Some characters were excluded as the use of these characters is limited to situations such as surnames (李, as in 李白) and honorific terms (您, to refer to a more senior person in place of 'you'). In these instances, the word that comes after will then be selected. Reference was also made to 常用汉字581 (王永强, 2010), a list of commonly used words in China, to verify the soundness of the selection of test items. Participants are given a time limit of 20 seconds for each test item.

Spelling Test

Children with dyslexia have been found to perform significantly poorer than children with typical development (Cheng-Lai, et al., 2013; Chung, et al., 2011; He, et al., 2011) and

this problem persists into adolescence (Chung, et al., 2011). Hence, the use of spelling as a measure in the tool. The spelling test has a total of 50 items. Each item is a word consisting of two characters. The items were selected from 新加坡学生日常华文用词频率字典 (吴、林 and 赵, 2013). The list was filtered to remove words that are made up of either only one character or more than two characters. Every fifth word from the filtered list is then chosen as a test item. If the character in a word was used in an earlier chosen word, the word before or after that would be selected instead. The category of the word chosen was also taken into account, such as nouns, verbs and adjectives. Participants are given a time limit of 30 seconds for each test item.

Reading Comprehension Test

Chik, et al., (2012) in their study found that word level skills were strong predictors of reading comprehension. While students may be able to recognise individual characters, they may be unable to decode the meaning of that vocabulary. The reading comprehension test measures participants' ability to understand texts and answer questions based on their understanding. The reading comprehension test is divided into eight levels of difficulty. Each level has 20 to 30 more characters than the previous level. The words used in the reading comprehension passages are selected based on 新加坡学生日常华文用字频率字典 (林、吴 and 赵, 2014). Characters of a lower frequency are used with each increase in level (refer to table 1).

Table 1. Level of difficulty and corresponding range of character frequency

Level	Characters used
1 and 2	First 400 characters
3 and 4	401st – 800th character
5 and 6	801st – 1200th character
7 and 8	1201st – 1600th character

The theme of the reading comprehension passage and type of questions also broadens with increasing level of difficulty (see Table 2). Question type is based on Bloom's taxonomy from literal skills to higher order thinking skills such as analysis, synthesis and evaluation.

Table 2. Analysis of level of difficulty according to theme and question types

Level	Theme	Question Type
1 to 2	Personal, Family, School	Knowledge, Comprehension
3 to 4	Personal, Family, School	Knowledge, Comprehension, Application, Analysis
5 to 6	Personal, Family, School, Society, Nation-Related	Comprehension, Application, Analysis, Synthesis, Evaluation
7 to 8	Personal Growth, Friendship, Interests, Nation-related	Comprehension, Application, Analysis, Synthesis, Evaluation

Copying Test

The copying task is developed based on the findings of Lam, Au, Leung & Li-Tsang (2011) that show that children with dyslexia wrote significantly slower, with greater average character size and variation in size, and with lower accuracy. Writing errors include missing strokes and concatenated strokes. Writing speed and accuracy were found to be good discriminators for the dyslexic group. A total of 25 Chinese characters were selected as test items following the 14 basic character structures (谢, 2002) and the 25 basic Chinese strokes (在线新华词典, n.d.). The characters are arranged in a manner that all 14 character structures are tested before repeating them. If participants were unable to complete the test in five minutes, the tester can terminate the test once the student has copied the first 13 characters.

Participants

As the researchers were from the Dyslexia Association of Singapore (DAS), they had access to students who were diagnosed with dyslexia based on full psychological IQ assessments plus measures of literacy skills in English, conducted by educational psychologists. A research proposal was also submitted to DAS to gain permission to access these students for the study. For access to participants from schools, the researchers first approached the principals of these schools and sought their consent. A signed copy of Form for Collection of Data from Schools was then submitted to the Ministry of Education (MOE) Data Administration Centre for approval.

A total of 149 primary school children participated in this study. 140 participants were

recruited from four neighbourhood primary schools located in different parts of Singapore and representative of typical mainstream primary schools in Singapore. Out of which, there were 4 students below the age of 9 years and 1 student above 12 years old. Hence, their data were excluded from the study. Of the remaining 136 students, one student was reported to have dyslexia. The remaining nine dyslexic participants were recruited from the DAS. As such, there were 10 students in the dyslexic group while 135 in the non-dyslexic group.

The participants were from three different school levels, primary three, four and five. They were also controlled for their gender, types of Chinese syllabus (Chinese, Higher Chinese and Foundation Chinese) that they were studying and their school performance (Table 3). School teachers assisted in identifying and selecting students of different ability (high, mid and low) in their Chinese language based on their latest school results (see Table 3 also).

Table 3. Age, Gender and Ability Level of Participants

Age Range (Gender)	Low Ability (school results 49 and below)	Mid Ability (school results 50 to 79)	High Ability (school results 80 and above)
9 years 0 to 9 years 11 months (Total=53; boys=24, girls=29)	17	24	12
10 years 0 to 10 years 11 months (Total=53; boys=24, girls=29)	17	19	17
11 years 0 to 11 years 11 months (Total=39; boys=15, girls=24)	12	15	12

Test Administration

Five research assistants were recruited for data collection. They were each given a four-hour training session. Training content includes assessment objectives, assessment items, test administration and scoring, and administrative matters.

The five literacy tasks were administered individually in the following sequence: orthographic awareness, word recognition and morphological awareness, spelling, reading comprehension and copying. The entire test took about an hour for each student. One assessor tested one student each time. Students were assessed either during or after school hours in a classroom or a computer lab in their school.

Orthographic Awareness Test

Participants were shown a character at a time and asked to indicate if the shown character was a real word or non-word. Non-words have character parts that are wrongly placed or reversed. The order of the items was randomised for each participant. This task was done online using the QuizEgg web site. There were four practice items prior to the actual test.

Word Recognition and Morphological Awareness Test

Participants were asked to read the single word shown on PowerPoint and then form a vocabulary word with it, e.g. “演”, they read “yǎn” and could form the vocabulary word “表演”, “演员” etc. If it was not possible to form a vocabulary word with the single word, they could form a phrase, e.g. “的”, they could form the phrase “你的书包”, “这是我的铅笔” etc. This is to provide flexibility in accepting responses, as some single words may be more difficult to form vocabulary words and participants may be more familiar with the use of the single word in a phrase. However, the names of people were not accepted. The participants responded to the test items verbally. Participants attempted two practice items before the actual test. The task was discontinued when the participants failed to read and form words with nine consecutive characters. Word recognition and morphological awareness are scored separately. For morphological awareness, the accurate forming of a vocabulary word or phrase is awarded one point. Answers are also recorded for the purpose of error analysis.

Spelling Test

Participants were asked to listen to audio recordings of the test items using earphones and write their answers on the student’s booklet, e.g. “我们”, “应该” etc. They heard the word first, followed by a sentence containing the word, and the word again. This gave them a context for it. The task was discontinued when the participants failed to write seven consecutive words correctly.

Reading Comprehension Test

Based on the age of the participants, the administrator chose the appropriate level to start with (9 years old - level 3; 10 years old - level 4; 11 years old - level 5). Passages are administered to participants in progressive levels. Participants were asked to read the passage first, then listen to the questions in the audio recordings through earphones, and answer verbally. Participants were also provided with a whiteboard marker to make annotations during reading if they wanted to. The task was discontinued when the participant failed two levels consecutively or obtained a zero mark at one of the levels.

Copying Test

Participants were asked to copy the characters from left to right on the grid paper in the student's booklet as accurately as possible. The research assistant recorded observations made on six areas - strokes, stroke sequence, proportion, overlapping of strokes, missing strokes and additional strokes.

RESULTS

To test the reliability (Table 4) and validity (Table 5) of the tests, Cronbach's Alpha and one-way ANOVA were used for statistical analysis.

Table 4. Reliability Statistics (Cronbach's Alpha) for each Test.

Subtests	No. of Items	Cronbach's Alpha (α)
Orthographic Awareness	30	.643
Word Recognition	100	.971
Morphological Awareness	100	.971
Spelling	50	.967
Reading Comprehension	17	.567
Copying	25	.711

Most of the tests were found to have a high level of reliability. The Word Recognition and Morphological Awareness Test both consisted of 100 items ($\alpha = .975$), the Spelling Test consisted of 50 items ($\alpha = .967$), and Copying Test consisted of 25 items ($\alpha = .711$). However, the Orthographic Awareness Test which consisted of 30 items and Reading Comprehension Test which consisted of 17 items (8 levels) were found to have relatively lower levels of reliability: the Cronbach's Alphas for these were $\alpha = .643$ and $\alpha = .567$ respectively.

Table 5. Descriptive Data and ANOVA Results by Age Groups (1 = 9yrs 0mths to 9yrs 11mths; 2 = 10yrs 0mths to 10yrs 11mths; 3 = 11yrs 0 mths to 11yrs 11mths)

Subtests	Age Group	N	Mean	Std. Deviation	ANOVA	Significance
Orthographic Awareness	1	53	25.302	3.4227	F (2,142) =8.85 p<.001	3>2=1
	2	53	26.170	2.8739		
	3	39	27.872	2.0797		
Word Recognition	1	53	61.019	28.4885	F (2,142) =5.96 p=.003	3>2=1
	2	53	65.019	33.9556		
	3	39	81.744	24.0610		
Morphological Awareness	1	53	59.717	29.7557	F (2,142) =6.05 p=.003	3>2=1
	2	53	64.396	34.3222		
	3	39	81.128	23.6467		
Spelling	1	53	44.604	27.9892	F (2,142) =9.29 p<.001	3>2=1
	2	53	52.660	32.4760		
	3	39	71.385	28.2467		
Reading Comprehension	1	48	23.604	12.3336	F (2,142) =8.37 p<.001	3>2=1
	2	51	28.098	14.4489		
	3	33	35.424	10.4344		
Copy Duration	1	53	207.547	71.5288	F (2,142) =5.49 p=.005	3=2, 2=1, 3<1
	2	53	190.547	70.9942		
	3	39	161.487	48.8321		
Copying	1	53	16.547	3.8857	F (2,142) =2.87 p=.060	NS
	2	53	16.849	3.5104		
	3	39	18.359	3.9034		

Table 6. Descriptive Data and ANOVA Results by group, Dyslexic (D) and Non-Dyslexic (ND) Groups.

Subtests	Groups	N	Mean	Std. Deviation	ANOVA
Orthographic Awareness	ND	135	26.378	3.0466	F = (1,143) .947
	D	10	25.400	3.3400	p=.332
Word Recognition	ND	135	70.252	29.8328	F = (1,143) 10.795
	D	10	38.400	25.5439	p= .001
Morphological Awareness	ND	135	69.452	30.2373	F = (1,143) 11.10
	D	10	36.600	27.7537	p= .001
Spelling	ND	135	56.985	31.1340	F = (1,143) 10.53
	D	10	24.600	17.3986	p= .001
Reading Comprehension	ND	123	28.992	13.2514	F = (1,143) 10.53
	D	9	18.778	13.7366	p= .001
Copying Duration	ND	135	189.356	68.7044	F = (1,143) .071
	D	10	183.400	61.2684	p= .790
Copying Accuracy	ND	135	17.444	3.6522	F = (1,143) 13.16
	D	10	13.100	3.6953	p= .000

There was a statistically significant difference between groups as determined by one-way ANOVA for most tests and their sub-scores, namely the Orthographic Awareness ($F(2,142) = 8.855, p < .001$), Word Recognition ($F(2,142) = 5.959, p = .003$), Word Formation ($F(2,142) = 6.048, p = .003$), Spelling ($F(2,142) = 9.293, p < .001$), Reading Comprehension ($F(2,142) = 8.373, p < .001$), and Copy Duration ($F(2,142) = 9.293, p < .001$). However, for the Copying Test, there was a statistically non-significant difference between groups ($F(2,142) = 2.871, p = .060$).

Tukey post hoc tests were conducted to compare each pair of age groups. For Orthographic Awareness, there was a clear effect of age, with both group 1 and 2 performing worse than group 3 ($p < .001, p = .017$ respectively), but there was a statistically non-significant difference between Age Groups 1 and 2 ($p = .278$).

For Word Recognition, there was an effect of age, with both group 1 and 2 performing worse than group 3 ($p = .003, p = .022$ respectively); though Age Groups 1 and 2 did not differ significantly ($p = .766$). For Morphological Awareness, groups 1 and 2 performed worse than group 3 ($p < .001, p = .025$), but groups 1 and 2 did not differ statistically ($p = .703$). For Spelling, again groups 1 and 2 were both worse than group 3 ($p = .009, p = .017$ respectively) but did not differ statistically from each other ($p = .347$).

For Reading Comprehension, groups 1 and 2 performed worse than group 3 ($p < .001, p = .031$ respectively), but were not statistically different from each other ($p = .191$). For Copy Duration, it was revealed that only Age Group 1 performed statistically significantly lower than Age Group 3 ($p = .003$). There was no statistically significant difference between Age Group 1 and 2 ($p = .383$), and Age Group 2 and Age Group 3 ($p = .096$).

Further analyses were undertaken comparing the students in dyslexic group ($N=10$) with those in the non-dyslexic group ($N=135$); together these formed the full group of 145 participants. These analyses were performed to further establish whether there were significant differences between the groups.

There was a statistically significant difference between groups as determined by one-way ANOVA for most tests and their sub-scores, namely Reading ($F(1,143) = 10.795, p = .001$), Morphological Awareness ($F(1,143) = 11.100, p = .001$), Spelling ($F(1,143) = 10.529, p = .001$), Reading Comprehension ($F(1,143) = 4.960, p = .028$), and Copying ($F(1,143) = 13.155, p = .000$). However, for Orthographic Awareness and Copy Duration, there were no statistically significant differences between the groups ($F(1,143) = .947, p = .332$, and $F(1,143) = .071, p = .790$, respectively).

DISCUSSION

The findings showed that learners with dyslexia or a lower ability performed poorer in word recognition (Shu and Li, 2012; Yeung et al, 2014), word forming as part of

morphological awareness (McBride and Wang, 2015), spelling (Cheng-Lai, et al., 2013; Chung, et al., 2011; He et al., 2011) and copying (Lam et al, 2011), which is consistent with literature. However, the areas of orthographic awareness (McBride and Wang, 2015) and reading comprehension (Chik et al, 2012) did not show as significant results. Future studies would require an in-depth investigation and revision of the orthographic awareness and reading comprehension test items to explain the differences observed with previous studies.

The results indicate good reliability and validity for the Chinese Literacy assessment tool overall. Cronbach's Alpha for each test have generally shown a good level of reliability, except for the Orthographic Awareness and Reading Comprehension tests. For these two tests, items require further review through greater scrutiny in terms of their administration.

The Orthographic Awareness test consists of a short practice session before the actual test items were administered. It was observed that students were deemed to have been "taught" how to identify wrong orthographic structures and hence most students were able to attempt the test with great ease. This is also supported in terms of the test validity as no significant differences were found between dyslexic and non-dyslexic students, as well as students aged between 10 and 11 years. Moving the cursor between the choices in the orthographic awareness task could be a variable as students that are more careful would also end up being slower and hence not able to complete the task given that this is a timed test. A revised version of the tool will be adapted to use the same number of correct answers as the wrong ones. We also discussed changing the design of the task where the student presses a key when it is a wrong answer and allows the correct answer to time out on the task.

For the Reading Comprehension tests, it was observed that there were some errors and inconsistencies between the test administrators in administering this test. Extreme scores or scores that were under- or over-measured were considered "outliers" and removed from the analysis. This has possibly affected the reliability result. The questions were also in an open-ended format, giving rise to variability in answers given.

Comparisons between subgroups of students have shown some significance in test validity in differentiating by age and learning difficulties. Further review is required in terms of level of challenge in each test and its test items. In addition to the limitations of this study, the selection and size of student sample should be reconsidered moving forward. A larger student sample for each age group would yield stronger results and perhaps produce more statistical significance. Also, a more controlled protocol in selecting high, mid and low ability students (including those with learning difficulties such as dyslexia) would provide more representative sub-groups and valid results for each sub-group of students.

The use of technology can help increase the efficiency of testing and reduce the time

required for data entry. The test on orthographic awareness was administered online and test items were shown in a randomised order. It also allowed the test to be completed under timed conditions. The students' answers to each question could also be generated within seconds. Pre-recorded explanations and test items also allowed for greater standardisation and minimised the variation that could have arisen from different testers such as pronunciation and details given for explanation. Moving forward, it is vital that technology is further incorporated to increase the efficiency and accuracy when testing. For example, the technology from the Chinese Handwriting Assessment Tool (Lam, Au, Leung and Li-Tsang, 2011) used in Hong Kong could be adapted to accurately record how students write and the errors when writing.

The CLA will be revised based on the above recommendations and test scores can then be standardised with a larger sample of students. The revised CLA is expected to be used by teachers to assess a learner's Chinese language ability and identify areas of difficulties the child is facing through error analysis. Teachers can subsequently customise curriculum and appropriate teaching strategies to support the learner.

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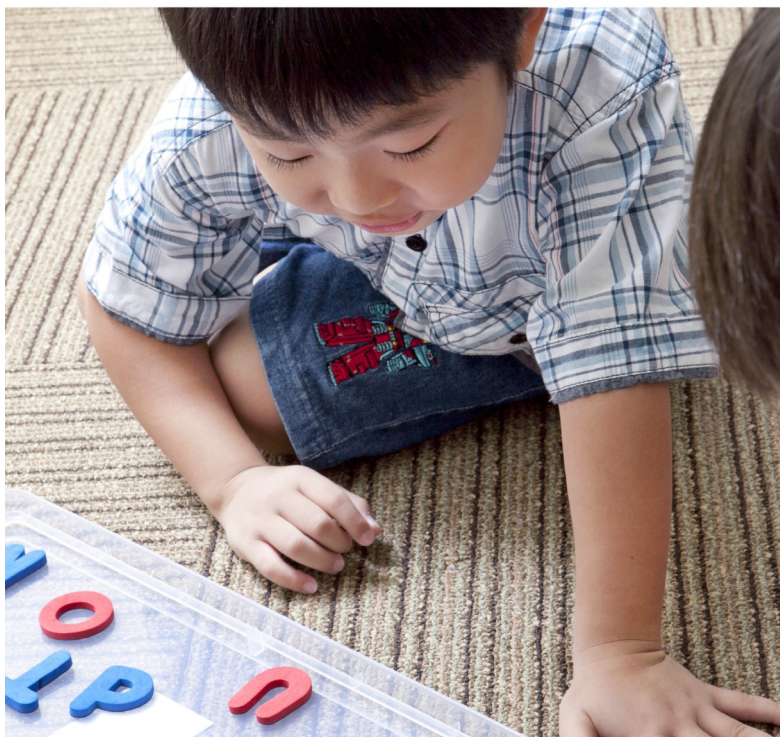
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Evaluating an early literacy intervention in Singapore.

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1. Dyslexia Association of Singapore

Abstract

Research has shown that the early years can be critical for children's progress in literacy and learning. Moreover, a number of predictors for success can be identified at this stage, including letter naming and phonological skills. An investigation into the effectiveness of the Dyslexia Association of Singapore (DAS) Preschool Early Literacy Intervention Programme (ELIP) was conducted with 294 kindergartners in 2016. Pre and post test results indicated literacy gains in all areas of early literacy intervention. These areas include alphabet and phonogram knowledge, sight words, reading and spelling. Thematic analysis of feedback gathered from parents, early literacy intervention therapists, and children showed intangible gains such as a love for learning and increased confidence, which may point towards the emergence of resilience. A positive tri-partnership between the therapist, the child and the parent is critical for success.

Keywords: Preschool/kindergarten; early intervention; phonics; literacy; stakeholder feedback; Singapore

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INTRODUCTION

Individuals born with difficulties in areas of reading, writing and spelling are often labelled as dyslexic, and dyslexia is regarded as a specific learning disorder (DSM-V). Therefore, dyslexics need to be “helped” because they are “disabled”. However, strengths in dyslexia have also been reported, although these are more difficult to quantify. This phenomenon is now increasingly recognised and it has even been discussed by the popular media. It was reported that “most people only get to see the full jigsaw picture when it’s nearly finished while the dyslexic cryptographers can see what the jigsaw looks like with just two pieces” (Mail Online, July 13, 2013). Dreyer, a notable dyslexic and a major innovator in biotechnology, (West, 2014) who invented the automated gas-phased protein sequencer, reported “When I’m inventing an instrument or whatever, I see it in my head and I rotate it and try it out and move the gears. If it doesn’t work, I rebuild it in my head” (Caltech, 1999).

Dyslexia, therefore, need not mean disabled in all areas of education – and it is important for the education system to support the development of the skills of individuals with dyslexia as much as it is any group. As a minority group, with dyslexia affecting only about 10% of the population, how can we nurture these unique abilities in young children, despite their known difficulties in areas of early reading, writing and spelling? Is there some way we can equip them with a dynamo to build their skills and ability to read, spell and write through holistic early literacy intervention? A dynamo that they can independently fuel (or refuel) on their own, to propel their personal academic (and non-academic) learning forward beyond the boundaries of their time with the Dyslexia Association of Singapore’s (DAS) Preschool Early Literacy Intervention Programme? In this article, these issues are explored, to address the impact of a targeted programme on achievement and affect in a large group of young dyslexic children.

Research has indicated that it is possible to identify young children in Singapore at risk for failure (See and Poay, 2014). At DAS, children are referred at the preschool level following concerns that they are not making the expected progress towards learning and there may be risk of dyslexia or other learning difficulties. At the end of this two year period of support, they are eligible for formal assessment for dyslexia, and those diagnosed as dyslexic will continue onto the MAP course funded by the Ministry of Education. In line with increasing evidence of co-morbid conditions in this group, children will often show a range of problems that have been associated with dyslexia. The rationale for provision of this course is the strong literature base indicating that early intervention can be the most successful, providing proactive support before a child falls behind their peers. DAS Preschool Early Literacy Intervention Programme (ELIP) has been offering weekly 2-hour intervention to kindergarteners outside regular school hours since 2011, helping a total of over 1100 children to date. It uses a prescribed scope and sequence curriculum to early literacy intervention, which is guided by Orton-Gillingham principles integrated with sound early childhood pedagogy. The Educational Therapist

(EdT) to student ratio is 1:5, providing a realistic opportunity for children to catch up with their peers in the early years, before they have experienced too much failure.

This approach to early screening and support has been well validated internationally, with evidence suggesting that support in the early years is most effective if undertaken between 5/6 before the impact of failure on self-esteem affects a child's ongoing progress (Nicolson et al, 1999, Fawcett et al, 2000). By contrast, by the age of 7/8 a number of children will need more intensive support to catch up with their peers (Nicolson et al, 2000). Support provided for children struggling in nursery can be effective from the age of 4, and persists over the next 18 months (Fawcett et al, 2014). Studies from the USA have indicated that once a child reaches the age of 8 without support, up to 67.5 hours of individual support will be needed to bridge the gap with the rest of their classmates (Torgesen, 2001). Moreover, Ferrar and colleagues (2015) recently demonstrated that problems in reading identified in US 1st grade will persist into adolescence, whereas early support can successfully cut into this cycle of failure.

The ELIP curriculum is continuously striving to provide enhanced holistic support for students, enabling success that is driven by the efforts of the children themselves. In anticipation of the common pitfalls faced by dyslexics, such as negative self-esteem, social challenges in daily routines, executive function issues and so on, elements of early social-emotional learning are carefully woven in with early literacy intervention. (For a full exposition see Wong et al,(2015, 2016) in the DAS Handbooks where details of these ongoing curriculum developments and examples of the impact on the children are provided.) A defining characteristic of the support provided is the recognition, derived from research on executive function (Diamond, 2013) that children learn best when they are fully engaged and challenged, but having fun.

In an extension of an earlier study by Sim, Wong, Samsudin and Bunn (2015), this research continues to examine the impact and effectiveness of the DAS preschool programmes' efforts with a much larger sample size (294 students as compared to the 56 students reported in the earlier publication). It also adopts a mixed measures design, seeking to examine the impact of the programme via feedback from the parents, the children and the EdTs, in addition to measuring outcomes in literacy attainments.

McConnell and Greenwood (2013, p. 143) observed that "The landscape of early childhood education has been changing to embrace the concept of response to intervention (RTI) specifically and intentional teaching more broadly as a means of improving all children's outcomes". Therefore, ongoing efforts in research reporting findings and sharing good practices are crucial in contributing to the expanding early literacy intervention landscape in Singapore. Research has indicated the importance of early intervention in all regions, but nowhere is this more applicable than Singapore, where standards are exceptionally high, and failure to progress can be potentially very damaging for the self-image of the developing child (Landulfo et al, 2015).

Research design

This investigative study uses a mixed design approach to analysis. A quantitative approach was used to measure participants' pre-post test scores during their early literacy intervention journey. A qualitative approach was applied to feedback gathered from surveys of parents, teachers, and students.

Research Questions and Hypotheses

This research aims to examine the effectiveness and impact of DAS Early Literacy Intervention Programme (ELIP), a phonics based intervention programme, for 5 to 7 year olds in Singapore. The research questions are

1. Is DAS ELIP's phonics based intervention approach effective in helping kindergarteners improve on their early literacy learning outcomes?
2. Is there a statistically significant relationship between the number of intervention hours and improvements, if any, in early literacy learning attainments?
3. Are there any common recurring themes from stakeholders' feedback?

The following hypotheses are proposed:

Hypothesis 1: The phonics based intervention approach was hypothesised to show statistically significant improvement in the areas of alphabet knowledge, phonogram knowledge, sight word knowledge, reading ability and spelling ability. Quantitative analysis was used to evaluate the effectiveness of the phonics based intervention approach

Hypothesis 2: A statistically significant positive linear correlation between intervention hours received by students and improvements will be found in the areas of phonogram knowledge, reading ability and spelling ability. That is to say, as the number of intervention hours increased, there would be an increase in scores for phonogram knowledge, reading and spelling.

Hypothesis 3: The experience would be positive for parents, students and EdTs alike. Thematic analysis was used to analyse and identify common themes brought up by all.

METHOD

Participants

Data were collected from 293 students (196 male, 97 female), primarily made up of kindergarten year one and year two students (59 five y/o, 209 six y/o, 23 seven y/o and

two 8 y/o). Students attended an average of 62 hours of intervention. The majority of the data was only available for 252 students, and analysis reported here focuses on these students. Discrepancy in sample size is due to incomplete data.

Materials

DAS ELIP Early Literacy Informal Test Kit (Wong, 2016, p. 110) was used as the pre-test and post-test measure. Five areas were assessed. These were alphabet knowledge, phonogram knowledge, sight words, ability to read and spell in combinations ranging from vc, cvc, ccvc, ccvcc to cccvcc (v=vowel, c=consonant) – these are detailed below. Individual parent, Educational Therapist and student survey forms were also crafted by DAS ELIP in order to gather feedback for thematic analysis.

Procedure

Students were pre-tested upon entry into the programme using DAS ELIP Early Literacy Informal Test Kit. Specific gaps in learning of the five areas (see above) were carefully noted and early literacy intervention plans drawn up. Early literacy intervention was then carried out holistically using sound early childhood pedagogy guided by OG principals. Intervention progress was carefully monitored and recorded.

Students were post-tested at the end of the programme year with results again recorded. No control group was established as DAS ELIP extends its services to all kindergartners showing signs of early literacy delays or at risk of dyslexia. The programme felt that it would be unethical to deprive or withhold early literacy intervention services from kindergartners in need of help. Instead, a correlation was established between literacy gains (specific pre to post-test components, including overall gains) and length of intervention hours.

Feedback from parents, DAS Educational Therapists and students themselves were also collected as part of DAS preschool programmes' ongoing programme evaluation published annually in retrospect. Thematic analysis was carried out to look for recurring areas of concern, issues and trends.

Data collection

Pre/Post Test

Test components: The assessment was split into 5 areas of concern

1) **Alphabet knowledge**

This component consisted of letter naming, letter sequencing, ability to correctly form all lower and upper case alphabet letters.

2) Phonogram knowledge

Phonogram knowledge consisted of the letter sound correspondence of the 26 letters as well as advanced phonograms (e.g.: consonant digraph, trigraphs, magic e)

3) Learnt word knowledge

Learnt word knowledge looked at student ability to read up to 50 sight words.

4) Reading ability

Reading ability was split into words of increasing difficulty starting with vc, cvc, ccvc, ccvcc, cccvcc and magic e words. There were 3 words in each category of difficulty. Therefore, a student with a score of 3 would have only been able to manage reading words in the vc category while a student with a score of 11 would have been able to read words in the ccvcc category.

5) Spelling ability

This component was similar to reading ability with participant being asked to spell words of increasing difficulty starting with vc, cvc, ccvc, ccvcc, cccvcc and magic e words. There were 3 words in each category of difficulty.

Survey forms from parents, EdTs and students

A Likert scale was used throughout the survey in interest of consistency. The survey used feedback forms which were given to all three categories of stakeholders—parents, EdTs and students—after the post test, at the end of the programme year. The student survey was carried out by the EdTs interviewing their own students and used emoticons. Each emoticon was assigned a score from one to five for the purposes of analyses.

RESULTS**Quantitative data from Pre-test post-test**

The results of the pre-/post-intervention measures can be found in Table 1, which also includes the results of paired samples t-tests that were performed (one for each pre- to post-test): the number of participants varied between tests. A Cohen's effect size (1992) was computed based on the mean difference and average standard deviation, with 0.2 indicating a small impact, 0.5 a medium impact and 0.8 and above a large impact of the intervention.

Overall difference

A paired samples t-test was used to compare overall mean score before versus after intervention. On average the participants improved by 51.67 points, which was statistically significant ($t(242)=-20.06$, $p<0.001$) with a large effect size ($d=-0.90$).

Alphabet knowledge

A paired samples t-test was used to compare mean alphabet knowledge scores before and after intervention. On average the participants improved by 22.14 points, which was statistically significant ($t(251) = -12.38, p < 0.001$) with a medium effect size ($d = 0.68$).

Phonogram knowledge

A paired samples t-test was used to compare mean phonogram knowledge scores before and after intervention. On average the participants improved by 10.30 points, which was statistically significant ($t(250) = -17.68, p < 0.001$) with a large effect size ($d = 1.10$).

Learnt word knowledge

A paired samples t-test was used to compare mean learnt word knowledge scores before and after intervention. On average the participants improved by 11.90 points, which was statistically significant ($t(250) = -14.62, p < 0.001$) with a medium effect size ($d = 0.77$).

Reading ability

A paired samples t-test was used to compare mean reading ability scores before and after intervention. On average the participants improved by 4.65 points, which was statistically significant ($t(246) = -16.24, p < 0.001$) with a large effect size ($d = 1.27$).

Spelling ability

A paired samples t-test was used to compare mean spelling ability scores before and after intervention. On average the participants improved by 2.92 points, which was statistically significant ($t(244) = -14.04, p < 0.001$) with a large effect size ($d = 1.06$).

A bivariate Pearson's product-movement correlation coefficient was calculated to assess size and direction of the linear correlation between intervention hours and improvements in reading. The bivariate correlation between these two variables was positive and significant, $r(243) = .32, p < .001$. Although a small effect size, this suggests the ability to read improves as intervention time increases.

A bivariate Pearson's product-movement correlation coefficient was calculated to assess size and direction of the linear correlation between intervention hours and improvements in spelling. The bivariate correlation between these two variables was positive and significant, $r(241) = .23, p < .001$. Again, the effect size is small, but suggests that the ability to spell improves as intervention time increases.

A bivariate Pearson's product-movement correlation coefficient was calculated to assess size and direction of the linear correlation between intervention hours and improvements in phonogram knowledge. The bivariate correlation between these two variables was not significant, $r(247) = .04, p > .05$. Phonogram knowledge does not significantly increase with intervention hours.

Table 1. Results of Paired Samples t-test comparing pre-test and post-test

Group	N	Mean	SD	t	df	p
Overall Pre test	243	100.68	53.67	-20.06	242	<.001
Overall Post-test		152.35	56.20			
Alphabet knowledge Pre test	252	74.25	35.45	-12.38	251	<.001
Alphabet knowledge Post test		96.39	29.47			
Phonogram knowledge Pre test	251	14.60	10.17	-17.68	250	<.001
Phonogram knowledge Post test		24.90	8.54			
Leant word knowledge Pre test	251	9.82	13.05	-14.62	250	<.001
Learnt work knowledge Post test		21.71	17.71			
Reading ability Pre test	247	1.01	2.38	-16.24	246	<.001
Reading ability Post test		5.66	4.95			
Spelling ability Pre test	245	0.91	1.76	-14.04	244	<.001
Spelling ability Post test		3.83	3.75			

Qualitative data from surveys

Thematic analysis of the stakeholder feedback (parents, educational therapists and children) was performed on 160 responses. Of these responses, 51 unique themes emerged. These themes were then further grouped into 14 categories. Of these themes, only six captured more than five percent of the total responses. These six general themes are presented in Table 2 along with the percentage of responses that they represent.

Table 2. Themes derived from stakeholder feedback and percentage of responses these represent

Themes	Percentage (%)
Learning through fun	41.3
Improvements in literacy	17.5
Supported by educational therapists	15.6
External assistance	13.1
Love for learning	12.5
Confidence	6.8

Table 3. A breakdown of themes reported by stakeholders

Stakeholder	n	Theme	Percentage
Children	81	Learning through fun	67.9
		Love for learning	22.2
Educational Therapists	42	External assistance	38.0
		Improvements in literacy	23.8
		Confidence	19.0
Parents	37	Supported by educational therapists	70.3
		Improvements in literacy	32.4
		Love for learning	5.4
		Confidence	5.4

Themes that accounted for less than 5% of responses are not represented. Some responses consisted of multiple themes.

Learning through fun

This theme appeared most commonly in children responses. They commented that they liked 'play', 'card drill' type activities in their intervention sessions. They also seem to say how 'fun' sessions were and that it made them 'happy'.

Love for learning

This theme noted in feedback from parents and children comprised of responses that seem to indicate an increase in a child's desire to learn, read or write more since intervention. For example, 'Teacher [] is an excellent therapist who has equipped my child with skills that will aid her for a lifetime. (e.g. learning attitude, systematic learning & a love for reading). Any child under her guidance will benefit from her love and genuine concern for them'.

External assistance

This theme was noted primarily in the responses made by Educational Therapists. It comprised of descriptions of comorbidities in specific learning differences such as social, emotional behavioural issues that needed extra support. For instance, ASD (autism spectrum disorder) or SID (sensory integration disorder). This category also included responses that seem to suggest possible demand for 'SLT' (speech and language therapy) or 'OT' (occupational therapy) support for children.

Improvements in Literacy

Improvements in literacy was an important theme for both Educational Therapists and Parents. It comprised of improvements in phonemic awareness activities such as blending, reading and writing. For instance, a child who 'started with good phonics background but was not able to read. Now he is able to blend and read ccvcc words and recognise silent e words'.

Confidence

This theme comprised of any comments that mention an improvement in confidence in reading, spelling or otherwise since joining the programme. For instance, ' [our child] has built much more confidence compared with prior. Thanks for the good efforts'. It was noted in both Educational Therapist and Parent responses.

This also includes comments that mention a decrease in anxiety in relation to tasks, such as, 'he was timid when he first started, always crying and full of anxiety. Now he is able to read independently up to level 'D' from "Razkids". (Note from author: Razkids is an online reading programme that provides a library of carefully structured levelled readers for learners. There are 29 levels in total. Level D readers were meant for kindergarteners to grade 1. For more information, <https://www.raz-kids.com/>)

Supported by educational therapists

This theme was found in most responses by Parents. It included support that was provided to either parents or students by educational therapists. Parents seemed to feel supported by educational therapists. Strategies on how to work with their child through regular feedback appeared to be appreciated. For example, 'Teacher gives us regular feedback on [our child] so that we can help her along. We have seen a significant improvement in [her] and she is now able to read on her own, and I feel this is mostly due to Teacher. Thank you Teacher.'

Some parents also seem to feel that their children were supported in their literacy intervention journey. Example, 'The teacher is encouraging and supportive. My child can finally read and I am thankful.'

The implications of these themes will be further examined the discussion section.

DISCUSSION

Returning to the hypotheses outlined at the beginning of this article, the following conclusions can be reached based on the significance levels identified in this study.

Hypothesis 1:

The data shows statistically significant improvement in overall scores following intervention. This is also reflected in each of the five components of alphabet knowledge, phonogram knowledge, learnt word knowledge, reading ability and spelling ability. Large effect sizes were found in the areas of reading spelling and phonogram knowledge indicating meaningful improvements in these skills

Hypothesis 2:

Correlations comparing intervention hours against phonogram knowledge, reading ability and spelling ability were then conducted. The results indicated significant correlations with reading and spelling ability but not with phonogram knowledge. The latter result may be because children, in general, do not require 62 or more hours to master basic phonograms. Not all students necessarily start with little or no knowledge: on average, the children scores 14.6 on known phonograms pre-intervention and attained an average of 24.9 by the time of the post-test, which is close to ceiling. However, the standard deviation indicated considerable variability in scores even post-intervention: those not attaining near ceiling scores may be those who require longer intervention.

The average scores at the end of intervention for reading (5.65) and spelling (3.82) indicated that students were at the cvc level at the end of intervention. It is notable that largest effect sizes were achieved for both reading and spelling in this study, largely because the students started from a low baseline. These results correspond to the average phonogram level retained by students at the end of intervention (24.9) which is

close to the full set of alphabet letters. Letter naming has consistently been identified as a key predictor of early literacy, providing the building blocks for later learning (Vellutino et al, 2004). Once students were able to master basic phonogram knowledge, the focus of intervention gets redirected to blending and segmenting to aid with reading and spelling. Students typically do not learn advanced phonograms until they have mastered reading and spelling at the cvcc level. As the current pool of participants averaged performance cvc word level, they had not yet been taught advanced phonograms. While the length of intervention did not affect mastery of phonogram knowledge, intervention itself significantly improved their phonogram knowledge. This mastery of phonogram knowledge was then able to provide them the tools they needed to make significant strides in reading and spelling.

Hypothesis 3:

The thematic analysis of feedback from teachers, parents and students identified 51 unique themes emerging from 160 respondents. Six of the most common reoccurring themes included (1) learning through fun, (2) improvements in literacy, (3) support from educational therapists, (4) external (multi-disciplinary) support, (5) intrinsic love for learning, and (6) growing confidence.

Results from the thematic analysis seem to suggest that kindergarteners find the DAS ELIP approach to early literacy intervention non-threatening (i.e. does not induce stress or anxiety) and above all “fun”. They seem to associate direct explicit literacy instructional activities with “play”. Card drill, a mentally demanding task, appeared to be a favourite activity for quite a few. This may seem surprising, given that phonological awareness is a known area of weakness for students at risk of dyslexia. However, this may be related to the delivery of direct, immediate, and positive feedback as part of the card drill process. This includes a warm, encouraging smile from the teacher with praise (or a hi-5) for every card that he/she gets correct.

Results from the thematic analysis seem to suggest that communication between the parent and EdT is crucial to student well-being and success. The presence of specific learning difficulties and challenges including mild autism spectrum disorder, speech and language delays, global developmental delay and so on make continued communication vital. While students received formal literacy intervention support within the confines of DAS ELIP (using a specially designed curriculum), what about their parents? Who is going to help reduce their anxiety in this context? Therefore, ongoing conversation between EdT and parent needs to continue, moving forward to ensure their developing understanding of their child and their learning. Professional development to keep EdTs abreast in related knowledge domains, is a necessity for addressing many of these co-morbid issues.

These results from the thematic analysis seem to point towards possible intrinsic motivators such as love for learning, and confidence, but these are items that are difficult

to quantify and measure, despite the positive response of the students and parents. These are qualities one would associate with “resilience”, the ability to overcome adversity or hardship, an area that has not been systematically evaluated in children at risk of dyslexia. Werner (2013) noted, ‘most longitudinal studies of resilient children and youths report that intelligence (especially communication and problem-solving skills) and scholastic competence (especially reading skills) are associated positively with the ability to overcome adversity’. Thus, one might speculate that the DAS ELIP curriculum, the approach adopted and the method of lesson delivery may inadvertently foster or even trigger the development and emergence of resilience in some of these students. However, further research would be needed to establish whether or not this could be attributed to the intervention undertaken.

LIMITATION AND DIRECTIONS FOR FURTHER RESEARCH

Notably, the degree of improvement hinges in this study as in others on the presence or absence of comorbidity, the severity of these comorbidities, and the extent of early literacy delay that the student may be experiencing, in addition to the amount of time available for literacy intervention to take place and for learning to take root. No attempts were made to quantify formally the extent of co-morbidity, although from work with older dyslexic children it is clear that a considerable overlap would be expected (Kaplan et al., 2001). Naturally, this group of children were too young for formal diagnosis, and it would be predicted that they would form a heterogeneous group.

There is a significant correlation between the number of intervention hours and improvements in early literacy attainments. However, due to a lack of control group and diversity in some of students with additional learning needs (e.g. in speech and language), no optimum number of hours for intervention was established. Future research could address some of these issues by utilising a group of children waiting for placement in the DAS Pre-school system, or children attending alternative provision as controls in order to evaluate the impact of this programme in comparison to normal maturation.

However, it is not possible from the data extracted from this sample to support the insights of the authors on the importance of executive function and fun in learning. In future research, this aspect should be addressed explicitly, possibly via an intervention aimed at developing resilience in this age group, building executive function and using language to mediate behaviour (Greenberg, 2016) and building on the concepts of positive dyslexia in identifying strengths. The suggestive evidence that the thematic analysis has provided for improved resilience and love of learning in this group needs to be investigated more systematically to address issues such as self-esteem, behavioural inhibition, early memory skills, and attention in the Preschool classroom.

CONCLUSIONS

Based on outcomes derived from the above study, it appeared that DAS ELIP phonics based intervention approach is effective in helping kindergarten age students improve on their early literacy outcomes. The results indicate that:

- (1) all children are capable to some extent of learning and acquiring early literacy skills despite specific learning difficulties,
- (2) early literacy intervention does seem to make a difference to children's overall well-being that includes literacy improvements, and
- (3) the approach of the early literacy intervention programme, how it was delivered and the way it was pitched, is as important as having a prescribed curriculum that has been carefully researched and monitored.

However, it could still be argued that early literacy intervention is effective only if all stakeholders work together in synchrony. Where there appears to be a gap in technical knowledge, or a shortfall in relevant research and literature in the Singaporean context, collaborative efforts across the industry will bring about positive change benefitting all children.

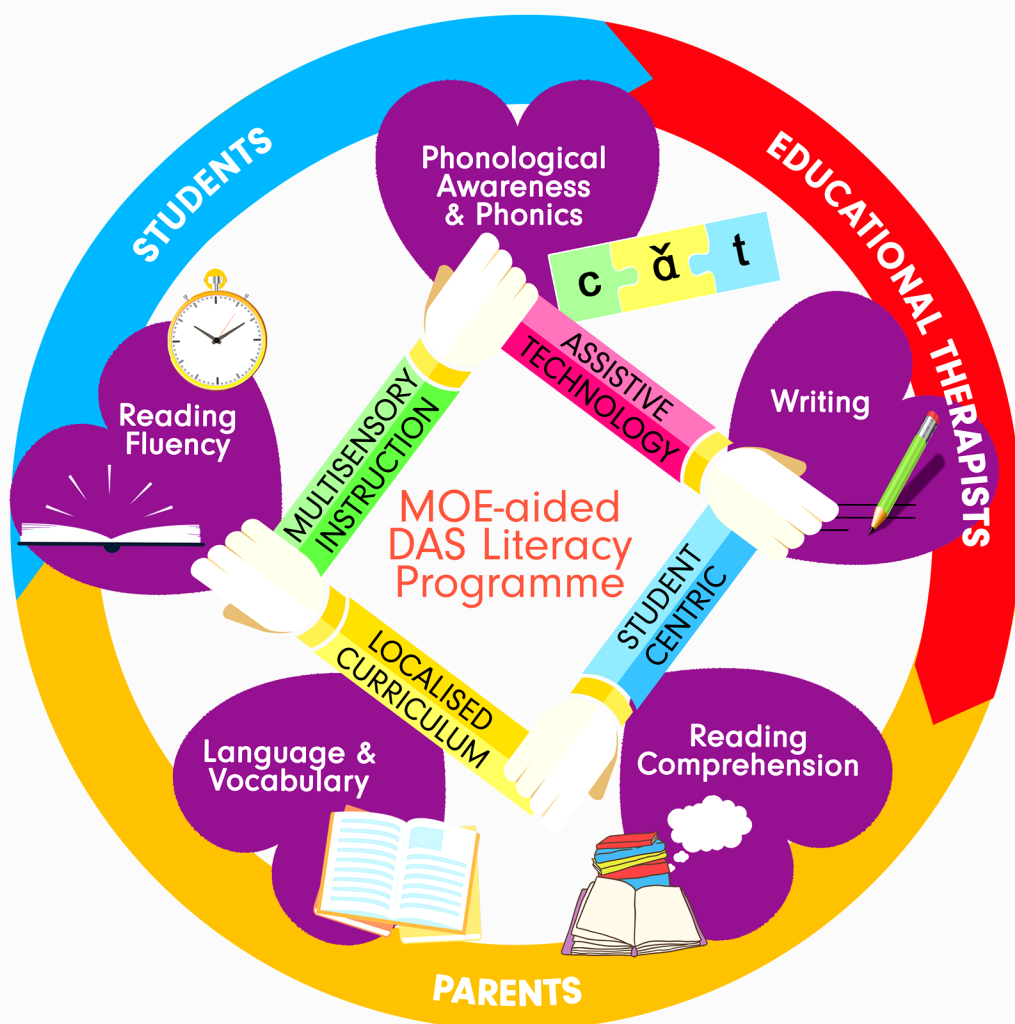
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MAP INTEGRATED CURRICULUM

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Evaluating reading and spelling performance of students with dyslexia using curriculum based assessments and teacher perception.

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Abstract

Students attending classes at the Dyslexia Association of Singapore have their cognitive and literacy profiles analysed in order to offer individualised lessons taught in accordance to the Orton-Gillingham Principles. They are placed into three bands, each with three levels of literacy learning, which map out the level of literacy skills taught from emergent to functional to advanced. Students' progress is then monitored using Curriculum Based Assessments (CBAs). This study was designed to better understand whether different profiles of students make a more marked improvement in terms of their reading and spelling ability, and to evaluate possible reasons for this. Results are reported for 60 students showing significant gains in reading over the period of intervention; though there was less impact on spelling. Questionnaires also explored teachers' perceptions in order to determine any effect on students' rate of progress as well as to identify if there is a need to enhance the curriculum and / or our teacher training to increase the impact of this ongoing support.

Keywords : Reading and spelling intervention, Teacher perceptions, Banding and curriculum assessment

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INTRODUCTION

Dyslexia as defined by the Rose Report 2009 (Rose, 2009, page 9), is as follows :

"Dyslexia is a learning difficulty that primarily affects the skills involved in accurate and fluent word reading and spelling."

In contrast, the definition used by the Dyslexia Association of Singapore (DAS), where the current research was conducted is broader, guided by the Ministry of Education, Singapore, with elements drawn from the Rose Report:

Dyslexia is 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. Co-occurring difficulties may be seen in aspects of language, motor co-ordination, mental calculation, concentration and personal organisation, but these are not, by themselves, markers of dyslexia. An appropriate literacy programme should include the following components: phonemic awareness, phonics, fluency, vocabulary and comprehension. The literacy programme provided by DAS meets these guidelines.

Dyslexia Association of Singapore website, (www.das.org.sg), 2017.

This is the definition used by the Dyslexia Association of Singapore (DAS) in diagnosing their students with dyslexia, which include children with a range of intellectual abilities in relation to their dyslexia. However, students with dyslexia not only have difficulties with word reading and spelling but they also have other co-occurring difficulties that make their learning and acquisition of reading and spelling arduous. Therefore, if dyslexic students are tested using normed tests they will be at a disadvantage because their performance will not match up to the level of their peers who are non-dyslexics.

A study by Thomson in 1988 charted the progress of both non-dyslexic and dyslexic children by measuring the progress they have made over a 12 month period using normed tests. For the non-dyslexic children their average ratio of improvement was 1.00 over a 12 month period. However, for the dyslexic learners' achievement ratio is about 0.27 for spelling and 0.4 for reading – which means the dyslexic learners made progress of 3 months in terms of spelling age and 4 months in terms of reading age over 1 year. Is this form of testing fair and equitable? Do these tests aid in getting more information about their learning? It is clear that given this rate of progress it is unlikely that a dyslexic student will meet the requirements to progress on standardised tests, which are adjusted in difficulty for age. These tests amplify their weakness and do not provide enough information for educators to work on to improve their performance.

Our approach is therefore to develop and apply curriculum based tests, which will be outlined below. This moves away from administration by a small group of psychologists to administration by the larger group of Educational therapists themselves, in order to avoid a bottle neck in delivery of results and to upskill and empower the teachers further.

About DAS students and MAP

Dyslexia Association of Singapore (DAS) is a non-profit organisation and it provides assessment, remediation and support services to about 3500 students aged 6 – 17 with dyslexia, i.e. from preschool to secondary levels. Classes at the DAS are conducted in a small classroom environment whereby the teacher student ratio is kept to 1:4 or 1:5. All students attend regular classes at mainstream school and come to the DAS for literacy remediation.

In 2013, the admissions division worked on profiling all our students into different bands based on the standardised scores that they obtained during their full psychological assessment. The students are then grouped into three educational bands A to C. Each band has three levels of language and literacy learning, making it nine levels of learning across bands A to C. In combination, the bands span from A1, A2, A3, B4, B5, B6, C7, C8 and C9, and an increasing level of language and literacy is mapped out and taught, from emergent to functional to advanced skills. Every dyslexic DAS student is expected to make progress in these skills over his period of intervention.

In 2014, the DAS moved away from using normed reference tests for annual testing of our students to a bi-annual Curriculum Based Assessment system to map the progress that they are making in our unique banding system.

Table 1. Literacy bands used at DAS

BANDING	LITERACY NEEDS
A1, A2, A3	Language and emergent literacy
B4, B5, B6	Basic literacy
C7, C8, C9	Higher Order literacy

In 2014, a revamped curriculum was introduced. The fundamental principles of the new curriculum were still based on the Orton Gillingham approach to teaching dyslexic students. The following components were included into the Integrated Curriculum - phonemic awareness, phonics, fluency, vocabulary and comprehension (MOE, 2011;

National Reading Panel, 2000; Rose, 2009). The approach was modified to suit the educational environment of Singapore, so for example exercises that include references to winter and snow were revised.

Students in Band A generally have poor receptive and expressive language skills and weak literacy skills; hence the lesson focus for this group of students will be to build up their oracy skills. The Educational Therapist is expected to apportion a significant amount of lesson time on developing listening and speaking skills. Teaching of phonics and basic writing and comprehension skills are also infused in the lesson but these are introduced on “bite-size” basis.

Students in Band B have fairly developed language skill but they have poor letter sound correspondence skills and some weak functional literacy skills. The curriculum focus for this group of students will be towards building their phonics and morphological skills. A portion of the lesson time will also focus on developing writing and reading comprehension skills.

Students in Band C have some foundational literacy skills with emerging reading fluency but difficulties developing inferential reading comprehension skills as well as composition writing. Therefore, the focus on the remediation will be on developing the advance reading and writing skills. Morphology, phonics and spelling are still infused into the lesson albeit a significantly lesser amount of time is apportioned for this.

Alongside the new integrated curriculum, the Curriculum Based Assessments (CBAs) were also introduced. The components that are tested in the CBAs are in accordance to the literacy taught. Prior to 2014, the students were tested annually using Normed Referenced standardised tests by psychologists. CBAs started in 2014 and are administered bi-annually by the Educational Therapists themselves. The reason for transiting to this mode of assessment is to allow Educational Therapists to be more involved in the testing of their students and also be more sensitive to their students’ areas of strengths and weakness. Notwithstanding this, it also serves as a measure to evaluate if the curriculum and teacher instruction is successful.

Purpose of the study

In 2015, a study was conducted at DAS to analyse the reading and spelling standard score gains in children with dyslexia following 1-year of Orton Gillingham remediation (Lim & Oei, 2015). The aforesaid study revealed that reading and spelling achievement at baseline inversely related to reading and spelling gains respectively. The study also revealed that age at beginning of intervention negatively related to reading and spelling gains, which suggested that early intervention is more effective.

DAS embarked on this perception and progress study (PPS) to identify how the students

have progressed under the new curriculum using the Curriculum Based Assessments (CBAs) instead of standard scores. This research also delved deeper to see if teachers' perceptions have affected their progression in the band (see Corkett et al, 2011). In a landmark study conducted by Rosenthal & Jacobson, 1968, when teachers' expectations of students were high, they performed better on achievement tests (known as the Pygmalion effect) and when teacher expectations were low, the students did not perform well in achievement tests (known as the Golem effect). We wanted to see if perception did indeed play a pivotal role in the progress of students from one band to the next (see also Rubie-Davies 2010). Through this study, we are hoping to find out if this holds true.

Reading and Spelling

There is an extensive literature on reading and spelling problems in dyslexia, with English one of the most difficult languages because of the irregularity of spelling. Teaching in Singapore is undertaken in English, although the students themselves use a form of English known as 'Singlish', a more colloquial language which can add to their problems in literacy. Many theories have tried to explain the underlying cause of the reading difficulty in dyslexia, with the dominant theory the phonological deficit hypothesis (Stanovich, 1986, Snowling, 1987). This proposes that difficulties are due to an inability to break down words into their constituent sounds, leading to problems in segmentation and blending, key skills underlying early reading and spelling.

The double deficit hypothesis (Wolf & Bowers, 1999) identifies speed deficits in addition to the phonological deficits, with the poorest outcomes for those children showing problems in both speed and in phonology. Working memory and processing speed within the phonological framework (Vellutino et al., 2004).

An alternative approach considers learning, with the automatization deficit hypothesis (Nicolson & Fawcett, 1990), applicable to reading, writing and spelling. Automaticity deficits will be identified in slowed performance, or in more complex tasks where dyslexic resources cannot keep pace with task demands.

All of these issues have been identified for children with dyslexia attending the DAS for remediation, and in many cases there is also evidence for problems in attention. Interestingly, in the earlier research, cited above, Lim and Oie (2015) followed a subset of 39 students aged 6-14 attending DAS for support, and established a significant improvement over 1 years teaching on standard scores for reading and spelling. Scores were accelerated from 76.79-82.59 for reading, medium effect size 0.52 and from 75.97 to 83.05 for spelling with medium Cohen's effect size 0.58. The effects of intervention were strongest for the youngest participants. This was the first study to formally evaluate the Orton Gillingham approach in Singapore, but it differs from the current study in selecting a homogeneous group in terms of IQ level, and a more heterogeneous group in terms of age, as well as not using the bands that were introduced later into the system.

Teacher training info for DAS

In Singapore, mainstream teachers teach using a standardised curriculum that is developed for typically developing children. We train our Educational Therapist on how they should tailor lessons to suit the needs of the individual students.

At the DAS our teachers are called Educational Therapists because they are trained to tailor individualised remediation to suit the needs of students under their care. Each lesson is individually prepared and delivered. Every new Educational Therapist (EdT) starts off with completing the Specialist Diploma, which comprises of 3 modules. The first module is the Dyslexia and The Essential Literacy Approach (DELA) which is a 3 week module, where the 1st week consists of full day lectures and the 2nd & 3rd week consists of half day lectures and 10 hrs of on-the-job training. The second module is the Advance Educational Therapy module for a period of 6 months, where lectures are scheduled once a fortnight for half a day and new Edts are paired up with Educational Advisors who will be guiding and advising them about lesson planning and delivery. The third module is the Enhancing Classroom Instruction which constitutes of 7 half day lectures. The Educational Therapists take about 9 months to complete the Specialist Diploma.

Educational Therapists' training involves observations and periodic meet ups with their Educational Advisors as well as self-reflection after a lesson has been delivered. We have a comprehensive training programme in place so as to give proper support and guidance to the new Educational Therapists. Teaching children with dyslexia can pose some challenges and we want to ensure that all Educational Therapists have adequate support to ensure that the lessons are delivered appropriately.

However, there are also clear indications in the literature that perceptions can influence the outcomes for children in a number of ways (Alkharusi et al, 2014; Begeny et al, 2008). Teachers' perception of their students' ability can influence their teaching which can in turn affect the way they teach. Moreover, children's reading skills and level of interest impacts on teacher's perceptions of their skills in individualised instruction, which may be particularly pertinent for this group of dyslexic children (Kikas et al, 2015).

Efficacy is another component that affects the level of commitment teachers want to invest in teaching students (Ross, 1992, Skinner and Belmont, 1993; Allinder, 1994). The higher the efficacy level, the higher the commitment level towards teaching the students. In this study, the author (Allinder, 1994) also identified that when teachers believe that students benefit from school experiences, their enthusiasm and confidence in teaching is also raised (see also Mojavezi, & Tamiz, (2012).

In a study conducted by Hoy, 2000 the efficacy levels of teachers were tested whilst they were undergoing a one year internship, with efficacy levels found to be high during this internship period. However, after one year of internship, when teachers were given their

own classes to teach, their efficacy levels fell.

These considerations led to the design and research methodology outlined below for this study.

METHOD

Participants

The research participants were randomly selected using the information from the CBA database of students based on the following criteria:

1. Students must have joined the programme in Term 1, 2015. Thus, from Term 1, 2015 to Term 4, 2016, the students would have been exposed to 4 rounds of CBAs only. To ensure validity of the testing, we wanted to restrict the exposure / familiarity with the CBAs to strictly 4 rounds.
2. Only Band A and Band B students were selected for the study. Band C students were omitted from this research because they are considered to be fairly independent in their learning and also, only 1 percent of the cohort of students at DAS are from Band C. Adding them as participants might not give us accurate information.
3. Only primary school students within the age range of 7-12 old were selected. Secondary students are excluded from this study. Secondary school students are considered as fairly independent and including them might again skew the results.

Sixty students were randomly selected from Band A1 – B6 using the data from the DAS Maptrack system (see Table 2 below for details). DAS Maptrack system is software developed exclusively for DAS to administer the Curriculum Based Assessments. Of these 60, 44 of the children were male and 16 of the children were female, with more males than females in each band.

Students are typically taught in groups of 4 at DAS, with groups matched on banding as far as possible so that within each group there is a range of no more than 3 bands, with for example A1-A3. They receive 2 hours support weekly. If there is a mixed banded group then the Educational Therapists are advised to challenge the students in the higher band while trying to bridge the skills of the lower band student. The curriculum / concept taught is the same but the Educational Therapist must differentiate the content either qualitatively or quantitatively to meet the diverse needs of the learners.

Table 2. Details of participants

Student number	Band	Age Range	Mean age for group	Standard deviation
1-10	A1	7-12	9.30	1.64
11-20	A2	8-10	8.50	0.71
21-30	A3	7-11	9.10	1.45
31-40	B4	7-12	8.60	1.65
41-50	B5	7-12	9.00	1.70
51-60	B6	9-12	10.60	1.35

The questionnaire

The Teacher's were given 2 sets of questionnaire. The first questionnaire with 20 questions was developed in house at DAS, following research into similar approaches. This included accessing a site "What kids can do" (2004) expressly designed for schools to craft their own questionnaires, and drawing on examples from 5 different schools, in addition to a recent study (Norman, 2016). The questions were evaluated and amended by a small team and were based on the following categories – Banding Belief System, Own Skill (i.e. teachers' belief in their own skill), teacher's perception of student's ability and organisational structural issues. The questions were tweaked to include terminologies that are unique to the DAS, for example the unique banding of students at DAS. This questionnaire was administered to find out the Educational Therapists' general perception of their students.

The second questionnaire has 18 questions. These questions were specific to selected students that the Edts are teaching. 5 questions were taken directly Fall and McLeod, (2001) with a further 2 adjusted for the DAS context, to specify reading and spelling, and the remainder were added to suit DAS' Educational Therapists, with the concepts for 3 of the questions taken from Bandura, 2006. (See appendix for the full questionnaires.)

Curriculum Based Assessments (CBAs)

Table 3 shows the range of CBAs used in the work – and the bands with which the components are associated. Examples of the screens used with the reading and spelling components then follow in Figures 1 to 5.

Table 3. Types of tests in CBAs

Components	Types of Tests	A1	A2	A3	B4	B5	B6	C7	C8	C9
Vocabulary	Picture naming	✓								
	Picture description		✓	✓						
	Written Vocab (evaluated through Writing)				✓	✓	✓	✓	✓	✓
PA / Phonics	PA – Identification	✓								
	Phonics	✓	✓	✓						
	Word reading accuracy	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Word spelling		✓	✓	✓	✓	✓	✓	✓	✓
Comprehension: Pending completion of RC curriculum										
Fluency	Words correct per minute				✓	✓	✓	✓	✓	✓
Writing	Letter formation	✓								
	Edit & Diagram	✓	✓	✓						
	Narrative / Exposition Writing				✓	✓	✓			
	Exposition Writing							✓	✓	
	Persuasive Writing									✓

Word Reading Accuracy requires the teacher and student to be logged on at the same time and as the student reads the teacher will mark the work.

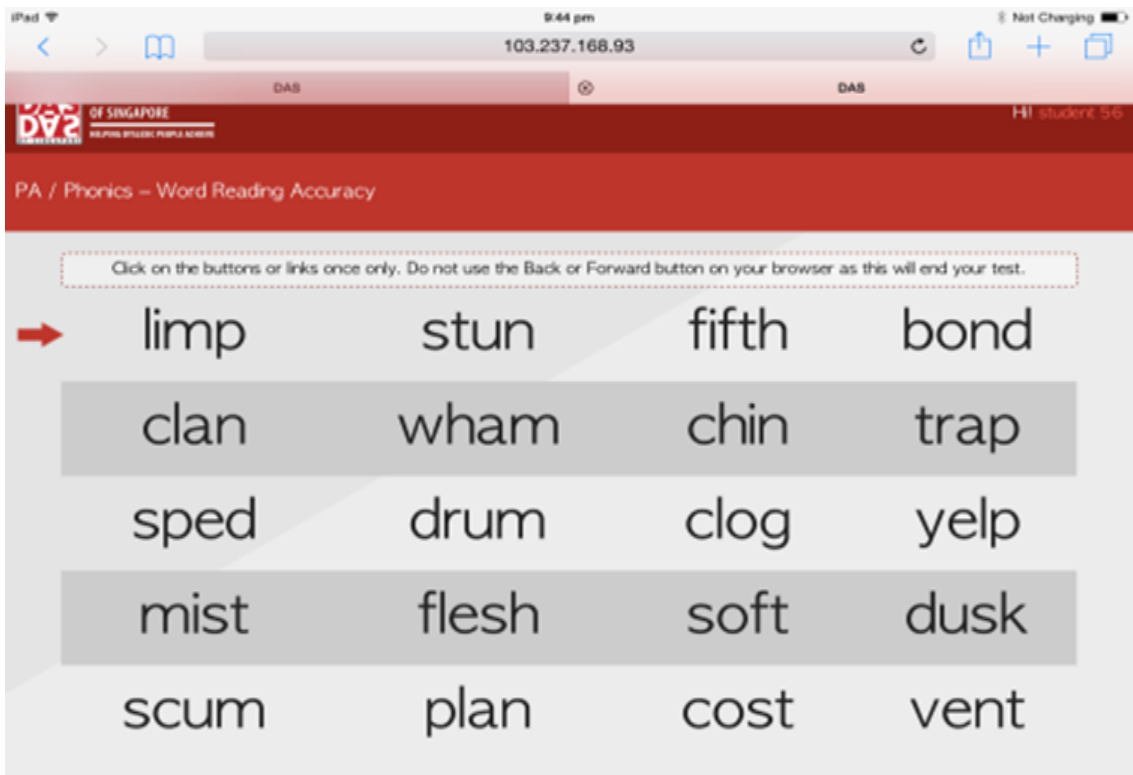


Figure 1. Word Reading Accuracy – student screen - A2 student



Figure 2. Word Reading Accuracy – Educational Therapist (Edt) screen – A2 student

Word Spelling of a B4 student – the word was huff but the student was spelling it wrongly. This is an independently done test whereby the student listens to the instruction and spells on his/her own. The discontinue rule for the spelling test is 3 consecutive errors or the time limit of 10 minutes is reached.



Figure 3. Word Spelling of a B4 student



Figure 4. Word Spelling of a B4 student – the word was shock. Student has spelled it accurately, system will mark it as correct.

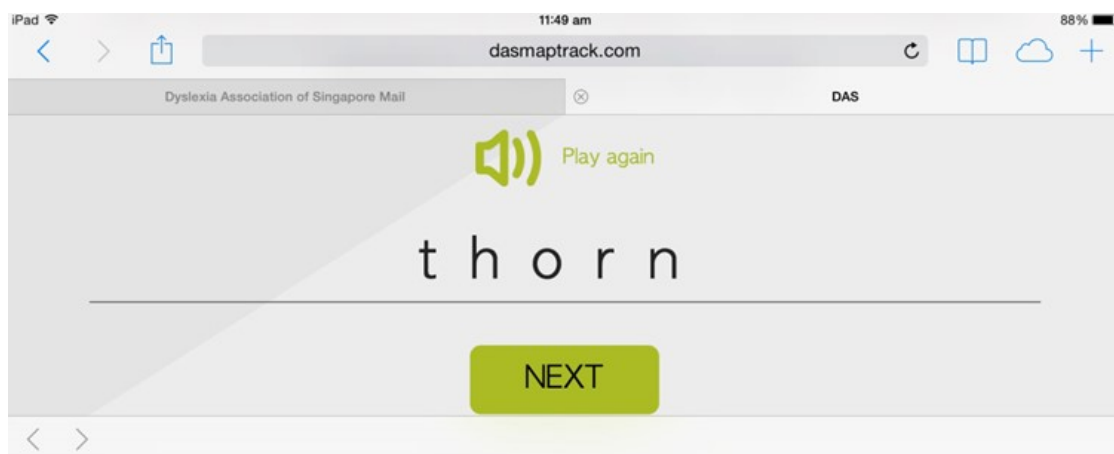


Figure 5. Word spelling of a B5 student.

Procedure

A year on year comparison was made on the scores obtained by the students for single word reading and single word spelling using the data from the DAS Maptrack system. The questionnaire on "General Teacher Perception" was administered to the Educational Therapists teaching these 60 students (See Appendix 1). The questionnaire was counterbalanced to ensure that participants were provided an opportunity to respond both positively and negatively, using a 5 point Likert scale.

Method of Analysis

The data on students' progress was analysed in terms of net gain for reading and spelling.

The questionnaire on "General Teacher Perception" consisted of 20 general questions. These questions were categorised as follows:

1. Banding Belief of Educational Therapists
2. Perception of own skill
3. Organisational support

The "Educational Therapists' Reflection of student" questionnaire had specific questions about the student that they are supporting.

RESULTS

Reading and spelling data

The following results (see Figures 6 and 7) were obtained for the Word Reading and Word Spelling analysis. Students generally performed better in reading than in spelling. Repeated measures t-tests were performed comparing scores at pre-test with those at post-test. For Reading, only A1 was not significant, and this was borderline, whereas for A2 to B6, all t-tests were all significant with a p-value equal to or less than 0.001. In contrast, for spelling, only A3 was significant. A1 did not undertake this test, and scores for A2 were not significant, although there was a trend towards significance. Spelling improvements did not reach significance at any level for the B Band.

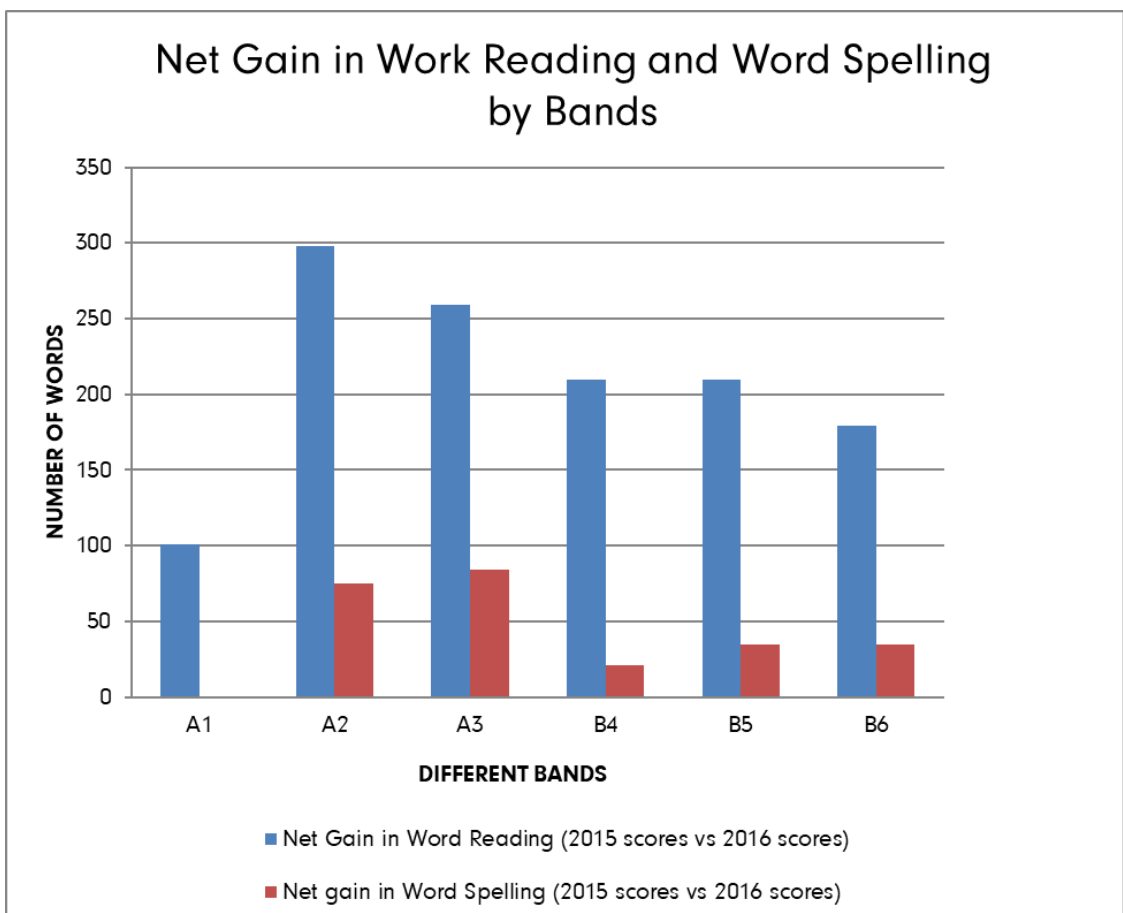


Figure 6. Word reading and spelling gains by band

A further t-test was undertaken comparing the improvement in reading in Band A and Band B scores (mean 24.97 and 19.97 respectively). There was no significant difference ($t=0.19$), possibly because of the higher variability in 2015 (standard deviation 18.4 versus 8.3 in 2016). It was not possible to undertake the same comparisons with spelling, because the mean scores in A1 were too low.

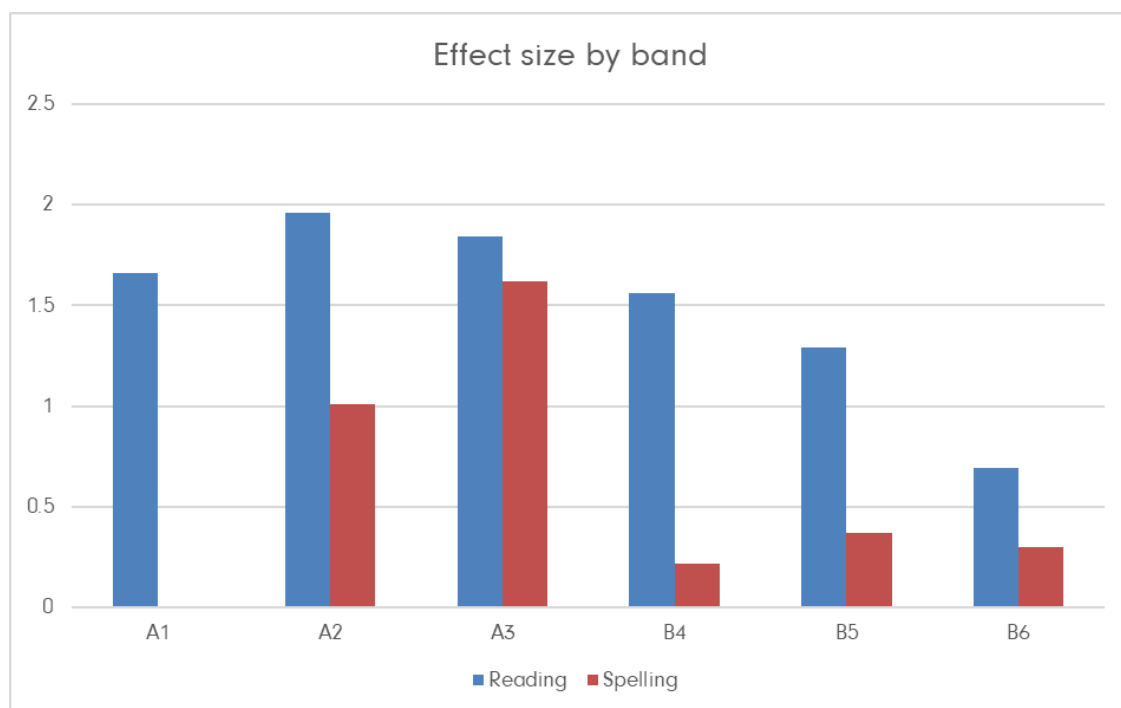


Figure 7. Effect sizes for reading and spelling by band

A series of effect analyses (Cohen 1992) were also conducted to compare the size of the improvement, based on the mean and standard deviation. These results show large effect sizes for reading at all levels apart from B6, where there is a medium effect size. The spelling results show large effect sizes at A2 and A3 and small effect sizes at B4-B6.

General Perception Questionnaire

One of the key questions for the "General Teacher Perception" questionnaire related to the likelihood of improvement in each band, as follows:

"I believe the following band of students will see the most progress within 6 months of MAP intervention, rank them in order (1 being the most progress and 3 being the least)" Based on the above, the Educational Therapists were supposed to rank which group of students they felt will make the most progress. The results are shown in Figure 8.

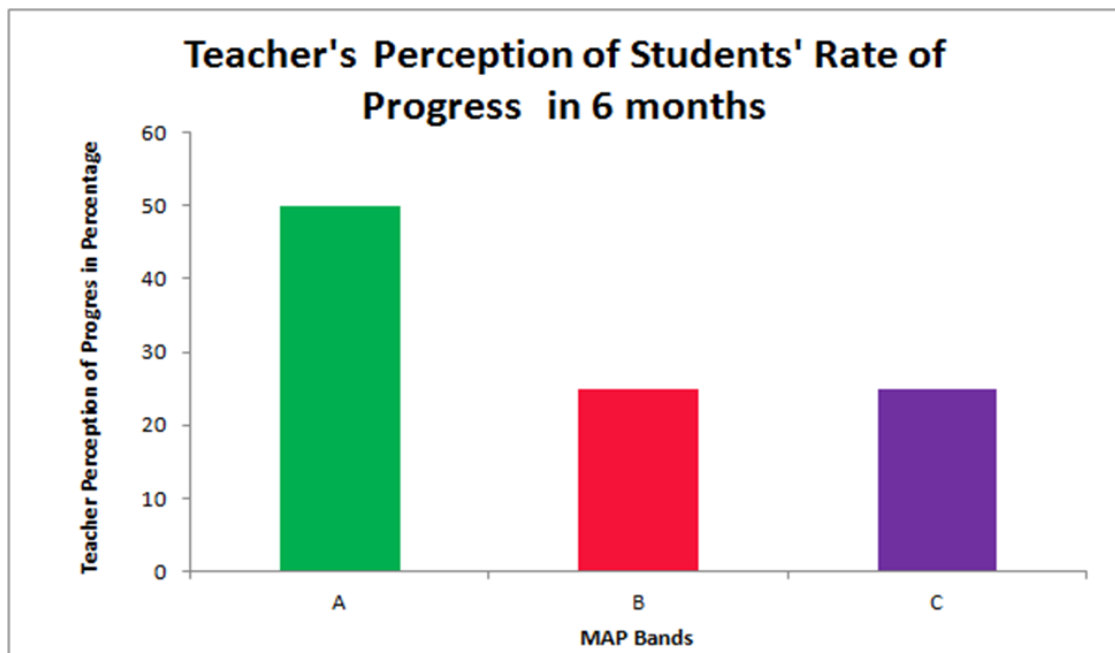


Figure 8. Teachers perceptions of student progress by band

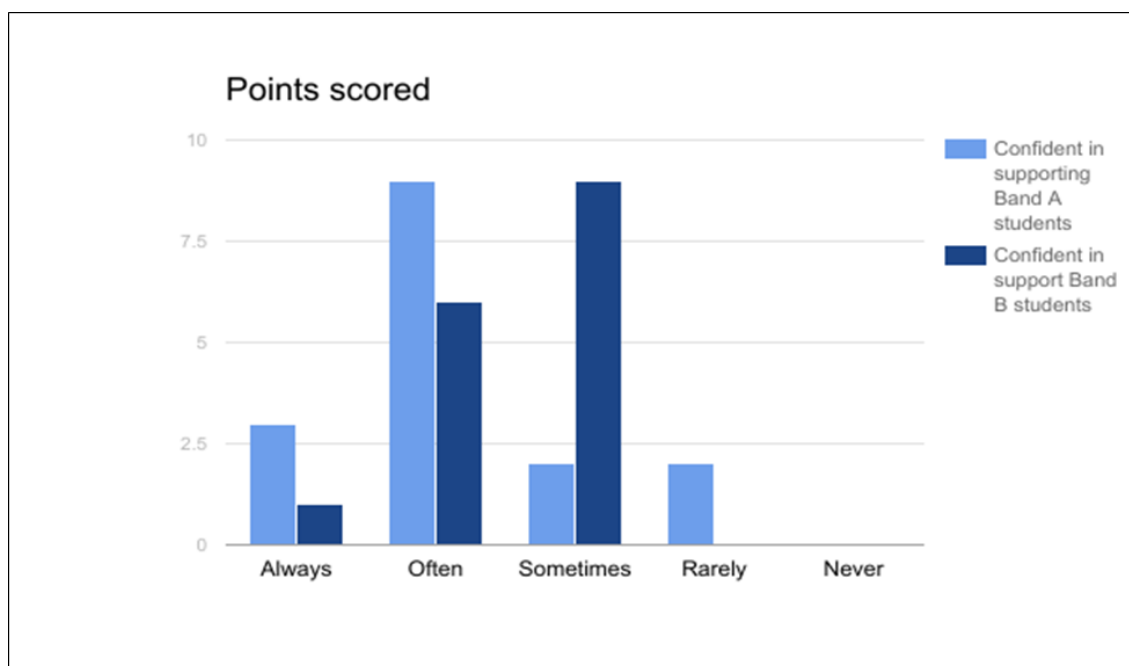


Figure 9. Teacher confidence in ability to support different bands

The Educational Therapists are the most confident that students in Band A will make the most progress in the remediation programme.

Two questions were posed to the Educational Therapists on their ability to support the higher band students as well as the lower band students. These results can be found in Figure 9.

69% of the Educational Therapists felt that they are able to effectively support students in Band A however only 44% of the Educational Therapists felt that they have the ability to effectively support students with high ability in the class.

The two questions that we posed were as follows:

"I am able to effectively support the weakest students in my class."

"I am able to engage students with high ability in my classes effectively"

The Educational Therapists felt that they are able to support the Band A students most often in the class however the Educational Therapists are only able to support Band B students sometimes.

We posed a question on how Educational Therapists felt about motivating the students that they teach. The results are reported in Figure 10.

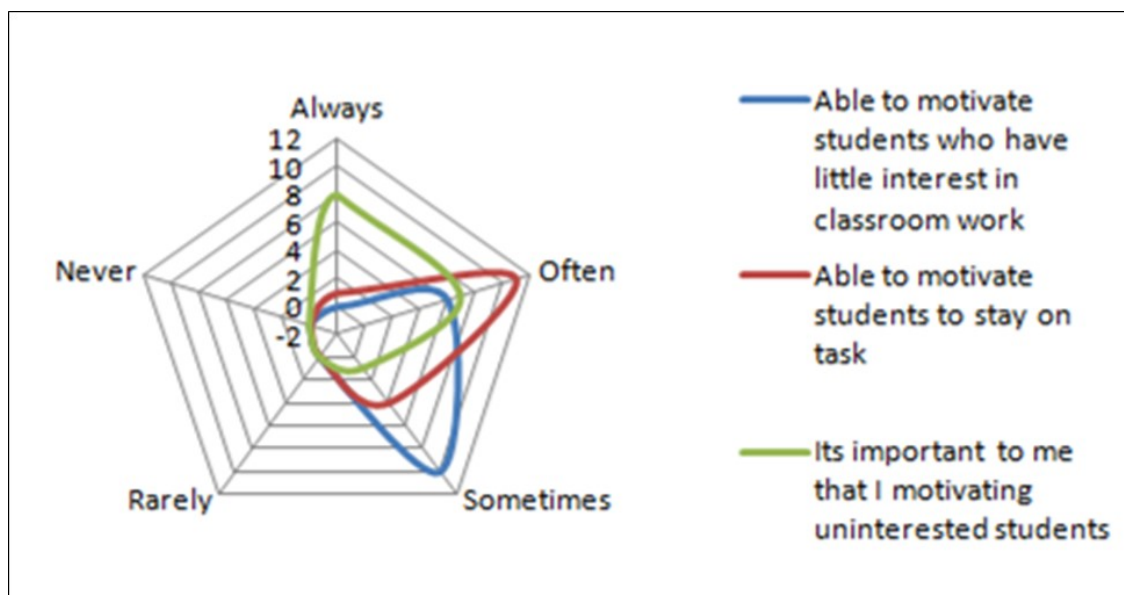


Figure 10. Ability and importance of motivating students.

The following is the result from the survey:

- ◆ Motivating students with little interest in the classroom work – only 38% of the Educational Therapists felt that they have adequate ability to motivate students who show a lack of interest in classroom work.
- ◆ Motivating students to stay on task – 75% of the Educational Therapists felt that they are able to encourage students to stay on task.
- ◆ Giving up trying to motivate students – 94% of the Educational Therapists do not give up easily in trying to motivate their students.

Figure 11 shows the results for the question on Teachers' views on students' potential.

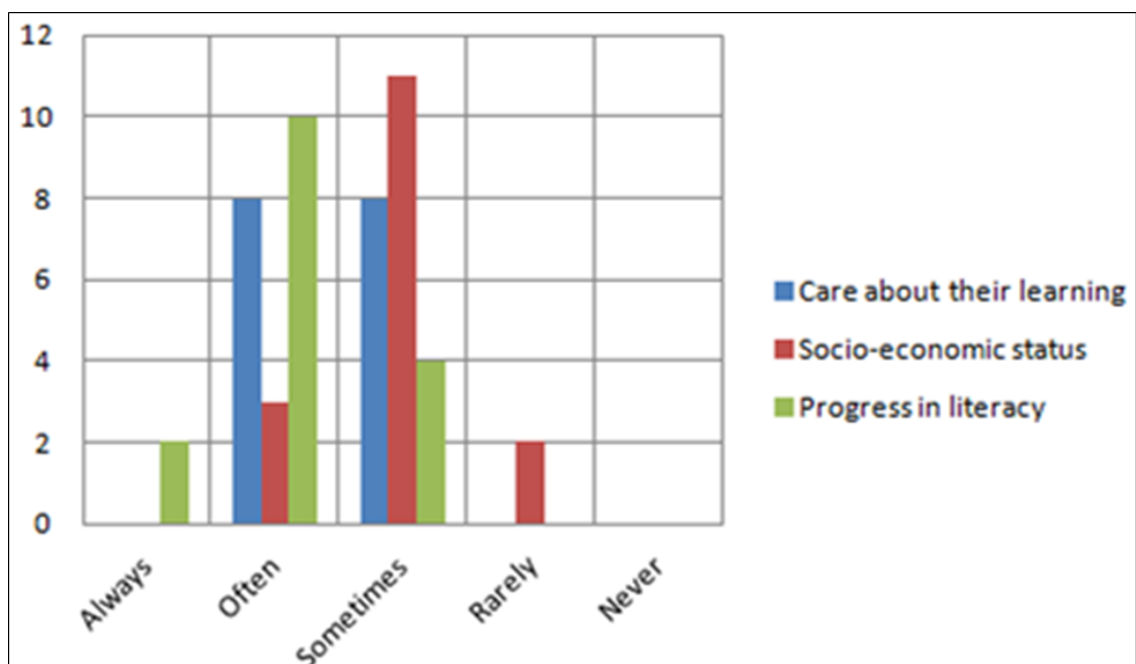


Figure 11. Factors impacting student potential

- a) 50% of the Educational Therapists felt that their students care about their learning
- b) 81% felt that progress of student is not dependent on their socio-economic level
- c) 75% of Educational Therapists felt that their students are making good progress in their literacy

Educational Therapists specific perception questionnaire

The Educational Therapist's stated that children rarely became frustrated in class, tried to complete tasks even those beyond their ability, attempted to tackle unfamiliar tasks, and rarely gave up in the face of difficulties. They noted that the majority of children approached a task eagerly, and relished a challenge, and were rarely reluctant to take part. Overall, the Educational Therapist's enjoyed teaching these children, recognised their potential, and only 1 child provoked dread in his Educational Therapist because he was not taking the class seriously, despite the challenges that working with these children involve. In terms of attributions, the Educational Therapist's thought that the students did not blame themselves or others for their difficulties.

The Educational Therapists were given the following question:

"The child is not trying hard enough in class."

1. 62.5% of the Educational Therapists felt that their students are not trying hard enough.
2. Persistence. The scores of 37% suggest that only around one third of the children show a level of determination to seek help, and this may be an area which warrants further attention. (Based on teacher perception question – *When the child is unable to read/spell a new word, the child persists in seeking solutions?*)
3. In terms of independent working, 63% of Educational Therapist's thought that their students were independent enough to find their own solutions
4. In the area of confidence in their ability to spell, only 45% of the teachers felt that their students had confidence in his/her own abilities.

DISCUSSION

One of the keys to literacy for children with dyslexia is their ability to both read and spell. In this study of the net gain in students' single word reading and spelling, there is striking evidence for improvements in reading, with strong but less impressive improvements in spelling. This lack of symmetry in words read and words spelled is not unexpected, in that spelling problems are more persistent in dyslexic learners than reading problems (Frith, 1984, 1985; Nicolson & Fawcett, 1994; Thomson, 1984). However, it is interesting to note that it differs from the previous study from DAS (Lim and Oie, 2015), where equal gains were found for both reading and spelling. This may reflect the different composition of the current group.

A key aspect here seems to be an increase in the fluency of reading, and possibly the automatisisation (Nicolson and Fawcett, 1990) given that the CBA approach is time limited. Note also that the words presented in reading here are not based on frequency of

occurrence, so one might speculate that this approach to intervention has been effective in improving word attack skills for unknown words, another key to improvement. However, there is no specific data to support these speculations, so these issues would need to be investigated more systematically in future research.

Focusing again here on reading, because this seems to be the strongest impact of the intervention received, it is interesting to note that the greatest gains are made at the lower levels of banding with a particularly striking net gain for Band A2 (nearly 300 words) and Band A3 (over 250 words). This means that the students were able to read more fluently from the list of words presented as part of the timed curriculum based assessment, and with greater accuracy ensuring they did meet the error criteria to discontinue before the allotted time. This finding is in line with earlier findings from Lim and Oie (2015) that intervention improves most for the lower achievers, and seems to be most effective for the younger age groups, but here the groups are comprised of participants ranging in age from 8-10 and 7-11 respectively (see Table 1 for details). Considering the approaches adopted for Band A and Band B respectively, A is a more oral language based instruction, whereas in Band B the focus is more intensely on written language. The key to success for Band A2 may be that their age range is clustered within a smaller range than the other bands. On the other hand, it may not be just the age range which is critical in learning but the stage the learner has reached.

It is interesting to note here that the teachers clearly indicate that they expect Band A to make the most progress in the 1st 6 months of teaching at MAP, and this indeed seems to be the pattern from the data. Comparing this belief with the reading and spelling performance of the students (Figure 1), there are suggestions that this could be a realistic analysis of the progress the students are making, and this is reflected in the scores obtained. These results show that the changes in method of assessment to involve the Educational Therapists themselves in curriculum based assessment have been successful in creating a greater awareness of their students' outcomes. Conversely, it could be that this belief on the part of their teachers has allowed students in Band A to make greater gains in reading as well as spelling compared to the Band B students. There is a possibility that the Educational Therapists strong sense of belief in Band A students' potential in turn made them dedicate significant time and effort to teaching Band A students (Tschannen-Moran & Hoy, 2001), but it is not clear whether this would also lead to less effective support for Band B. Is the Pygmalion phenomenon coming into play here? (Rosenthal & Jacobson, 1968; Rubie-Davies, 2010), or does this simply reflect the greater room for improvement in Band A?

There is also a possibility that Teachers' belief in their ability to integrate language and vocabulary (Oracy) to support Band A students could also be one of the factors that account for Band A students to make the most progress amongst the 3 bands. This is in line with the Rose Report which emphasises phonics as part of a wider curriculum which includes language comprehension (Rose, 2006).

There is a further possibility emerging from the data that Educational Therapists find it easier to support students in Band A and/or they might be lacking in confidence to support Band B students. This seems to emerge in figure 3, where there is clear evidence of greater confidence in supporting at the lower level. Although it may well be that teachers put in greater effort in order to support their more challenging students in Band B, the results here clearly indicate that Band A students are receiving more effective support.

This could be interpreted as Educational Therapists either needing more training or support to engage these students. This phenomenon needs further investigation to identify gaps – and to establish whether this reflects gaps in training, or lack of resources or the curriculum not meeting the needs of these students fully. It may well be that the greater awareness that the Educational Therapist's have developed of the needs of their students based on the Banding system has led them to question their own efficacy further, and that this increasing knowledge has not yet transferred to increased confidence in their own teaching. Further research is currently underway to address the more complex needs of Band B and above, and this will be reported in future papers.

The results indicate that sufficient training, resources and support is in place for Educational Therapists to deliver lessons for Band A students. However, our organisation needs to further investigate as to why the Educational Therapists felt that they are not able to engage the higher ability students as effectively.

Motivated learners have a positive mindset and they are more likely to persist with learning and understanding (Simmons, 2014). 62% of the Educational Therapists felt that they do not have adequate ability to motivate students who show a lack of interest in the classroom. However, even if they do not believe in their ability to motivate, Educational Therapists still do their utmost to try motivating and engaging these students, and were clearly committed in their approach, with 94% determined to continue striving to improve outcomes. Further training may be needed for Educational Therapists on how to effectively motivate these more challenging students. Notwithstanding this, there might be a need to probe further to understand the reason for the lack of interest shown by the students - Is it a trait within the students themselves, or situational forces that make them have little interest in classroom work? (D'Elisa, 2015).

Learned helplessness linked to lack of esteem may well be a factor with students who are experiencing difficulties in learning, but this might well be more of an issue for Band A where achievement is lower. Conversely, the students in Band B may be more aware and frustrated by their lack of progress. Issues such as intelligence levels in these students and any co-morbid issues also need to be investigated. One might speculate that more intelligent and mature children would show greater issues with motivation, given that despite their best efforts and the extra support provided they are still not achieving at the level of their peers.

It is reassuring to know from figure 5 that Educational Therapists do not hold stereotypical views of their students and their abilities to succeed and there is no evidence that banding has impacted this. Additionally, the majority of Educational Therapists were also optimistic about the progress that their students were making.

Interestingly, it is often assumed that higher scores than those demonstrated in the Educational Therapist's surveyed suggest that they are likely to be more effective. Conversely, these scores may be seen to demonstrate that Educational Therapist's at DAS are developing their self-critical faculties, and this combined with their enthusiasm and optimism for their student's progress, could augur well for outcomes here.

The Educational Therapists also feel that the students have not attained confidence as yet in their spelling, and this is well matched by the data on improvement, which show less improvement than might be hoped for in this area. Nevertheless, this pattern of results is in tune with research internationally, which demonstrates that spelling typically improves less consistently than reading (Nicolson and Fawcett, 1994). This may be largely because it is possible to use a combination of phonics and vocabulary to successfully guess a word in reading, whereas it is never possible to accurately guess the correct spelling.

Overall, the Educational Therapist's perceptions of individual students show a strong and positive approach, whereby the Educational Therapists have a realistic understanding of the students and their strengths and weaknesses, and the children are largely co-operative and confident. These students do not blame themselves or others if they are not successful, and these positive attributions augur well for their future success.

LIMITATIONS

Although the research has reached its aims, there were still some limitations that could be addressed in future research. First and foremost, the selection of students was strictly based on their start date on the programme and no independent checks were made to see if these students had any initial diagnoses of co-morbidities, or any differences in IQ. Another issue that we did not take into consideration is to check if these students are receiving any additional support outside of the DAS, such as private tuition. Given that Singapore is highly focused on education, many students receive more than one input in terms of support. Thirdly, student demographics and primary language of communication was not taken into consideration. If students' primary language of communication is not English then their exposure to the English language might be limited thus hampering the development of their oracy. Two other factors that might need to be included in this study are the age and experience of the Educational Therapists and also parents' perception of their children as learners.

In all good research, a number of outstanding questions will emerge once the researchers have focused on a specific area of interest. In further research, a small focus

group of the Educational Therapists who had participated in this study could address some of these unresolved issues and consider whether the therapists felt the need for further training, greater access to resources or mentoring in enhancing their support for students in Band B.

CONCLUSIONS

The study that we embarked on revealed particularly interesting data on the gains in reading and spelling made by this group of DAS students. The most impressive reading gains were seen in A2 students and most gains in spelling was seen in Band A3 students. These results are in line with Teachers' perceptions that Band A students will make the most progress. This accurate prediction of students' performance is in line with the previous study where it was found that reading and spelling achievements at baseline inversely related to reading and spelling gains respectively. It could also be suggested that Educational Therapists own feelings of adequacy influenced their behaviour in feeling more confident to better support Band A students. Conversely, it could simply be an accurate estimate of the gains their students have made, based on their own abilities in teaching.

Offsetting the needs of lower band students, versus the needs of students in higher bands – are Educational Therapists' perceptions that lower band students' needs are more 'urgent' or 'severe' affecting the support given to higher functioning dyslexics. The study needs further exploration in the following areas –

- ◆ A more targeted needs analysis to find out about training gaps in Educational Therapist training that are currently in place.
- ◆ To form a new sample and conduct a second round of data collection and analysis, with the following in mind:
 - ◇ Split students into groups based on diagnosed co-occurring issues
 - ◇ Undertake further analyses with IQ as a variable
 - ◇ Educational Therapists' years of experience – does it affect teaching, i.e. does longer service inversely affect perception and performance
 - ◇ Questionnaire to include open ended questions.
 - ◇ To conduct focus group sessions to clear any ambiguities.
 - ◇ To conduct a parent perception of their child as a learner

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APPENDIX 1 General teacher questionnaire (ref)

S/NO.	QUESTIONS	CLASSIFICATION
1	I believe the following band of students will see the most progress within 6 months of MAP intervention, rank them in order (1 being the most progress and 3 being the least)	Banding Belief System
2	I am able to effectively support the weakest students in my class.	Own skill
3	I am able to get my students to follow classroom rules.	Own skill
4	I am able to control disruptive behavior in the classroom.	Own skill
5	The training and support I receive is sufficient for me to teach in class.	Organisational support
6	There are opportunities for me improve my teaching (i.e. observations, collaboration with other colleagues).	Organisational support
7	I am able to motivate students who show low interest in classwork.	Own skill
8	I feel my students are making good progress in their literacy	Perception of students
9	I am capable of motivating my students to stay on task.	Own skill
10	My students are not working hard enough to progress to the next band.	Perception of students
11	My teaching methodology does not change to suit students at different bandings .	Own skill
12	If my student is uninterested in the lesson, I will do my best to motivate them.	Own skill
13	The curriculum challenges my students.	Banding Belief System
14	My students care about their learning.	Perception of students
15	My students in Band A progress slower compared to Band B.	Banding Belief System
16	Focusing on Language and Vocabulary (Oracy) component helps Band A students make progress.	Banding Belief System
17	The organisational restrictions hinders my students' progress i.e. curriculum, administrative work and etc .	Organisational support
18	I am able to engage students with high ability in my classes effectively	Own skill
19	My students' progress depends on their socio-economic level.	Perception of students
20	OTHER COMMENTS	

APPENDIX 2**EDUCATIONAL THERAPISTS' REFLECTION OF STUDENT QUESTIONNAIRE**

1. How long have you taught this student for?
2. When the child is unable to read/spell a new word, the child persists in seeking solutions
3. The child becomes frustrated when unable to read/spell a new word.
4. The child is not confident of completing the task, although he/she has the skills to accomplish the task.
5. The child tries hard to complete a task, even though he/she does not have the skills to complete the task.
6. The child tends to blame others for personal failure.
7. The child tends to blame himself/herself when unable to read/spell words.
8. The child has confidence in his/her own abilities.
9. When presented with an unfamiliar task, the child believes that he/she can complete the task.
10. The child gives up easily when he/she feels that the word is too difficult to read/spell.
11. The child appears to like challenges.
12. When you give a child a task, he/she eagerly approaches it.
13. The child is reluctant to participate when given a task.
14. I believe that the child has the potential to do well.
15. The child is not trying hard enough in classes.
16. The child is not taking classes seriously.
17. I enjoy teaching this child.
18. Sometimes, I dread teaching this child.

Questions 6,8,9,11 and 12 taken from the Self-Efficacy Scale - Teacher Version (Fall & McLeod, 2001) with questions 2 and 10 adapted for literacy, and with added questions devised based on Bandura (2006) on creating self-efficacy scales.

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A Comparison of Incidental and Intentional Vocabulary Learning in English Language Learners with Reading Comprehension Deficits

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Abstract

The present study explored the effects of incidental vs. intentional teaching on the vocabulary learning and retention of Iranian English Foreign Language (EFL) learners with poor English reading comprehension. The study used extra two English tests to identify students who stood at the bottom 30% of reading comprehenders in the sample. These participants were divided into incidental learning, intentional learning and control groups. All groups took a vocabulary pretest and vocabulary posttest before and after the intervention. There was also a delayed vocabulary posttest, the results of which were used to establish vocabulary retention scores. The results indicated no differences between groups before the intervention, but both intervention groups showed vocabulary levels greater than the control group in the posttest. No significant differences were found between incidental and intentional groups on vocabulary immediately after the intervention; however, the incidental group showed significantly better retention. These findings suggest similar incidental and intentional teaching effects on the immediate vocabulary learning, but enhanced vocabulary retention for the incidental method.

Keywords: incidental vocabulary learning, intentional vocabulary learning, poor reading comprehension, vocabulary retention

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INTRODUCTION

Graves (2000) defines vocabulary as the whole stock of words known by a person. Similarly, Miller (1999) asserts that vocabulary is considered as a set of words which constitutes the basic building blocks an individual uses to produce sentences. According to Graves (2000), vocabulary goes beyond the meaning of words and concerns the relationship between words and phrases, as well as between categories of words and phrases, and the ways that individuals make use of and store words. Vocabulary knowledge is a strong predictor of comprehension in both the first and additional language acquisition, and inadequate vocabulary knowledge can prevent second language (L2) learners from effective comprehension in the target language (Davis, 1989; Gass, 1999; Stein, 1993; Wesche & Paribakht, 1999). This makes teaching vocabulary crucial. In fact, vocabulary acquisition is viewed as one of the essential components of L2 programs (Coady et al., 1993). As a result, it is necessary to use the most effective teaching methods to enhance vocabulary knowledge among L2 learners, and various strategies have been suggested in teaching/learning vocabulary.

Richards and Schmidt (2002) maintain that incidental learning involves the process of learning a particular thing while the individual aims at learning something else. When it comes to L2 learning, incidental learning has been viewed as a helpful way to learn vocabulary from text (Day, Omura, & Hiramatsu, 1991; Jenkins, Stein, & Wysoki, 1984). The alternative to incidental learning is intentional learning, which has also been found to be useful in vocabulary learning (Tayebi, 2011). In terms of learning vocabulary, such intentional learning methods typically involve explicitly working with the meaning of words by finding their synonyms or antonyms, matching similar words (e.g., by category), and completing crossword puzzles or multiple choice questions that require an appreciation of word meanings.

Given that L2 learners tend to resort to rote learning, acquiring the meaning of new lexical items with little categorization into a lexicon may lead to the development of relatively disorganized vocabulary of insufficient size to support efficient language learning. On the contrary, reading new lexical items and deriving the meaning based on the context may be more productive for L2 learners. This is because deriving the meaning of words within context should improve learners' capability of inferring the meaning of unknown words and require L2 learners to focus on associations between words to infer meaning. Determining unknown words within text may also involve referring to a dictionary, which should also be helpful in storing the meaning of words. Hence, it can be argued that reading enhances vocabulary acquisition in L2 learners (Nagy, Anderson, & Herman, 1987). While reading texts, vocabulary learning can be either intentional (with intensive focus) or incidental (with no focus).

Many studies have been conducted on the significance of both incidental and intentional vocabulary learning in the context of English language learning. Intentional learning is

viewed as the kind of learning that is planned, whereas incidental learning is viewed as the learning that occurs while learning something else (Richards & Schmidt, 2002; Yali, 2010). Nation (1990) notes that incidental learning may enhance lexical formation, collocation and parts of speech, but intentional learning may enhance lexical knowledge (i.e., grasping the sense of a word as well as linking between lexical items). Tabrizi and Ahmadi (2013) compared the effects of incidental and intentional vocabulary learning among Iranian EFL elementary learners and found that both strategies produced improvements in language learning, although the intentional strategy learners showed the better results over the short-term. Similarly, Alemi and Tayebi (2011) investigated incidental and intentional vocabulary learning through reading strategies. The results showed that intentional vocabulary learning was more helpful than incidental vocabulary learning in terms of both vocabulary knowledge and learners' reading strategy use.

However, Hulstijn (2003) notes that incidental vocabulary learning may associate with learning abstract and factual declarative knowledge, whereas intentional learning can only be used for factual knowledge. Furthermore, reading is viewed as an essential skill which makes important contribution to vocabulary learning (Horst, 2005; Krashen, 2004). When L2 learners encounter unfamiliar words while reading, they will acquire the words' partial meanings at least, and repeated exposures to words in text should lead to vocabulary development. As such, readers learn vocabulary subconsciously by focusing on the meaning of the text rather than focusing on the unfamiliar words.

Multiple investigations in both first and second language acquisition has demonstrated that the amount of reading contributes to successful rearing acquisition (Iwahori, 2008; Nishono, 2007). Such a notion supports extensive reading which may enhance vocabulary learning, too. Extensive reading can be motivational for language learners provided that they are supported in choosing what to read (Bright & McGregor, 1970; Day & Bamford, 1998; Harmer 2003). However, according to Schmitt (2000), extensive reading is necessary since language teachers mostly believe that intensive reading does not suffice to develop fluent and competent readers. Similarly, Bell (2001) claims that extensive reading may enhance faster reading rate as well as better overall general language proficiency. Learners then encounter the same words over and over again in context when they read extensively, resulting in vocabulary learning (Mason & Krashen, 1997; Pigada & Schmitt, 2006).

However, barriers to extensive reading supporting language learning can occur due to difficulties with reading. Reading comprehension deficits can be found in any group of learners, and studies suggest that as many as 10% of school age children can suffer from serious impairments in their ability to comprehend written text (e.g., Pimperton, & Nation, 2010). Such poor comprehenders can suffer from significant deficits in reading comprehension despite having normal or near-normal capabilities in word reading/decoding, whereas other children can show reading deficits across a range of word recognition and comprehension processes (Catts & Kamhi, 2005; Shaywitz, 2003; Vellutino,

Fletcher, Snowling & Scanlon, 2004). Although few studies have investigated the effects of teaching vocabulary (incidental or intentional) on children with low reading comprehension levels, those that have (e.g., Bowyer-Crane et al., 2008; Clarke et al., 2010; Fricke et al., 2013) suggest that improvements in oral language skills (such as vocabulary) can lead to better reading performance. This suggests a reciprocal relationship between reading and vocabulary in which good vocabulary can support reading comprehension, and extensive reading can lead to improvements in vocabulary. However, none of these studies focused explicitly on L2 learners whose language proficiency may be supported by vocabulary development during reading.

The current study, therefore, investigated the potential effectiveness of incidental versus intentional vocabulary learning through extensive reading for L2 learners with evidence of poor comprehension levels. The study posed the following research questions:

- i) Is there any difference between incidental and intentional vocabulary learning through extensive reading among L2 learners with low scores on measures of reading comprehension?
- ii) Is there any difference in the retention of vocabulary items acquired incidentally and intentionally through extensive reading among L2 learners with low scores on measures of reading comprehension?

METHOD

Participants

The participants of this study were students of a girls high school in Tehran, Iran (schools in Iran are single-sex), who were learning English as a foreign language. Participants were Persian native speakers and were initially selected based on their English proficiency (at least intermediate levels) determined by a standardized placement tests (the Oxford Placement Test Version 1). All girls (N=200) in Grades 7 & 8 were assessed using the placement test and 117 students were at intermediate level of English proficiency.

Two reading comprehension tests were given to these 117 students and all were ranked according to their reading scores. Those scoring in the bottom 30% of students across the two reading measures (N=72) were selected as showing reliable evidence of poor comprehension levels. Table 1 presents basic demographic information of the participants: the selected poor comprehension group in comparison to the whole cohort of grade 7 and 8 students. Table 2 presents descriptive statistics on the two measures of reading comprehension for the students showing poor comprehension levels.

Table 1. Demographic details of the participants in comparison to the cohort of grade 7 and 8 students

	Grade 7	Grade 8	Total
Grade 7 & 8 students in the participating school			
Number	78	122	200
Mean age in months	153	169	161
Poor comprehension participants			
Number	49	23	72
Mean age in months	152	168	160

Table 2. Scores of the poor reading comprehension students on the two reading comprehension measures

	N	Minimum	Maximum	Mean	Std. Deviation
Sadeghi et al.'s Cloze reading comprehension measure	72	4	13	10.70	2.29
Woodcock-Johnson reading comprehension measure	72	6	10	8.90	1.08

Ethical considerations

Participants were assured that their test results were not disclosed to the school authorities, classroom teachers, and were not used to evaluate their educational achievement. Participants were also informed that their participation was voluntary and consent forms were sought prior to testing. Additionally, they were informed that they could withdraw from the study any time with no consequences.

Instrumentation

In order to find the answers of this research questions, the following tests were used.

The Oxford Placement test (*retrieved April 2017 from <https://www.oxfordonlineenglish.com>*) was used to assess the participants English proficiency levels. The test consisted of 20 items and students were given 30 minutes to tick the correct answer for each question in their answer booklet. The reliability of the test reported by Oxford ESL is .87.

The English reading comprehension cloze test developed and validated by Sadeghi, Everatt, McNeill and Rezaei (2014) was one of the two measures used to assess participants reading ability in English. This test has been used in Iranian and other Persian speaking contexts (see Sadeghi et al., 2014) making it highly appropriate for the current study. The test comprised five passages with 24 missing words. The participants were required to read the passages silently and fill in the gaps with the appropriate words for each passage. The test sheets were collected after 15 minutes. To ensure the reliability of the test, it was piloted on 30 participants and the reliability index was calculated to be $\alpha=0.72$.

The Woodcock-Johnson comprehension measure (WJ-IV; Schrank, McGrew, & Mather, 2014) is an American norm referenced standardized test, and was the second measure used to assess the English language learners' reading comprehension levels. The test included 38 items from which 15 utilized a picture above each sentence indicating the word to be given to complete the sentence. The rest of the items were sentences and short paragraphs which required the testee to fill the blank by an appropriate word. Students were tested individually and required to read the sentences silently or loudly and then decided on a specific word needed in the blank to make the sentence complete. Testing was continued until the testees answered three consecutive items incorrectly. The number of the correct answers out of 38 was used as the score of the test. The level of difficulty of the reading test items increased throughout the test. The pilot data indicated the reliability of the test within samples similar to those used in the current study was $\alpha=0.78$ consistent with other research (e.g., Torc-4, Berown, Hammill and Wiederholt, 2009).

The modified version of the vocabulary size test (Nation & Beglar, 2007) in English was utilized to assess the vocabulary knowledge of the participants at pretest, posttest and delayed posttest. The test comprised 19 items and participants were required to perform the test in 15 minutes. The number of the correct answers out of 19 was used as the score of this test. Wrong answers did not bear any negative marks. The level of difficulty of the test items increased throughout the test. Nation indicates that the reliability of the test falls within the range of $\alpha=0.79$ to $\alpha=0.83$ in different testing contexts. Furthermore, pilot data collected prior to the current study indicated a reliability index of $\alpha=0.81$.

Procedures

Testing was administered in a high school in Tehran within the normal hours of the students' educational program. At the beginning of each test, participants were provided with ample and clear instructions and examples to make sure that they understood how to perform and answer the questions. The testing was carried out in a classroom setting and students were not allowed to talk or see each other's work during the test. Each testing session took approximately 50 minutes and was performed over several days to fit with the school's timetable and in order to avoid the student boredom.

The Bookworm series, third edition, published by Oxford University Press (2017) was used for the extensive reading procedures that comprised the intervention: the aim was to teach vocabulary items through extensive reading. The 72 participants were divided into three groups. The first intentional vocabulary learning group was assigned to accomplish reading three short Bookworm series books within one month. These readings were used for intentional vocabulary learning through teaching strategies that focused on considerations of synonymous and antonymous for selected words within the stories. The second incidental vocabulary learning group read the same three short books within one month. Incidental vocabulary learning occurred by students focusing on exercises that involved providing verbal summaries of what they read. The third group was assigned to the control group who continued with the conventional teaching of the school.

In order to assess the students' vocabulary knowledge, the vocabulary test was given three times: once before the teaching intervention started, once immediately after the one-month intervention period, and once after a further delay of one month after the teaching intervention finished.

RESULTS

The present study investigated the effects on vocabulary learning and vocabulary retention of incidental and intentional vocabulary teaching on Iranian EFL learners with poor reading comprehension. Table 3 presents the descriptive statistics of the three participating groups in terms of vocabulary knowledge. At the start of the study, mean vocabulary scores produced by the groups were similar and a one-way analysis of variance showed that there was a non-significant difference between the three groups ($F(2,69)=.15$, $p=.859$). In contrast, a one-way analysis of variance comparing the posttest vocabulary scores indicated a significant difference ($F(2,69)=11.02$, $p<.001$) among the three groups (i.e., incidental, intentional and control), with Scheffé post-hoc pairwise comparisons showing differences between the two intervention groups and the control group (incidental versus control group, $p<.001$; intentional versus control group, $p<.05$), but not between the two intervention groups ($p>.1$). A one-way analysis of variance at retention posttest also showed a significant effect of group ($F(2,69)=33.68$, $p<.001$). This time the Scheffé post-hoc pairwise comparisons suggests differences between all three

groups (incidental versus control group, $p < .001$; intentional versus control group, $p = .012$; incidental versus intentional group, $p < .001$).

Table 3. Pretest, posttest and delayed posttest vocabulary scores for the three groups

		N	Mean	SD	Minimum	Maximum
Pretest	Incidental	24	4.00	.97	1	9
	Intentional	24	3.75	.91	0	9
	Control	24	3.54	.73	1	9
Posttest	Incidental	24	13.75	3.27	9	18
	Intentional	24	11.83	3.22	7	16
	Control	24	9.58	2.70	3	14
Delayed Posttest	Incidental	24	10.83	3.48	6	18
	Intentional	24	6.08	3.81	1	11
	Control	24	3.21	2.24	0	7

DISCUSSION

The purpose of the present study was to explore the comparative effects of incidental versus intentional teaching on vocabulary learning and vocabulary retention among the Iranian EFL learners with poor reading comprehension. The study made use of two reading tests to identify students with low levels of English reading comprehension. The two measures were selected as one (the Sadeghi et al.'s measure) developed specifically for Persian speaking children and the other (the Woodcock-Johnson measure) used extensively in English language research and standardized across a range of English speakers. Evidence of weaknesses on both measures also reduced the potential for effects being due to regression to the mean. Students identified as showing evidence of reading comprehension weaknesses were further divided randomly into three groups which experienced incidental, intentional or traditional teaching. In terms of vocabulary knowledge, the results indicated: no differences between the groups before the intervention; significant difference between each of the intervention (incidental and intentional) groups and the control (traditional teaching) group immediately after intervention; and significant difference between the two intervention groups and the

control group one month following intervention. These results suggest that incidental and intentional teaching of vocabulary both lead to improvements in vocabulary, but that the incidental teaching method led to better retention of vocabulary improvements in these Iranian EFL learners with poor levels of reading comprehension.

The result of this investigation can be viewed as another piece of evidence revealing the effectiveness of instruction methods that include the incidental and intentional teaching of vocabulary. Studies conducted by Cho and Krashen (1994), Dupuy and Krashen (1993), Ahmad (2012), and Alipour Youhanaee, Barati, and Nasirahmadi (2015) also argue for the effectiveness of the incidental learning of vocabulary, while the studies carried out by Hulstijn (2003), Nation (2001), Read (2004) and Tode, (2008) also support intentional vocabulary learning. Previous studies have reported equal impact of incidental and intentional vocabulary learning, which are partially consistent with the current study. Alemi and Tayebi (2011) studied the difference between incidental and intentional instructions of vocabulary learning/teaching, reporting no significant difference between the two methods with respect to EFL learners' vocabulary learning. Similarly, Fallah (2009) sought to shed light on the impact of incidental and intentional vocabulary learning on the speed of the retention. The findings showed that both incidental and intentional vocabulary strategies were helpful. However, in contrast to the results of the current study, better retention of vocabulary was found to be obtained through intentional vocabulary learning rather than incidental learning. Generally, it is claimed that in the context of incidental learning, retention is generally low (Swanborn & de Glopper, 1999) which runs counter to the results of the current study. Laufer and Hulstijn (2001) have argued for the importance of engagement in vocabulary learning. Such engagement develops through motivation, the perceived needs to determine the meaning of new words, searching and evaluation. The authors concluded that that retention of unknown words is conditional unless there are some degree of engagement.

It should be noted that the weak comprehenders in the current study showed improvements following both incidental and intentional intervention methods. Hulstijn (2005) has pointed to the density of unknown words affecting vocabulary learning. The current study indicated that both incidental and intentional vocabulary learning can be helpful for poor comprehenders through providing more grounds for flexibility in the instruction of vocabulary teaching. However, there might have been some other factors such a reciprocal relationship between vocabulary learning and reading comprehension should be considered when thinking of selecting either instruction method for vocabulary teaching/learning. This reciprocal relationship between reading comprehension and vocabulary learning may mean that improving reading is happening in the incidental learning condition which may lead to better vocabulary learning due to the relationship between the two (i.e., better reading may enhance better language). One of the limitations of this study was that the tasks that focused on word meaning did not seem to lead to better reading comprehension and hence this condition did not show the benefits of the reciprocal relationship. The future study to test such a possible explanation would

involve measuring reading comprehension at post-test. Additionally, the vocabulary test used in this study was unlikely to include the words that were explicitly taught in the intentional learning condition, hence it may be that these 'taught' words were retained but were not generalized, whereas maybe making reading enjoyable lead to more reading, which may have led to more reading and increased the chance to generalize to vocabulary retention. This might be argued to lead to a future study which contrasts words taught with words not taught.

In conclusion, the present findings indicate that extensive reading can support vocabulary development even amongst those who may struggle with reading and aspects of understanding written text. Further research on the value of such learning would be beneficial, particularly the usefulness of incidental learning for those with evidence of poor comprehension in a second language, and the conditions under which such vocabulary learning through extensive reading can be effective.

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The influence of a general literacy intervention on the psychosocial development of students with literacy learning difficulties

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Abstract

The present study examined whether the psychosocial development of students with literacy learning difficulties (LLD) could be positively influenced via an academic intervention that focused on the explicit instruction of general literacy skills. Twenty-one students with LLD aged from 8 years 6 months to 11 years 5 months participated in the study. Following pre-intervention assessment, students received an average of 20 sessions of 30-minute duration, over a six week period that focused on developing students' skills in the areas of decoding, vocabulary and reading fluency using age-appropriate narratives. Results found that the students demonstrated significant gains in multiple areas of literacy, as well as, academic and global self-esteem, general self-efficacy and its emotional and social subscales. Overall, gains in literacy were found to be more likely associated with changes in self-efficacy, rather than self-esteem. Additional analyses also suggested that the association between literacy and psychosocial development was greater for students with LLD who demonstrated lower levels of resilience at pre-intervention.

Keywords: self-esteem, self-efficacy, resilience, literacy development, reading comprehension, decoding

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INTRODUCTION

The psychosocial development of students with literacy learning difficulties (LLD) has featured within the research literature. Much of this research literature has focused on self-esteem, though some attention has been given to self-efficacy and resilience. Determining the association between LLD and psychosocial development has led to variable results and is influenced, not only on how each constituent area is conceptualised and defined, but also the research methodology that underpins the research. When research has investigated psychosocial development, such as self-esteem, the focus has mostly been on how self-esteem can be positively influenced within the educational context, via interventions that specifically focus on psychosocial development. Less research has focused on how self-esteem can be positively influenced via academic interventions. The present study is concerned with the latter possibility, and aims to determine whether the psychosocial development of students with evidence of weaknesses in literacy can be influenced by an academic intervention that focused on literacy development, but which also targeted experiences of success and resilience.

Self-esteem can be viewed as deriving from the experiences of an individual within their social world and the evaluations that the individual makes about those experiences (see discussions in Denston, 2016). Whilst early theorists viewed self-esteem as being largely behavioural, more current conceptions view self-esteem as also being influenced by cognition and emotion. The nature of self-esteem has also been debated, in terms of whether it is unidimensional (that is, solely consisting of global self-esteem) or whether it is a multi-faceted concept where differentiation into sub-domains (such as academic and physical self-esteem) occurs, as well as from varying developmental perspective/processes (Marsh & Craven, 2006).

One sub-domain of self-esteem that is of particular interest to educational researchers is academic self-esteem. This interest may be largely attributed to the research that exists around the relationship between academic self-esteem and academic achievement. Indeed, academic achievement has found to show larger associations with academic self-esteem than global self-esteem (Byrne, 1984; Marsh & Craven, 2006), although age or grade/year level and placement within an educational context have been identified as potential mediating variables in this association (Chapman, 1988). Academic self-esteem has been assessed via learning outcomes, which has led to it being conceptualised as the evaluations that individuals make about their ability within specific academic domains (Trautwein, Lüdtke, Köller, & Baumert, 2006) in contrast to the evaluations that individuals make of their wider experiences within the school environment (Marsh & Craven, 2006).

Debate also exists about the trajectory of the relationship between academic achievement and academic self-esteem: whether academic achievement is posited as influencing academic self-esteem, through the skills development model (Calsyn & Kenny,

1977) or whether academic self-esteem is posited as influencing academic achievement, through the self-enhancement model (Guay, Ratelle, Roy, & Litalien, 2010). In contrast, Marsh and colleagues (Marsh, Byrne, & Yeung, 1999; Marsh & Yeung, 1998) argue that the relationship underpinning academic self-esteem and academic achievement is reciprocal and dynamic in nature.

A more recent construct within the field of psychosocial development is self-efficacy. Bandura (1997) viewed that behavioural change was underpinned by self-efficacy, which he defined as the judgements that an individual makes about his/her performance capabilities. Self-efficacy is developed via cognitive and not affective processes, which distinguishes it from self-esteem, even though they have, at times, been treated synonymously within literature. Associations between self-efficacy and self-esteem have been identified; however, these are variable in strength, which is largely due to the value that an individual places on a specific activity (Bandura, 1997).

Self-efficacy is formed via four sources: mastery experiences, vicarious experiences, verbal persuasion, and physiological and affective states. Experiences are fundamental to self-efficacy, although their influence is differential, largely due to the aforementioned value placed on the experience by the individual and the degree to which self-efficacy has developed within the individual. Successful experiences promote self-efficacy, while unsuccessful experiences can compromise self-efficacy. Difficult experiences also play an important role in the development of self-efficacy because they provide opportunities for an individual to develop perseverance.

Self-efficacy has also been associated with academic achievement, which has made it of interest to educational researchers (Multon, Brown, & Lent, 1991). Research has found that in elementary students, self-efficacy and academic achievement were associated to a lesser degree (Multon et al., 1991); however, this was later argued by Pajares and Schunk (2001) to depend on the academic outcomes selected, as well as, how the constructs were operationalised. Pajares and Schunk (2001) further argued that the findings supported the context-specific nature of self-efficacy and that findings would be influenced by the degree of correspondence between self-efficacy beliefs and academic outcomes selected. Studies (Lee & Jonson-Reid, 2016; Liew, McTigue, Barrois, & Hughes, 2008) have found that domains of self-efficacy can be differentiated in children as young as Grade 1, although such research is complex due to the role that cognitive development in self-efficacy.

The area of resilience emerged when research in the field of psychopathology found that individuals who, as a result of exposure to negative circumstances, were identified as at-risk for maladaptation actually demonstrated positive adaptation, thus, developing into competent adults (Luthar, Cicchetti, & Becker, 2000; Masten et al., 1999; Schoon, 2006; Werner, 2000). Resilience develops over time and is a dynamic process that promotes the ability of individuals to overcome significant adversity (Cummings, Davies, & Campbell,

2002; Garmezy, Masten, & Tellegen, 1984; Rutter, 2006; Werner, 1993). Resilience is characterised by two specific elements. These include the experience of adversity or risk, as well as, the successful adaptation, overcoming, or experience of positive outcomes in the presence of the adverse circumstance (Rutter, 2012; Schoon, 2006). Risk factors are those factors that increase the likelihood of maladjustment or negative outcomes for an individual (Ofiesh & Mather, 2012). The development of resilience can be influenced by both temporal and contextual variables, as well as, developmental factors. While resilience is underpinned by the exposure to risk and the positive adaptation by an individuals, debate exists within literature as to what experiences and the level of chronicity that effects the risk of maladaptation (Fletcher & Sarkar, 2013).

Resilience within education has also been of prominence, largely because the school has been viewed as an environment where resilience can be promoted in a child (Martin, 2002), largely via targeting the levels of individual competence or by moderating or mediating risk factors external to the child. However, because risk factors can be derived from within the educational context, Doll and Lyon (1998) argue that the educational context can also result in the accumulation of risk for a child. Students with LLD have been of interest to researchers due to the fact that literacy difficulties can often be chronic in nature (Ofiesh & Mather, 2012), extend beyond literacy to affect wider academic achievement (Forrest-Bank & Jenson, 2015) and psychosocial development (Sorensen et al., 2003), as well as affecting academic ability in young adulthood (Masten et al., 2004). According to Rutter (1987), when examining relationships between LLD and risk, it is paramount to focus on the interactions that occur within the educational context. Sorensen et al. (2003) further refined this to argue that it is the proximal factors within the educational context that are integral to examining resilience. This has been supported in research by other studies that have identified proximal factors (such as successful experiences, problem-solving skills, positive social behaviour) in resilient adaptation (Miller, 2002; Rutter, 2012).

For students with LLD, lower skill levels are more likely to result in lower levels of academic self-esteem (Chapman & Tunmer, 2003). Furthermore, research suggests that students with LLD judge themselves less positively across academic domains (Bear, Minke, & Manning, 2002). Students with LLD who demonstrate multiple difficulties or more complex difficulties may be more likely to experience even lower levels of academic self-esteem than other students with LLD (Cosden, Elliott, Noble, & Kelemen, 1999). These findings derive from the educational context, largely from learning tasks that demonstrate academic achievement. This means examining the association between psychosocial development and academic achievement in students with LLD is crucial. While support for an association between self-esteem and academic achievement has been contentious within literature (see Baumeister, Campbell, Krueger, & Vohs, 2003), research has found that interventions that target academic achievement or learning strategies are likely to show positive effects on self-esteem in primary or elementary aged students with LLD (Elbaum & Vaughn, 2003). This may be due to the role that

positive learning outcomes have on the development of academic self-esteem, which has been supported in research (Lüdtke, Köller, Marsh, & Trautwein, 2005; Wu & Kuo, 2015). However, research should not focus on self-esteem in isolation. Pajares and Schunk (2001) argue that any intervention that targets learning strategies or academic achievement should also focus on self-efficacy. This is because self-efficacy beliefs can be influenced by aspects of an academic or strategy-based intervention and these beliefs also influence the use of newly developed academic competencies in students. Furthermore, the literacy learning difficulties demonstrated by students can also be exacerbated by held self-efficacy beliefs, which can influence the risk for maladaptation, and implicate the role of resilience in research examining associations between psychosocial development and academic achievement.

The current research, therefore, focuses on the following questions:

1. Does a targeted intervention, which includes instruction in general literacy skills, promote psychosocial development in students with LLD?
2. Is change in literacy development associated with change in psychosocial development in students with LLD?

METHOD

Participants

This study involved 21 students from Year 4 to Year 6 who attended a Decile 3 primary school in one of the larger cities in New Zealand. (Note that deciles relate to socio-economic factors within the enrolment area of the school: 1 being the lowest, 10 the highest.) Participants were identified by the Deputy Principal of the participating school as having demonstrated low scores in school tests of reading; i.e., students who had made little progress in their reading development for the duration of their education at the participating school. Students were not eligible to participate in the intervention if they were currently receiving any individualised support for their literacy development within the school context as any influence from such additional support will make conclusions based on the current intervention problematic. In New Zealand, the only Ministry of Education funded intervention for literacy difficulties is Reading Recovery (Clay, 1979), which targets students at 6 years of age. Therefore, schools will have limited resources to support older children with reading difficulties, meaning that (particularly in lower decile schools) there will be children with low progress in reading and writing who will not be eligible for extra support.

The sample consisted 12 male and 9 female students who ranged in age from 8 years 6 months to 11 years 5 months. The sample included 13 students from Year 6, five students from Year 5, and three students from Year 4. Of the 21 students, five were identified by

the school as being eligible for Ministry of Education funding as English as Speakers of Other Languages (ESOL); however, all students identified English as their primary language of communication. Parents/caregivers of students provided informed consent for their child's participation in the study. All students provided personal assent to participate in the study, prior to the collection of pre-intervention data.

Table 1. Demographic information for participants and comparison children

	Study participants	Comparison children
Age		
	M (SD)	10.27 (0.93)
	Range	8: 6 – 11: 5
Gender		
	Percent (number)	Percent (number)
	Female	53.8% (n = 49)
	Male	46.2% (n = 42)
Year Level		
	Percent (number)	Percent (number)
	Year 4	31.9% (n = 29)
	Year 5	30.8% (n = 28)
	Year 6	37.4% (n = 34)
School assessments		
	Mean (SD)	Mean (SD)
	STAR ¹	5.98 (2.30)
	RR ²	12.98 (3.44)
	OTJ-R ³	3.60 (0.69)

1. STAR scores are based on stanines (scores from 1 to 9)
2. RR is a raw score of accuracy and comprehension components – scores from 10-12 indicate a reading age from 10 to 11 years, whereas a score of 8 suggests a reading age of about 8
3. OTJ-R indicates students' progress as 1=well below, 2=below, 3=at, and 4=above according to the New Zealand Ministry of Education's National Standards

In contrast to a comparison group ($n = 91$) comprising students from the same Year 4 to 6 classes of the intervention students, the 21 children were performing well below expected levels in reading (see Table 1). The comparison group were identified by the school as progressing in their reading development at the expected level (or above) in accordance to National Standards, which set standards for achievement in the first eight years of schooling (Ministry of Education, 2009). Demographic information for the groups is presented in Table 1.

Contrasts were based on school data for the Supplementary Test of Achievement in Reading (STAR) (Elley, 2001), Running Records (RR) (Clay, 2000) and Overall Teacher Judgement-Reading (OTJ-R) (Ministry of Education, 2009). These measures are widely used in New Zealand to assess children progress in reading and the measures were administered by the school independent of the researcher. In each case, the participant group were performing well below their peers in terms of the school's assessments of reading.

Measures

The study used a range of measures to assess change over the course of the study in both literacy and psychosocial development. Measures in literacy included word reading accuracy, text reading accuracy, as well as comprehension and rate. Changes in psychosocial factors specifically related to self-esteem, self-efficacy and resilience. Each of the measures used is described below.

Burt Reading Test

This standardised test is used in New Zealand schools, and is individually administered to children from 6 years 4 months of age. The New Zealand data have demonstrated reliabilities greater than .90 (Gilmore, Croft, & Reid, 1981). In the current study, the data produced a Cronbach's alpha of .96. The test comprises of 110 words, presented in groups of 10 that increase in complexity. Each participant was asked to read orally each set of words from left to right. Testing continued until the student had made 10 consecutive errors. The student was then shown the remaining words and provided with an opportunity to read any additional words. One point was given for each correct response and raw scores out of a possible 110 were collected for analysis.

Neale Analysis of Reading Ability

The Neale Analysis of Reading Ability (NARA) is an assessment of oral reading skills and reading behaviours (Neale, 1999). The test demonstrates reliability co-efficient of over .85 (Neale, 1999); and the current study also found a high internal consistency for the accuracy (.97), comprehension (.91), and rate (.97). The NARA is an untimed test that is administered individually and has been standardised for use with students from 6 years

of age. The study used the standardised component that contained two parallel forms, with Form 2 used at pre-intervention and Form 1 at post-intervention. Each form contained two practice texts, as well as six graded texts that increased in vocabulary and grammar complexity. Each participant was asked to read the text aloud, and was then asked a series of scripted questions that assessed their literal and inferential comprehension of the text. Raw scores for reading accuracy and comprehension were collected for analysis, and reading times were recorded and converted into a rate of reading score.

Rosenberg Self-Esteem Scale

The Rosenberg Self-Esteem scale was developed by Rosenberg in 1965 and was used as a measure of global self-esteem. The scale consists of 10 statements that elicit information about an individual's overall evaluation of their sense of worth. According to previous research (Gray-Little, Williams, & Hancock, 1997; Robins, Hendin, & Trzesniewski, 2001), the scale has an internal reliability of around .88 to .90. In the current study, a Cronbach's alpha of .69 was calculated. Students were read a statement by the researcher (e.g., On the whole, I am satisfied with myself) and asked to respond to the statement by indicating their level of agreement or disagreement using a 4-point Likert scale. Each response was assigned a numeric value ranging from 1 (low self-esteem) to 4 (high self-esteem). Raw scores between 10 and 40 were used for the purpose of analysis.

Self-Perception Profile for Children-Scholastic Competence subscale

This measure included six questions contained within the scholastic competence subscale (academic self-esteem) of the Self-Perception Profile for Children (Harter, 2012). The subscale elicits information regarding a student's perception of their cognitive competence, specifically in relation to schoolwork. Statements are presented to students through an alternative structure format, which seeks to minimise socially desirable responses (Harter, 2012). The subscale demonstrates a high internal consistency, with Cronbach's alphas ranging from .80 to .84 (Harter, 2012). In this study, Cronbach's alpha was .87. Students were read two statements by the researcher (e.g., Some kids feel that they are very good at their school work; Other kids worry about whether they can do the school work assigned to them.). Students were asked to decide which statement reflected him or her most and the degree to which the chosen statement reflected him or her. Each item was assigned a numeric value from 1 (low academic self-esteem) to 4 (high academic self-esteem). Raw scores, with a minimum of 6 and a maximum of 24, were collected for analysis.

Sense of Coherence-Orientation to Life Questionnaire

This measure included 10 questions extracted from the manageability subscale of the

Sense of Coherence-Orientation to Life Questionnaire (Antonovsky, 1987). The subscale measures students' perceptions of control and confidence within their lives (i.e., resilience). The subscale has a reported Cronbach's alpha of .80 (Frenz, Carey, & Jorgensen, 1993); and showed a Cronbach's alpha of .72 in the present study. The subscale contains ten statements that are presented using a semantic differential format. Students were read each statement by the researcher (e.g., Many people – even those with a strong character – sometimes feel like losers in some situations. How often have you felt this way in the past?). Students were required to select a response to the statement using a 7-point scale, with each scale being anchored with semantically different phrases. Each item was scored by assigning a numeric value from 1 (low resilience) to 7 (high resilience). Raw scores, with a minimum of 10 and a maximum of 70, were analysed.

Self-Efficacy Questionnaire for Children

The self-efficacy scale consists of 24 items that measures a child's perceptions of their capabilities to perform desired behaviours in order to meet specific goals (Muris, 2001). The overall scale is a measure of general self-efficacy, which also contains three subscales (academic, social, emotional self-efficacy) of 8 items each. The measure can be used to determine how a child copes and adapts to daily challenges and stressors within life events, which is reflective of subsequent behaviours (Muris, 2001). The scale has high internal consistency, with a Cronbach's alpha of .88 for the full scale, and similarly good reliability scores for the subscales (from .85 to .88) (Muris, 2001). Reliabilities for the current study found a high internal consistency for the full scale (.90), and the academic (.86) and social subscales (= .83) but a lower score for the emotional subscale (.67). Vocabulary used in a couple of questions within the academic subscale was altered to suit the educational context of the school (e.g., homework was replaced with the words home learning, and the word test was replaced with the word assessment). The researcher orally read each question to the students (e.g., How well can you focus on learning (study) when there are other interesting things to do?). Students responded on a numerical scale from 1 (Not at all) to 6 (Very well). This measure was scored with a minimum of 24 and a maximum of 144 for the full scale and a minimum score of 8 and a maximum score of 48 for each subscale.

Elementary Reading Attitude Survey

The Elementary Reading Attitude Survey (McKenna & Kear, 1990) contains 20 questions. Ten questions assess students' attitude towards recreational reading and 10 questions assess students' attitude towards academic reading. High internal consistencies have been reported, with Cronbach's alphas ranging from .80 to .87 for the subscale (McKenna & Kear, 1990). The present study showed a consistent range of reliability scores. Each question was read out loud to students (e.g., How do you feel when you read a book on a rainy Saturday?). Students responded by selecting a point on a scale that most

reflected their feelings, from 1 (Very upset) to 4 (Happiest). Items that contained references to reading class were changed to reading group, in order to suit the educational context of the students. Raw scores, with a minimum of 20 and a maximum of 80 points were collected for the full scale and a minimum of 10 and a maximum score of 40 for the recreational and academic subscales.

Procedure

Pre-intervention assessment measures were administered over a five-day period during the first two weeks of the school term. Post-intervention data were collected over a six-day period at the end of the term. The format for post-intervention assessment gathering matched pre-intervention assessment. All assessments were carried out in the researcher's office, within the participating school. To minimise student fatigue, literacy and psychosocial measures were assessed across several sessions and students received breaks whenever needed.

The intervention consisted of 24 sessions, which occurred during the literacy times of the participating school. The duration of each session was approximately 30 minutes. Students attended a maximum of four sessions per week, over a six-week period. Students were primarily grouped according to class or year level in consultation with staff. Where possible, groups were consistent throughout the length of the intervention; however, fluidity in the composition of groups was allowed in order to best meet students' learning needs. Students attended an average of 20 sessions, with a range of 14-24 sessions.

The intervention sessions followed the format developed by Marriott (2013) and were underpinned by tasks that supported decoding, vocabulary, and fluency components of reading. The first component involved the development of decoding strategies whereby students practised decoding words selected from the focus text as likely to be unknown or difficult for the students to read accurately. Students were taught a decoding strategy that focussed on the use of the CVC syllable structure and the ability to identify the sounds within a simple syllable as a basis to try longer words. Students were also encouraged to look for familiar chunks within words that could include morphological units, orthographic patterns, or rimes. The vocabulary component involved clarifying and teaching students the meaning of selected words identified from the decoding component. The final component of the session focused on fluency and involved a repeated reading format, which incorporated using the researcher as the model of a fluent reader. The session format is provided in Table 2, though each lesson varied as to the included components: for example, the session that focused on decoding and vocabulary included less of the fluency component, while the subsequent lesson would focus primarily on the fluency component, and then the next session would focus on the decoding/vocabulary component for a new text.

The educational resources StoryBytes (Sharp Reading, 2013) were used as the texts for the intervention; these have been formatted for use in guided reading lessons. Each narrative is published in three levels of text difficulty that includes: easy (Reading Age 7-8 years), medium (Reading Age 10-12 years), and hard (Reading Age 13-15 years). For the current study, easy texts were used to teach students the session format, with medium texts used for the remainder of the study. The stories selected had short composition and were deemed to have high-interest subject matter or content for students: for example, stories about Batman, yetis, pirates, and spies. High-interest content was chosen to assist students in engaging within the learning process.

Table 2. Session structure for intervention

Component	Structure
	Words selected from focus text that are potentially unknown by students.
Decoding	Students and teacher discuss and apply decoding strategies that included the used of CVC syllable sound recognition, blending sounds, and chunking based on morphology, orthography, rime.
Vocabulary	Discussion of meanings of selected words from decoding component.
	Repeated reading:
Fluency	<ol style="list-style-type: none"> i. teacher reads a section of the text to students, and all students follow the text using text cards; ii. teacher and students re-read section of the text as a group; iii. students take turns to individually re-read sentences or sections of the text out loud – and remaining students read silently, using their text cards to follow. <p>Discussion: text based comprehensions questions that related to the targeted vocabulary.</p>

RESULTS

Descriptive statistics for the measures administered to intervention group are presented in Table 3. Paired sample t-tests were carried out to compare pre- and post-intervention researcher-administered measures (eta squared statistics were included to determine the effect size and followed guidelines set by Cohen, 1988) – these were one-tailed analyses

Table 3. Pre- and post-intervention scores for the intervention group (n = 21) for all researcher-administered measures

Test (maximum score)	Pre-intervention			Post-intervention		
	Mean	SD	Range	Mean	SD	Range
Literacy						
Burt (110)	44.05	14.94	26 - 88	52.19	17.02	31 - 94
NARA-Accuracy (100)	33.67	17.50	8 - 75	39.43	14.90	16 - 79
NARA-Comprehension (44)	10.57	4.39	4 - 20	18.33	5.54	10 - 31
NARA-Rate	39.33	18.02	17 - 101	39.29	18.50	14 - 99
Psychosocial						
Global Self-Esteem (40)	26.86	4.57	19 - 35	28.10	3.33	22 - 34
Academic Self-Esteem (24)	14.95	3.89	6 - 24	17.24	3.99	10 - 24
Resilience (70)	43.52	7.80	31 - 61	44.71	10.63	29 - 65
Self-Efficacy-Total (144)	88.19	18.03	45 - 117	97.33	18.22	60 - 131
Efficacy-Academic (48)	30.62	7.15	12 - 44	31.29	8.80	12 - 45
Efficacy-Social (48)	29.95	8.00	9 - 42	33.38	8.45	15 - 46
Efficacy-Emotional (48)	27.62	7.04	13 - 43	32.67	5.57	21 - 41
Reading Attitude Total (80)	51.90	12.93	21 - 74	53.14	9.54	31 - 73
Recreational (40)	25.24	5.78	11 - 34	26.48	5.05	17 - 38
Academic (40)	26.29	7.16	10 - 37	26.67	5.83	14 - 39

given the expectation of gains in measures between the two time points. Correlational analyses were then used to determine the level of potential relationships between literacy gains and psychosocial development found in the study: partial correlations were used to control the influence of year level and gender.

The paired sample t-test for the Burt test was significant ($t(20) = 5.77, p < .001, \eta^2 = .62$) indicating that students performed significantly better on the single word reading accuracy task at post-intervention. Significant gains were also identified for NARA accuracy, ($t(20) = 4.46, p < .001, \eta^2 = .50$), and NARA comprehension ($t(20) = 12.07, p < .001, \eta^2 = .88$). No significant gains were identified for NARA rate ($t(20) = .03, \eta^2 = .005$), with pre and post reading rates being almost identical (see Table 3). The distribution of rates at both time points were highly skewed (there were some very slow readers), which led to concerns about the normality assumptions. Re-analysis of the data using a Wilcoxon Signed Rank Test (the non-parametric version of the paired t-test) did not show a significant effect for the NARA rate component ($Z(20) = -.469, p > .05$). Therefore, these data suggest gains in reading accuracy (word and text) and comprehension, but not rate of reading.

Similar analyses for the psychosocial measures indicated significant gains between pre- and post-intervention scores for the global self-esteem scale ($t(20) = 1.777, p = .046, \eta^2 = .14$) and academic self-esteem ($t(20) = 3.114, p = .002, \eta^2 = .33$), as well as the general self-efficacy scale ($t(20) = 2.814, p = .006, \eta^2 = .28$), and the subscales of emotional self-efficacy ($t(20) = 3.821, p < .001, \eta^2 = .42$) and social self-efficacy ($t(20) = 2.050, p = .027, \eta^2 = .30$). Non-significant differences were identified for resilience, academic self-efficacy, or reading attitude.

In order to determine if relationships existed between literacy and psychosocial development, analysis was carried out using Pearson product-moment correlations (see Table 4). Correlations were interpreted in terms of effect sizes, based on a small effect having an $r = .10$ to $.29$, a medium effect with an $r = .30$ to $.49$, and a large effect of $r > .50$ (Cohen, 1988). This indicated several medium effects between measures of literacy and psychosocial development, as well as a range of small effects. The present study will focus on r -values of $.2$ and above only.

Overall, literacy gains were more likely to be associated with changes in self-efficacy and reading attitude, rather than self-esteem and resilience. Also, improvements in accuracy (word or text) did not seem to have consistent influences on changes in psychosocial development. However, gains in comprehension and rate did produce small to medium size relationships with self-efficacy and reading attitude. Improvements in reading comprehension were related to positive changes in self-efficacy, particularly academic self-efficacy ($r = .311$) but also general self-efficacy ($r = .273$), as well as reading attitude ($r = .335$). Faster text reading rates were also related to increased academic self-efficacy ($r = .278$), suggesting that those showing increased reading rates

Table 4. Pearson correlations between literacy and psychosocial measures

	Burt word reading	NARA-accuracy	NARA- comprehension	NARA-rate
General Self-esteem	-.003	.104	.134	<i>-.264</i>
Academic Self-esteem	-.011	-.084	-.119	.177
Resilience	-.052	-.114	-.105	.155
Global Self-efficacy	-.137	.009	<i>.273</i>	.168
Self-efficacy - Academic	-.076	.017	<i>.311</i>	<i>.278</i>
Self-efficacy - Social	.021	<i>-.217</i>	.153	-.060
Self-efficacy - Emotional	<i>-.285</i>	<i>.281</i>	.155	<i>.200</i>
Reading attitude	.169	-.015	<i>.335</i>	<i>-.303</i>
Reading attitude - Recreational	-.003	<i>.245</i>	.196	<i>-.254</i>
Reading attitude - Academic	<i>.203</i>	.122	-.100	<i>-.243</i>

Note: bolded r-values indicate a medium effect; those in bolded italics a small effect of $r > .2$

felt more confident about their capabilities. In contrast, text reading rate was negatively correlated with reading attitude ($r = -.303$), suggesting that increases in positive attitudes to reading may be associated with slowing reading down, possibly to implement the decoding strategies taught to students over the course of the intervention.

The latter two effects show that the relationship between literacy gains and psychosocial development is complex. To assess these relationships further, the children were divided into two groups based on their pre-intervention resilience level, given that those with high resilience levels may be resilient to changes in psychosocial areas. These data indicated that students with high pre-intervention resilience levels actually reduced their scores on the resilience scale (about 2 scale points), in contrast to those with low pre-intervention resilience levels who increased scores on this scale (about 5 scale points). Additionally, the correlations between improvements in comprehension or rate and changes in the psychosocial variables varied across these two groups. For the low pre-intervention resilience group, improvements in reading comprehension were related to increases in most aspects of self-efficacy (general self-efficacy, $r = .310$, academic self-efficacy, $r = .333$, social self-efficacy, $r = .353$). Similar effects were also found for improvements in reading rate (general self-efficacy, $r = .235$, academic self-efficacy, $r = .617$, emotional self-efficacy, $r = .312$). However, for these children, increases in reading rate were related to reductions in reading attitude ($r = -.547$). For the high pre-intervention resilience group, improvements in reading comprehension were related to moderate improvements in self-efficacy ($r = .318$) but had a large effect on reading attitude ($r = .655$).

DISCUSSION

This study was concerned with the psychosocial and literacy development of primary aged students, from Year 4 to 6, with literacy learning difficulties (LLD). The primary purpose was to examine whether the psychosocial development of students with LLD could be influenced by a targeted literacy intervention. This was based on the meta-analysis of Elbaum and Vaughn (1999) that argued for the effectiveness of school-based interventions that targeted the development of academic skills in improving the academic self-esteem of elementary school students with LLD. In the current study, the evidence suggests that the students were experiencing literacy learning difficulties. Mean scores on the standardised STAR measure indicated that the students performed on average at Stanine 2, which placed the students within the 5th percentile for reading achievement. This finding aligned with the OTJ-R data that indicated teachers rated students as working below the expected national average. Pre-intervention scores on the NARA measure indicated that, on average, students were performing around 7.4 to 7.9 years of age; and on the Burt measure, at pre-intervention students were performing, on average, around 8 years of age. The students were performing well behind their classroom peers in their literacy learning and hence should benefit from targeted interventions supporting literacy learning. The analyses comparing pre- and post-intervention literacy measures were consistent with this argument: students showed significant gains for word and text reading

accuracy, as well as text reading comprehension, though not for rate of text reading.

The latter null effect with regard to rate of reading may be due to the focus of the intervention on more accurate decoding and strategies to support accurate word recognition. An alternative explanation is based on the observations that difficulties existed within the fluency component of the intervention and may need to be a focus of future improvements. The lexicons held by some students were less developed and the fluency component was often interrupted with the decoding of words in the text unfamiliar to students that often extended beyond those words identified by the researcher in the decoding component of the intervention. In order to meet student needs, the intervention was modified partway through by increasing the number of words selected for the decoding component, although this resulted in additional time being spent on this part of the intervention, which likely affected the amount of time spent on the fluency component. It was also evident that students were more reluctant to read during the fluency component, even though the StoryBytes texts were short in nature, and a lack of engagement in the repeated reading element of the fluency component may have reduced the impact of this aspect of the intervention.

However, given that the intervention was leading to improvements in struggling learners (at least in accuracy and comprehension), the focus of the current work was whether this would be related to improvements in measures of self-esteem, self-efficacy, resilience and reading attitude. Analyses identified that students made significant gains in aspects of self-esteem and self-efficacy, but not in resilience and reading attitude. In addition, a positive association was found between improvements in text reading comprehension and increased self-efficacy – and to some extent better reading attitudes. The positive association identified between reading comprehension and academic self-efficacy is perhaps not surprising: having the capacity to answer comprehension questions correctly is likely to be perceived as a key component of successful (effective) reading achievement in older learners.

In the current research, literacy learning difficulties were conceptualised as a risk factor for students, which is likely due to difficulties in literacy development influencing students' ability to succeed within the educational context (see also Margalit, 2003; Miller, 2002). Findings indicated that changes in resilience were not related to literacy gains, and it was only when the children were divided into groups based on pre-intervention resilience levels that the influences of resilience were more apparent. Findings suggested that students with low resilience levels at the start of the intervention showed improved resilience by the end of the intervention, whereas those with high resilience scores at the start showed a small reduction in resilience. By the end of the study, a difference of 12 resilience scale points between the two groups had been reduced to 5. This finding supports the notion that heterogeneity exists in terms of how children may respond to risk, in this case LLD, which means that variation in adaptability is likely (Rutter, 2012; Schoon, 2006). Indeed, these findings may be reflective of children's

reactions to the intervention content. Cummings et al. (2002) noted that perceptions and cognitive processes are likely to underpin children's reactions to experiences, rather than the objective experience itself. Additionally, according to Boyden and Mann (2005), exposure to risk does not automatically result in increased vulnerability. Students in the current study, who were higher in pre-intervention resilience may have held positive perceptions of their literacy competence. Participating in the intervention may have highlighted literacy difficulties leading to an increase in vulnerability. Indeed, it may have been only after experiencing the challenges of reading age-appropriate material that resilience was being developed – prior to this, it may be better to conceptualise the views of these children as confidence rather than resilience. In comparison, students who had lower levels of resilience may have held lower levels of perceived competence in literacy. Therefore, positive perceptions of their experiences may have fostered the development of resilience.

These findings lend some support to Elbaum and Vaughn (2003) in that initial levels of psychosocial development will influence subsequent development; however, in the current study, it was resilience, not self-esteem, that was the focus of this influence. Furthermore, relationships between gains in literacy and psychosocial development were more evident in self-efficacy, not self-esteem; which contrasts with findings within literature that tend to emphasise the association between self-esteem (specifically academic self-esteem) and academic achievement (Byrne, 1984; Chapman, 1988; Guay et al., 2010; Hettinger, 1982; Tunmer & Chapman, 2003). One interpretation of the present findings is that self-efficacy may be predicted to exert more influence on psychosocial development due to perseverance, which enables resilient self-efficacy to develop (Bandura, 1997) and that this has potential benefits to academic achievement. As such, self-esteem may be less fundamental to understanding behaviour and emotional responses in students with LLD than the development of self-efficacy, and its association with resilience. However, the interactions between these concepts are complex (as the present data confirm) and future consideration should be given to examining further those factors that influence the differential effects of an intervention on the development of resilience in students with LLD, as well as association with self-efficacy.

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Impacts of Inferential Skills on Reading Comprehension in Thai (L1) and English (L2)

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Abstract

This study investigated the influence of the ability to make inferences on reading comprehension in Thai (L1) and English (L2). Eight measures were utilised, including four measures of inferential skills and reading comprehension in Thai and English, three measures of language skills (vocabulary and listening skills), and the Raven's Advanced Progressive Matrices. Data were collected from 220 undergraduate students in Thailand. Results demonstrated a significant inter-relationship between inferential skills in Thai (L1) and English (L2). Furthermore, findings from hierarchical regression analyses indicated that the addition of the inferential measure scores significantly increased the predictability of reading comprehension in the same language, after controlling for within-language vocabulary levels (and listening comprehension in the case of Thai) and non-verbal reasoning. Analyses across languages showed positive correlations between Thai inferential skills and English reading comprehension, and between English inferential skills and Thai reading comprehension. Hierarchical regression analyses also indicated that the addition of the English inferential measure predicted extra variability in Thai reading comprehension after controlling for English and Thai language related skills and non-verbal reasoning measures, but the addition of the Thai inferential measure did not influence the level of prediction of English reading comprehension after controlling for the same variables. Implications for bi-lingual learners of different ability levels are discussed.

Keywords: Reading comprehension; Inferences; Thai-English speakers; Language transfer

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INTRODUCTION

Drawing inferences is one of the central cognitive processes in reading comprehension. Inference generation takes place when readers want to get more from text than what is literally stated (Kispaal, 2008). Inference generation relies upon the ability to integrate clues in the text with prior knowledge to achieve a more fully integrated and coherent representation of text (Cain & Oakhill, 1998; Kintsch, 1998; Pressley, 2000; Snow, 2002). As such, successful inference skills are often seen as key to successful comprehension (Cain, 2010; Cain, Oakhill, Barnes, & Bryant, 2001; Dole, Duffy, Roehler, & Pearson, 1991; Eason, Goldberg, Young, Geist, & Cutting, 2012). Indeed, longitudinal studies have provided evidence of the importance of inference in the development of reading comprehension (Cain et al., 2001; Hannon & Daneman, 1998; Kendeou, Bohn-Gettler, White, & van den Broek, 2008; Oakhill & Cain, 2012).

The significance of inference to reading comprehension has been investigated in first language (L1) contexts. Much of this previous research has examined inferential skills in English as a first language, particularly with regard to school age children (e.g., Cain & Oakhill, 1998, 1999; Cain et al., 2001; Silva & Cain, 2015). For example, the study of Oakhill and Cain (2012) showed that comprehension skills that comprised the ability to make inferences, to monitor comprehension, and the knowledge/use of story structure were the largest predictors of reading comprehension in year 6 English L1 students. Furthermore, Silva and Cain (2015) explored how receptive vocabulary, grammar and verbal memory (which they described as lower level comprehension skills) supported the early development of inference and literal story comprehension (higher level comprehension skills), and identified the predictive power of these skills on subsequent reading comprehension in four to six-year-old English L1 children.

In sum, the results show that inference skills are significant to the construction of text representations in the earliest stages of reading comprehension development. However, research also argues for the influence of inference making on reading comprehension in older learners (the focus of the current research). For example, Cromley and Azevedo (2007) investigated the effects of background knowledge, inferencing, vocabulary, and single word reading on reading comprehension and argued that the ability to use strategies such as summarising and inferencing provided a greater contribution to reading comprehension in adolescents and adults than in children. Studies also indicate that performance on tasks requiring inferences can differentiate groups of adult skilled readers from their less skilled peers (Hannon & Daneman, 1998; Long, Oppy, & Seely, 1994). Therefore, the ability to make inferences is a significant predictor of reading comprehension in a first language.

In terms of research relating inference and reading comprehension in a second language (L2), one area of interest has been lexical inferencing, which is the skill of being able to interpret the meaning of a word based on the context in which the word is found (Nation,

2001). Clearly, this is a skill that could support reading within a language where vocabulary knowledge may be limited. Therefore, lexical inferencing has been investigated in several studies (e.g. Hatami & Tavakoli, 2012; Karlsson, 2014; Prior, Goldina, Shany, Geva, & Katzir, 2014; Wu & Shen, 2009). However, little L2 research has investigated other types of inference, comparable to that widely conducted in L1 research. One example is the study by Lee (2014) in which English second language primary school students showed low levels of inferencing with a narrative text and informational article. Such findings may suggest that more general types of inferencing are less likely to be found in L2 readers in contrast to their L1. Therefore, the present study aimed to investigate the relationship of inferential skills and reading comprehension in students' L1 and L2.

As suggested above, research that has focused on explanations of L2 reading based on underlying cognitive processes (such as processing involved in making efficient inferences about a text) often considers processes as hypothesised in models of L1 reading. Such research on second language learners has also identified cross-linguistic influences in successful reading L2 acquisition: skills developed in one language may support the development of analogous skills in a second, or the same skills developed in one language may be used during reading in the second language (see discussions in Bialystok, McBride-Chang, & Luk, 2005; Sadeghi & Everatt, 2015). This means that models of reading acquisition and practices to support literacy learning need to take account of such cross-linguistic influences (see findings in Lipka & Siegel, 2007). Although transfer between L1 and L2 has been identified, questions still arise regarding what skills/ processes transfer from one language to another and whether they produce facilitative versus interfering influences (Koda, 2007; Sadeghi & Everatt, 2015).

Several theoretical hypotheses have been proposed for the potential transfer of reading skills. The Reading Universal Hypothesis postulated by Goodman (1971) argues that the reading process is much the same for all languages, with minor variations to accommodate the specific characteristics of the writing systems and the grammatical structures of the language.

Cummins (1981) proposed the theory of the Common Underlying Proficiency (CUP), which is also called the Interdependence Hypothesis, which makes a strong case for the transfer of literacy skills across languages. The theory argues that there is a cognitive/ academic proficiency that is common for all written languages although the surface aspects of two languages differ. Such theories suggest that it is plausible that inference skills developed in one language should transfer to the processing of text in a second. However, such transfer effects are usually considered from the perspective of lower level reading/ comprehension skills (based on Silva and Cain's, 2015, delineation of lower and higher comprehension skills). Investigations of higher level comprehension skills across languages have been rare (e.g. Han & Stevenson, 2008). Although studies have considered how lower level skills may transfer to support higher level processes: for

example, Gottardo, Javier, Farnia, Mak, and Geva (2014) showed significant associations between Spanish (L1) word reading and English (L2) reading comprehension. Most studies of transfer focus on L1 to L2; however, recently, research has focused on reciprocal transfer or the transfer from L2 to L1 (e.g., Oller & Cobo-Lewis, 2002; van Gelderen, Schoonen, Stoel, de Glopper, & Hulstijn, 2007). These studies suggest that reading skills may transfer between languages; while, the majority of studies on cross-linguistic transfer have focused on early reading skills, such as decoding or phonological awareness, the current study aimed at investigation into transfer of high level skills in reading comprehension such as inference among English language learners.

The present study investigated the impact of inferential skills on reading comprehension of Thai (L1) and English (L2). The research questions were posed as follows:

1. Is there any relationship between inferential skills in Thai (L1) and English (L2)?
2. Do inferential skills support reading comprehension within-language (Thai and/or English)?
3. Can inferential skills in one language support reading comprehension in another language?

METHODS

Participants

The sample for this study was 220 second year undergraduate students in eastern Thailand. The participants were studying various majors except English language, but they were required to complete three English courses in order to meet the requirements for a four-year undergraduate programme. As part of the study, participants completed a questionnaire that included demographic information and were asked for details of language learning. Based on these self-reports, all participants were Thai native speakers, aged 18-19 years old. The sample comprised 76 male (34.5%) and 144 female (65.5%). They had studied English as a foreign language for about 12 to 13 years before attending the tertiary level.

Measures

A range of measures were used in this study to assess skills in Thai and English. These assessed reading comprehension, inferencing, language and non-verbal reasoning. For all measures, pilot work was also conducted, and involved adult students from a similar university background, but who were independent of those participants whose data were analysed in the results of this paper.

Thai and English Reading Comprehension

The Thai and English reading comprehension measures were adapted from the Thai language critical reading test (Prasansorn, 2001). This test was originally developed to assess the reading abilities of secondary school students before and after teaching methods that focused on higher-level thinking. Given the focus of the current study, such a measure fitted the needs to assess more complex reading skills as well as be relevant to the target population of Thai students. The test items were constructed on the basis of the cognitive domains of Bloom's taxonomy (Anderson et al., 2001), enabling different types of reading skills to be investigated. By random selection, the English reading comprehension test was constructed based on the Thai language critical reading test Form A, whereas Form B of the test was used as the basis of the Thai reading comprehension test. Form A was translated from Thai into English, and some types of reading passages (i.e., Thai poetry and advertising commercials) were omitted to avoid ambiguity or misinterpretation by the adult students who were the focus of the current study – they would not be familiar with such passages in English.

This process resulted in the selection and piloting of a total of 10 passages. These procedures led to an English measure comprising 40 comprehension questions and a Thai measure of 35 comprehension questions. Participants were given 25 minutes to complete the Thai measure and 30 minutes to complete the English version. Their task was simply to read the passages silently to themselves and answer the comprehension questions following each passage. The number of questions answered correctly in each measure was recorded. Part of an English reading item can be found below as an example of the measures used.

Passage:

Nawarat Pongpaiboon was born on 26 March 1940 at PhanomThuan district, KanchanaBuri. He is a son of Sombat and Somjai Pongpaiboon. He was in the family where everyone loved Thai literature. His father was especially interested in Thai classical music and Thai poetry.

Nawarat's mother herself liked reading Thai literature. She also liked to share her enjoyment through the stories she read to her children. His father loved reading not only poems, but also other things, such as traditional Thai literature and contemporary stories.

Question:

What factors encouraged Nawarat Pongpaiboon to become a poet?

- | | |
|-----------------------------------|----------------------|
| a. Nawarat's personal interests | b. Nawarat's talents |
| c. Nawarat's teachers and friends | d. Nawarat's family |

Thai and English Inferential skills

The Thai and English inferential skills tests were developed in parallel to make them as consistent as possible. The tests consisted of ten short reading passages followed by a series of multiple-choice-questions with four choices for each. All reading passages were carefully written, taking into account the potential for cultural interference and the participants' interests and competency. Each reading passage included five different types of question to ensure that a range of inferences were tested. Literal questions asked for factual information explicitly stated in the passage; these questions were included to ensure that the reader had a basic level of text comprehension (Hogan, Bridges, Justice, & Cain, 2011): for example, following the text "Debbie was going out for the day with her friend Michael", a literal question would be "Who did Debbie spend the afternoon with?" (Cain & Oakhill, 1999, p. 495). Grammatically connecting inferences involved a referent which was used in the text to refer to a person or object: for example, given "Tim also took off his dusty overalls and threw them into a plastic garbage bag", then a correct answer to the question "Where did Tim put his overalls?" would suggest that the reader had correctly inferred that "them" related to "overalls". Vocabulary related meaning inferences meant that the reader had to infer the relationship between two words or phrases that referred to the same concept: for example, "every morning" and "daily" would refer to similar concepts in the text and in the comprehension question.

Text coherence inferences focused on relating information in two contiguous phrases or sentences to achieve the coherence meaning of a written text. An example based on Cain and Oakhill (1999) was "Michael got some drink out of his duffel bag. The orange juice was very refreshing." which provided the information needed to answer the question "Where did Michael get the orange juice?". To answer the question, the reader needed to make a connection between the phrase "some drink" and the phrase "orange juice". Prior knowledge inferences required the ability to connect information in the text with background knowledge about the text or incidents described. For instance, in "No one came to the party. Nancy threw away the cake." (an example from Hogan et al. (2011, p. 6), the question might be "What was Nancy's feeling after the party?". Here, the correct answer would likely be to infer that she was upset.

For the Thai measure, two Thai lecturers gave specific advice on the reading passages and questions. Based on this advice, and the results of pilot work, the test was revised in terms of content and complexity. The English measure was also revised based on pilot work, and materials were reviewed by two English native speakers. Both tests were reviewed by experts in test development who provided feedback in terms of content quality, clarity and lack of ambiguity, and sensitivity to cultural issues.

The Thai inferential skills test comprised reading passages between 150-250 words in length and a total of 45 comprehension questions, and students were given 20 minutes to read the passages silently to themselves and answer the questions. A similar procedure

was used for the English version, with reading passages of between 140 and 225 words in length, 35 questions and about 30 minutes. The number of questions answered correctly for each language version formed the scores for these measures.

English vocabulary

Vocabulary, or word knowledge, is vital for text comprehension (Cain & Oakhill, 2014) and, therefore, has been found to be one of the best predictors of reading comprehension (Carroll, 1993; Thorndike, 1973), particularly in skilled adult readers (Guo, Roehrig, & Williams, 2011). Word knowledge, or vocabulary size, is typically measured by determining the number of words of varying frequency that participants can understand. The Vocabulary Size test (Nation & Beglar, 2007) was determined to be the most appropriate measure to investigate the vocabulary proficiency of the participants as this is a standardised test that was developed to measure receptive vocabulary of non-native speakers of English.

The 20,000 version of Nation & Beglar's Vocabulary Size test contains two forms (A and B) with 100 items in each form. For this study, form B was randomly chosen to be a measure of English vocabulary. To avoid the participants' boredom and a lack of motivation in attending a 100 item test administration, 40 test items were used in the study which showed good variability of scores in pilot work conducted with independent participants prior to the current study. Participant were given a word in isolation and within a sentence and then selects from the four choices the meaning of the isolated word. The score for the test was the number correct out of 40 and they were given 15 minutes to complete as many items as possible. An example from the test is provided below.

basis: This was used as the <basis>.

- | | |
|--------------|-------------------------|
| a. answer | b. place to take a rest |
| c. next step | d. main part |

Thai vocabulary

The set of Thai vocabulary used for the Thai vocabulary test was randomly selected from Thai vocabulary lists of secondary level education Thai language textbooks. Participants would have encountered all of these words when they were in high school, though their frequency of use would be variable outside of school. These words were then placed in a format following that used with the English vocabulary measure. Based on pilot work with students independent of those in the current study, 50 items were selected for the measure. Participants were given 12 minutes to complete as many items as they could, with the score being the number correct. An example from the test is provided below.

กัลยาณี เธอเป็นกัลยาณี

ก. หญิงงาม

ค. หญิงสุขุม

ข. หญิงที่เรียบร้อย

ง. หญิงอ่อนช้อย

Thai listening comprehension

Given that Thai language was the participants' first language, an additional measure of language ability was included in the study to ensure that any identified relationships between inference ability and reading comprehension were not simply due to general language skills not assessed by the vocabulary measure: for example, the process of understanding words combined into sentences may not be assessed by the vocabulary measure. Hence, a measure of listening comprehension in Thai was included to assess skills in combining words for understanding. This measure focused on the ability to derive meaning from what was actually stated, rather than infer meaning.

The Thai listening comprehension test consisted of a series of spoken passages followed by one or more YES/NO questions. The measure was developed for the specific purpose of this study – though using procedures consistent with measures of listening comprehension reported in the literature (Bell & Perfetti, 1994; Juel, Griffith, and Gough (1986). Following amendments based on the suggestions of two Thai university lecturers, all the listening comprehension passages and questions were recorded by a Thai native speaker at normal conversational speed. In total there were 25 questions that the participant was expected to answer; and the test took approximately 10 minutes. The number of questions answered correctly was the score for this task. An example from the test is provided below.

Spoken passage:

วันนี้แม่รู้สึกไม่ค่อยดี ครั้นเนื้อครั้นตัว เจ็บคอ สงสัยจะโดนไข้หวัดเล่นงานซะแล้ว เมื่อเข้าทานยา แต่อาการก็ยังไม่ดีขึ้น เดี่ยวจะโทรไปลางานก่อน และคงต้องไปหาคุณหมอแล้วละ

Spoken question:

ผู้พูดรู้สึกดีขึ้นหลังทานยาใช่หรือไม่
(ใช่) (ไม่ใช่)

Non-verbal reasoning ability

The Advanced Progressive Matrices (Raven, 1962) is one of the most common and popularly used tests of non-verbal ability (Kaplan & Saccuzzo, 2009) and has been used across a wide range of age groups, including adults (Raven & Raven, 2008). A primary drawback of the full form (36 items) of Raven's Advanced Progressive Matrices is the

length of the test administration, which might increase the influence of interfering variables, such as fatigue and boredom (Chiesi, Ciancaleoni, Galli, Morsanyi, & Primi, 2012). Therefore, several shortened versions have been proposed, including the one included in the present study by Arthur and Day (1994). This 12 item test has been used with samples of university students and has been shown to produce results consistent with the full version (e.g., Chiesi et al., 2012). For the present study, a practice item was used to ensure that the students understood the task. This was followed by the 12 test trails that comprised a matrix of nine areas, eight of which contained shapes that formed a sequence based on shapes, orientation or shading. For each of the 12 test items, the participants were asked to identify the missing element that completes a pattern from eight options provided. The students were given 10 minutes to complete as many of the abstract sequences as they could.

Procedures

The measures were performed in two sessions each of which took about 90 minutes, but with a thirty-minute intermission in order to avoid participant exhaustion. The first part of the first session involved completing a questionnaire asking for background details (demographic details and language experience), the Thai listening comprehension measure and the Thai reading comprehension measure. The second part involved the Thai vocabulary test and the Thai inferential measure. The second session involved the Raven's advanced progressive matrices, English vocabulary test, English inferential measure and English reading comprehension – again split over two parts with a rest break.

RESULTS

Scores on the measures were coded and entered into a statistical programme for analysis. Descriptive statistics can be found in Table 1, followed by correlations between the study variables in Table 2, and correlations between reading comprehension and the different type of inference question in Table 3.

Correlations indicated relationships between Thai reading comprehension and all of the Thai language measures, and the non-verbal measures. However, the Thai Inferential skills measure produced the largest correlation with Thai reading comprehension. A similar pattern was identified for the English measures: the inference measures showed larger correlations with English reading comprehension than English vocabulary and the non-verbal measure. In terms of cross-language relationships, the Thai inferential measure was significantly positively correlated with the English inferential measure. Interestingly, the relationship between English inferential skills and Thai reading comprehension was larger than the relationship between Thai inferential skills and English reading comprehension, though both were significant and consistent with cross-language transfer of such inferencing skills.

Table 1. Descriptive statistics for all measures in this study (N = 220)

Measures	No of items	Mean	SD	Range
Thai reading comprehension	30	17.12	3.81	7-27
Thai inferential	45	27.82	5.77	9-38
Thai listening comprehension	15	10.64	2.06	2-15
Thai vocabulary	40	21.80	4.19	8-33
English reading comprehension	35	10.10	3.31	1-20
English inferential	35	13.22	4.35	3-26
English vocabulary	30	8.70	3.38	1-16
Non-verbal reasoning	12	5.42	2.29	0-11

Table 2. Pearson product moment correlation between the variables in the study

	1	2	3	4	5	6	7	8
1. Thai reading comprehension		.42**	.20**	.25**	.09	.32**	.12	.23**
2. Thai inferential			.16*	.44**	.16*	.41**	.22**	.24**
3. Thai listening comprehension				.21**	.21**	.06	.11	.21**
4. Thai vocabulary					.05	.33**	.33**	.19**
5. English reading comprehension						.37**	.20**	.14*
6. English inferential							.28**	.17*
7. English vocabulary								.11
8. Non-verbal reasoning								

* $p < .05$, ** $p < .01$.

Table 3. Correlations between reading comprehension and the different types of inference questions

	Thai reading comprehension	English reading comprehension
Thai inference questions		
Literal	.31**	.06
Grammatical	.33**	.05
Vocabulary related	.25**	.19**
Text coherence	.37**	.14*
Prior knowledge	.28**	.13
English inference questions		
Literal	.27**	.24**
Grammatical	.23**	.29**
Vocabulary related	.23**	.10
Text coherence	.12	.26**
Prior knowledge	.19**	.28**

Hierarchical regression analyses were conducted to investigate whether inferential skills predicted same-language reading comprehension (see Table 4). Two analyses were performed, one for each language and with the reading comprehension measure as the dependent variable. For each analysis, gender, language and non-verbal reasoning were entered prior to the inference measure to investigate whether the latter explained variability in reading comprehension over that of the other measures. The inferential

Table 4. Hierarchical regression analysis investigating predictive ability of inferential skills on reading comprehension within-language

Step and variables entered	R ²	R ² Change	Sig. R ² Change	Final Beta
DV = Thai reading comprehension				
1. Control	.100	.100	F = 24.29 p < .001	Gender: .279 (p<.001)
2. Thai language and Non-verbal reasoning	.215	.115	F = 10.49 p < .001	Thai listening: .086 (NS) Thai vocabulary: .068 (NS) Matrices: .150 (p=.015) Thai inferential: .300 (p<.001)
3. Thai inferential	.283	.068	F = 20.39 p < .001	Literal: .062 (NS) Grammatical: .091 (NS) Vocabulary: .087 (NS) Text coherence: .200 (p=.007) Prior knowledge: .048 (NS)
DV = English reading comprehension				
1. Control	.000	.000	F = 0.02 p = .878	Gender: -.021 (NS)
2. English language and Non-verbal reasoning	.054	.054	F = 6.17 p = .002	English vocabulary: .096 (NS) Matrices: .072 (NS) English inferential: .332 (p<.001)
3. English inferential	.151	.097	F = 24.47 p < .001	Literal: .103 (NS) Grammatical: .147 (p=.043) Vocabulary: .048 (NS) Text coherence: .172 (p=.012) Prior knowledge: .116 (NS)

Table 5. Hierarchical regression analyses predicting across languages of inferential skills on reading comprehension

Step and variables entered	R ²	R ² Change	Sig. R ² Change	Final Beta
<i>DV = Thai reading comprehension</i>				
1. Control	.100	.100	F = 24.29 p < .001	Gender: .266 (p<.001)
2. Non-verbal reasoning	.167	.067	F = 17.33 p < .001	Matrices: .141 (p=.022)
3. Thai language	.215	.048	F = 6.62 p = .002	Thai listening: .092 (NS) Thai vocabulary: .042 (NS)
4. English language	.217	.002	F = 0.64 p = .425	English vocabulary: .004 (NS)
5. Thai inferential	.284	.067	F = 19.81 p < .001	Thai inferential: .260 (p<.001)
6. English inferential	.297	.013	F = 3.96 p = .048	English inferential: .131 (p=.048)
<i>DV = English reading comprehension</i>				
1. Control	.000	.000	F = .02 p = .878	Gender: -.015 (NS)
2. Non-verbal reasoning	.020	.020	F = 4.42 p = .037	Matrices: .072 (NS)
3. English language	.054	.034	F = 7.79 p = .006	English vocabulary: .080 (NS)
4. Thai language	.073	.019	F = 2.18 p = .116	Thai listening: .006 (NS) Thai vocabulary: .085 (NS)
5. English inferential	.155	.082	F = 20.62 p < .001	English inferential: .327 (p<.001)
6. Thai inferential	.151	.097	F = 0.36 p = .548	Thai inferential: .046 (NS)

variable was entered in one analysis as a total score and then in a second as the five separate types of questions; the latter was performed to determine if one type of question explained more variance than the others. The Thai analysis indicated that the Thai inference measure explained a statistically significant additional variability in Thai reading comprehension despite controlling for Thai language skills and the non-verbal reasoning.

Furthermore, Thai inferential skills produced the largest beta weight in the final regression model ($\beta=.30$, $p<.001$). When the inference measure was divided into the five types of questions and these were entered as the last step in the regression, only the text coherence type questions produced a significant beta score ($\beta=.20$, $p=.007$). The English analysis showed a similar pattern of results, with English inferential skills predicting additional variability in English reading comprehension over that explained by language and non-verbal processes. In the final regression model, the English inference measure produced the largest beta weight ($\beta=.33$, $p<.001$). And when the five types of questions were entered separately in the final step, the text coherence questions also produced a significant beta score ($\beta=.17$, $p=.01$); though for English, the grammatical type questions also produced a significant beta ($\beta=.15$, $p=.04$).

Similar hierarchical regression analyses were performed to assess cross-language relationships between reading comprehension and inferential skills taking measures of language and non-verbal ability into account (see Table 5). Again, Thai or English reading comprehension was used as the dependent variable in each analysis, and the same entry method was used with the exception that both Thai and English language measures were entered prior to the inference measure, and the same-language inference measure was entered prior to assessing the cross-language relationships. The results of these analyses suggested that the addition of Thai inferential skills scores did not increase the level of prediction of English reading comprehension, with only the variable of English inferential skills producing a statistically significant beta score in the final model ($\beta=.33$, $p<.001$). However, for the Thai reading comprehension model, English inferential skills explained a statistically significant additional variability in Thai reading comprehension, and both Thai inferential skills ($\beta=.26$, $p<.001$) and English inferential skills ($\beta=.13$, $p=.048$) produced significant beta scores in the final model.

DISCUSSION

Three major areas of findings were reported in this study. First, the correlational analyses demonstrated the positive relationship between inferential skills and reading comprehension within the same language and also across languages. Second, hierarchical multiple regression analyses showed inferential skills made independent contributions to reading comprehension within the same language, but only the English inferential measure predicted extra variability in reading comprehension across languages. Finally, analyses of the five types of inferential questions demonstrated that

text coherence inferences were the type of questions most associated with reading comprehension in both Thai and English.

The positive relationship between inferential skills in Thai and English suggests that it is plausible that transferability of inferential skills across languages/orthographies may occur. Such results are consistent with several studies that have demonstrated the transference of skills across L1 and L2; though many of these have focused on measures of phonological awareness (Bialystok, Luk, & Kwan, 2005; Keung & Ho, 2009; Lindsey, Manis, & Bailey, 2003) and morphological awareness (Deacon, Wade-Woolley, & Kirby, 2009; Schiff & Calif, 2007). However, in a study by Abu-Rabia, Shakkour, and Siegel (2013), improvements in a range of skills including reading comprehension were found in both Arab (L1) and English (L2) after an intervention program conducted in English. The present findings are consistent with such previous research and suggest that such transfer can occur at the level of making inferences from text (or higher level comprehension processes, according to Silva & Cain, 2015). This conclusion is in line with Tang's (1997) study which demonstrated that bilingual Chinese (L1) and English (L2) adult learners used similar reading strategies to construct the meaning of texts presented in their L1 and L2.

Making inferences enables a reader to connect one part of a text to other parts, as well as to background knowledge, in order to comprehend a meaningful and coherent mental representation. Thus, inferential skills are reasonably viewed as a constructive cognitive higher level comprehension skills (Kendeou, van den Broek, Helder, & Karlsson, 2014). Therefore, the process of inference generation is likely to be similar in any language: as such, inferential skills in Thai and English will share cognitive commonalities. Despite the considerable linguistic differences between these two languages, and between the two writing systems, the positive associations between inferential skills in two different language, and their potential cross-language interactions with reading comprehension, supports theories of reading that argue for common underlying processes (Cummins, 1981; Goodman (1971).

However, the cross-language hierarchical regression indicated that only English inferential skills were predictive of Thai reading comprehension. One potential reason for this specific effect may be due to the fact that inferential skills were likely to have been explicitly taught in the students' English classrooms. A study by Chen (2012) investigated non-native English language teachers at one university in Thailand and found that the teachers' taught and provided practice in both metacognitive and cognitive reading strategies that are rarely explicitly taught in Thai language classrooms. Although further research is required, the current findings argue for the potential transferability of these explicitly taught L2 skills to L1 processing, a finding that is line with several intervention studies on explicit teaching in L2 strategies development in both L2 and L1 (e.g., Abu-Rabia et al., 2013; Aghaie & Zhang, 2012; Akkakooson, 2011; Salataci, 2002). The targeted L1 in these studies represented different languages: Iranian (Aghaie

& Zhang, 2012), Turkish (Salataci, 2002), and Thai (Akkakoson, 2011). However, the L2 of all the studies was English. Such research indicates that strategy instruction/training in L2 (English) can have a positive effect on both L1 and L2 reading comprehension and suggests that students who have acquired strategies from L2 learning may be able to use similar strategies when reading in their L1.

The analysis of the five types of inferential questions indicated that text coherence inferences were specifically associated with reading comprehension in both Thai and English. The potential role of such inferences in reading comprehension is consistent with the results of Cain and Oakhill's (1999) study with school-age L1-English children. Their results demonstrated that skilled readers were more able to make text connecting inferences (which shares similarities to the text coherence inferences of this study) than less skilled readers, but those same skilled readers were not significantly better than their less skilled peers on gap-filling inferences, which required the incorporation of the reader's background knowledge. However, other studies with school-age children have identified differing results. For example, Carlson et al. (2014) found that good, average, and struggling readers did not differ in their use of text-based inferences, and Bowyer-Crane and Snowling (2005) found no difference in achieving coherence inferences between skilled and less skilled comprehenders. Therefore, further research is required to identify the specific type of inferences that may support reading comprehension and which may vary across ability levels. However, a positive conclusion from the current study is that once these specific areas of deficit are identified, they can be acquired by second language learners and, under the right conditions, may show the potential to transfer from one language to another.

In conclusion, the findings are consistent with the importance of inferential skills in supporting reading comprehension of adult students when using their L1 and L2. One of the potential implications of this is that the explicit teaching of inferential skills would be a recommendation for practice in different language classrooms. Syllabus design and activities across language teachers would potentially allow for more opportunity for students to practise drawing upon inferential skills in various contexts. With direct and explicit explanation, as well as regular practice, students may become more skilled readers (Gaskins, 1994) both in their home/first language, but potentially also in newly acquired (second or additional) languages. Indeed, the evidence for cross-language transfer, which suggests that a skill learnt in one language can be used, or support the development of a similar skill, in a second, indicate that, rather than being a barrier to educational outcomes, bilingualism and/or second language learning may be an aid such literacy acquisition (see discussions in Sadeghi & Everatt, 2015). One way in which this may manifest is akin to when compensatory mechanism can be used to support learning following difficulties in acquisition: e.g., for those with dyslexia and word decoding problems, the context in which a word is written can be used to compensate for difficulties in word processing (see Nation & Snowling, 1998; Stanovich, 1986). Similarly, difficulties in processing in one language may be supported by second or additional

language processes, particularly if the acquisition of those processes are easier in one language compared to another. This has been argued to be the case in learning the relationships between written characters and language sounds since the more consistent these relationships, the faster the development of word decoding skills (for example, see discussions in Everatt et al., 2010): more transparent or regular orthographies have been found to show faster development of decoding processes and if these can transfer across language/orthographies, then faster development in one orthography may support the acquisition of the same skills in a less transparent orthography. Identifying how these compensatory influences manifest should lead to better informed teaching strategies. This should also support teachers: if a skill is easier to teach in one language/orthography compared to another, and is known to transfer between languages, appropriate bilingual teaching strategies should impact positively on learning, especially when difficulties are encountered. Additionally, problems with literacy learning can lead to negative feelings about the task to be learnt, and hence disengagement. Learning a second language in which negative consequences related to feelings of failure have not been established may also be a way to overcome learning difficulties that have manifested in L1 via a process of re-engagement in learning, and by strategically using positive outcomes and skills transfer as a way to support additional learning strategies in an L1. Clearly, more data are needed to determine how to implement these practices effectively, and how to vary them based on the strengths and weaknesses of the individual (more general or more complex needs typically require different overall strategies compared to more specific deficits). However, evidence for transfer should provide opportunities to develop teaching strategies, as well as suggest another positive feature of trends towards a more multilingual world.

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HELPING DYSLIXIC PEOPLE ACHIEVE

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

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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 3,000 preschool, primary and secondary school students in 13 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.

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.

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.

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

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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.

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