ART-BASED PSYCHOEDUCATION MODULE IN IMPROVING PSYCHOLOGICAL FUNCTIONING AMONG CHILDREN WITH DYSLEXIA

NURUL SHAFIRA BINTI ADI

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by

NURUL SHAFIRA BINTI ADI

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HUSM	Hospital Universiti Sains Malaysia
PEDSQL- VAS	Present Functioning Visual Analogue Scale
CBCL	The Child Behavior Checklist
STAI-C	State-Trait Anxiety Inventory for Children
ADHD	Attention Deficit Hyperactivity Disorder
SLD	Specific Learning Difficulties
WHO	World Health Organization
IDA	The International Development Association
CBT	Cognitive Behavior Therapy
ADDIE	Analysis, Design, Development, Implementation, Evaluation
RM ANOVA	Repeated Measure Analysis of Variance
LINUS	Literacy and Numeracy Screening

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MODUL PSIKOPENDIDIKAN BERASASKAN SENI UNTUK MENINGKATKAN KEFUNGSIAN PSIKOLOGI DALAM KALANGAN KANAK-KANAK DISLEKSIA.

ABSTRAK

Salah satu kesukaran pembelajaran khusus yang paling utama ialah disleksia. Kanak-kanak yang didiagnosis dengan disleksia sering menghadapi banyak masalah psikologi kerana kebolehan mereka yang terhad untuk membaca, mengeja dan menulis. Justeru, kajian ini bertujuan untuk membangunkan, mengesahkan dan menilai Psikopendidikan Berasaskan Seni dalam meningkatkan fungsi psikologi dalam kalangan kanak-kanak disleksia. Kajian ini terdiri daripada tiga fasa yang melibatkan kanak-kanak disleksia berumur 7 hingga 12 tahun dan guru masing-masing daripada Unit pemulihan di HUSM dan sekolah berkeperluan khas di Kelantan, di mana mereka dipilih secara pensampelan bertujuan. Dalam fasa I, satu kajian telah dijalankan untuk menilai dan membandingkan fungsi psikologi dalam kalangan kanak-kanak disleksia dan dengan kanak-kanak yang melalui tahap perkembangan normal. Empat puluh (n=40) kanak-kanak yang menghidap disleksia dan lima puluh (n=50) kanak-kanak biasa yang tidak mempunyai masalah membaca telah dikenakan penilaian daripada guru sekolah rendah mereka yang mengenali kanak-kanak itu selama sekurang-kurangnya satu tahun. Untuk penilaian masalah tingkah laku dan masalah emosi, Senarai Semak Tingkah Laku Kanak-kanak (CBCL) dan *State-Trait Anxiety Inventory* (STAI) telah diisi. Keputusan menunjukkan jumlah skor untuk masalah tingkah laku dengan (*Mean* = 88.3; SD = 31.0) di kalangan kanak-kanak disleksia adalah lebih besar berbanding kanak-kanak yang melalui tahap perkembangan normal (*Mean* = 31.2; SD =32.8). Kemudian, model Analisis, Reka Bentuk, Pembangunan, Pelaksanaan dan Penilaian

(ADDIE) digunakan untuk membimbing pembangunan dan pengesahan modul Psikopendidikan Berasaskan Seni dalam fasa II. Secara keseluruhannya, berdasarkan kesemua peratusan markah yang diberikan oleh pakar, kesahan kandungan modul ini dianggap baik kerana peratusan markah mencapai 92%. Dalam fasa III, kajian intervensi kuasi-eksperimen telah dijalankan ke atas 33 kanak-kanak disleksia untuk menilai keberkesanan modul psikopendidikan berasaskan seni berbanding kumpulan kawalan (n=31). *PedsQL Present Functioning Visual Analogue Scale* (PedsQL-VAS) dan *State-Trait Anxiety Inventory* (STAI) telah digunakan untuk mengukur fungsi psikologi. Kajian antara kumpulan intervensi dan kumpulan kawalan dalam penilaian pra dan pasca adalah signifikan, di mana keputusan menunjukkan bahawa intervensi psikopendidikan berasaskan seni berkesan dalam meningkatkan fungsi psikologi dalam kalangan kanak-kanak disleksia, [$F(1,62) = 5.59$, $p < 0.05$]. Di samping itu, masa juga memberi impak yang besar kepada kumpulan intervensi, [Wilks' Lambda = 0.42, $F(1,62) = 83.2$, $p<0.001$). Hubungan yang signifikan antara keadaan kumpulan dan masa juga dikenalpasti [Wilks' Lambda = 0.63, $F(1,62) = 37.2$, $p<0.001$]. Secara khusus, terdapat penurunan dalam markah pada penilaian pasca untuk kedua-dua kumpulan terutamanya dalam kumpulan intervensi. Keseluruhannya, kanak-kanak disleksia mempunyai kecenderungan yang lebih tinggi untuk rasa tertekan dan cemas, dan mengalami gangguan dalam masalah tingkah laku berbanding rakan sebaya mereka yang melalui tahap perkembangan normal. Penurunan skor dalam tekanan emosi didapati pada penilaian pasca berbanding kumpulan kawalan selepas intervensi psikopendidikan berasaskan seni dilengkapkan. Kajian ini turut mencadangkan agar kajian longitudinal pada masa hadapan dijalankan menggunakan modul ini bagi memastikan keberkesanannya dalam jangka masa panjang.

ART-BASED PSYCHOEDUCATION MODULE IN IMPROVING PSYCHOLOGICAL FUNCTIONING AMONG CHILDREN WITH DYSLEXIA

ABSTRACT

One of the most common Specific Learning Difficulties is dyslexia. Children diagnosed with dyslexia often have to face many psychological problems due to their limited ability to do reading, spelling, and writing. Hence, this study aims to develop, validate, and evaluate Art-based Psychoeducation in improving psychological functioning among children with dyslexia. This study consisted of three phases that involved children with dyslexia aged 7 to 12 years old and their respective teachers, purposively sampled from rehabilitation Unit at HUSM and the selection of special needs school in Kelantan. In phase I, a study was conducted to assess and compare psychological functioning among children identified as having dyslexia and to compare it with typically developed children. Those who participated in this research had dyslexia as their primary diagnosis. Forty (n=40) children with dyslexia and fifty (n=50) typically developing children without reading problems were subjected for assessment from their primary school teachers, whom should have known the children for at least one year. For assessment of behaviour problems and emotional problems, the Child Behaviour Checklist (CBCL) and State Trait Anxiety Inventory (STAI) were filled out. The results indicate an existence of a significant greater degree of total score for behavioural problems, the mean score for children in the dyslexia group was significantly higher (Mean = 88.3; SD = 31.0) compared to the control group (Mean = 31.2; SD =32.8). Then an Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model was used to guide the development and validation of Art-based Psychoeducation module in phase II. Overall, the content validity of this module is 97% . Based on all the percentage of scores as given by the experts, this module can

be considered as having good content validity. In phase III, a quasi-experimental intervention study was conducted on 33 children with dyslexia to evaluate the effectiveness of art-based psychoeducation module as compared to a control group (n=31). PedsQL Present Functioning Visual Analogue Scale (PedsQL-VAS) and State Trait Anxiety Inventory (STAI) was used to measure the psychological functioning. The main effect comparing the intervention and control group over pre- and post-assessment level was significant, suggesting the art-based psychoeducation intervention was effective in enhancing children with dyslexia in improving psychological functioning, [$F(1,62) = 5.59$, $p<0.05$]. There was a substantial major effect for time in the intervention group, [Wilks' Lambda = 0.42, $F(1,62) = 83.2$, $p<0.00$]). There was significant interaction between the group conditions and time [Wilks' Lambda = 0.63, $F(1,62) = 37.2$, $p<0.001$]. Specifically, there are decreases in score at post-assessment for both groups especially in intervention group. Overall, children with dyslexia have higher tendency to be depressed, anxious, and had disturbance in behavioural problems compared to their peers who are typically developing. The decrease in all emotional distress score was found at post-assessment compared to control group after completing art-based psychoeducation intervention. This study also suggests that future longitudinal studies should be carried out using this module to ensure its effectiveness in the long run.

CHAPTER 1

INTRODUCTION

1.1 Study Background

This chapter will provide a brief understanding of the nature of specific learning difficulties (SLD) and dyslexia such as the prevalence, symptoms, theories, assessments, and treatments. A detailed problem statement, research gap, justification of the study, research questions, objectives, hypothesis, operational definition, and thesis outline are also included.

This study aimed to report on the psychological functioning of Malaysian children who suffer from dyslexia. It also aimed to develop and validate the art-based psychoeducation module for children with dyslexia. In addition, the study aimed to evaluate the effectiveness of art-based psychoeducation in improving psychological functioning among children with dyslexia.

SLD is a condition that affects various domains of education and can manifest a unique difficulty in academic performance. The first type of SLD is dyslexia, which is characterized by difficulties in accurate word recognition and the likelihood of struggling with phonological awareness, which is a central part of the reading process (Westby, 2015). The second type of SLD also involves writing, which is called dysgraphia. The person who suffers from this type of SLD may have difficulty writing down ideas on paper (Di Betta & Romani, 2006). The third type is dyscalculia, which is a difficulty in solving mathematical problems (Butterworth et al., 2011).

Several past studies on dyslexia were devoted to studying the link between emotional disorders and learning difficulties. However, very few studies focus on children with dyslexia. Thus, children with dyslexia and their teachers were chosen as participants in this research. Teachers play a vital role in the performance and progress of their students, as well as in teaching reading acquisition, and might be among the first to detect learning difficulties among their students.

Poor academic performance may lead to reduced psychological functioning when children with dyslexia notice “differences” between themselves and typically developing children, especially in reading-related tasks (Pollak, 2005). Dyslexia can have significant psychological effects on behaviour and emotional well-being, often expressed by children, which include anxiety, frustration, and sadness (Wilmot et al., 2023). Sahoo et al. (2015) reported that about 30% of children with SLD have behavioural and emotional problems, and they are at increased risk for other comorbidities. In Malaysia, most interventions focused on improving reading and writing performances, such as phonological interventions, multisensory methods, and cognitive training (Yuzaidey et al., 2018). The recent study focuses more on the improvement of psychological functioning among children with dyslexia using several psychological interventions. Some evidence shows that children with dyslexia can be helped by specific interventions to improve their psychological functioning, including cognitive behavioural therapy (Bekirogullari, 2018), mindfulness-based cognitive therapy (Tarrasch et al., 2016), and psychoeducation (Nukari et al., 2022).

1.2 Specific Learning Difficulties

Historical evidence of treatment for SLD goes as far back as the 18th century, when it was called "word blindness" by neurologist Adolf Kussamaul to explain the condition of dyslexia (Moll et al., 2016). In 1967, Samuel Kirk devised the term "learning disability" at a conference in Chicago. Soon after that, in 1969, the Children with Specific Learning Difficulties Act was passed by the United States Congress (Moll et al., 2016). Up until 2018, this disorder has been recognized worldwide and is being treated by a variety of professions and specialists, all of whom work together to provide a better learning experience for children.

Some changes were made in the Diagnostic and Statistical Manual of Mental Disorder, Fifth Edition, Text Revision (DSM-5-TR), regarding the specifications of learning difficulties. Among them was the reintroduction of dyslexia and dyscalculia, as well as dysgraphia, into the DSM-5-TR (American Psychiatric Association, 2022). Besides, specifiers for the disorder were included to help with the diagnosis process, where difficulties in reading, writing, and doing math were introduced. The intelligence quotient (IQ) discrepancy criteria was removed as it was deemed unfit as a criteria for SLD (Cavendish, 2013). Based on the DSM-5-TR, SLD is characterized as academic difficulties in at least one of the following factors: inaccurate reading, written expression, comprehension, writing, or solving mathematical problems (American Psychiatric Association, 2022). Learning difficulties may begin at a younger age, although manifestations of SLD may begin at a later age, usually during the early years of schooling.

1.2.1 Dyslexia

Dyslexia is a condition of processing information that is different from that of typically developing children and is often characterized by difficulties in reading and writing. It can affect areas of cognition such as processing speed, memory, the skill to regulate time, and problems in coordination and control of motion (Shaywitz, 2008). The word “dyslexia’ was introduced by Rudolph Berlin in 1884. Dyslexia originated from the Greek words “dys” and “lexia”, which mean “disordered words” . The term was used to refer to a group of stroke patients in 1887 who had trouble in reading and spelling (Reid et al., 2003).

Dyslexia can be classified into two subtypes. The first subtype is peripheral dyslexia and the second is central dyslexia. Peripheral dyslexia refer to a type of reading difficulty that can be described as a weakened visual analysis of the word form (Kim, 2021). On the other hand, central dyslexia can be subdivided into non-semantic reading, surface dyslexia, phonological dyslexia, and deep dyslexia (Al-Shidhani & Arora, 2012).

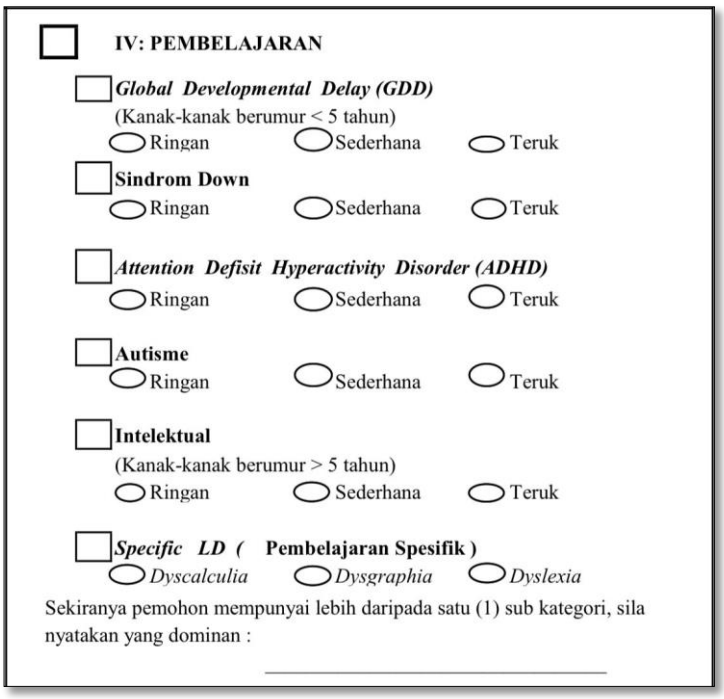
Despite a substantial increase in public awareness and understanding of dyslexia (Gomez, 2000), the negative stigma remains firmly entrenched within our culture. People around children with dyslexia label them as either “dumb” or “lazy” (Glyn, 2015). Similar attitudes towards individuals with dyslexia can be observed across cultures. For instance, a study conducted by Frey and Fisher (2010) discovered that many people in Western culture believe that “dyslexia” is a man-made term created to serve the interests of other parties, such as special education teachers. This is further supported by Riddell (2009), who asserted that the diagnosis of dyslexia is

used by parents to acquire additional support for their children. This is consistent with the claim made by an educational psychologist at Durham University, who asserted that “dyslexia” is not a medical condition and is only used as a label by middle-class parents to disguise their children’s lack of intelligence (Hickman and Brens, 2014). This finding contradicts the criteria outlined for SLD in the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR), which indicated that intellectual difficulties (ID) and SLD cannot coexist and therefore, are not interrelated. It can be concluded that individuals with dyslexia are generally those with average to superior intellectual quotients (IQs) (Svensson et al., 2001).

Due to the widespread of stigma and prejudice, there is a high probability that children who receive a dyslexia diagnosis may feel isolated from their peers (Miller-Guron & Lundberg, 2000). However, labelling individuals with dyslexia has its advantages as it opens the door to extra resources and assistance for them, which would not be granted without a formal diagnosis (Cameron & Billington, 2015; Ho, 2004; Skinner, 2011; Mullins and Preyde, 2013). In addition, the label also helps the affected parties to distinguish themselves from those with intellectual disabilities (Glazzard, 2010), which may be helpful in altering their academic self-efficacy (Glazzard and Dale, 2015). However, to reach their full potential and prevent long-term reading impairment, Balsiger (n.d.) stated that it is best for children with dyslexia to be identified between the ages of 5 and 7. One reason for this is that those ages have been recognized as windows of opportunity for literacy development. While it is not impossible for children who receive a late diagnosis of dyslexia to catch up with their peers, it may take them a longer time and more intensive interventional support to close the gap between themselves and other typical readers (Balsiger, n.d.).

To date, the exact aetiology of dyslexia remains unknown, despite a huge body of research that has been conducted (Demonet et al., 2004). However, past studies have shown that genetics may play a major role in the development of dyslexia, suggesting that dyslexia is an inherited condition (Meng et al., 2005). Apart from that, past researchers also revealed that people with dyslexia have less gray and white matter in the left parietotemporal area compared to individuals not having dyslexia (Deutsch et al., 2005; Booth & Burman, 2005). Having less gray matter in this region of the brain has been linked to deficits in phonological awareness, which is a skill that enables a person to differentiate individual sounds in spoken language. A reduction in white matter volume, on the other hand, has been associated with decreased reading skills. One explanation for this is that having less white matter in the area causes disruption in the communication between the lobes of the brain, which play a significant role in language and speech production. In addition, unlike the brain architectures of right-handed non-dyslexic individuals, reversed asymmetry (right larger than left) or symmetry hemispheres have been observed in those with dyslexia (Heim and Keil, 2004).

In Malaysia, dyslexia as a learning disability condition is registrable under Community Welfare Unit *(Jabatan Kebajikan Masyarakat).* Under this disability registration, dyslexia is classified as one of three types of Specific Learning Difficulties (SLD), in addition to Dyscalculia and Dysgraphia. This classification allows individuals with dyslexia to access appropriate support services and accommodations tailored to their specific learning needs. The illustration about learning disability in are illustrate on figure 1.1.


IV: PEMBELAJARAN

Global Developmental Delay (GDD)
(Kanak-kanak berumur < 5 tahun)
Ringan Sederhana Teruk

Sindrom Down
Ringan Sederhana Teruk

Attention Defisit Hyperactivity Disorder (ADHD)
Ringan Sederhana Teruk

Autisme
Ringan Sederhana Teruk

Intelektual
(Kanak-kanak berumur > 5 tahun)
Ringan Sederhana Teruk

Specific LD (**Pembelajaran Spesifik)**
Dyscalculia *Dysgraphia* *Dyslexia*

Sekiranya pemohon mempunyai lebih daripada satu (1) sub kategori, sila nyatakan yang dominan :

Figure 1.1: The Categories of Learning Disability Condition

1.2.2 Prevalence

According to the American Psychiatric Association (2013), the SLD prevalence among schoolchildren of different races and cultures is between 5 to 7%. SLD occurs in at least one in 10 people, putting more than 700 million children and adults worldwide at risk of life-long illiteracy and social exclusion (Sprenger-Charolles et al., 2011).

In Malaysia, the estimation is mainly based on the number of enrolments for the Special Education Integration Program, which is implemented in regular schools under the Ministry of Education, Malaysia. In 2013, 50,662 students enrolled in the special class for learning difficulties, which constituted approximately one percent of the total enrolment of students in all educational institutions under the Ministry of

Education Malaysia (Ministry of Education Malaysia, 2013). From the number of students enrolled in the special class for specific learning difficulties, nearly two-thirds were in primary schools, and the rest were in secondary schools. In addition, 599 preschool children have enrolled in the special preschool classes for learning difficulties, which are provided by several schools in Malaysia.

Dyslexia affects many aspects of children's development and has a prevalence of 5 to 17% worldwide (Singh et al., 2017). To date, there is no representative data on the incidence rate of dyslexia in Malaysia (Gomez, 2004). Despite this, a pilot study involving 2,000 Malay students aged 8 years old found that 140 out of 2,000 of them exhibited reading deficits, which may be attributed to poor phonological awareness (Gomez, 2000). A recent phenomenological study by Oga and Fatimah (2012) reported that in Malaysia, there are approximately 314,000 students who suffer from dyslexia. Other than that, 5 to 10% of Malaysian primary school students have dyslexia (Lee and Low, 2013). According to Rafiola et al. (2020), the number of children with dyslexia is increasing over time. Although there is little published research on this topic, recent studies serve as evidence that there is a significant number of children with dyslexia in Malaysia.

1.2.3 Symptoms

Symptoms of SLD can be seen from a young age, and the manifestations of the symptoms will gradually become localized in the specific academic domains that the individual might have problems in (Karande et al., 2007). At a preschool age, a child may have trouble pronouncing words, dressing themselves, and memorising numbers

from 1 to 10, as well as the days of the week. As the child progresses in the early years of school, the difficulties will start becoming localized in reading, writing, doing math, and physical activities (sports). At the ages of 10 to 13 years old, symptoms of SLD would have been fully manifested in the individual. They would usually be aware of their condition and have support in handling it, or they might not be aware of their condition as they have less severe symptoms of SLD (Karande et al., 2007). According to the American Psychiatric Association (2013), a person can only be diagnosed with dyslexia if he or she exhibits reading difficulties for a minimum of 6 months, despite targeted intervention focusing on areas of weakness.

1.3 Theories Explaining Dyslexia

"Developmental dyslexia" is usually defined as a discrepancy between intelligence and reading ability when receiving adequate reading skills (Ramus et al., 2003). The developmental dyslexia theories can be divided into three subcategories, which are the phonological, cerebellar, and magnocellular theories.

1.3.1 Phonological Theory

The main developmental dyslexia theory is the phonological theory. The phonological theory suggests that individuals with dyslexia have a specific impairment in the representation, storage, and/or retrieval of speech sounds (Bowers & Wolf, 1993). At the neurological level, it is usually assumed that the origin of the disorder is a congenital dysfunction of the left hemisphere Perisylvian brain area underlying phonological representations or connecting between phonological and orthographic

representations **(**Brady, 2013). Support for this theory comes from the evidence that children with dyslexia perform particularly poorly in tasks requiring phonological awareness, such as manipulation of speech sounds and conscious segmentation (Ramus et al., 2003).

1.3.2 Cerebellar Theory

Nicolson and Fawcett (2007) have hypothesized that a cerebellar deficit, which specifies the cerebellum is active during the early stages of skill development but less functioning when the skill becomes automated. The cerebellum plays a function in motor control and therefore in speech (Bodranghien et al., 2016). It is suggested that dysfunctional verbalisation would lead to poor phonological representations, which could lend support to why dyslexia is present in some individuals.

1.3.3 Magnocellular Auditory

The cerebellum is the head ganglion of magnocellular systems. It contributes to binocular fixation and to inner speech for sounding out words, which is defective in children with dyslexia (Stein, 2001). Support for this theory appears from the evidence that individuals with dyslexia show poor performance on several auditory tasks, including frequency discrimination (Ramus & Ahissar, 2012) and temporal order judgement (Temple et al., 2000). The failure to correctly represent short sounds and fast transitions would cause further difficulties when such acoustic events are the cues for phonemic contrasts, as in “ba” vs. “da” (Prestes & Feitosa, 2017). There is also

evidence that individual with dyslexia may have a poorer categorical perception of certain contrasts (Serniclaes et al., 2001).

1.3.4 Magnocellular Visual

There is a unifying theory that attempts to integrate all the findings mentioned above. The visual theory reflects another longstanding tradition in the study of dyslexia, considering it a visual impairment giving rise to difficulties with the processing of letters and words on a page of text. Children with dyslexia might simply be bad at all visual motion tests (Stein, 2022). This may take the form of unstable binocular fixations, poor vergence, or increased visual crowding (Stein & Walsh, 1997). The diagram below (Figure 1.1) illustrates the theories that explain the development of dyslexia.

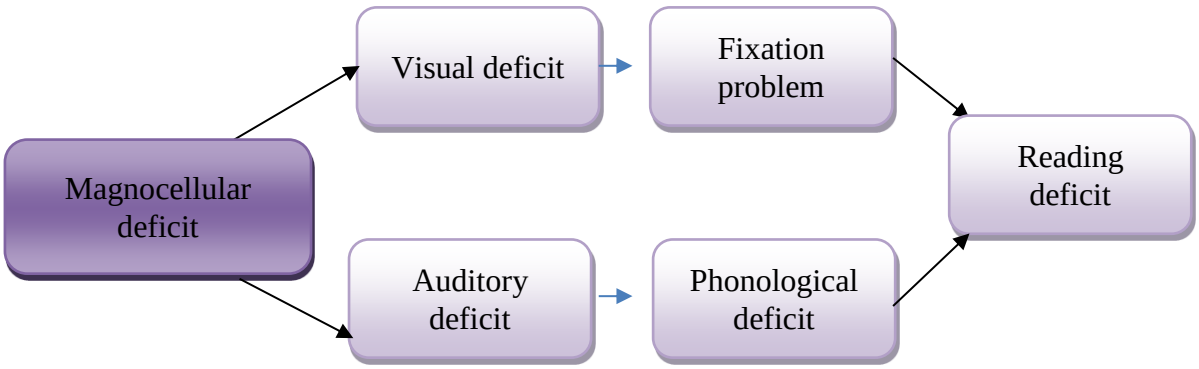


Figure 1.2: Theories of dyslexia

1.4 Assessment

Assessment is the first step in identifying these students at an early stage to make sure they receive the effective instruction they need to succeed. Schools and teachers play an essential role in identifying students with *reading difficulties,* including dyslexia. Assessment and screening are fundamental to identifying dyslexia. This includes spelling, writing, and cognitive function tests. Screening may include a clinical interview to obtain background information on family, early childhood development history, and academic performance (International Dyslexia Association, 2009). The screening and evaluation process is also a method of gathering information to identify factors that contribute to reading and writing problems. Furthermore, many children with dyslexia report experiencing heightened negative emotions and behaviour problems. It is important to identify whether a child may be more or less at risk of mental health concerns, including the status of psychological problems, as it can help the diagnosis process and determine the direction of intervention.

1.4.1 Assessment to Identify Academic Performance

There are several screening tools that have been used to detect the signs of dyslexia, including problems in reading and writing achievements. These tools are designed to help the screening procedure and standardize the final diagnosis. An example of the tool used is the Colorado Learning Disabilities Questionnaire (CLDQ), which has been used in a past study to assess the specific dimensions of functioning that are often impaired in children with LD (Willcutt et al., 2011). A study by Wagner et al. (2013) used the Comprehensive Test of Phonological Processing (CTOPP-2) to

measure phonological processing skills. The *Texas Primary* Reading Instrument (TPRI) is used to assess student progress in critical reading and was developed by the Texas Education Agency at the University of Texas. On the other hand, the *Wechsler Adult Intelligence Scale* (WAIS) and the Wechsler Nonverbal Scale of Ability (WNV) are used to evaluate intelligence quotient (IQ) (Weschler, 2014; Wechsler and Naglieri, 2006). In addition, Kaufman et al. (2004) developed the *Kaufman Test* of Educational Achievement (KTEA-3) to measure the academic performance of individuals aged between 4 to 25 years, and the Shaywitz Dyslexia Screening has been used to measure the risk of dyslexia in children aged between 5 to 6.11 years (Shaywitz, 1983).

In Malaysia, to overcome this problem, the Ministry of Education has introduced literacy and numeracy screening (LINUS) in year 2010, which is an early intervention program created by the Malaysian government. In the LINUS programs, children in Year 1 (7 years old) who are unable to dominate basic literacy and numeracy will be placed in a special class, and they will be monitored by special needs teachers (Ministry of Education Malaysia, 2010). The implementation of LINUS aims to achieve 100% student success in Year 3 (9 years old) in mastering literacy and numeracy skills before moving up to Year 4 (10 years old). Chew (2012) reviewed the effectiveness of LINUS in Malaysia. The survey involved 120 students in three different schools. The result showed that the students had fun with LINUS programs. The children concluded that the teacher teaches in an enjoyable way and uses simple language that is easy to understand. The implementation of the LINUS program shows positive results. During the program, all children will undergo assessments of their skills in reading, writing, and counting. If the child still has difficulty attaining the

basic skills, the child will then be referred to either a paediatrician or child psychiatrist, who will give an initial diagnosis, which is subsequently confirmed by the clinical psychologists through further testing (Yuzaidey et al., 2018). The main role of a clinical psychologist in the treatment of dyslexia is to administer multiple assessments, such as intelligence, development, and academic achievement tests, and determine whether the child meets the criteria outlined in DSM-5 (American Psychiatric Association, 2013). Given that the child does not exhibit any emotional behaviour issues, psychological intervention may not be necessary at that time, and clinicians may instead provide recommendations tailored to the client's specific needs. However, if secondary symptoms or comorbidities are detected, a combination of psychological and educational interventions may be more effective in managing the difficulties.

1.4.2 Assessment to Identify Psychological Problems

Numerous tools have been used to identify psychological problems among children with dyslexia. The Child Behaviour Checklist (CBCL), developed by Anchenbach et al. (2001), has been widely used in clinical settings and in research to measure emotional and behavioural problems in children. The target population is 6 to 18 years old. The Strength and Difficulties Questionnaire (SDQ) developed by Goodman (1997) has been used to measure internalizing and externalizing symptoms in children aged 3 to 16 with five subscales. The Behaviour Assessment System for Children (BASC) develop by Reynolds and Kamphaus (2010) has been widely used to monitor changes in children's behaviour and emotional status. The BASC is suitable for children aged between 2 to 25 years. Spielberger et al. (1970) developed the State and Trait Anxiety Inventory for Children to measure state and trait anxiety among

children aged between 6 to 18 years. The measure can be administered verbally to younger children. Lastly, the Present Functioning Visual Analogue Scale (PedsQL VAS) is used to measure functioning, including anxiety, sadness, worry, anger, tiredness, and pain. A summary of the screening tools for children with dyslexia is presented in Table 1.1.

Table 1.1: Summary of Screening Tools for Children with Dyslexia

Author	Purposes	Population	Tools	Items / scale
Tools to Identify Reading and Writing Performance				
Willcutt et al. (2011)	To assess specific dimensions of functioning that are most often impaired in children with learning difficulties, including reading, doing math, social cognition, spatial functioning, and memory.	School-age	Colorado Learning Difficulties Questionnaire	20 items with 5-point Likert scale.
Wagner et al. (2013)	To measure phonological processing skills related to reading	Aged 4 to 24	Comprehensive Test of Phonological Processing (CTOPP-2)	Six core subtests and eight supplemental tests.
Texas Education Agency and the Children's Learning Institute at the University of Texas Health Science Centre	To assess student progress in critical reading domains, including phonemic awareness, graph phonemic knowledge, word reading, comprehension, accuracy, and fluency	Kindergarten through third grade.	Texas Primary Reading Instrument	Graph phonemic Knowledge (spelling), Word Reading and Reading Accuracy, Fluency, and Comprehension.
Wechsler (2014)	To evaluate the intelligence quotient (IQ)	Aged 6 to 16	Wechsler Intelligence Scale for Children	Five primary index scores, namely Verbal

Table 1.1: Continued

				Comprehension Index, Visual Spatial Index, Fluid Reasoning Index, Working Memory Index, and Processing Speed Index.
Wechsler and Naglieri (2006)	To assess cognitive ability regardless of the language spoken	Aged 4 to 21	Wechsler Nonverbal Scale of Ability	Matrices, Object Assembly, Coding, Recognition, Spatial Span, and Picture Arrangement.
Kaufman et al. (2004)	To measure academic achievement	Aged 4 to 25	Kaufman Test of Educational Achievement	Measuring areas such as math, reading, written language, and oral language.
Shaywitz (1983)	To measure students who may be at risk for dyslexia	Aged 5 to 7.11	Shaywitz Dyslexia Screening	It emphasises phonological, linguistic, and academic performance based on classroom teacher observations.
Ministry of Education Malaysia	To ensure that students achieve basic literacy and numeracy skills upon completing their lower primary education.	Aged 7 to 9	Literacy and Numeracy Screening (LINUS).	Ability to read, write, and understand words.

Table 1.1: Continued

Tools to Identify Psychological Problems among Children with Dyslexia				
Anchenbach and Rescorla (2001)	To measure emotional and behavioural problems in children and adolescents	Aged 6 to 18	The Child Behaviour Checklist (CBCL)	112 items with 3-point Likert scale.
Goodman (1997)	To measure internalizing and externalizing symptoms	Aged 3 to 16	Strengths and Difficulties Questionnaire (SDQ)	5 subscales with 3-point Likert scale.
Reynolds and Kamphaus (2015)	To monitor changes in children's behaviour and emotional status	Aged 2 to 25	Behaviour Assessment System for Children (BASC)	16 primary scales, along with 5 composite scales.
Spielberger et al. (2019)	To assess feelings of apprehension, tension, nervousness, and worry (state and trait anxiety)	Aged 6 to 18	State and Trait Anxiety Inventory for Children (STAI-C)	40 items using 4-point Likert scale from 0 to 3 points.
Sherman (2006)	To measure functioning, including anxiety, sadness, anger, worry, fatigue, and pain.	Aged 5 to 18	The PedsQL Present Functioning Visual Analogue Scale (PedsQL-VAS)	Scores are recorded by making a handwritten mark on a 10-cm line which represents a continuum between "no pain" to "worst pain".

1.5 Psychological Intervention

As evident from the number of different professions that come together in the treatment of dyslexia, it can be estimated that this disorder provides a host of other comorbidities that could influence the severity of the primary diagnosis. Studies suggest that among the most common comorbidities of dyslexia are other learning difficulties (i.e., dyscalculia, dysgraphia), attention deficit disorder (ADD), depression, and anxiety (Germano et al., 2010). Possible reasons for the high prevalence of comorbidities in this disorder may have to do with the manifestation happening at a very crucial stage in a child's upbringing, a stage of developing self-autonomy and self-confidence consistent with the theory of development by Erik Erikson (Goch et al., 2014). With the development of insecurity towards reading activities, a child may soon produce negative thoughts in their mind. For instance, the child may fear bullying or teasing from their friends and therefore would try to avoid reading in front of their peers to protect themselves from getting bullied (Goch et al., 2014). When children have repressed pain, it is often expressed through misbehaviour, or a deep internalization of the pain, leading to the development of other comorbidities such as social anxiety and speech disorder (Jordan & Dyer, 2017). Dyslexia, being another disorder among many that can affect a child's growth and adaptation to society, it is apparent that the role of a psychologist is vital in ensuring these individuals are able to overcome their life challenges. Children with dyslexia can be treated to improve academic performance and psychological functioning through a combination of treatments. The most effective dyslexia interventions include Orton-Gillingham, Applied Behavioural Analysis (ABA), token economy, Cognitive Behavioural Therapy (CBT), art therapy, psychoeducation, and relaxation techniques.

1.5.1 The Orton-Gillingham Approach

The most common treatment conducted by professionals worldwide is the Orton-Gillingham Approach (Ritchie & Goeke, 2006). In Malaysia, institutions such as the Dyslexia Association of Malaysia employ this approach in their treatment of this learning disorder. The Orton-Gillingham approach was developed by a neuropsychiatrist and a psychologist called Samuel Orton and Anna Gillingham in 1930 (Vickery et al., 1987). Orton-Gillingham is an instructional approach primarily designed for the treatment of reading, writing, and spelling difficulties. Under the right and experienced instructor, this approach can prove to be powerful in breadth, flexibility, and efficacy (Vickery et al., 1987). With 88 years of clinical evidence and a variety of studies conducted on its efficacy, the Orton-Gillingham approach can be used worldwide and adapted to suit any language, as well as accounting for contributing factors in the symptoms of an individual, such as other academic difficulties or even behavioural difficulties. Most education sessions in the Orton-Gillingham approach are done one-on-one, although small group-based sessions are also common (Hwee & Houghton, 2011). Strong emphasis is also given to individuals learning about the process, where they focus on the knowledge of how treatment will be done, what is expected of the learners, and why it needs to be done (Ritchie & Goeke, 2006). This is to promote instructional therapy as one that focuses on rationality and analytical thinking. They also employ a multisensory approach, utilizing various stimulus-inducing activities in their education (Rose & Zirkel, 2007). This can ensure continuous participation from children while making use of existing educational pathways in reading and writing, as most individuals with dyslexia may

suffer from a lack of usage of the left hemisphere and usage of both hemispheres to read (Eden & Moats, 2002). Contradicting the study from Stevens et al. (2021), Orton-Gillingham is also used to approach students with or at risk for word-level reading disabilities. The results showed that Orton-Gillingham reading interventions do not statistically significantly improve foundational skill outcomes (i.e., phonological awareness, phonics, fluency, and spelling). Lastly, there is also an emphasis on comprehension, where certain kids may be able to read and write but may not be able to comprehend what is read (Rose & Zirkel, 2007).

1.5.2 Applied Behavioural Analysis (ABA) Therapy

In the treatment of attention problems among children with dyslexia, the most common method utilized by psychologists is ABA therapy (Arns et al., 2014). Psychologists, educators, counsellors, and healthcare professionals often make use of this powerful behavioural technique to teach or provide treatment for children with special needs. It can be utilized in any setting and for severe cases of ADD, given that the educator is experienced in this behavioural treatment (Antshel, 2016). ABA is a form of behaviour modification that uses the power of reinforcement to bring about a desired behaviour in children (Arns et al., 2014). Among the techniques described under this treatment would be differential reinforcement of behaviours, which uses operant conditioning to promote desired behaviours and reduce undesired behaviours. Next is Discrete Trial Training (DTT), which breaks down complex behaviours into smaller, manageable elements and aims to reduce the problematic behaviours. Lastly, it provides self-management strategies, which are important to ensure the children are

able to sustain the education given to them, training them to correct and manage their behaviours in the future.

Various centres in Malaysia cater to special needs children using Applied Behavioural Analysis, such as Autism Link Malaysia, NASOM, Brightstars, and IDEAS. Besides utilizing the three main steps of ABA as mentioned previously, rehabilitation centres also practice the ABC model, a method of ABA that stands for antecedents, behaviour, and consequence of the behaviour (Jaekel et al., 2013). This model is important to understand the thought processes in the individual as well as the triggers of the behaviour (Pelham et al., 2005). For instance, a child with dyslexia and ADD may misbehave only during reading or writing lesson and may perform as well as other children in other lessons. Often, a child with both severe diagnosis of ADD and dyslexia would require multiple educators specializing in behaviour and educational treatments, as well as the expense of medications, which would be a great burden on the family (Lee, 2008). For a child with a low to moderate level of severity of ADD, various organizations that educate special needs children, such as the Dyslexia Association Malaysia, accept children with both dyslexia and ADD and cater a specialized educational plan for everyone. Besides, monthly interventions with a clinical psychologist, administering ABA techniques as well as psychoeducation to the parents, have been seen to improve the behaviour of a child (Lee, 2008). Since the problem of dyslexia often extends much further than just academic difficulties, it is often necessary to utilize other approaches under ABA, such as token economy, to provide motivation to the children (Reiber and McLaughlin, 2004).

1.5.3 Token Economy

Token economy was first introduced to train children with dyslexia and has been proven to be highly effective in enhancing motivation, social skills, academic abilities, attention span, speech fluency, and off-task behaviours to this day (Maggin et al., 2011; Hackenberg, 2009). Although reading difficulties can be minimized with consistent practice, many children with dyslexia have trouble finding motivation to read and persevering through challenges (Staats, 2003). This may be attributed to the fact that they perceive reading as an ordeal that is not worthy of their time and effort (Staats, 2003). Fortunately, levels of motivation can be increased through a token economy by using incentives (Chevalier, 2012). While intrinsic motivation is often regarded as the ideal (Carlton & Winsler, 1998; Kohn, 1998; Sax & Kohn, 1996), other researchers asserted that rewards are practical and effective in getting a person to commit to their goals (Cameron & Pierce, 1996; Chance, 1993; Strong et al., 1995). In a token economy, children with dyslexia are required to demonstrate specific behaviours to earn tokens, which can then be used to redeem a variety of backup reinforcers. This behaviour modification method typifies the real world, where humans work to earn money to be able to afford desired items. Money, in this context, is equivalent to tokens in the token economy system. Unlike the backup reinforcers, both the money and tokens do not hold any value but are rather a means to an end. The seven components entailed for a successful token economy include identifying target behaviour, type of token, backup reinforcer, reinforcement schedule, exchange criterion, time and place for exchange, and response cost.

The first step in a token economy is to choose the target behaviour to be increased. For instance, a parent of a child with dyslexia aims to increase the child's motivation and interest in reading. Therefore, the target behaviour is to get the child to attempt to read. However, the goals set for the child must be within the realm of possibility. Setting goals that are unrealistic and unattainable may increase the child's chance of failing and generate discouragement (Al-Lamki, 2012). Thus, instead of getting the child to read a book, the parent may ask the child to focus on one word at a time.

As previously mentioned, tokens are tools that can be exchanged for backup reinforcers. Tokens are physical objects and may take the form of anything that the child desires, such as stars, checkmarks, and coins (Killian, 2016). One possible reason why the tokens need to be physical items is because they enable the child to visualize their progress and help sustain their motivation. Although the delivery of tokens signifies correct responses, Chevalier (2012) suggested parents pair the act of delivering tokens with praises such as "Good try!" and "Good job saying A" so that the child understands why their behaviours are being reinforced. In addition, constant usage of social praises may also help the child learn the value of compliments and facilitate the fading process by gradually replacing the tangible items with praises.

As mentioned earlier, backup reinforcers are capable of motivating children with dyslexia to continue behaving in desirable ways. However, to use the rewards as a source of motivation, they must be considered meaningful and highly valuable to the child (LeBlanc, 2004). Hence, instead of selecting the reinforcers on behalf of the child, parents should encourage them to assume an active role in choosing the items to

be used as their reinforcers. (LeBlanc, 2004; Piper et al., 1972). This can be done through reinforcer sampling, where the child is exposed to a variety of objects, including unfamiliar items, and is given the opportunity to identify their own reinforcers (Miller, 2017). Parents may then create a reinforcer checklist to rank them from “most desirable” to “least desirable” and eliminate the toys or items that are not powerful enough to be counted as reinforcers. Once the list has been finalized, the parents may create a reinforcer menu consisting of a few rewards that the child can choose to play with after earning all their tokens (National Professional Development Centre on Autism Spectrum Disorder, n.d.). Encouraging the child to participate in selecting their own reinforcers not only guarantees the potency of the reinforcers, but it has also been found to bring a greater sense of accomplishment and enjoyment to students who take part in the token economy system (Myles, 1992).

The reinforcement schedule is used to govern the frequency and time of the delivery of tokens. The common reinforcement schedules associated with the token economy are continuous schedules and intermittent schedules, specifically fixed-ratio and variable-ratio schedules (Miltenberger, 2007). Using a continuous schedule indicates that the child would receive a token for every correct response. On the other hand, a fixed-ratio schedule implies that the tokens will only be given out after a fixed number of responses. For example, a child will only get a token after two correct responses. The number of responses required to earn a token is established by the parents of the child. Lastly, using a variable-ratio schedule signifies that the tokens will be delivered after an unpredictable number of responses. According to Cooper et al. (2007), a continuous reinforcement schedule is more appropriate when shaping new behaviours, whereas intermittent schedules are more suitable to sustain learned