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Aims and Scope
The Journal of Reading and Literacy (JRL) is the official journal of the Society of Reading and Literacy, Singapore. This is a refereed journal with interests in reading and literacy issues in both mainstream (including adult education) and special education settings. The journal welcomes manuscripts of diverse and interdisciplinary themes in the aim of improving reading and literacy. Literacy is contextualized within a broad interpretation including traditional literacy, literacy standards, early and/or emergent literacy, comprehensive literacy, content area literacy, adolescent literacy, functional literacy, adult literacy, multimedia literacy, multicultural literacy, literacy and technology as well as any other interpretation that is of interest to the readers and the Editorial Board. Based on this broad conceptualization of literacy, assessment, measurement, evaluation, testing, programming, implementation, remediation, teaching and methodology are examined. The journal is particularly interested in papers investigating reading and literacy from the Southeast-Asian region, and how systems and practitioners are addressing literacy issues from their respective cultural and social backgrounds.
**Guidelines for Submission to JRL**

The JRL welcomes manuscript submissions at any time of the year on themes related to reading and literacy. Authors are completely responsible for the factual accuracy of their papers contributed to this journal. Neither the Editorial Board of JRL nor the Executive Committee of the Society for Reading and Literacy (SRL) accepts any responsibility for the assertions and opinions of contributing authors. Authors are also responsible for obtaining permission to quote lengthy excerpts from previously published papers.

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1. Manuscripts should be submitted electronically with the words “Submission for JRL” in the subject line to the Society for Reading and Literacy.

2. Language: English only

3. Document: Microsoft Word

4. Font and font size: Times New Roman or Arial; 12 point

5. Page limit: None

6. Margin: 1” on all sides

7. Title of paper: Top of page, capitals, bold, centred

8. By-line(s) of author/co-author(s): centred under the title

9. Name of organisation/institution that the author/co-author is associated with: centred under the by-line(s)

10. Abstract of not more than 150 words should accompany each submission and should appear immediately after the by-line(s)/name(s) of organization or institution.

11. Length: 3000-6000 words

12. Format: All authors and/or co-authors are expected to follow the guidelines of the 5th edition of the Publication Manual of the American Psychological Association (APA, 2001).

13. All figures, diagrams, illustrations and tables should be integrated in the typescript.
14. All sources cited in the paper must also appear on the References page at the end of the manuscript.

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Message from the President of the Society for Reading and Literacy

Serene Wee

Here is another issue of the e-Journal of Reading and Literacy (JRL) – the flagship of the Society for Reading and Literacy – that we have all been waiting for. Our e-journal is now in its sixth volume and the theme for this issue is on Readers with Diverse Needs.

I am also delighted to announce that our e-journal had undergone review by the Global Impact Factor (GIF) Australia and the e-journal has an impact factor of 0.321. I want to take this opportunity to thank the members of the SRL Editorial Board for their dedicated commitments to make this e-journal a success. We look forward to receiving more quality contributions from authors within and outside Singapore.

In this issue, five papers have been accepted for publication after being peer reviewed. We want to welcome three new authors, Hoo Lee Pin, Deon Poh and Wendy New Lee Pin. Hoo Lee Pin and Deon Poh will examine issues related to dyslexia while Wendy New Lee Pin writes a primer about autism spectrum disorder. We are also pleased to announce that Hoo Lee Pin is also the SRL Award 2014 recipient for this year. The two previous recipients of the same research award are Saryana Elangovan (in 2012) and Patricia Ng Mui Hoon (in 2013). Our in-house Representative Editor, Dr C.H. Ng, has also contributed a paper on using Directed reading and thinking activity (DRTA) for reading literacy texts. In addition, Dr Noel K.H. Chia and Dr M.E. Wong have also co-authored and contributed a short paper on different oral reading errors made by poor readers to raise the awareness among educators to know and identify these miscues and how to help these readers.
A Psycho-educational Framework for Conversion Reaction Syndrome – A Subtype of Dyslexia

Lee Pin HOO, BA
SRL Research Award 2014 Recipient
M.Ed (Special Education) Candidate
Society for the Physically Disabled
Singapore

Abstract

This paper provides a brief introduction to dyslexia and its subtypes, i.e., developmental, acquired, induced and idiopathic. The main focus of the paper is on one subtype of dyslexia identified as psychologically induced dyslexia, which is also known as Conversion Reaction Syndrome (CRS), first mentioned and described by Manzo (1983). The author provides a psycho-educational framework based on structuralism to help readers to understand the condition of CRS as well how best to help a child with CRS.

Key words: anxiety, conversion reaction syndrome, psychological induced dyslexia, subtypes

Introduction

Dyslexia, a term from Greek: dys and lexis, where dys means bad and lexis refers to words or vocabulary of language. In other words, dyslexia simply means difficulty with words. Siegel (2006) defined dyslexia as "a reading disability characterized by significant difficulties with speed and accuracy of word decoding, with comprehension and spelling being affected” (p. 581). Similarly, Peterson and Pennington (2012) acknowledge decoding as one of the difficulties in dyslexia and have further defined dyslexia as a neuro-developmental disorder, characterized by slow and inaccurate word recognition and spelling. The International Dyslexia Association (IDA) has given its operating definition of dyslexia as:

“A specific learning disability that is neurological in origin, characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede the growth of vocabulary and background knowledge.” (International Dyslexia Association, 2002)

The triangulation of these various definitions, essentially generates a triad of impairments for dyslexia, namely on word recognition, spelling and decoding. This triad of impairments forms the primary symptoms for dyslexia, with the underlying core cause in the phonological deficit. However, Peterson and McGrath (2009) have claimed that this single deficit is not sufficient to
impede the acquisition of word recognition skills which consequently, impede the acquisition of fluent reading. Likewise, Wolf and Bowers (1999) proposed a "double-deficit hypothesis" as an alternative conceptualization of dyslexia. In the double-deficit hypothesis, apart from the core deficit in the phonological component, naming-speed deficits, that is, deficits in the processes of rapid recognition and retrieval of visually presented linguistic stimuli, represent the second component of reading dysfunctions.

What is reading?

Prior to understand about dyslexia, the understanding of reading has to be established first. According to Latham and Sloan (1979), reading is seen as an active process; a reader's conscious attempt to make meaning of what is written. Since the goal of reading is making meaning of what is written, that is, reading comprehension, it is crucial to look into the cognitive components of reading comprehension. Peterson and McGrath (2009) proposed the breakdown of reading comprehension into various cognitive components and developmental precursors (See Figure 1).

From Figure 1, we can see that one of the main factors leading to reading comprehension is the fluent printed word recognition skills, which can be further sub-divided into two components: phonological coding and the orthographic coding, and Chia (2007) has termed the latter as the decoding process. In this process of decoding, it involves two sub-processes: the aural-visual decoding process and the visual-oral decoding process. The latter represents the word expression,
where "the reader sees the words and says them verbally aloud", while the former "represents word recognition where the reader may be able to recognize more words than he or she can accurately read them aloud" (Chia, 2007, p. 4). This decoding process is similar to the direct or the orthographic route, in the dual route theory of reading (Baron & Strawson, 1976; Coltheart, Curtis, Atkins, & Haller, 1993), which involves looking at the word and automatically knowing what it says. This direct route of reading will require one to have good rapid naming skills and skilled readers usually use this route during reading, unless they encounter unfamiliar words, where they will use the second component of the fluent printed word recognition skills: phonological coding, also known as the recoding process by Chia (2007). This process refers to how one is able to attack unfamiliar words by breaking them down its constituents, or in other words, phonemes, and knowing the pronunciation of these words through blending the individual and/or parts of the sounds together in order to read the word. This process constitutes the phonological route in the dual route theory of reading, and is commonly used at the beginning of the development of reading skills or by the skilled readers who have good phonemic awareness skills.

Therefore, the purpose of reading, that is, reading comprehension, is established through the deciphering of words in the text using the decoding (orthographic route) and/or recoding (phonological route). However, Chia (2010a) suggested that:

“The aim of decoding and recoding processes is to obtain the meaning of what is read and this meaningfulness plays an essential role in making sense of what a writer's intent is and what a reader can expect from the writer through reading the text, which leads to the ultimate aim of reading - reading comprehension.” (p. 4)

In other words, the fluent printed word recognition skills, that is, the dual route theory of reading does not suffice for the achievement of reading comprehension. The ultimate goal of reading - reading comprehension - also depends on the input of the readers in terms of his or background knowledge and prior experience, which in turn provides the reader the topic knowledge needed to understand the text. This is also termed the discourse-specific comprehension skills by Peterson and McGrath (2009) which they have defined as skills such as inferencing and building a mental representation of the meaning of the text.

In essence, we read in order to comprehend what we are reading, and this is a multi-faceted active process where the different components inter-relate to achieve the goal of reading comprehension.

**Characteristics of Dyslexia**

It is evident that one of the main characteristics of dyslexia lies in the deficits of the phonological component, where the individuals with dyslexia have trouble in the process of grapheme-phoneme conversion during reading. Even when they can read words, their reading process may be slow as a result of difficulties in retrieving rapidly the visually-presented words through the grapheme-phoneme conversion rules. Some of these individuals may also have difficulties remembering what they have read. Pennington (1991) has characterized the symptoms of dyslexia into four categories: primary, correlated, secondary and artifactual.
Primary symptoms
The primary symptoms comprise the triad of impairments in dyslexia, that is, reading (word recognition and decoding) and spelling, and the difficulties result from a deficit in the phonological component of language.

Correlated symptoms
These difficulties include articulation, rapid naming causing slow reading especially on timed reading tests, verbal short-term memory and long-term memory.

Secondary symptoms
The secondary symptoms, as illustrated by the operational definition of dyslexia by IDA. include problems in reading comprehension and reduced reading experience. Other symptoms include problems in memorizing basic math facts, poor self-esteem, letter and number reversals and eye movement differences in reading.

Artifactual symptoms
The problems include poor organizational skills, written output difficulties, attention deficits, delinquency, and visuo-spatial perceptual problems, leading to visual errors such as substitutions for content words that are based on a superficial visual similarity to the target word (e.g. "car" for "cat").

Comorbidities
Dyslexia may co-exist with other externalizing disorders such as attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), and conduct disorder (CD). Peterson and McGrath (2009) has suggested that males with dyslexia are more likely to have these comorbid externalizing disorders, while females with dyslexia are more likely to have comorbid internalizing disorders like dysthymia. Apart from these externalizing and internalizing disorders, individuals with dyslexia may also have other comorbid developmental and learning difficulties such as dyscalculia, dysgraphia and other handwriting difficulties (e.g., cacographia), verbal dyspraxia also known as articulo-graphic dyslexia and specific language impairment.

Subtypes of Dyslexia
According to Chia (2000), dyslexia can be “inherited (i.e. developmental), acquired (i.e. due to external insults to the brain), instructionally induced or psychologically induced” (p. 16). Therefore, dyslexia can be divided into four types, namely developmental, acquired, induced and idiopathic dyslexia, where the fourth type refers to dyslexia of unknown origin or causation. The four main types of dyslexia can be further sub-divided into other subtypes. For example, the first main type of dyslexia (i.e. developmental dyslexia) can be sub-divided into three primary subtypes such as dyseidesia, also known as visual-spatial dyslexia, where individuals with this subtype of dyslexia will have poor sight-word recognition and rely heavily on using word attack skills (e.g. phonics) to decode words. The second primary subtype is dysphonesia, known to be auditory-linguistic dyslexia. Individuals with dysphonesia will have difficulties in phonetic skills when decoding unfamiliar words. The last primary subtype is dysnemkinesia, where individuals with this subtype of dyslexia have an abnormally high frequency of letter reversals. They may
misread *dog* as *bog* (i.e. reversal known as changes in rotation in letters), *war* as *raw* (also known to be kinetic reversals), misread or mis-spell words like *tragedy* as *tradegy* (i.e. sequential reversals) or commit mirror-image reversals, which involves both the rotation and direction of the letters in the words when writing or spelling (e.g. *bump* as *qmud*) (Chia, 2009).

There are other secondary subtypes of dyslexia resulting from the combination of these three primary subtypes. They are: dysphoneidesia, dysnemkineidesia, dysnemkinophonesia, and dysnemkinphoneidesia. Each secondary subtype can be further sub-divided into more subtypes with different dysfunctions. Figure 2 shows the summary of the subtypes of the developmental dyslexia.

*Note: The underlined zigzag line beneath each of the secondary subtypes of dyslexia does not indicate misspelling of the term used here. It refers terms that are rarely used by educators but are used by other professionals.*

However, the focus of this paper will be on the third main type of dyslexia - induced dyslexia. According to Chia (2010c), "induced dyslexia is not true dyslexia and it is often caused by socio-emotional stress. It is also known as pseudo-dyslexia or conversion reaction syndrome (CRS)" (p. 65).
**Induced Dyslexia - Conversion Reaction Syndrome (CRS)**

To understand CRS, it is important to first, understand our mental context using the structuralistic model of mind. The three key structural elements of the mind, to quote Chia (2010b), are cognition, conation and affect (See Figure 3). Cognition has to do with intellect and the use of mind, while conation is the behaviour which relates to self-will, self-regulation and self-awareness. Affect is also behaviour, but relates more to self-esteem. These three components inter-relate to one another through sensation, which refers to the faculty of the perception of stimuli.

![Figure 3: The structuralistic model of mind: Cognition-conation-affect interrelationship](image)

*Note: The underlined zigzag line beneath Lexikos or Calculatus does not indicate misspelling of the term used here. It refers to terms that are rarely used by educators but are used by other professionals.*

An individual who has developmental dyslexia will have primary issues or problems in the cognition component of the mental context, particularly on *lexikos* (i.e. knowledge on language and literacy skills). As mentioned in the characteristics of dyslexia, these individuals will have secondary issues on the affect component (i.e. poor self-esteem). Some may even have co-existing symptoms like attention deficit, which lies in the conation component of the structuralistic model of mind.

On the other hand, an individual who has induced dyslexia, or CRS, will have primary issues in the affect and conation components instead, with correlated or artifactual symptoms on learning difficulties, which relate closely to the cognition component, especially the *lexikos* and/or *calculates* (i.e. knowledge about mathematics or calculations). Goldberg, Schiffman and Bender
(1983) states that "personality problems or emotional disorders may compound the disability, but children who are poor readers because they are emotionally disturbed are not dyslexic" (p. 18).

According to Manzo (1987), “Conversion Reaction Syndrome is said to be a subconscious process by which deep emotional conflicts or fears which otherwise would give rise to considerable anxiety are put aside by converting them into an external expression of some type” (p. 410). This term, conversion reaction syndrome (CRS), originates from a type of somatic disorder known as the conversion reaction. It is defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM) 4th edition, as a physical (motor or sensory) symptom that occurs after stress or conflict and is not intentionally produced and is without evident somatic cause, resulting in significant impairments in the different aspects of one’s functioning (e.g. academic, daily living, etc.). It appears to be more prevalent in late childhood and adolescence.

"The psychosocial profile of these patients and their families yielded a high frequency of recent familial stress, family communication problems, unresolved grief reactions and school-related and social disturbances" (Zeharia, Mukamel, Carel, Weitz, Danziger, & Mimouni, 1999, p. 162). This school-related and social disturbances may be the result of tremendous stress from the school or home environment, where a lot of emphasis is placed on academic achievements. This, consequently, can be a heavy burden for school-age children as they feel they must live up to the expectations of parents, peers and teachers, which could lead to a high risk of psychological stress in them.

In our current local context, these school-age children usually come from dual-income families where both parents are working, resulting in less bonding time with the child. As a result, these children may attempt to gain attention from his or her parents through somatization, presenting with abdominal pain, headache, fatigue and various other complaints. Apart from the physical complaints or symptoms, these children may shows signs and symptoms of poor learning or academic behaviors or achievements in school, leading to teachers suspecting them of having developmental learning difficulties or disorders. Manzo (1987) concurred that “the student, in his preteen whose life is largely influenced by parental rather than peer pressures, wins considerable attention from his parents while reducing his preoccupation with his true emotional conflict and this is achieved at a relatively small cost: namely, not being able to read” (p. 411). The author has organized the diagnostic indicators of conversion dyslexia as follows:

“(1) Apparent emotional gain from the disability. (2) Evidence of generative learning in most areas outside the area of specific disability. (3) Chameleon type personality. (4) A logically inconsistent or unreliable pattern of errors on an IRI or miscue analysis. (5) A reversal of subtest scores on the WISC from one testing to the next (e.g., high verbal/low performance one time, low performance/high verbal another). (6) A look of relaxed, resigned indifference to the disability.” (Manzo, 1987, p. 412).

It is therefore, crucial to examine the child with dyslexic-like symptoms holistically before diagnosing him with developmental dyslexia or other developmental learning difficulties based on the surface learning and academic difficulties presented.
Recommendations

According to the Developmental Stages of Learning Skills (Chia, 2008), “anything can happen at any point during the process of learning, resulting in all kinds of learning problems or difficulties” (p. 28). At the foundation level, learning is first built on the child’s innate abilities. The flow of the learning development then “progresses through the stages of sensory – motor skills, socio – emotional skills, cognitive skills and finally results in her ability to assimilate formal instruction in a regular classroom situation” (Chia, 2010b, p. 38). Any deficiency in any one stage can result in problems in the subsequent dependent stages. In the case of the induced dyslexia, or CRS, the child's innate abilities such as his WISC scores should not be of an issue. Affective (socio-emotional) skills, which constitutes to the affect component of the structuralistic model of the mind, is the main cause in the child with CRS, who exhibits poor (pseudo) cognitive skills and assimilation of formal instructions in the classroom (See Figure 4).

![Figure 4: Developmental stages of learning skills](image)

**Diagnostic Evaluation**

Before developing any individualized treatments or interventions for the child with CRS, it is important to first draw up a psycho-educational diagnostic evaluation for the child. This diagnostic evaluation is based on the model of building blocks of learning by Goldstein and Mather (1998). The model is also called the Learning and Behavioral (L&B) framework by Chia and Wong (2011). The various components in each level of the framework provide us with a holistic understanding of the child’s learning (See Figure 5). As defined by Chia and Wong (2011), diagnostic evaluation “is a specific type of evaluation whose goal is to discover why a system does not produce the expected outcomes” (p.11). According to the authors, diagnostic evaluation “plays an important role in helping an evaluator to decide if a child under his/her care has strengths or weaknesses with skills in a specific building block” (p.11).
Hence, the diagnostic evaluation and the identification of the child’s learning needs with relation to his/her environment as well as to his/her learning and behavioral potentials have to be addressed first before drawing an individualized education or counselling plan for the child with CRS.

**Art as a Dialogic-Diagnostic Therapy**

According to Chia (2002) in an unpublished paper presented at the inaugural diagnostic art therapy training workshop, art therapy is a viable treatment method whereby art images are used as a modality for self-understanding, emotional change and personal growth. In addition, dialogic in art as a dialogic-diagnostic therapy refers to “the way meanings of the drawn icons, symbols or pictures are derived or understood within a society concerned based on the societal understanding of its collective archetypes” (Yap, 2008). Diagnosis on the other hand refers to how we analyze the art, decipher and make sense of the symbols and pictures within the context. Therefore, art as a dialogic-diagnostic therapy looks into the perception of mind of the drawer (e.g. the mental states of mind) and analyze the meaning of the pictures and symbols drawn.

Since art as a dialogic-diagnostic therapy involves the perception of mind, it can be related closely to the structuralistic model of mind, that is, the cognition-conation-affect model. Dialogic involves how we analyze the meanings of the pictures drawn, and this involves cognition from the drawer as he or she thinks of how best to present his or her thoughts and feelings into the drawing. Diagnosis, on the other hand, involves conation and affect as the perception of the mind of drawer by looking into the drawer's act of drawing and his or her feelings during the process of drawing.

Figure 6 shows that art as dialogic-diagnostic therapy, unlike art therapy, involves more than just the conation and affect components of the mind. The circle in Figure 6 represents the learning
sphere while the rectangle represents the behavior domain. The triangle consists of the cognition-conation-affect and it falls within both the learning and behavior domains. In other words, any learning and/or behavioral challenge will fall in one or more of these places. Thus, art as a dialogic-diagnostic therapy involves a trans-disciplinary approach, comprising the different professionals addressing the cognition, conation and affect components. Chia and Yap (2010) concurred:

“Within the context of providing art as dialogic-diagnostic therapy, learning and behavioral challenges have to come into picture. On one hand, if there is any learning or memory challenges, cognition is affected. On the other hand, if any behavioral challenge is concerned, conation and affect are the ones involved, resulting in disruptive behavioral disorders and/or emotional behavioral disorders. It is therefore, important to have these students properly assessed before proper intervention programs, which include individualized education or counselling plan can be designed and implemented.” (p. 14)

![Figure 6: Dialogic and diagnosis within the structuralistic model of learning and behaviour](image)

**Conclusion**

As educators, we have to recognize every child as a whole individual, educating him in every aspect, such as the academic, the physical, the socio – emotional, and moral. In today’s context, we often neglect this holistic approach and tend to just focus on the academic aspect. Performing poorly in any subjects would mean that the child is academically inept. Any inappropriate emotional and behavioral responses would mean that the child is naughty or defiant. These negative comments and labelling would therefore trigger the child’s Conation (Self-will) and Affect (Self-esteem) in a negative way.

In the case of a child with induced dyslexia, we now question if this child has genuine learning concerns related to developmental dyslexia, that is, inaccurate and fluent word recognition, poor spelling and decoding skills due to phonological processing deficits, or this child is trying to pull
off an emotional gain from his parents through exhibiting the pseudo learning difficulties, or to some extent, this child may avoid the psychological stress as a result of academic burden faced in school or home environment. It is therefore, extremely crucial to look at the child in the different contexts (e.g. analyzing the child's diagnostic psycho-educational assessment reports, understanding the child holistically through art as a dialogic-diagnostic therapy) before designing and implementing the best suited educational or counselling plan for him or her.

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A Brief Introduction to Dyslexia as we know it today

Deon Poh
M.Ed (Special Education) Candidate
Centre Manager/Educational Therapist
DAS Learning Centre
Dyslexia Association of Singapore

Abstract

The author of this paper began with a brief history on the origin of the term “dyslexia”, where Greek: "dys" meaning "bad, abnormal or difficult" and "lexis" meaning "word". In addition, the author discusses the prevalence, gender differences (between boys and girls), diagnosis of reading process, psycho-educational assessment – including the controversial ACID profile of individuals suspected to have specific learning difficulty (dyslexia) – and intervention (e.g., Orton-Gillingham approach) and support for children with dyslexia in mainstream schools in Singapore.

Key words: dyslexia, intervention, psycho-educational assessment, reading process

Introduction

History

The word "dyslexia" comes from Greek: "dys" meaning "bad, abnormal or difficult" and "lexis" meaning "word". Dyslexia is only one of many terms that have been used over the years to describe children with literacy difficulties. Dyslexia was first identified by Oswald Berkhan, a German physician, in 1881 (Berkhan, 1917). The term "dyslexia" was coined in 1887 by Rudolf Berlin, an ophthalmologist in Stuttgart (Rudolph, 1973). However, developmental dyslexia only truly surfaced in November, 1896 in Sussex, England, when a doctor named W. Pringle Morgan published the first description of a learning disorder known as developmental dyslexia in the British Medical Journal. In the journal, he wrote about Percy F., "a bright and intelligent boy who was quick at games and no way inferior to any boys his age and yet displayed an inability to read" (Shaywitz, 1996).

From 1896 till today (for over a century), the ability to read has been often used as a benchmark for intelligence. Decades back, most people would assume that a child should be able to read, write and spell so long as he or she is motivated, bright and schooled. However, many cases have surfaced, and there is more to it than meets the eye. In the past two decades, we have experienced an explosion in understanding dyslexia as a specific learning disability. According to Shaywitz (1996), there is no strong correlation between intelligence and the ability to read. Non-dyslexic readers gain meaning from print quickly and effortlessly; it is as simple as a breathing process. However, for dyslexic readers, reading would be considered as a laborious process (Shaywitz & Shaywitz, 2003). Across the globe, we continue to witness striking
similarity of many such children this day. Dr Lee Wei-Ling, a neurologist and director of the National Neuroscience Institute Singapore, mentioned in The Straits Times on 30 July 2013 about how she used to struggle in school especially on the spelling component of English, "To analyze a word at phoneme level is unnatural; and for those with phonological disability, a tremendous challenge" (see Lee, 2013, for more detail). On hindsight, Dr. Morgan captured the essence of dyslexia as a reading difficulty that is not due to the lack of intelligence (Shatwitz, 2008).

**Definition**
Developmental dyslexia is characterized by an unexpected difficulty in reading in children and adults who otherwise possess the intelligence and motivation considered necessary for accurate reading (Shaywitz & Shaywitz, 2003).

According to the International Dyslexia Association, the operating definition is as follows: "Dyslexia is a specific learning disability (Lyon, 1995; Lyon, Fletcher, & Barnes, 2003) that is neurobiological in origin (Brown et al., 2001; Eliez et al., 2000; Klingherg et al., 2000). It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities (Shaywitz, 2003; Wolf, Bowers, & Biddle, 2001). These difficulties typically result from a deficit in the phonological component of the language (Chia, in press; Fox & Routh, 1980; Morris et al., 1998) that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction (see Torgeson, 2000, for a review). Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge (see Pennington, 1991, for a review)" (Lyon, Shaywitz, & Shaywitz, 2003, p.2).

Dyslexia Association Singapore (DAS) is now guided by a new definition of dyslexia as provided by the Department of Education, USA (2006) and also by the Ministry of Education Singapore in their November 2011 publication "Psycho-educational Assessment and Placement of Students with Special Educational Needs". The definition states that "[d]yslexia is a type of specific learning difficulty identifiable as a developmental difficulty of language learning and cognition" (Department of Education, US, 2006).

"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 organization, but these are not, by themselves, markers of dyslexia" (Rose, 2009).

**Prevalence**
According to Shaywitz and Shaywitz (2001) the prevalence of dyslexia in the United States is estimated to range from 5 to 17 percent of school-aged children. Up to 40 percent of the entire population is reading below grade level. Dyslexia (or specific reading disability) is the most common and carefully studied of the learning disabilities. Dyslexia affects 80 percent of all individuals identified as learning disabled.
According to the statistics from DAS, the incidence of dyslexia in Singapore is within the international range of 3 to 10 percent of the population. Currently, there are about 20,000 primary and secondary school students who are dyslexic. An average of 1 to 2 students could be dyslexic in a class of 40. Dyslexia can range from mild to moderate to severe.

**Gender Differences**
The hypothesis by Geschwind and Galaburda (1987) presented a theory (through Magnetic Resonance Imaging) that male brains mature later than females, and the left hemisphere matures later than the right. Geschwind, Behan, and Galaburda (1984) propose a "testosterone hypothesis" in which the characteristics of dyslexia cannot be explained by other theories. They claim that excess fetal testosterone can retard the development in the left hemisphere, modify cerebral lateralization and therefore, disrupt language development. This compensatory development of the right hemisphere leads to left-handedness, more common in developmental disorders like stuttering, autism and dyslexia.

Firstly, they argue that high testosterone levels are the principle common cause for a range of individual indifferences that modify the brain and immune system, possibly causing a disordered neural development. They propose that the increased in fetal testosterone delayed development in the left hemisphere, therefore, leading to the broad category of developmental learning disorders causally related to dyslexia. Since males generally have higher testosterone levels than females, atypical cerebral lateralization is observed more in males than females. Therefore, this theory reflects a higher account of males being dyslexic than females. Interestingly, this may also explain the theory for superior spatial skill in men, a right hemisphere ability and women having superior verbal ability, a left hemisphere ability (Shaywitz, Shaywitz, Fletcher & Escobar, 1990).

In recent times, development in technology has helped enhanced the study of dyslexia as technology has enabled further research on specific brain parts so that it is possible to localize and observe differences in parts of the brain when activated during reading.

The new development came about with the invention of functional magnetic resonance imaging (fMRI). The machine allows studies to reveal the neural signature of adult normal reading (Fiez & Petersen, 1998; Turkeltaub et al., 2002) and phonological processing (Gelfand & Bookheimer, 2003; Poldrack et al., 1999). The fMRI has been relied on to provide brain functioning knowledge on the neural activity of dyslexic children so that individualized interventions may be provided for them. Shaywitz (2003) found an interesting pattern in the differences in brain activation patterns between males and females when they read. The experiment revealed that men engaged left inferior frontal gyrus, while women activate both sides of the brain. Both males and females performed the same task and also at the same speed and accuracy. According to researchers using fMRI, a network situated in the inferior frontal gyrus (Broca’s area) has long been associated with articulation. This serves an important function in silent reading and naming (Fiez & Peterson 1998; Frackowiak et al., 2004). Also, two other regions in the left hemisphere: the parieto-temporal region, for word analysis and occipito-temporal region for word forming are essential for reading fluency. Reading failure occurs due to the mal-functioning of the left hemisphere posterior brain (Brunswick et al. 1999; Shaywitz et al. 1998). The study proved the difference in the use of different brain hemisphere between genders, with dyslexic women
utilizing bilateral frontal gyrus for phonological processing which help to compensate for their deficits in reading. This probably explains the lower incidence of females than males being dyslexic. Another point we may learn from this study is that the isolation of phonological processing taking place within the inferior frontal gyrus, brings about a more precise diagnosis for dyslexia (Shaywitz, 1996).

As boys are twice more likely than girls to have mild forms of reading disabilities, boys are also twice as likely to be identified with dyslexia (Rutter, Caspi, Fergusson, Horwood, Maughan, et al., 2004). Shaywitz, Shaywitz, Fletcher, and Escobar (1990) suggest that while research-identified criteria identified an even ratio of boys to girls with learning issues, teachers tend to be more boys bias in their school-identified criteria. Their research has reflected that four times as many boys than girls were being identified by their teachers. The results in another research conducted by Hawke, Wadworths and Defries (2005) revealed little evidence that males differ from females in the genetic aetiology of reading disabilities. This is an indication of school-identification procedure reflecting boys' disruptive classroom behavior as an indicator for reading disabilities (Shaywitz et al., 1990). Because boys tend to be more impulsive and active, their externalizing behaviors are easily identified by their teachers through their traditional identification method in school. Girls on the other hand tend to be quiet in class without much behavioral issues and they usually continue to struggle quietly without being noticed. According to Vogel (1990), girls who have attention deficit and low achievement are less likely to be spotted since their quiet behavior often goes unnoticed. However, Vogel (1990) also pointed out that these girls tend to have a wider discrepancy between aptitude and achievement. A range of data indicate that a significant number of girls struggle to read although boys stand at a higher number (Flynn & Rahbar 1994; Shaywitz et al., 1990). In sum, the flagging of reading difficulties should not depend on overt or covert signs of behavioral issues. Instead, reading fluency should be monitored regularly through the employment of dynamic indicators of basic early literacy skills or DIBELS (Kame'enui et al., 2000) for all children at-risk of making progress so that remediation may be administered early to help the child (Shaywitz, Morris, & Shaywitz, 2008).

**Diagnosis of Reading Process**

Phonological processing is defined as the use of letter-sound relations to retrieve the pronunciation of a letter string (Peterson & Pennington, 2012). According to Shaywitz, Morris, and Shaywitz, (2008), a deficit in phonological processing represents the hallmark of dyslexia. Both speaking and reading rely on phonological processing but the significant difference is that speaking is a natural process and reading is not. Unlike speaking, readers must appreciate consciously what the symbols on the text mean in the writing system they learn (Liberman, 1992). Reading has to be learnt at a conscious level in order to achieve fluency (Shaywitz, 1996). When the eyes come into contact with the printed text, the reader has to visually encode the print, leading to the recognition of letters and its sequence in order to identify the printed word. For instance, the reader recognizes that in the word *dam*, the letter *d* is the initial word and is different from the word *mad* and its sequence of letters is different although both words contain the same letters. This initial phase takes place in the iconic memory of the reader (Chia, 2009). The second phase concerns word recognition. Word recognition is defined as "the process of identifying the spoken word by correctly matching its orthographic pattern seen with its
phonological representation heard" (Chia, 2007). For instance, to be able to recognize the word *cat* from a list of words and non-words like *tac, cak, tack, cat, act* and *cta*. Word recognition takes place in the working memory in order to retrieve its pronunciation and meaning (Chia, 2009). It is also the process of converting alphabetic symbols into linguistic ones; which also means converting grapheme (letters) into corresponding phonemes. In summary, the reader needs to be proficient in the phonological structure of spoken words (the first phase of decoding). Then, in the second phase of word recognition, there is the need to realize the orthography and the phonology represented by the sequence of letters (Shaywitz, 1996). During the process of word recognition, the semantic lexicon could be directly accessed thereby bypassing the working memory to derive meaning from words (Orton, 1937; Stanovich et al., 1984). The final stage is processing of written language for comprehension. This can come into play after the word has been successfully decoded and identified in the earlier two phases. When new information is acquired, the reader draws from his or her long term memory storage and relates the new information with his or her prior experience for the purpose of schema matching (Chia, 1992).

The deficit in phonological processing limits comprehension through the initial two phases of having the ability to learn to read and spell using the sounds of the language. This causes children delays in language development.

**Assessment**

There is always the question if the child has a learning disadvantage or learning disability if he or she is not performing in school. Learning disadvantage is a result of "inadequate environmental experiences, socio-cultural differences, or lack of appropriate educational experiences" (NHMRC, Canberra, Australia). To identify the possibility of dyslexia, there is a need to rule out certain conditions: that dyslexia cannot be due to poor pedagogy, lack of learning opportunity or socio-cultural or ethnic differences (Chia, 2009). As a basis for a specific learning difficulty, dyslexia cannot be due to lack of intelligence, poor education and family background. Dyslexia is a life-long condition and a 'hidden' handicap.

The evaluation of intelligence is an important element when assessing for dyslexia. Although Detterman, (1982) and Humphreys, (1979) argue that IQ test scores provide an indication of cognitive function, they cannot count as an accurate measure of the reader's true ability. However, to quote Lyon et al., (2003), "Dyslexia is a specific learning disability... results from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities." Also, as defined above (under Definition) by Shaywitz and Shaywitz, (2003), "Developmental dyslexia is characterized by an unexpected difficulty in reading in children and adults who otherwise possess the intelligence and motivation considered necessary for accurate reading".

Therefore, to identify children of dyslexia based on cognitive and achievement test scores, it is essential to distinguish between a learning disability or learning disadvantage so as to be able to provide remediation (Chia & Wong, 2010).

The Wechsler Intelligence Scale for Children-Fourth edition (WISC-IV) (Wechsler, 2003) is a test most commonly used by psychologists worldwide to test a child’s IQ and to examine the strengths and weaknesses of their academic learning.
However, some evaluators have expressed their concern that the WISC is a relatively weak analysis of the child's general intellectual ability (GIA). Working Memory Index (WMI) and Processing Speed Index (PSI) comprise of Digit Span, Letter-Number Sequencing and Coding and Symbol Search respectively. These four subtests make up just 40 percent of the Full Scale IQ (FSIQ). For the higher-order intellectual abilities, the Verbal Comprehension Index (VCI) makes up just three subtests: Vocabulary, Similarities and Word Reasoning. VCI measures how well children are able to express themselves verbally and how well they are able to understand what is being said to them.

Perceptual Organizational Index (POI) measures nonverbal areas of being able to perceive spatial relationships related to problem solving, perceptual organization, processing speed and visual-motor proficiency. POI makes up three subtests of Block Design, Matrix Reasoning and Picture Concepts. Thus, the VCI and POI comprise just 60 percent of the FSIQ. In the WISC-III, two from the Working Memory and Processing Speed subtests were included in the FSIQ. At the same time, there were eight VCI and POI subtests (at 80 percent). Clinical studies reveal that this change in balance from the WISC-III to the WISC-IV might lower the FSIQ on above-average GIA children as well as raising the FSIQ scores for above-average GIA children (Dumont & Willis, 2001b).

Based on the claims above, two new composite scores are derived. They are: (1) Dumont-Willis Index-1 (DWI-1) which is made up of the WISC-IV combined VCI and POI six subtests of Vocabulary, Similarities, Word Reasoning, Block Design, Matrix Reasoning and Picture Concepts; and (2) Dumont-Willis Index 2 (DWI-2) which is made up of the WISC-IV combined PSI and WMI four subtests of Digit Span, Letter-Number Sequencing, Coding and Symbol Search.

The new formula provides a useful estimation of a child's overall abilities. However, it does not provide any indication of specific learning difficulty by any means. I propose to discuss the use of the ACID profile and examine the correlation between the subtests in the ACID profile and the characteristics of dyslexia. The ACID profile may still be a worthy area of exploration for dyslexia despite the many arguments that ACID profile is not frequently assumed by dyslexic children.

Firstly, there is a need to establish that the child's FSIQ is average. It has certain implications: that is to ensure that reading and spelling difficulties are not the result of a slow learning potential (see above definition by Shaywitz & Shaywitz, 2003) and also as a baseline to evaluate the relationship or discrepancy between reading and spelling performance on the basis of intelligence.

The difference in VCI and POI should provide us with a guide to language problems in the child's profile. If the VCI is very weak, then the child could be referred to a Speech and Language Therapist to undertake a language assessment. If the POI is very weak, then we could possibly suspect that the child has motor or dyspraxia issues and it will be better to refer the child to an Occupational Therapist for further assessment. Based on definition that dyslexia is a language-based deficit more than an overall cognitive disability, this presumption should serve
as a guide that: (1) VCI should be higher than the POI. (2) Both scores should be within the average range of between 90 and 110. Therefore, (3) the FSIQ should also be within the average range of 90-110.

In WISC-IV (Weschler, 2003), children with dyslexia generally score lower in the subtests of Arithmetic, Coding, Information and Digit Span. The four subtests make up the ACID profile. According to Thomson (1990), this pattern is linked to children with specific learning difficulties and the evidence is reviewed elsewhere.

Information is a general knowledge test. It measures "long-term memory of general information gained from experience and education. It taps on the child's knowledge about common happenings, places, things and people and his or her ability to demonstrate if he or she has stored these facts as general knowledge" (Searls, 1997, p.14). Simpson (2000) argues that phonological skill is fundamental to reading development and any deficit in the process will result in serious implications for reading fluency as well as automatic literacy skills. Hence, gaining information and general knowledge through reading would prove to be a challenge.

As defined by Weschler (1991), the arithmetic “subtest is not placed on mathematical knowledge per se but on mental alertness and concentration. It measures the child's ability to establish adequate attention-concentration span in order to extract the relations involved between numbers. It also concerns the child's ability to deal with abstract concepts of numbers and to perform basic numeral operations of addition, subtraction, multiplication and division". As summarized by Ellis and Mills (1978), children with dyslexia possess weak short-term memory, attention and focus and phonological skills and a low score in Arithmetic subtest is consistent with dyslexia.

Digit Span subtest is not used in the computation of VCI. It measures attention-concentration span, immediate auditory memory and auditory sequencing (Searls, 1997). Dyslexics suffer from difficulties in learning and remembering information in the short term memory. Jeffries and Everatt (2004) brought up a research case of comparing children with dyslexia against control children. The results proved that dyslexic children implicated deficits in their working memory systems which affected their cognitive functioning. Also, Swanson (1999) attributed children’s reading and comprehension difficulties to deficit in the phonological loop. Many researchers agree on the link between working memory and cognition in dyslexic profiles and that this test on the child's phonological working memory proves consistent with dyslexia.

Coding measures "visual-motor dexterity and the association of meaning with a symbol. It also measures short-term ability so that looking back at the guide is unnecessary" (Searls, 1997). Coding involves visual scanning, short term memory, graphics skill and processing speed which mitigate against children with dyslexia. Memory is defined as the ability to store, retain and recall the information. According to Baddeley (2003), short term memory allows recalling of information from a few seconds to a minute without the need to rehearse the information. He then proposes that dyslexics have weak short term memory. Denckla and Rudel (1976) also describe that dyslexics have deficits in coding and naming. Thomson (1984) proposed that due to their coding deficits, dyslexics have smaller memory storage as compared to non-dyslexics.
ACID Profile Controversy
The ACID profile is commonly examined and linked with children with specific learning difficulties and so regarded as a value in the diagnosis of dyslexia (Vargo et al., 1995). However, many studies are confined between its group and no individual comparison is made. Studies by Prifitera and Dersch (1993) and Watkins et al. (1997) found that the ACID profile samples in specific learning difficulties was greater by only between 4 to 5 percent as compared to normal samples of the population. Therefore, this small difference does not signify a valuable assessment. To quote Watkins et al. (1997), "they are justified in their conclusion that the ACID profile is a ‘poor diagnostic indicator’ and should not be used for diagnosis of dyslexia”.

Combining Cognitive and Achievement Assessment
WISC is widely used to evaluate cognitive ability and may serve as an indicative tool to suspect specific learning difficulties or dyslexia. In addition, it may also be used along with other sources of data or achievement assessments to provide a better informed diagnosis of a child.

Therefore, the WISC has to be used diagnostically with achievement tests especially when assessing children for dyslexia. In addition to the value of the scores in the subtest, the observation on how the child responds to the specific test items, for instance, the level of attention as well as motivation during each tests play a part in the overall scores throughout the assessment. The administration of the assessment is not a means to the end but constitutes a part of the entire process.

Wide Range Achievement Test (WRAT III)
The Wide Range Achievement Test (WRAT 3) is an achievement test used to obtain a spelling and reading age for each child. This test is often chosen by psychologist for its reliability in measuring the child's reading ability (Jastak & Jastak, 1978). The WRAT-3 has two alternative testing forms (tan and blue). The blue form is used in this assessment. Turner and Rack (2004) report that the use of the WRAT reading and spelling test is the “first step” in assessing literacy skill. Spelling and reading assessments are performed on each student. The reading test consists of 15 letters and 42 individual words that the student is asked to name or pronounce. The spelling test consists of writing one’s name, 13 letters, and up to 40 words dictated to the assessor and used in a sentence. The spelling items increase with difficulty. Testing is discontinued when the child makes 5 consecutive errors. The scores from the WRAT 3 can be used to compare with the VCI of the child to mark for discrepancy, which can indicate a high possibility of specific learning difficulties.

Wechsler Individual Achievement Test (WIAT-II)
The Wechsler Individual Achievement Test (WIAT-II) provides an in-depth insight into literacy acquisition. The scores can be correlated to the WISC to mark for specific learning difficulties. For better accuracy when interpreting WIAT-II results, past practice suggests that it should be considered in combination with the evaluation and review of the child’s background, personality, emotional state, attention and motivation level (The Psychological Corporation, US, 1992). The WIAT-II is comprehensive and thus, the assessor would have to diagnostically analyze the data. WIAT-II gives a composite measure on key areas like reading, mathematics, oral and written language. The results from the data provide us with a framework of the child's reading process.
though it does not specifically pin-point the reasons for the child's difficulties. The information from the WIAT-II does purposefully provide the necessary information for effective intervention.

**Comprehensive Test of Phonological Processing (CTOPP)**

According to Wagner et al. (1999), the CTOPP is able to provide a diagnostic criteria and age/grade-related measures in terms of (1) phonological awareness: the main difficulty faced by children with dyslexia. Torgeson et al. (1992, 1997) claim that children who receive intervention in phonological awareness improve their reading; (2) phonological memory: this component bears similarity to the WISC-IV subtest of coding. It refers to coding information phonologically for momentarily storage in the working or short-term memory, also known as the phonological loop (Baddeley, 1986; Torgeson, 1996) (3) rapid naming: this tests the child's ability to retrieve phonological codes associated with individual phonemes, word segments or entire words. Children who have difficulty in rapid naming will have difficulty in reading fluency (Bowers & Wolf, 1993).

The CTOPP provides diagnostic information on the child's condition and this may be used for monitoring progress as well as for intervention.

**Reading Importance**

Fluency refers to the ability to effortlessly scan through a written text with speed, accuracy and clear expression. This is important for it allows for automatic, attention-free word recognition and thus, achieves comprehension (Shaywitz & Shaywitz, 2003).

Having the ability to read at high levels is so important that Lyon (1999); Snow, Burns, & Griffin (1998) associate reading ability with "continued academic success, significantly reduced risk for school dropout, higher rates of entering college and even finding successful employment".

Reading is not a natural process but the product of decoding and comprehension (Gough et al., 1993). To Shaywitz (2003), “Reading is not a natural or instinctive process. It is acquired and must be taught. How reading is taught can drastically affect the ease with which a child learns to transform what are essentially abstract squiggles on a page into meaningful letters and then sounds and then words, and then entire sentences and paragraphs” (p.11).

The initial stage of reading begins at the phoneme awareness stage. This is a tougher process than thought for a child has to be able to decode and read the printed word, which constitutes individual phonemes. For example, a teacher asks the child to demonstrate knowledge of the sound structure of words by removing the /b/ sound from the word 'bag'. A child with proficient phoneme awareness should be able to link sounds (phonemes) with letters. He or she should be able to respond with a correct /ag/ sound. If children have difficulty perceiving the sounds in spoken words (mentioned above), decoding difficulties will be present. This results in poor reading comprehension and learning (Pennington, 1991).

This initial stage of practicing the skills of learning phonics and phoneme awareness is critical. Children must acquire fluency and automaticity in decoding and word recognition. If the child
reads laboriously, he or she will not achieve the goal of understanding and enjoyment (Lyon, 1998).

Reading is a difficult process for many children with reading difficulties. The struggle to read is very demoralizing for many children. In classrooms, children who struggle to read are quickly picked up by their teachers and peers. Learning to read is a part of language development and literacy-related skill which is critical in society today. In Singapore, English functions increasingly as the learners’ academic or curriculum language, through which their educational achievements are assessed. Therefore, developing good reading ability is essential for academic achievement.

**Intervention**

Although early intervention is key to successful remediation, early detection for reading failure or specific learning difficulties may prove to be hard since children are typically just learning to read.

Receiving poor instruction in early primary years has a more direct impact on reading than in the later years. Therefore, poor readers need high quality reading intervention in the early year of school (Joshi et al., 2002).

A commonly used method to help children read is to include programs to improve phonemic awareness. Phonemic awareness is the ability to manipulate phonemes in spoken words and/or syllables. Teaching children in small groups explicitly to manipulate phonemes has proved to be effective in enhancing their phonemic awareness, reading as well as spelling skills (Shaywitz & Shaywitz, 2003). Research by Foorman, Francis and Fletcher (1997) compared kindergarten children who received phonological awareness remediation (rhyme, blending and segmentation) against another group of kindergarten children who did not receive the same intervention. The results proved positively the “significant gains in phonological skills relative to children in the same curriculum who did not receive this training”.

According to Shaywitz and Shaywitz (2003), a highly effective method to build reading fluency is through guided repeated oral reading. The child reads aloud repeatedly to the teacher and receives instant feedback. This method is still one of the most commonly practiced methods in schools today. Evidence indicates a positive feedback that it improves word recognition, fluency and comprehension across many grade levels and is applicable to both fluent and non-fluent readers.

**The Orton-Gillingham Approach**

The Orton-Gillingham (OG) approach originates from the United States of America and is commonly used to teach children with dyslexia. In the 1920s, Samuel Orton, a neuro-psychiatrist and pathologist pioneered an instructional approach for reading while in the 1960s, Anna Gillingham, an educator and psychologist, created a curriculum based on that approach to teach it. They call it the Orton-Gillingham approach. The OG approach is a language-based approach. A huge portion of this remediation approach focuses on working knowledge of phonology,
morphology and orthography through a multi-sensory approach to successfully transfer knowledge to the student (Ram, 2012).

The Dyslexia Association of Singapore (DAS) adopts the combined teaching approach in an Asian context with the Orton-Gillingham. John (2011) critically examined the effectiveness of the OG approach by teaching reading to poor readers in elementary school. The objective of the research was to identify if the OG approach is effective and superior as compared to other teaching techniques for poor readers. The overall result of the research suggests that all reading measures were not shown to improve with the OG approach, not all positive effects were in favor of the OG approach, or solely the OG approach and some studies did not find statistically significant improvement for either instructional approach. However, the OG did positively impact reading in areas like word decoding, spelling and comprehension in general classroom and clinical settings. Litcher and Roberge (1979) also find that the OG approach for teaching reading has significant results in all the research measures.

**Mainstream Support**

The management of dyslexia for students in Singapore is in terms of accommodation and remediation. In 2004, the Ministry of Education (MOE) announced the following initiatives to support children with mild special educational needs like dyslexia in mainstream schools through the deployment of Allied Educators in particular the Learning and Behavioral Support (AED LBS).

Dyslexic or at-risk children in these schools during their Primary one and two levels are provided with extra support in the form of reading programs through the Learning Support Program (LSP) where phonics are taught to them in a small group setting at instructional level. The progress of these children is monitored through the use of DIBELS. Older children are also supported through the AED LBS through withdrawal programs where these children are remediated through the Orton-Gillingham approach and the AED LBS have been trained by the Dyslexia Association of Singapore (DAS).

Dyslexic children are given special exam accommodations also known as access arrangements. For instance, extra time, which is essential to allow them to decode instructional texts in their examination with their unimpaired cognition so as to determine the meaning of words that they have difficulty decoding rapidly (Shaywitz & Shaywitz, 2003). Other accommodations may include providing of single-sided papers, bigger fonts, and spelling leniency for subjects other than English as well as having Mother Tongue exemption.

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A Primer to Understanding Autism Spectrum Disorder in Children

Wendy Lee Bin NEW
M.Ed (Special Education) Candidate
School of Early Childhood Education
ITE College Central, Singapore

Abstract

Autism spectrum disorder (ASD for short) has always been a hot topic in the mass media. In this paper, the author has attempted to illustrate the condition of ASD with examples selected from various readings she has come across. She also briefly examined the mistakes or misconceptions about ASD and how these false leads could mislead our understanding of the condition. The author also provides a list of autistic symptoms as well as introduces some treatment options for children with ASD including narrative story-telling, social stories, activity schedule and dolphin-assisted therapy. She cautions that there are many types of strategies but it is important to be careful to select an appropriate strategy that best suit the child with ASD for no two children with ASD are the same.

Key words: diagnostic assessment, hyperlexia, reading, reading comprehension, word decoding

Introduction

Autism Spectrum Disorder, commonly known as ASD, is a long term neurodevelopmental disorder that will affect how someone communicates and relates to the people around them. In A Practical Guide to Autism, Volkmar and Wiesner (2009) stated that recognition of ASD as a disorder is a relatively recent one, first described in 1943 but not “officially” used as a diagnosis until 1980. Volkmar and Wiesner (2009) mentioned that term Pervasive Developmental Disorder (PDD) is used to refer to an overarching group of conditions which autism spectrum disorder (or ASD) belongs. Under this class, several disorders are now officially recognized, Autism, Rett’s disorder, childhood disintegrative disorder (CDD), Asperger’s disorder and finally pervasive developmental disorder which are types of ASD.

In A Practical Guide to Autism, Volkman and Wiesner (2009) cited Dr Leo Kanner’s description of autism: “The outstanding, “the pathognomic,” fundamental disorder is in the children’s inability to relate themselves in the ordinary way to the people and situations from the beginning of life. Their parents referred to them as having always been ‘self-sufficient’; ‘like in a shell’; ‘happiest when left alone’; ‘acting as if people weren’t there’; ‘perfectly oblivious to everything about him’; ‘giving the impression of social wisdom; ‘falling to develop the usual amount of social awareness’; ‘acting almost as if hypnotized’. This is now as in schizophrenic children or adults, a departure from an initially present relationship; it is not a ‘withdrawal’ from formerly existing participation. There is from the start an extreme autistic aloneness that, whenever possible, disregards, ignores, shuts out anything comes into the child from outside.
physical contact or such motion or noise as threatens to disrupt the aloneness is either treated “as if it weren’t”… resented painfully as a distressing interference. This insistence on sameness led several children to become greatly disturbed upon the sight of anything broken or incomplete. A great part of the day was spent in demanding not only the sameness of the wording of a request but also the sameness of the sequence of events. The dread of change and incompleteness seems to be a major factor in the explanation of the monotonous repetitiousness and the resulting limitation in the variety of spontaneous activity. A situation, a performance, a sentence is not regarded as complete if it is not made up of exactly that were present at the time the child was first confronted with it if the slighted ingredient is altered or removed the total situation is no longer the same.”

Mistakes /Misconceptions about ASD

Volkman and Wiesner (2009) noted that some early mistakes or misconceptions about ASD are that children with autism probably had normal intelligence. He thought this because though these children managed to do parts of an IQ test rather well, the parts that were associated with the cognitive and intellectual skills were rather difficult to assess as the children either did poorly or refused to cooperate at all. They also mentioned that that children with ASD may have average or above average abilities when it comes to tasks that are not verbal whereas the same child’s abilities with verbal task can be very significantly delayed. Not only that, children with autism have some unusual ability, such as the ability to draw, play music, or memorize things, or sometimes calculate days of the week for events in the past or future (calendar calculation) (Volkman & Wiesner, 2009).

Due to the early misconceptions made about ASD, there were some false leads for research in this area as seen in A Practical Guide for Autism. Volkman and Wiesner(2009) mentioned that researchers had some false leads for research as seen below:

- “Impression of some normal levels of intelligence because children did well on some parts of IQ test:
  Implication: Bad performance due to lack of motivation of child (rather than viability in skills)
  Subsequent research: Significant scatter in abilities is often present, marked discrepancies between skills areas (e.g., verbal and nonverbal IQ) are common.

- Autism as a form of schizophrenia
  Impression: Confusion with schizophrenia given the use of the word autism (earlier used to describe self-centered thinking in schizophrenia).
  Implication: Autism might be the earliest manifestation of schizophrenia (no more than expected by chance) children with autism develop schizophrenia.

- Increased rate in more families with higher levels of education in Dr Leo Kanner’s original paper:
  Implications: Effects of experience.
  Subsequent research: There is no increase in autism among parents with education (more educated parents likely to get to the one child psychiatrist in the country).
• No associated medical conditions (children had an attractive appearance):
  Implication: exclusion of “organic” cases (if medical condition present) from having autism.
  Subsequent research: High rates of seizures, higher than expected rates of some disorders—especially some genetic disorders.”

With all the misconceptions and mistakes made in the diagnosing of ASD, it is really a wonder how the people with autism dealt with it in the past. In Diagnosing Learning Disorders, Pennington (2009) mentioned that ASD - its severity and late recognition - present us with a puzzle: How did the earlier generation regard people with ASD? What treatments did those with ASD receive? Another puzzle lies in what is a recent change in social attitudes toward those with severe developmental disabilities, such as ASD and ID, for not very long ago, such people were considered as untreatable and were institutionalized very early in life.

In a way, we should be grateful to the movies that bring greater awareness to the world like ‘Rain Man’, ‘I am Sam’, ‘What’s eating Gilbert Grape?’ and ‘Forest Grump’ that portray people with ASD as high functioning too and thus make useful introductions to people who are keen to know more about ASD. Besides people with ASD who are high functioning, we too should not forget or neglect the fact that most with ASD are not as high functioning as what was seen in the movies. Like what Pennington (2009) said, a large portion of such individuals have ID and about half lack speech.

**Autistic Symptoms**

An article found in [http://www.kkh.com.sg/HealthPedia/Pages/GrowingUpAutism.aspx](http://www.kkh.com.sg/HealthPedia/Pages/GrowingUpAutism.aspx) on ‘Autism’ by KK hospital Singapore has broken down some of the symptoms in the various developmental domain as below:

**Social Interaction**
Children with ASD encounter difficulty in interacting with their peers. They prefer to be alone most of the time and seem to have very little interest in other people, often described as 'being in their own world'. Response to others’ attempts to engage them is poor and inconsistent. Some ASD children may often appear interested in interaction, but clearly do not have the 'know-how' when attempting to engage others. They do not register social cues and may frequently irritate others. They have difficulty understanding and expressing emotions and tend to use people as a "tool" (e.g. pull the adult's hand to the object he wants without a word or glance). Yet others may interact well with adults but have difficulty amongst their peers.

**Speech, Language and Communication Development**
Approximately 40% of children with autism do not acquire speech at all. Most would have some degree of speech and language delay. Many of those who do speak have echolalia (i.e. parrot-like imitation of what has been said to them). They may recite phrases from television commercials or the computer ('scripted language'), but cannot use speech to communicate meaningfully or effectively. Eye contact is poor or absent. They may use illogical words repetitively and have little understanding of abstract concepts (e.g., danger) or symbolic gestures (e.g. waving bye-
Imaginative Play
A child generally learns to play imaginatively from the age of 2-2½ years. This is usually demonstrated by play with toys such as 'masak-masak' (cooking toys), toy guns and doctor sets. The child with ASD has poor imaginative skills and often plays in an unusual way. He may spin an object or play in a repetitive manner (e.g. lining up cars and blocks). Some children with ASD may appear to play imaginatively but often in a learnt or restricted manner (e.g., always in the same scenario).

Abnormal Responses to Sensory Stimulation
Autistic children may over-react to certain sensory stimuli or have no reaction at all. They have difficulty "filtering out" extraneous noises in the environment (e.g., air-conditioned setting) and may throw a tantrum until the stimuli is removed. They may be fascinated with lights or colours and pre-occupied with tapping certain surfaces. They may frequently smell objects. Some may spin themselves without getting dizzy while others have a great fear of movement (e.g. swings).

Developmental Atypicalities
An autistic child's motor skills may be relatively normal. However, many of them are clumsy or may have poor fine motor skills. Some children with ASD may have hyperlaxia, i.e., when they are young, although clearly delayed in speech and language development and unable to communicate even simple needs, a child with ASD may be able to recognize many words beyond his/her peers and is often fascinated with letters and numbers. At an older age, he/she may be able to read complex words (e.g., universe and catastrophe) as well as newspapers but without real understanding of word meanings. At the same time, he/she continues to have difficulties communicating with others, although this skill may improve with age. Skills may appear at the appropriate time and then disappear (e.g., a child may start saying "pa-pa" at 1-year old and then stop at age of 2, i.e., a characteristic known as regression of skills. Children with ASD may have specialized skills in certain areas (e.g., solving complex puzzles, performing lightning calculations or playing piano for the first time after listening to the music) but their language and communication skills remain far below their chronological age level.

While the child with ASD may manifest varying degrees of the symptoms described above, not all the features listed may be present. Nevertheless, all children with ASD will have difficulties in the key areas of social interaction, communication and imagination. A question that is most commonly asked by parents is that “Does my child have autism?”

As seen in the article on “Autism” (for more information, visit the following website: http://www.kkh.com.sg/HealthPedia/Pages/GrowingUpAutism.aspx), some guidelines are provided for parents to know and understand what to do if they suspect their child could be autistic. As ASD is often detected only in early childhood when parents seek help for delayed speech and language development in their child. Typical age of presentation is around 2-3 years.
old, and definitive diagnosis is usually made around the age of 3 years. Autism affects boys four times more than girls (see http://www.kkh.com.sg/HealthPedia/Pages/GrowingUpAutism.aspx).

Due to the increasing awareness by parents, educators, doctors and therapists, the diagnostic and intervention strategies have also become more advanced and child friendly.

According to Poh and Chia (2009), a verbal behavioral trait will only continue to be maintained if it is reinforced by an event (i.e., a reinforcing consequence) during the process called operant conditioning (Skinner, 1957), which is “an experimental analysis of the ways in which the behavior which is emitted rather than elicited by external stimuli may nevertheless be a function of environmental events” (Blackman, 1974, p.40). If this behavior is the function of controlling consequences and stimuli, it is possible to create an environment that provides the appropriate stimuli and consequences so that the children have the motivational reason to exhibit the appropriate verbal behaviors based on different social situations (Skinner, 1957). Teachers as well as parents can stimulate such an environment using various remedial intervention strategies.

Poh and Chia (2009) have argued that the most common form of verbal behavior is vocal verbal behavior (Skinner, 1957). Vocal verbal behavior consists of “the coded vocal materials of spoken language, the vocal shaping of conversational structure, and the vocal marking of speaker-attribute” (Laver, 1994, p.16). Its response is controlled by a verbal stimulus. The impairment of social interaction and communication of children with ASD affect their ability to display appropriate vocal verbal behavior. It will be helpful to them if they learn to maintain appropriate vocal verbal behavior based on different social interactions. The acquisition of narrative speech is one way that leads to reinforcement of such vocal verbal behavior (Greer & Ross, 2008). Narrative speech requires a communicator to use the language effectively so as to create an emotional effect among the listeners. The ability to produce good narrative speech will lead to the development of social interaction and communication skills. This ability requires different techniques to work on social interaction and communication skills (Greer & Ross, 2008).

**Treatment Options for Children with ASD**

**Narrative Story-telling**

Moreover, Poh and Chia (2009) have emphasized that narrative story-telling can become a very good intervention strategy to improve the speech of children with ASD: Firstly, through narrative stories, it “give expression to feelings” (Shires, 1988, p.12). Teachers as well as professional storytellers are using narrative story-telling to provide opportunities to children with ASD to display their emotions publicly (Egan, 2005). In schools, especially during a literature lesson, students are allowed to express emotions through different approaches (e.g., an open discussion to talk about a protagonist’s emotions and actions). English and 2nd language teachers can use this approach to facilitate discussion within a safe environment so as to help children build their emotional vocabulary (Eades, 2005). According to Chia (2008), children with ASD face difficulties in displaying appropriate emotional reactions to mental states naturally. Narrative story-telling as a strategy may provide them with an alternative channel of opportunity to develop verbal behavioral traits in their response to various social situations (Poh & Chia, 2009). Secondly, during narrative storytelling, teachers are able to adopt “flexibility and adaptability to the needs of the listener and the listener’s circumstances” (Burns, 2004, p.21). They can adjust
the stories to meet the different needs of these children. When children are engaged in a narrative story-telling session (especially through dramatic play), teachers are able to interact with them. This, in turn, helps encourage the children “to react affectively to participation in the performance of the poem or story” (Park, 2004, p.16) resulting in a positive socio-emotional impact on children with special needs (Poh & Chia, 2009). Lastly, besides narrative storytelling, caregivers, teachers and parents can use social stories strategy to help children with ASD to improve in their social interaction with their peers and the appropriate way of interacting.

**Social Stories**

In another article entitled *Strategies to Help Children with Autism Cope with Social Situations and Increase their Independence in the Classroom* (see the following website: [http://www.education.com/reference/article/strategies-help-children-autism-cope/](http://www.education.com/reference/article/strategies-help-children-autism-cope/)), Heward (2010) showed that social stories can be used to explain social situations and concepts, including expected behaviors of the persons involved, in a format understandable to an individual with ASD. Social stories can answer a child’s questions about concepts and provide information about social behavior that she is not likely to ask for or obtain in other ways (Gray, 1994, 2010). According to Gray and Garand (1993), social stories can be used to describe a situation and expected behaviors, explain simple steps for achieving certain goals or outcomes, and teach new routines and anticipated actions. Providing social stories before an event or activity can decrease a child’s anxiety, improve his behavior, and help him understand the event from the perspective of others (see also Ivey, Heflin, & Alberto, 2004; Kuoch & Mirenda, 2003).

**Activity Schedules**

In addition, Heward (2010) also mentioned that the use of picture activity schedules also help children with ASD to have a better understanding of the schedules and activity going on in class. Some level of independent performance is needed for success to be experienced by these children with ASD in an inclusive classroom setting (Massey & Wheeler, 2000). For preschoolers with ASD, a lack of play skills “might prevent opportunities for learning and successful participation in inclusive classrooms. The impending isolation might serve to perpetuate the children’s deficits in socialization and communication” (Morrison, Sainato, Benchaaban, & Endo, 2002, p. 58). Several studies (e.g., Bevill, Gast, MaGuire, & Vail, 2001; Massey & Wheeler, 2001; Morrison et al., 2002) have found that children with autism can be taught to use picture activity schedules to increase their independence in selecting and carrying out a sequence of activities in the classroom.

**Dolphin-Assisted Therapy**

One interesting strategy that has attracted the public attention in Singapore is the dolphin-assisted therapy (DAT) held at the Dolphin lagoon managed by the Underwater World Singapore. Shaifudin and Chia (2012) have conducted a study involving 15 children (ten boys and five girls, aged between 9 and 10 years) with high-functioning autistic disorder in a 12-month Dolphin Encounter for Special Children (DESC) Program conducted by the dolphin trainers from the Underwater World Singapore at the Dolphin Lagoon in Sentosa. The Indo-pacific humpback dolphins (commonly known as pink dolphins) were used in this dolphin-assisted therapy. A pre-/post-treatment design was used to determine if the 15 subjects showed significant improvement in the reduction of their autistic symptoms after they had completed the program. The results
suggested that the subjects showed a significant reduction in stereotyped behaviors and a significant improvement in communication and social interaction. With a good effect size, their mean AQ remained within the average range for typical individuals with autism.

Shaifudin and Chia (2012) mentioned that the general purpose of DAT is to encourage children with disabilities to engage in desired responses in accordance with their individual education or therapy plan (Nathanson, 1998; Nathanson et al., 1997; Nathanson & de Faria, 1993). It consists of a series of therapeutic sessions that allow participants to interact with the dolphins from the pontoon or in the water after giving a correct motor, cognitive, or language response. Interaction with the dolphins may include touching, kissing, making hand signals to the dolphins to elicit specific behaviors, taking a short ride atop the dolphin while holding its dorsal fin, or dancing in a circular motion with the dolphin (Humphries, 2003). The DAT sessions are specially designed to jump-start the participating children with disabilities and to complement or reinforce other conventional therapies (Nathanson, 1998). The duration and frequency of the DAT varies from one providing organization to another, and it can be done in a few hours to several weeks or even months.

Shaifuddin and Chia (2012) have also listed the therapeutic benefits of DAT as follows: Several theories have been put forward to explain the purported therapeutic benefits of DAT, specifically the physiological and relational effects (Simpson, 2005). McKinney, Dustin and Wolff (2001) suggest that the whistles and clicks emitted by the dolphins can produce changes in an individual’s tissue and cell structure, and works in some way similar to music therapy. In addition, because of their natural spontaneity, happiness, and playfulness, dolphins have a profound positive impact on individuals, and it is said to elicit happiness in individuals (McKinney et al., 2001). Moreover, dolphins are said to be particularly perceptive to the needs of individuals with disabilities, and as a result, they respond to such individuals in a very supportive manner (McKinney et al., 2001; Simpson, 2005).

In the recent DAT study, Chia and Kee (2010) report some major behavioral change of their five subjects with autism, aged between five and seven years old, in what they describe as a reduction in hyper-egocentrism. The subjects have also become more socially aware of themselves, beginning with the somatic awareness of their hands (e.g., performing a hand signal to get the dolphin to respond back) and legs (e.g., waddling their legs in the pool). No longer did they have to hold someone’s arms and using them as if they were a tool to get something or to do something. These children could do proto-declarative pointing if they wanted something (e.g., pointing to the dolphin, keeping an eye contact with it and beckoning it to come forward). The somatic awareness led them to what we have termed decentrizing their hyper-egocentrism. To decentrize is to break down the walls of hyper-egocentrism, leaving the egocentrism without the hyper part (Chia & Kee, 2010, p.43-44).

According to the theory that Chia and Kee (2010) propose, the dolphin is like some sort of an awareness initiator to these children with autism: a point of a social contact. They use the term psychopomp to describe the role of the dolphin in DAT. In other words, a psychopomp is like a portal or middle-person that serves as the link between the child with autism and the other people surrounding him/her. For instance, in the story of Alice in the Wonderland, the rabbit with a waist-watch was running for its time as it muttered, “Oh dear! I’m late! I’m late!” Alice followed
the rabbit into a hole that led her to the Wonderland. The rabbit is the first psychopomp (animated) while the hole (non-animated) is the second psychopomp. Both psychopoms are portals to the Wonderland.

Conclusion

In conclusion, there are many effective strategies in helping children with ASD. However, in order for the intervention to be effective; we need to know the severity, the level of functioning, and the different levels of developmental challenges in these children with ASD in order for the professionals to implement the most effective strategy to help them.

References


Directed Reading and Thinking Activity (DRTA) for Reading Literary Texts: Why and How

Chiew Hong NG, PhD
Lecturer, English Language & Literature
National Institute of Education
Nanyang Technological University

Abstract

This paper presents the Directed Reading Thinking Activity (DRTA), developed by Stauffer (1969), as a reading strategy that has current relevance in enhancing close reading of literacy texts and/or critical reading by providing the rationale for using the strategy and looking at a few studies on using DRTA to teach narratives. The paper outlines steps for carrying out DRTA and discusses ways to teach literary elements through the reading strategy.

Key words: Directed Reading Thinking Activity (DRTA), reading strategy, critical reading, literary texts

Introduction

The Directed Reading Thinking Activity (DRTA) was developed by Stauffer (1969) as a comprehension strategy that provides the teacher opportunities to guide students to think like good readers in asking questions about a text, making predictions, reading to confirm or refute their predictions and modifying their ideas as the story unfolds (Blachowich and Ogle 2008). Stauffer has recommended using DRTA with both narrative or non-narrative text at all grade levels to motivate and encourage reluctant readers. A narrative text serves the primary purpose of entertaining by telling stories through events that are written sequentially. In narratives, in the form of novels or short stories, numerous episodes or even one episode of action can relate a causal chain of events where “each event in the story leads to another, as the protagonist, or main character, tries to reach a goal or solve a problem” (Barton 1998, p. 29). Narrative texts can encompass literary texts or extracts from the three genres of prose, poetry and drama and they can be useful in teaching students about author’s lexical, semantic and grammatical choices. Through exposure to literary texts, students can learn about elements that are basic to narrative text such as setting, characters, plot, conflict, and theme, besides literary devices like simile, metaphor, image and stanza. Reading literary texts will enable students to draw on a wide range of styles and literary language for their writing and speaking. Literary texts also provide opportunities for students to develop their higher order thinking skills.

This article looks specifically at Directed Reading and Thinking Activity (DRTA) to enhance the reading of literary texts for close reading and/or critical reading through looking at the a) why in terms of providing the rationale for using DRTA and examining briefly research on using DRTA to teach reading non narrative and narrative texts and b) how in terms of outlining the steps in
preparing for and carrying out DRTA in class as well as incorporating the teaching of literary elements into the DRTA strategy.

**Rationale for using Directed Reading and Thinking Activity (DRTA)**

The DRTA process encourages students to be active and thoughtful readers since they either verify or change their predictions as they read. Jennings and Shepherd (1998) highlight how DRTA helps students develop awareness of reading strategies, understanding of the reading process, and development of prediction skills. Background knowledge is brought to the reading experience as students need to draw on their prior knowledge and text information to hypothesize what the text is about (Stauffer 1976) for DRTA “invites a general sharing of background information and experience as students and teacher move toward the common goal of understanding” (Haggard 1988, p. 532).

To Duke and Pearson (2002), DRTA teaches students to self-monitor as they read which can lead to an increase in attention, comprehension, and achievement. DRTA can be used to teach procedures for inferring information and justifying responses, as well as developing metacognition and monitoring comprehension because students are “encouraged to apply metacognitive skills to the reading-thinking process” (Haggard 1988, p. 528). Tankersley (2005) states that DRTA extends reading to higher-order thought processes and provides teachers insights into each student's ideas, thought processes, prior knowledge and thinking skills. Richardson and Morgan (1997) see DRTA as engaging students in higher order thinking skills in terms of connecting interrelated elements of the text, justifying thought processes and drawing logical conclusions. According to Haggard (1988), DRTA promotes critical thinking through these processes: (1) identifying a problem, (2) generating hypotheses, (3) gathering evidence, (4) testing hypotheses, and (5) drawing conclusions (p. 532).

Questioning as a strategy to develop different levels of thinking skills for deeper learning can be facilitated with the Directed Reading Thinking Activities Approach (Marzano, Pickering and Pollock, 2001) when the teacher reads a text with students, stops at intervals, and asks questions “that require speculation and prediction … [and] questions that require drawing conclusions and/or providing support” (Haggard 1988, p. 530). In DRTA students discuss their answers to the questions posed in a whole-class activity in order to have a better understanding of what they are reading (Hendricks, Newman and Stropnik 1996).

In fact, DRTA provides “a frame for small group reading instruction” (Stahl 2003, p. 9) where “students are held accountable for using evidence to support their claims in their discussion with the groups” (p. 10). It is thus a dynamic group reading activity involving individuals generating hypotheses and engaging in group/class discussion to offer, confirm and reject predictions. According to Jennings and Shepherd (1998), this strategy stimulates students' thinking through them listening to the opinions of others and modifying their views in the process. To provide an environment for this process, Stauffer (1976) recommends working with groups of eight to twelve students.
In summary, the DRTA:

- Establishes a clear purpose for reading.
- Involves students in active comprehension by calling on their personal background knowledge and text knowledge.
- Develops higher-level thinking using predictions and speculations, reading to verify, revising predictions or forming new ones, and drawing conclusions.
- Uses the social dynamic of group interaction to propose and discuss options and outcomes.
- Helps students arrive at decisions and conclusions based on text and personal knowledge (Blacklock et al. 2010)

**Research on DRTA for literary texts**

Research has shown that DRTA can enhance comprehension of literary texts. First- and third-grade Title I DRTA participants were able to recall more story elements than groups that listened to a narrative text without discussion, at a level of statistical significance (Biskin, Hoskisson, & Modlin 1976). Many and Flyfe (1996) examined the effect of using directed reading thinking and writing activities to promote reading and higher order thinking skills for 51 students. The result indicated significant gains in both reading achievement and writing skills.

Studies have also confirmed the effectiveness of DRTA with novice readers (Reutzel & Hollingworth, 1991; Stahl, 2003). When Renn (1999) investigated the impact of two reading strategies a second-grade classroom – the directed reading thinking activity (DRTA) and the traditional directed reading approach (DRA) – on reading comprehension scores, there were no significant differences between the two strategies. Dougherty Stahl (2004) too explored the effects of three instructional strategies, one of which was the directed reading thinking activity, on 31 second-graders with an instructional reading level that was approaching grade level. Results indicated that the directed reading thinking activity yielded statistically significant effects on fluency as measured by a timed maze task and effects on reading comprehension and science content acquisition. Generating and justifying predictions and verifying predictions after reading appeared to facilitate reading comprehension acquisition among novice readers.

Riley (2006) investigated the effect of directed reading thinking activity on low reading achievement first grade students and found that directed reading thinking activity can increase reading achievement and promote thinking among low achievers. Kusumawardani (2013) described the implementation of the DRTA method to improve 30 11th grade students’ reading comprehension achievement at SMA N 1 Klirong academic year 2012/2013 and concluded that the implementation of the DRTA method can improve the students’ reading comprehension achievement in understanding narrative text. Novita Arianti (2013) also concluded that the DRTA strategy was very effective and significant in increasing 34 Grade XI students’ ability in narrative text-based inference-making when the 30 multiple choice test items were analyzed by t-test and effect size formula.
Steps in DRTA

To prepare for and conduct DRTA, these are the general steps to observe:

**Preparation by teacher before lesson**

1. Teacher selects the literary text (pitched at the instructional level of students) to be read. Students should not have read the text previously or read ahead of others in the group.
2. The amount of reading should be adjusted to fit the purpose and the difficulty of the text i.e. the text should be broken into smaller sections so that the students have time to think about and process information.
3. Teacher determines the points to pause during the reading process and prepares questions to prompt students to make or revise predictions.

**Procedure during lesson**

1. In the class introduction, the teacher leads the students in thinking about what they already know about the topic through questions such as ‘What do you know about ...?’
2. The teacher asks students to preview the reading segment by examining the title, illustrations and headings.
3. The teacher asks students to make predictions using both text information and personal background knowledge to set a purpose for reading:
   a. Read the title of the book and asks: ‘What do you think this book (or chapter or section) might be about?’
   b. Ask questions to generate hypotheses: ‘What do you predict might happen in this book? What do you think might happen next? How do you think ‘X’ will solve the problem? Why do you think so? (relating prior knowledge to the problem or situation).’
4. Teacher asks students to write predictions individually, with a partner or discuss the predictions orally and create a list of class predictions. Teacher encourages students to take risks with predictions by prompting for different suggestions. Teacher can ask students which of the predictions they agree with and then discuss agreement or disagreement with one another’s suggestions.
5. After students have read to confirm their predictions, teacher asks students to evaluate their predictions by asking: ‘Were you right? What evidence supported your predictions? What evidence contradicted your predictions?’
6. Teacher asks students to take notes or use post-it notes to mark information, examples, or evidence in the text that verifies or refutes their predictions.
7. Teacher and students then continue the predict-read-prove cycle throughout the text selection.
8. At the end of the reading, teacher discusses and reviews with students how and why predictions have changed and converged throughout the reading. Teacher can revisit sections that have misled some students’ thinking to prompt thinking about the reading process.
9. The teacher and students discuss how they can use this strategy on their own to facilitate understanding and critical thinking.
DRTA process and the reading of literary texts

In preparing for and conducting DRTA, teacher can facilitate the teaching of literary elements by incorporating the following suggestions into the lesson:

**Before DRTA**

Many learners require explicit instruction for comprehending narrative text (Calfee & Patrick 1995; Smolkin & Donovan 2002) and DRTA allows the use of rich literary texts to teach and/or revisit the structure of a narrative (e.g., orientation, complication, resolution). Narrative text structure can be analysed using *story grammar* which is the system of rules used for describing the story parts: a setting, characters, episodes, overall plot in terms of problem, response, action, and the outcome/resolution (Dymock 2007).

In preparing to teach narrative structure through DRTA, the teacher has to determine the key elements of the story to decide on logical stopping points within the story which normally come at key junctures in a causal chain of events in the story line. Ways to determine the stop-points are to stop after the title, after the first or second paragraph, and at points of high suspense or interest as episodic breaks in the plot line (Haggard 1988). Lastly stop just before the end of the story.

**During DRTA**

During DRTA, teacher can prepare broad, open-ended questions to be asked at stop points to draw attention to story grammar as stated by Cooper (1986):

**Setting:**
Where did the story happen?
When did the story happen?

**Characters:**
Who was the story about?
Who were the people in the story?
Who was the most important person in the story?

**Problem:**
Did the people have a problem?
What was the big problem that the story was about?

**Action:**
What did the people do to solve the problem?
What were the important things that happened in the story?

**Resolution:**
How did the people solve the problem?
How did the story end? (pp. 382-384)
After DRTA

As DRTA encourages pupils to read the entire text first, after the completion of DRTA, the teacher can analyze with students selected extracts through extension activities such as re-examining the story, selected words or phrases, pictures or diagrams from the text; clarifying concepts; making observations and reflecting on elements of the story/text (Ruddell 1997); “story mapping and sharing of maps; extension of plot beyond story ending, [writing] letters to characters [and] letters to authors” (Haggard 1988, p. 531), retelling the story in sequence, writing a personal response or dramatizing an unusual perspective of the story e.g., from the point of view of a minor character (Manzo and Manzo 1995).

To teach literary elements, the teacher can get pupils to think about what each character and each situation could symbolize and analyze how characterization is achieved. The teacher can enable vocabulary development by exploring analytically and critically the use of language in a text. For instance, the teacher can guide pupils in the discovery of how mood and atmosphere are created through language use or literary devices. The teacher can also lead students to interpret various points of view and get students to respond in greater depth to the literary text through a range of higher order questions that will stimulate and extend their thinking such as using questions that “require drawing conclusions and/or providing support” (Haggard 1988, p. 530).

Conclusion

Though DRTA is a reading strategy developed in the 1960s, it is still valuable for developing higher-level thinking using predictions and speculations, verifications, inferences and drawing conclusions in reading. The strategy is also interactive as it utilizes the social dynamic of group interaction to engage students in meaningful reading and discussion of rich literary texts.

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Alexandria, VA: Association for Supervision and Curriculum Development.
The Effectiveness of the Scaffolding Interrogative Method (SIM) for Teaching Children with Reading Comprehension Deficits

Patricia Mui Hoon NG
SRL Research Award 2013 Recipient
M.Ed (Special Education) Candidate
National Institute of Education
Singapore

Abstract

This is a study on the effectiveness of the Scaffolding Interrogative Method (SIM) (Chia, 2002; Chia & Kee, 2013) for severe reading comprehension problems in children with no word recognition issues. Such traits are associated with hyperlexia, which is an advanced word recognition ability in children with language disorders (Aaron, 1989). Challenges for affected children have been found in the formation and organization of schemata for processing information (Healy, 1982). The strengths of the SIM in these aspects form the basis for this study so that children can overcome such challenges in transiting from “learning to read” to the next developmental stage of “reading to learn” in Chall’s (1983) stages of reading.

Keywords: Scaffolding Interrogative Method, schemata, reading comprehension, hyperlexia, children, developmental stage

Introduction

The purpose of this study is to investigate the effectiveness of the Scaffolding Interrogative Method (SIM) (Chia, 2002; Chia & Kee, 2013) for severe reading comprehension problems in children with no word recognition issues. Such traits are associated with hyperlexia, which is known historically as an advanced word recognition ability in children with language disorders (Aaron, 1989). Language disorders have been described as deficits in comprehension and/or use of spoken, written and/or other symbol systems (American Speech-Language-Hearing Association, 1993).

Literature Review

The term hyperlexia was coined by Silberberg & Silberberg (1967) to refer to children whose ability to recognize words was significantly higher than either their evaluated verbal functioning level or ability to comprehend the material that was read. Using this discrepancy, these researchers selected a heterogeneous sample of the mentally defective to bright normal for their study. It seemed controversial as the unexpected advanced reading ability was previously only described in “idiot savant” studies of severely autistic and cognitively impaired clinical populations (e.g., Kanner, 1943; Parker, 1919; and Phillips, 1930).
Further along, Healy (1982) sought to rectify two issues about hyperlexia: Its unglamorous title of a savant idiosyncrasy; and the inclusion of normative populations with the discrepancy. For the first, she used the term “enigma” as a replacement. The latter issue was deliberated at length in her study where she put forth additional criteria for hyperlexia, such as a spontaneous ability to read before age 5, a compulsive preoccupation with reading together with echolalia - the repeating of speech sounds, the impairment of expressive language, and difficulty with all language processing in both listening and reading modes.

Literature on hyperlexia is found to be more prevalent in clinical studies of children with Pervasive Developmental Disorders (PDD) (Huttenlocher & Huttenlocher, 1973; Mehegan & Dreifus, 1972); this befitted hyperlexia the title of a syndrome. Nevertheless, there were clinicians who reported on the precocious talent in children of superior IQ without comprehension deficits by age norms (e.g. Jackson & Biemiller, 1985; Pennington, Johnson, & Welsh, 1987). Hence, labeling hyperlexia as a language disorder can be controversial. Back in 1976, Elliott and Needleman had pointed out that hyperlexia is not a disorder; thus it should not be described as a syndrome. In their case study, a toddler with a total absence of speech was described to have spontaneous ability to recognize words before age 2, and could even use sentence cards and a typewriter to make her needs known.

In cases of acquired hyperlexia, Mehegan & Dreifus (1972) found that there was normal language acquisition until an interruption as a result of physical illness, injury, or even psychic trauma. Usually, there would be no appreciable language until the parents witnessed the remarkable talent for reading emerging suddenly. Reading was a compulsive, ritualistic exercise for their children; and the material was rendered in a stereotyped rhythm. A more recent study on acquired hyperlexia has described the compulsion in terms of print groping and ambient echolalia in an adult woman with no such symptoms preceding her brain damage (Suzuki, Itoh, Hayashi, Kouno, & Takeda, 2009). This visual groping draws a parallel to that in Healy’s (1982) study where the children obsessively sought out reading material, and a majority was glued to Sesame Street or other TV programs which associated print with spoken words at the expense of other customary childhood activities.

Causal factors
Campbell (1971) suggested that comprehension depended on higher thinking processes in the complex nature of reading, therefore hyperlexia may be explained by the fixation on word reading at the imagery level, without an attachment of symbolic meaning. The progress to the higher thinking processes could have been stalled by a generalized cognitive disability in structuring incoming experiences (Healy, 1982). In other words, it is the automaticity (which the normative population takes for granted) in structuring incoming experiences that is lacking for those with hyperlexia hampering the meaningful processing of linguistic input. Furthermore, studies have shown that children with hyperlexia are unable to pass age-appropriate Piagetian tasks, both verbal and non-verbal (Healy, 1981; Huttenlocher & Huttenlocher, 1973). This supports the presence of underlying cognitive deficits in children with hyperlexia that contribute to the comprehension deficit.
Remediation strategies
There can be issues as precocious reading behavior does not necessarily translate into a positive developmental milestone. Many might presume that the conceptual understanding for such children would just come along with maturity, as they have a head-start in word recognition. However, the studies mentioned here show that that facility with the words of the text does not promise a corresponding comprehension. Prolonged preoccupation with reading replacing other customary childhood activities can further hinder the child from gaining enough social-emotional experiences to promote understanding. Hence, it can be counter-productive for affected children such as those in the Healy (1982) study - parents seemed very proud of the reading and indicated that they encouraged it. Only one parent out of the twelve had concerns when reading developed before expressive language at age 3, saw it as an additional manifestation of abnormality, and made serious efforts to boost alternative activities. Therefore, family services in the form of parent education would be helpful in early intervention.

For school-aged children, there is the suggestion that written instructions work better over verbal ones (Mehegan & Dreifus, 1972). Additionally, DeHirsch (1971) had stressed that it is imperative to assimilate content into a pre-existing conceptual framework to support their comprehension. Such a framework should be based on cognitive "schemata" (Anderson, 1977; Rumelhart, 1980) that help the child select important ideas, relate text to prior experience, and remember content. The SIM is one intervention that has shown effectiveness in the application of the above-mentioned strategies (see Chia, 2002; Chia & Kee, 2013). Firstly, it uses the schemata of "Wh" questions, which refer to who, what, when, and where questions to scaffold important information in a matrix framework. Written instructions are further given by scaffolding who/what/where/when with What person/What happened/What place/What time.

The design of the present study is modeled after the single-subject studies on the effectiveness of the SIM (Chia, 2002) and a story-mapping strategy (Idol-Maestas, 1985). Single-subject designs have been advocated as a powerful and useful methodology for improving the practices that benefit individuals with disabilities and their families. At the same time, the methodology can be used to test conceptual theory and to identify and validate effective clinical interventions (Horner et al., 2005). The systematic form of experimental analysis in single-subject research have been found to help educators build individualized educational and support plans (Dunlap & Kern, 1997). Furthermore, its usefulness for one-to-one or small group instruction has practical relevance for withdrawal sessions in school, as well as for home tutoring.

In conducting this study, it is hoped that the SIM can be further validated as an effective intervention to stimulate an automaticity in structuring incoming experiences that is lacking in those with hyperlexia. The evidence on the effectiveness of the SIM from two earlier studies provides some assurance that the present study can proceed without unethically risking experimental failure.
Methodology

Independent variable
The independent variable (IV) was the SIM matrix for scaffolding the comprehension passages taken from *Teaching Reading Comprehension to Children with Hyperlexia* (Ng & Chia, 2013). The subject was taught to first number the sentences of the test passage before filling in the sentence number into the first column of the matrix. Then, the subject was guided to find the important words to fill in under each of the “wh” interrogative of a sentence. The completed matrix would then be used as a reference for a plausible answer to the comprehension questions given at the end of the passage. Figure 1 shows a sample of a comprehension test passage, and the SIM matrix is shown in Figure 2.

Danny had a good dinner at home today.
His mom had spent hours cooking it in the kitchen.
His dad helped in clearing up after dinner.
When all the washing was done, they all sat down to watch TV in the living room.
The phone rang and dad took the call to the study room.
Thereafter, the clock struck nine, and it was time for Danny to go to bed.
Danny washed himself and changed into his pyjamas before climbing into bed.
Soon after, mom came to kiss him goodnight and switched the lights off.

Questions
1. Where did Danny have his dinner?
2. Who cooked the dinner?

*Figure 1.* A partial sample of a comprehension test passage
**Scaffolding Interrogatives Method (SIM) Matrix**

<table>
<thead>
<tr>
<th>Sentence No.</th>
<th>Who?</th>
<th>What?</th>
<th>Where?</th>
<th>When?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What person(s)?</td>
<td>What happened?</td>
<td>What place?</td>
<td>What time/period?</td>
</tr>
<tr>
<td>1</td>
<td>Danny</td>
<td>had dinner</td>
<td>at home</td>
<td>today</td>
</tr>
<tr>
<td>2</td>
<td>His mom</td>
<td>spent hours cooking</td>
<td>in the kitchen</td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>His dad</td>
<td>helped in clearing up</td>
<td>X</td>
<td>after dinner</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Figure 2. A partial sample of a SIM matrix*

**Dependent variables**
The intervention was carried out on a one-to-one basis using the single-subject ABAB (A: Baseline; B: Intervention) design. The primary dependent variable (DV) is the percentage score of each discrete trial on the comprehension tests in both the baseline and intervention conditions. To address the bias in the use of specially designed comprehension passages, a standardized instrument, the *GAP Reading Comprehension Test* (McLeod, 1977), was used as a pre-/post-test measure for the difference in comprehension age.

**Instructional Stimuli**
The comprehension tests for the baseline and intervention conditions were taken from the book *Teaching Reading Comprehension to Children with Hyperlexia* (Ng & Chia, 2013). The researcher of the present study had written the test passages to include important words (e.g. place, person, time) in each sentence, and a range of interest topics under fact, fiction, and fantasy to appeal to children. On top of that, the passages are categorized by grade levels to facilitate selection based on the competency level of the child.

**Instruments**
In this study, the word recognition age/reading age (R.A.) and reading comprehension age (R.C.A.) of the participants were measured for the purpose of confirming the advanced word recognition ability and comprehension impairment in hyperlexia, as well as for determining the participants’ level of functioning before and after the intervention. A single-word reading test instrument called the *Schonell Graded Word Reading Test* (Schonell & Schonell, 1950) was used to measure the pre-test R.A. It was developed to assess reading ability in children from the age of 5 to 14. A comparable single-word reading test instrument called the *St Lucia Graded Word Reading Test* (Andrews, 1969) was used to measure the post-test R.A. This instrument can be used to assess reading ability in children from the age of 5 to 13. It was used for the post-test so that a different list of words could be tested, instead of repeating the *Schonell Graded Word Reading Test*. As for the R.C.A., the instrument used was the *GAP Reading Comprehension Test*. 
(McLeod, 1977). The Form B3 and Form R3 of this test instrument were used for the pre-test and post-test respectively. The age range for this comprehension test is also 5 to 14 years.

**Background Information of Participants**

The subject is a mainstream school student recruited by convenience sampling, via referral from a learning disability center in Singapore. Prior to the invitation to participate in this study, the parents had brought him to the center for the remediation of comprehension difficulties. Following the consent from both the subject and his parents, pre-test data was collected as shown in Table 1. The subject’s chronological age of 8.7 years put him in Stage 2 of reading (Chall, 1983), where decoding becomes more automatic for typically developing children and reading for comprehension begins. Thus, he was deemed to be in the appropriate age for the intervention. Based on the records from the clinician at the center, the Wide Range Intelligence Test (WRIT) (Glutting, Adams, & Sheslow, 1999) revealed that the subject’s IQ is in the low average range. On the other hand, he has a significantly higher Visual IQ than Verbal IQ; and his score in the matrices subtest is in the High Average range. These indicators show that he is likely to have the learning preference and strengths in using the visual and matrix type of support in SIM.

The construct of hyperlexia was operationalized by a superior level of word recognition relative to other linguistic or cognitive functioning (see Healy, 1982). The subject’s R.A. was found to be 3.4 years above his R.C.A.; and 4.1 years above his Mental Age (M.A.). This confirmed his superior level of word recognition.

<table>
<thead>
<tr>
<th>Table 1 - Participant information at pre-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Verbal IQ</td>
</tr>
<tr>
<td>Visual IQ</td>
</tr>
<tr>
<td>Full Scale IQ (FSIQ)</td>
</tr>
<tr>
<td>Matrices</td>
</tr>
<tr>
<td>Chronological Age (C.A.)</td>
</tr>
<tr>
<td>Mental Age (M.A.)</td>
</tr>
<tr>
<td>Reading Age (R.A.)</td>
</tr>
<tr>
<td>Difference between R.A. and M.A.</td>
</tr>
<tr>
<td>Reading Comprehension Age (R.C.A.)</td>
</tr>
<tr>
<td>Difference between R.A. and R.C.A.</td>
</tr>
</tbody>
</table>

**Procedure**

**Teacher**

The researcher, who was trained by the developer of the SIM, was the sole teacher throughout the entire study. This eliminated any inconsistencies that could result from different teaching styles of different teachers.

**Setting**

The study was implemented in the subject’s home on a one-to-one basis. Each session was conducted at the subjects’ usual study area, as this natural environmental context would be more
conducive for eliciting positive responses from the subject. Efforts were made to remove other undesirable stimuli that could cause sensory discomfort or distraction from the task.

**Primary DV**
Discrete trials without any IV were first conducted to collect data for baseline condition A\(_1\). Thereafter, the subjects were trained in the use of the IV. Following a mastery level set at 80%, discrete trials were conducted again, but with the use of the IV to collect data for condition B\(_1\). Upon the establishment of a stable comprehension performance pattern, the process was repeated with the IV withdrawn for baseline condition A\(_2\), and re-introduced at intervention condition B\(_2\). During data collection, no teacher assistance was given for answering the comprehension questions or filling in the matrix. Nevertheless, the subject was encouraged to complete the tasks and was given a star upon the completion of each task. Each discrete trial with the use of the IV followed the approximate time frame:

<table>
<thead>
<tr>
<th>Duration</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 min.</td>
<td>Read the passage aloud in its entirety.</td>
</tr>
<tr>
<td>2 min.</td>
<td>Re-read silently.</td>
</tr>
<tr>
<td>7 min.</td>
<td>Fill in the matrix</td>
</tr>
<tr>
<td>3 min.</td>
<td>Answer the comprehension questions.</td>
</tr>
</tbody>
</table>

**Data analysis**
The percentage of correct answers across conditions with multiple baselines for the subjects was computed, tabulated and presented in a chart for a comparison of the performance. No marks were given for completing the matrix. Data was also collected from the standardized comprehension test used as a second dependent measure for a comparison of the pre- and post-test results.

**Scoring reliability**
Scoring for the primary DV (comprehension tests from *Teaching Reading Comprehension to Children with Hyperlexia*, Ng & Chia, 2013) and secondary DV (*GAP Reading Comprehension Test*, McLeod, 1977) was done by the researcher and a blind-rater. The inter-rater agreement for the two DV was respectively calculated by dividing the number of agreements by the total number of agreements plus disagreements multiplied by 100 (Kazdin, 1982).

**Implementation of procedures**
The fidelity of teacher implementation of the study procedures was determined by ratings completed by a rater who did not participate in this study and was not informed of its purpose. The rater observed at least 30% of the intervention sessions and used a checklist to rate whether each component of study procedures was implemented correctly. The fidelity checklist items are shown in Figure 2.
No. | Procedural Fidelity Checklist                                      | YES | NO |
---|-------------------------------------------------------------------|-----|----|
1  | At the start of the comprehension test, the participant was told to read the passage aloud in its entirety. |     |    |
2  | The participant was told to read the passage a second time silently. |     |    |
3  | The participant filled in the SIM matrix independently.            |     |    |
4  | The participant answered the comprehension questions using the matrix independently. |     |    |

*Figure 3 - The Procedural Fidelity Checklist*

**Social validity**

A social validity questionnaire was used to gather student perceptions of the intervention. This is important because high treatment acceptance can indicate long term continuation (Reimers, Wacker, Cooper, & DeRaad, 1992). The question topics covered their perceptions on the level of fun, difficulty and usefulness of the treatment. Made simple to suit the comprehension level of the child subjects, the questionnaire was modified from an elementary reading attitude survey (McKenna & Kear, 1990). The response format was a three-point Likert scale (with answering options ‘always’, ‘sometimes’, and ‘never’). The middle response is positive rather than neutral.

**Results and Discussion**

**Outcome of primary measures (ABAB design)**

![Graph of baseline and intervention data](image)

*Figure 4: Baseline and intervention data.*

The mean of baseline Condition A₁ was 28.75% and the range was 0% - 50%. After the training in the use of the SIM matrix, immediate positive effects were found in Condition B₁ where the mean score increased to 100% in stark contrast. In the return to baseline (Condition A₂), the mean fell to 75% and the range was 70% - 80%. This performance without the SIM matrix was
nevertheless better than that in Condition A. The implication is that there is already some increase in the automaticity of structuring the passage without the SIM matrix in the second phase of treatment withdrawal. The reintroduction of the SIM matrix in Condition B saw a sustained 100% score throughout, reflecting the subject’s dependence on it to ensure success when it was made available.

**Outcome of secondary measures (pre-test/post-test design)**

Table 2 shows the data from the secondary measures (pre-test/post-test design) illustrated in Figure 5.

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Test item</th>
<th>Pretest (age in years)</th>
<th>Posttest (age in years)</th>
<th>Post-Pre (age in years)</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Single Word Recognition Test</td>
<td>11.7</td>
<td>11.7</td>
<td>0.00</td>
<td>0.00%</td>
</tr>
<tr>
<td>2</td>
<td>Reading Comprehension Test</td>
<td>8.3</td>
<td>10.9</td>
<td>2.6</td>
<td>31.33%</td>
</tr>
</tbody>
</table>

**Figure 5**: Outcome of secondary measures (pre-test/post-test design)

At the beginning of the study, the Single Word Recognition pre-test using the *Schonell Reading Test* yielded a R.A. of 11.7 years. The post-test carried out at the end of the intervention study with the *St Lucia Graded Word Reading Test* yielded a R.A. of 11.7 years as well. Hence there was no difference in the pre-/post R.A. Contrastingly, the post-test R.C.A. is 10.9 years, which is an increase of 2.6 years from the pre-test R.C.A. of 8.3 years. This is an astounding 31.33% improvement. This indicates that by the end of the study, the subject had acquired some level of automaticity in comprehending text even without any scaffolding supports. As a result, the discrepancy between R.A. and R.C.A. at post-test has become smaller (0.8 years) as compared to the discrepancy at pre-test (3.4 years). With this discrepancy reduced, his symptoms of hyperlexia can be considered to have been eradicated. This data is shown in Table 3.
Table 3 - A comparison of the comprehension deficit at pre-test and post-test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test reading age (R.A.)</td>
<td>11.7 years</td>
</tr>
<tr>
<td>Pre-test reading comprehension age (R.C.A.)</td>
<td>8.3 years</td>
</tr>
<tr>
<td>Pre-test difference between R.A. and R.C.A.</td>
<td>3.4 years</td>
</tr>
<tr>
<td>Post-test reading age (R.A.)</td>
<td>11.7 years</td>
</tr>
<tr>
<td>Post-test reading comprehension age (R.C.A.)</td>
<td>10.9 years</td>
</tr>
<tr>
<td>Post-test difference between R.A. and R.C.A.</td>
<td>0.8 years</td>
</tr>
</tbody>
</table>

**Treatment fidelity and inter-rater agreement**
There was 100% fidelity of teacher implementation as observed by a blind-rater using the checklist (previously shown in Figure 3) for about 30% of the intervention sessions. The inter-rater agreements for the primary and secondary DV were both 100%.

**Social validity**
Table 4 shows the results of the Student Satisfaction Survey for the subject. These results indicate a high level of satisfaction in the use of the SIM matrix. It also reflected a strong endorsement of the intervention and an early-adopter attitude in the subject as all of the items were indicated with “Always”. It was observed that if the teacher had not presented the SIM matrix with the test paper at the start of study sessions, the subject would be quick to ask if the teacher had forgotten to bring the SIM matrix. The subject also seemed to enjoy color-coding the interrogative headings of each column of the matrix, as well as the corresponding phrases in the sentences of the comprehension passage. Most of all, he was clearly delighted with the perfect scores owing to the use of the SIM matrix. Hence, there is some basis for optimism that the SIM would be adopted by other new users.

Table 4 - Results of the Student Satisfaction Survey

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Student Satisfaction Survey</th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I know how to use the SIM matrix.</td>
<td>X</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>The SIM matrix helps me understand the passage.</td>
<td>X</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>The SIM matrix helps me answer the questions.</td>
<td>X</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>It is easy to use the SIM matrix.</td>
<td>X</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>I like to use the SIM matrix.</td>
<td>X</td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

**Conclusion**

The results of the present study has provided evidence through the ABAB design, as well as the pre-test/post-test measures that the SIM can be an effective tool for the remediation of reading
comprehension deficits in children with hyperlexia in the context of the study. While such effects cannot be generalized for other contexts, the study has built on the evidence of effectiveness from the two preceding studies on the SIM.

Since without intervention, poor comprehenders would commonly fall further behind (Clarke, Snowling, Truelove, & Hulme, 2010), any improvement in comprehension can be considered to have an appreciated value in real terms. To further reduce the comprehension deficit, it is recommended that the schemata be expanded to include other parameters of discourse comprehension such as inferential reasoning. Nevertheless, the SIM would be most useful for kick-starting the development of automaticity in structuring written information for those with such difficulties. This would help poor-comprehenders continue to develop their skills in “reading to learn” (see Chall, 1983), as they already have the talent in “learning to read”.

REFERENCES


Understanding the Oral Reading Errors committed by Poor Readers: What They are and Why They are made

Noel Kok Hwee CHIA, EdD
Assistant Professor
&
Meng Ee WONG, PhD
Assistant Professor
Early Childhood & Special Needs Education
National Institute of Education
Nanyang Technological University
Singapore

Abstract

Recognizing the different oral reading errors made by poor readers, who can be either dysfluent or disabled, creates awareness among the educators about the challenges that underlie the reading process. There are several oral reading error types and they are caused by different problems (e.g., mispronunciation and guesses at words) encountered during the process of decoding words. For instance, substitution error is the result of a target word (e.g., “father”) being replaced by another word that conveys the same meaning (e.g., “daddy”) or a totally different meaning (e.g., “feather”). Understanding the different oral reading error types and their causes will help educators to come up with appropriate intervention strategies to cater to the learning needs of these poor readers.

Key words: decoding, miscues, oral reading errors, poor reader

Introduction

This very short paper aims to raise the awareness among the educators the different oral reading error types caused by different challenges that poor readers commit during the process of decoding words they encounter in the passages. With a better understanding of the various oral reading error types committed, the authors of this paper believe it will help both regular teachers and allied educators (AED for short) who provide learning and behaviour support (AEDLBS for short) as well as those for teaching and learning (AEDT&L) to better appreciate the decoding challenges and what strategies can be provided to correct these oral reading errors.

According to Shanker and Ekwall (2003), there are several most common oral reading errors made by poor or disabled readers. They are mispronunciation, omission, repetition, reversal, insertion, substitution, and guesses at words. Chia (1998) has further identified four error subtypes for reversals. In addition, Chia (2006) has also identified two more oral reading error types: addition and invention (i.e., pseudo words). Table 1 shows the types of oral reading errors beginning with the most common to the least common.
Chia (2006) in his study on oral reading errors made by dyslexic readers found that the most common oral reading errors made by such readers were mainly substitutions (40%), omissions (23%) and additions (23%). According to Chia’s (2006) study, the other minor oral reading errors included reversals (13%) and insertions (1%). No invented words (invention errors) were found in his study. All these oral reading errors will be discussed further in the next section of the paper.

**Types of Oral Reading Errors**

Oral reading errors are also known as miscues. According to Shanker and Ekwall (2003), phonics difficulties with consonants and vowels can result in different types of oral reading errors or miscues. In other words, poor readers are unable to use consonants, consonant digraphs, vowels and vowel digraphs to decode one-syllabic or poly-syllabic words because they are unable to give the correct sounds and the variant sounds of the consonants (e.g., /cl/, /g/, /ls/), consonant digraphs (e.g., /-ck/, /-mn/, /gh/), vowels (i.e., /a/, /e/, /i/, /o/ and /u/) and vowel digraphs (e.g., /ay/, /ie/, /ow/).

**Mispronunciation**

Among all the oral reading errors made by poor readers, mispronunciation (or poor pronunciation) is considered the most serious problem. According to Shanker and Ekwall (2003), such errors are the result of poor use of phonics and/or structural analysis when decoding words, poor fluency skills and/or caused by hearing, or speech and language difficulties. In the case of hearing or speech and language difficulties, an audiologist or speech-language therapist will be required to confirm the diagnosis.
For example, “argue” is pronounced as /ɑː(r)ɡjuː/, while “Vogue” is pronounced as /vəʊɡ/; NOT “argue” mispronounced as /ɑː(r)ɡ/ and “Vogue” as /vəʊɡjuː/.

Omissions
This type of oral miscues is most common and is often the result of inadequate decoding skills such as poor fluency skills or words unknown to the readers. In other words, when a reader skips over a word or phrase that he/she cannot read, it is often assumed that the reader has been taught to do so and hence, the skip is intentional to avoid unknown words. However, if the reader knows the word(s) and he/she skips it/them, the problem is one of poor reading fluency.

For example, an omission of the second article “the” in the original sentence – “The poet and the artist will be present at the autographing session this evening at Kinokuniya Bookshop.” changes the original meaning of the sentence. When there are two articles “the” as in “The poet and the artist”, there are two DIFFERENT persons. However, when the second article “the” is omitted as in “The poet and artist”, poet and artist refers to the same ONE person.

Repetitions
Poor word recognition skill (sight word knowledge) is often the cause of repetitions during oral reading. In addition, poor word analysis and poor reading fluency can also result in repetitions of what is read earlier. However, a reader can repeat “certain words in order to correct a reading error or to gain time so as to avoid making an error” (Shanker & Ekwall, 2003, p.109). Moreover, repetition is also a form of reading strategy that a reader uses while “mentally works on the upcoming word” (Shanker & Ekwall, 2003, p.109).

For example, the original sentence – “The Prime Minister read his National Day message on TV last evening.” – is repeated as follows: “The Prime Minister ... The Prime Minister read his National Day message ... message on TV last evening.” The first repetition is made because the reader needs time to be certain that it is The Prime Minister NOT anyone else who read the National Day message. The second repetition “message” is made to correct an earlier misreading “massage”.

Reversals
Reversal miscues (also known as Inversions) are the result of poor decoding skills regardless of a reader’s age. According to Chia (1998), there are four types of reversals: Firstly, static reversals include changes in rotation of a letter, e.g., the “d” in “dog” is rotated and the word is read “bog”. Secondly, kinetic reversals involve changes in direction of a word, e.g., the “raw” is changed and read “war”. Thirdly, sequential reversals involve changes in the order of letters in a word, e.g., the word “relevant” is misread as “revelant” – a pseudo-word. Finally, the mirror-image reversals involve changes in rotation as well as direction of the constituent letters in a word during writing or spelling.

According to Shanker and Ekwall (2003), reversals occur as a result of a reader’s failure to develop a left-to-right eye movement or a left-to-right reading pattern. There are cases in which a poor reader makes a lot of reversal miscues due to some neurological impairment. Although it has been reported that dyslexic readers are more prone to make many reversal errors, it is not so in all cases of dyslexia (Chia, 2006).
**Insertions**

Insertions (also known as Additions) are the third most common miscues encountered in oral reading. One possible cause of this kind of oral reading errors is that a reader’s oral language development may surpass his/her reading level or that the reader may anticipate what is coming next and read that instead of what actually is in the print (Shanker & Ekwall, 2003). When viewing an insertion made within the context of a sentence read, an insertion makes more sense to the reader in raising his/her awareness or comprehension of the sentence read.

For example, the original sentence is “The policeman chased the pickpocket.” An insertion of a word can happen in this sentence as follows: “The policeman chased after the pickpocket.” In this case, the additional word “after” after the word “chased” is redundant as the target word “chased” in past tense means “ran after”. An insertion can also take the form of a prefix or suffix as in the following examples: (1) Insertion of a prefix: “The irresponsible boy was praised by the principal during the school assembly.” (2) Insertion of a suffix: “The bully pushed the little boy off his chair during recess.”

**Substitutions**

Another type of most common miscues in oral reading is the substitution error. A poor reader substitutes a target word given in a sentence for another word. The reader has either not developed adequate decoding skills or he/she has poor fluency skills. If substitutions are not in the proper context of the sentence, they cause decoding difficulty and eventually impact on reading comprehension. At times, substitutions are made because the readers are too used to the common words they know and often encounter in their reading.

For example, a poor reader may substitute the word “purchase” in the sentence – “We purchase (buy) some cans of root beer at the 7-Eleven store.” with the common word “buy” in their haste to quickly finish reading a given passage to order to have more time to answer reading comprehension questions that follow after the passage.

**Guesses at words**

Guesses at new or unknown words can be a wild guess or an educated guess. The difference between the former and latter is that the latter involves a careful attempt to make sense of word decoded in the sentence it appears in order to read with understanding.

For example, the words “tsunami” and “catastrophe” in the original sentence – “The tsunami is a natural catastrophe that has happened to both Japan and Indonesia in recent times, killing thousands of people.” – are being guessed by a poor reader as “The sun and I” for “tsunami” and “catch a trophy” respectively.

**What can be done to correct the Oral Reading Errors**

To date, there is not one best strategy that can rectify the problems of different oral reading errors. Appropriate phonics instruction is certainly most helpful to poor readers learning to read English. According to Shanker and Ekwall (2003), phonics instruction tends to be more beneficial to those who are reading at or below the second-grade reading level. To determine
which grade-level of reading competence their students are at, educators can administer an informal reading inventory to find out more about their students’ performance in oral reading. There are many types of informal reading inventories (e.g., Bader’s Reading and Language Inventory, Analytical Reading Inventory, Developmental Literacy Inventory, and Classroom Reading Inventory) available in the market.

Here are some selected word analysis strategies (also known as word-attack strategies) that can be used with poor readers to improve their decoding skills. These strategies include phonics, structural analysis and context clues.

**Phonics**
Phonics approach uses phoneme-grapheme relationships to teach decoding. It is often used in beginning reading in deciphering one-syllable words. It often requires a learner to match a letter with its appropriate sound(s). For example, the letter “c” has two sounds. The first sound is /k/ when “c” is followed by “a”, “o” or “u” as in cat, cot or cut (the hard “c” sound); and the second sound is /s/ when “c” is followed by “e”, “i” or “y” as in cent, city or cycle (the soft “c” sound).

**Structural analysis**
Structural analysis (also known as morphological strategy) covers meaningful units such as root words, prefixes, suffixes, possessives (e.g., ’s and s’), plurals (e.g., -s and -es), accent rules and syllables (e.g., rab.bit – two closed syllables). In this strategy, readers are taught how to use these meaningful units to decode polysyllabic words by identifying, separating and pronouncing reliable units of parts of words. For example, -sion (a suffix) can read as /ʃən/ after a consonant as in “mansion” or as /zən/ after a single long vowel as in “evasion”, “cohesion”, “erosion” and “fusion”, but a single short “i” as in “vision”.

**Contextual clues**
These clues refer to deriving the meaning and/or pronunciation of an unknown word from the words preceding (known as anaphoric clues) or following (known as cataphoric clues) that word. For example, in the sentence – “Ali is a policeman. He caught a thief last week.” the meaning of the word *He* in the second sentence can be inferred from two words found in the first sentence: Ali and policeman. Ali is a name for a guy while policeman certainly refers to the crime-buster who is a man. Hence, the word *He* certainly refers to *Ali* the policeman and no one else.

**Conclusion**
Challenging reading problems encountered by poor readers can be reduced or managed better if educators are aware of the different oral reading errors or miscues committed by their students. Being aware of such miscues made during oral reading is not enough. Identifying these specific oral reading errors or miscues is the next important step to be taken by educators to better understand the underlying causes of reading difficulties encountered by poor readers. In this way, educators can think and create better strategies to help poor readers to cope with each different type of the oral reading errors.
References

