English Word Reading Profiles of Chinese Dyslexic Students

By

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A thesis submitted in conformity with the requirements for the degree of Doctor of Philosophy
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Abstract

This study explored the English word reading profiles of Chinese dyslexic and typically developing children in Hong Kong. A mixed methods design was employed to compare the English word reading abilities, phonological processing, word reading strategies, home environment, and goal orientations of the two groups. Four students with Chinese dyslexia and five typically developing students enrolled in grades four to six in Hong Kong elementary schools completed a battery of standardized tests measuring phonological awareness, phonological memory, rapid naming, reading fluency as well as word and nonword reading. They also completed a demographic questionnaire and a goal orientation questionnaire. Finally, they participated in a read-aloud activity and an interview regarding their experiences of learning English. Mann-Whitney tests showed that the dyslexic children performed significantly lower than the typically developing children on phonological memory, rapid letter naming, some aspects of phonological awareness, reading fluency and word reading. Integrative text and miscue analyses also showed that typically developing children generally made use of a wider variety of strategies in reading more effectively as compared to the dyslexic children. These findings largely corroborate those found in research with monolingual English children. This suggests that the English word reading difficulties Chinese students encounter are mostly attributable to the presence of dyslexia and not to difficulties with the orthography of the English language.
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My late brother Tony was the voice and memory I kept at the forefront of my mind throughout the pursuit of my doctoral studies. His sudden death was marked by a powerful transformation within me that needed to be captured as I embarked on a journey to keep his memory alive. He left behind memories that remain deeply ingrained, a glimpse most of all, in terms of what he could have become. Without a family of his own to carry on his legacy, I carried him with me throughout this journey, which in turn fuelled my own dreams along the way.

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Chapter 1
Introduction

Overview

In the last few decades, immigration has soared in Ontario. According to Statistics Canada Census (2011), 170,490 immigrants from Hong Kong live in the Toronto metropolitan area alone. From that total, 137,630 speak Cantonese as the primary language at home. The rise of immigrant populations has implications for many areas of Canadian society, such as health care and the education system. Children from immigrant families are most likely to enter the Canadian education system as English Language Learners (ELLs). These students are often taught to read English with special teaching methods that enhance their learning experience. However, some immigrant children might still experience difficulties with learning English due to the differences in the reading systems in their primary language and English or due to having a diagnosis of dyslexia.

Children with dyslexia have difficulty reading and spelling words (Catts & Kamhi, 2005; Seymour, 1998). Given that word reading ability is imperative for reading comprehension and academic success (Cutting & Scarborough, 2006), research has sought to understand the word reading strategies of children with dyslexia in order to explain the difficulties they face in this process (e.g., Howard, 1996, Ziegler & Goswami, 2005). It has been shown that among English-as-first-language (English L1) as well as English-as-second-language (English L2) learners with an alphabetic L1, dyslexics exhibit greater phonological processing difficulties as compared to typically developing children (Georgiewa et. al., 2002). However, little is known about the nature of phonological processing difficulties in the English reading of bilingual children with a non-alphabetic L1 such as Chinese. In addition, examinations of dyslexia have primarily employed a quantitative approach that looked at the language and literacy performance of children with
dyslexia. In contrast, there is a lack of research examining the underlying factors such as reading strategies and goal orientation that are linked to dyslexia. These factors are better addressed with qualitative methods such as interviews and observations. In view of this, the primary goal of the current study was to explore the English reading profiles of Chinese students with dyslexia using both quantitative and qualitative approaches. In particular, the study focused on Cantonese-speaking Hong Kong Chinese children.

In the present study, the English reading profiles of Hong Kong Chinese students with dyslexia were thus compared with those of Hong Kong Chinese students without dyslexia (referred to as “typically developing children” hereafter), and the results were discussed in light of the literature on English L1 dyslexic children. Specifically, the present study examined phonological processing, word reading skills, reading strategies, goal orientations, perceptions towards learning as well as home literacy environment of the two groups of children. There were five research questions:

1. What difficulties do Chinese children with dyslexia experience in reading English?
2. What are the similarities and differences between the English reading profiles of dyslexic and typically developing Chinese children?
3. What strategies do Chinese children with dyslexia and typically developing Chinese children use to read English words?
4. What are the attitudes and perceptions Chinese students with and without dyslexia have towards learning to read?
5. How do classroom and home environment as well as attitude towards reading contribute to reading practices of Chinese students with and without dyslexia?
This thesis is divided into five chapters. In the first chapter, the purpose for conducting this research is presented. A review of the theories and literature on reading in English and Chinese, phonological processing, word reading strategies, and goal orientation in relation to dyslexia is presented in Chapter 2. The method used for the present study is discussed in Chapter 3 and the results are explained in Chapter 4. Chapter 5 presents a discussion of the findings.

**Purpose of research**

I am a special education teacher and a Vice Principal in the Greater Toronto Area. For the past 17 years, I have designed and implemented various English reading programs for students with dyslexia. Currently, with the influx of immigrant students to Canadian classrooms, it is challenging to plan reading programs for ELL students who possibly have dyslexia. At this point, in the field of education, it is not clear whether the same teaching strategies are suitable for teaching word reading to immigrant students, especially those whose L1 is typologically different from English. This is an important point to consider given the significant number of Chinese students in the education system in Canada. As the methods of identification of dyslexia among Chinese children are more established in Hong Kong than in Toronto, I situated the present study in Hong Kong to examine the English reading profiles of Chinese children with dyslexia. Although English L2 learners in Hong Kong are different from their counterparts in Canada in many ways, the findings may shed light on the learning process of ELLs from Chinese backgrounds in Canada. The findings will thus enable Canadian educators to provide better support for Chinese-speaking ELLs and ease their transition into an English-dominant environment.
Chapter 2
Literature Review

Over the decades, extensive research has been conducted to understand the characteristic profiles of English L1 dyslexic students. Dyslexia refers to difficulties with reading and writing (Bourassa & Treiman, 2003). Dyslexia has been broadly characterized into two subtypes, namely, surface dyslexia and phonological dyslexia. Individuals with surface dyslexia have difficulties reading exception words (e.g., yacht) that have irregular letter-sound correspondences (McCarthy & Warrington, 1990). Their ability to read words with regular spellings (e.g., tape) remains intact. In comparison, those with phonological dyslexia have difficulty sounding out words with regular letter-sound correspondences (e.g., flap) and reading nonwords (e.g., rad) although they have no problems reading words they have encountered before. Despite this distinction, the most common subtype of dyslexia found among children is phonological dyslexia (Bradley & Bryant, 1983; Castles & Coltheart, 2004; Liberman, Shankweiler, & Liberman, 1989; McArthur & Castles, 2013; Siegel, 1988; Stanovich & Siegel, 1994; Stanovich, Siegel, & Gottardo, 1997; Torgesen et. al., 1999).

While there is a large body of research examining English L1 children with dyslexia, examining profiles of Chinese dyslexic students learning English as an L2 has been less forthcoming. Researchers have posited that for bilinguals, their two languages interact with each other and that may affect the way they read (e.g., Koda, 2007; Wang, Koda, & Perfetti, 2003). This phenomenon that Koda (2007) terms as ‘dual-language involvement’ suggests that L2 learners may approach L2 using the way they read their L1. The study conducted by Perfetti and colleagues (2007) showed support for this hypothesis. Using brain imaging, they found that Chinese readers activated the same brain regions used in reading Chinese when they read English words. Wang and colleagues (2003) also found that as compared to Korean-English bilinguals, Chinese-English
bilinguals used less phonological processing skills in reading English. Wang and colleagues concluded that this difference was a result of an influence of L1 on English reading. More phonological processing is involved in Korean reading as compared to Chinese, therefore, Chinese-English bilinguals would be less inclined to use phonological processing when they read English. These findings suggest that Chinese readers approach English reading differently from English monolingual readers. This necessitates research examining Chinese readers of English.

In addition, Wang and colleagues’ study also found that Chinese-English bilinguals exhibited more difficulties with tasks involving phonemes. Phonological skills are central to reading in English but play a smaller role in reading Chinese (Huang & Hanley, 1995), thus Chinese children may experience more difficulties in learning English as compared to monolingual L1 learners or bilinguals with an alphabetic L1. It is possible that Chinese dyslexic children’s difficulties are exacerbated because of the presence of dyslexia. Therefore, educators need to understand the challenges that Chinese dyslexic students face in English word reading, in order to determine which instructional practices to be taken when designing remediation programs.

In the next section, the literature review begins with a comparison of reading in English and Chinese and dyslexia in the two languages, followed by a discussion on aspects of phonological processing, namely, phonological memory, phonological awareness, and rapid naming and how they relate to reading and dyslexia. Following that, a discussion of word reading strategies and the role of goal orientation in relation to dyslexia are presented.

**Reading in English and Chinese**

*The English script.* The English language is based on an alphabetic writing system that consists of 26 letters. Phonemes form the smallest sound units in the language that map onto graphemes, which can be represented by a single letter (e.g., c, t, p) or a combination of letters.
(e.g., ph, sh, ea, ee). However, the phoneme-grapheme correspondences are often irregular for English words (e.g., bouquet, enough). A phoneme may correspond to more than one grapheme (e.g., ph, f) and the same grapheme may correspond to different phonemes (e.g., /gh/ in /ghost/ vs. /gh/ in /enough/). Therefore, English is often referred to as a deep orthography (e.g., Bentin & Frost, 1987; Katz & Feldman, 1983).

According to Liberman, Shankweiler, Fischer, and Carter (1974), children need to be cognizant of the sound structure of words to be able to make the appropriate associations to letters, thus, phonological awareness is important for English reading. However, given the opaque relationship between letters and sounds in English, reading in English would be a difficult task if only phonemic awareness was used. Research has shown that there exists a higher consistency in the correspondence between onset-rimes and graphemes (Treiman, Mullennix, Bijeljac-Babic, & Richmond-Welty, 1995), therefore, there is a need for readers to be aware of bigger sound units within words (e.g., onset-rimes and syllables) and use them in reading English words (e.g., Li & McBride-Chang, 2014).

Dyslexia in English. According to Lyon, Shaywitz, and Shaywitz (2003), the primary type of deficits that dyslexic children reading in English have is in the area of phonology. Specifically, dyslexic children often exhibit difficulties with naming letters and digits (e.g., Katz, 1986), segmenting words into component sounds (e.g., Olson, Rack, & Forsberg, 1990) and maintaining phonological information in memory (e.g., Siegel & Ryan, 1988). These areas correspond to what Wagner and Torgesen (1987) refer to as phonological processing skills. Phonological processing refers to the use of phonological information in word processing (e.g., Jorm & Share, 1983; Wagner & Torgesen, 1987). In light of the body of research pointing to deficits in the area of phonological processing observed among dyslexic children, researchers have put forth the
‘phonological deficit hypothesis’ that posits phonological processing deficits underlie the reading problems experienced by dyslexic children (e.g., Goswami & Bryant, 1990; Vellutino & Scanlon, 1987).

**The Chinese script.** Chinese is a morpho-syllabic language. The basic units of the Chinese script are characters which map onto morphemes and syllables. There are 5000 commonly used characters in Chinese (Shu, Meng, Chen, Luan, & Cao, 2005). Chinese characters are visually complex. About 20% of Chinese characters are simple characters that stand alone while approximately 80% of characters are compound characters because they are made up of a phonetic and a semantic radical. The semantic radical typically appears on the left side of a compound character and provides information about character meaning. For example, the semantic radical /目 mu4/ (eye) in /瞪 deng4/ (to stare) gives an indication that the compound character has something to do with sight. The phonetic radical, which often appears on the right side of a compound character, provides information about character pronunciation (Hoosain, 1991). For instance, the phonetic component /丁 ding1/ in the character /叮 ding1/ provides information about its pronunciation. The phonetics of the language also reveals a large number of single syllable homophones, which estimates to be 1200 (Siok & Fletcher, 2001). The large number of homophones in the language makes homophones one of the most important and distinguishing features of Chinese (Shu et. al., 2005). Chinese is also a tonal language in which the same syllable with different tones corresponds to different morphemes (Zhang & McBride-Chang, 2011). For example, the syllable /men/ corresponds to two different morphemes /门 men2/ and /闷 men4/ with different tones. Mandarin has four tones, whereas Cantonese consists of six tones.

*Dyslexia in Chinese.* Given the logographic nature of the Chinese script, researchers have postulated that visual (e.g. Huang & Hanley, 1995) and orthographic deficits (e.g., Ho, Chan,
Tsang, & Lee, 2002) are characteristic of Chinese dyslexic readers. Subsequent studies with Chinese dyslexic children also provided support for deficits in visual skills (e.g., Huang & Hanley, 1995; Woo & Hoosain, 1984) and orthographic knowledge (e.g., Ho, Chan, Tsang, Lee, & Luan, 2004). Chung, Ho, Chan, Tsang and Lee (2010) found that more than 40% of the Chinese dyslexic adolescent participants in their study exhibited visual-orthographic deficits. Ho and colleagues (2002) also found that the dyslexic participants in their study tended to reverse the positions of the radicals.

In addition, as characters in Chinese map onto morphemes, some researchers also suggested that Chinese dyslexic readers may be impaired on morphological awareness (e.g., Shu, McBride-Chang, Wu, & Liu, 2006). Morphological awareness refers to the understanding and ability to manipulate morphemes (Carlisle, 2000). Indeed, Shu and colleagues (2006) found that morphological awareness measures best differentiated between dyslexic and typically developing children in Hong Kong as compared to orthographic and phonological measures. Chung and colleagues (2011) also found that approximately 30% of the dyslexic adolescents in their study had morphological difficulties.

Despite the logographic nature of Chinese, phonological deficits have also been found among Chinese dyslexics. Ho, Law, and Ng (2000) examined the phonological deficit hypothesis with Chinese dyslexic children and found that the dyslexic children had significantly more difficulties in phonological processing, especially in rapid naming, as compared to typically developing children as well as younger readers who were matched on reading level. This suggests that the Chinese dyslexic profile is also characterized by phonological impairment. Interestingly, the study of Ho and colleagues yielded findings that suggested that dyslexic children appeared to
be able to use other strategies such as visual and text-based strategies to compensate for their lack of phonological skills in reading.

From the review above, phonological processing skills consistently emerge as significant factors that differentiate between typically developing children and dyslexic children in both English and Chinese reading. It also appears that phonological processing is more important for English than Chinese as Chinese children may rely also on other skills such as orthographic processing in reading. Therefore, the present study focussed on phonological processing of dyslexic and non-dyslexic children in relation to English word reading. The following section will examine in detail, the relationship between the different aspects of phonological processing and reading among dyslexic and typically developing children in English and Chinese.

**Phonological processing skills and dyslexia**

Phonological memory, phonological awareness and rapid naming are three aspects phonological processing, that have been identified to contribute to reading English and Chinese (Wagner & Torgesen, 1987; Wagner, Torgesen, & Rashotte, 1994) and to differentiate between good and poor readers in both languages.

**Phonological memory.** Phonological memory refers to the coding of information phonologically for temporary storage (Baddeley, 1982). According to Wagner and Torgesen (1987), during word reading, early readers have to decode letters encountered, maintain the decoded information in their memory and blend these sounds to form words. An individual with better phonological memory can effectively decode the sounds of words and store them in memory, thus freeing up more cognitive resources to the blending of sounds to form words (Baddeley, 1979).

Phonological memory deficits lead to incorrect representations of words and sounds in the short-term memory (Gathercole, Willis, & Baddeley, 1991). Although the impact of phonological
memory on reading may be relatively small when compared to the other two components of phonological processing (Wagner & Torgesen, 1987), it affects the ability to acquire new words, especially longer words that require more memory resources.

**Phonological memory and dyslexia.** Difficulties in phonological memory have been found among both English dyslexic (e.g., Hulme & Snowling, 1992; Siegel & Ryan, 1988) and Chinese dyslexic children (e.g. Ho & Lai, 1999) in that dyslexic children usually exhibit significantly lower scores on phonological memory tasks of digit, word and nonword repetition as compared to typically developing children. For instance, Ho and Lai (1999) found that Chinese dyslexic readers in Hong Kong consistently had lower scores on phonological memory tasks as compared to children without dyslexia and children matched on reading-ability. Ho and colleagues (2002) also found that Chinese dyslexic children showed more difficulties with phonological memory tasks as compared to phonological awareness tasks.

**Phonological awareness.** Phonological awareness refers to the ability to understand and manipulate sound units of a language (Schuele & Boudreau, 2008). Typically, children develop awareness of larger units (syllables, onsets and rimes) before they become aware of smaller units such as phonemes (Anthony & Francis, 2005). At the initial stages, children are capable of dividing words into syllables, making rhyming words and matching words according to beginning and ending sounds. At the more advanced level, PA involves segmenting words into onsets and rimes, initial and final sounds. Also, at an even more complex level, it is important for individuals to develop the ability to isolate and manipulate phonemes (Shuele & Boudreau, 2008; Justice & Schuele, 2004). Studies have shown that phonemic awareness is causally linked to early word decoding in English for monolingual children (Anthony & Lonigan, 2004; Torgesen, Morgan, & Davis, 1992; Wagner, Torgesen, Laughon, Simmons, & Rashotte, 1993; Wagner & Torgesen
1987) as well as ELL children (e.g., Durgunoglu, 2002; Gottardo, Siegel, Yan, & Wade-Woolley, 2001). This is because a child cannot acquire an alphabetic script without understanding that that spoken words are constituted of sounds (Beck & Juel, 1995). Therefore, English-speaking children with poor phonological awareness encounter difficulties identifying, segmenting and blending sounds to read words.

Although Chinese is a logographic writing system, phonological awareness is still related to word reading in Chinese (Hu & Catts, 1998; Lam, Perfetti, & Bell, 1991; McBride-Chang & Ho, 2000; So & Siegel, 1997; Ho & Bryant, 1993). This relationship can be explained by at least three reasons. First, many Chinese characters contain a phonetic radical, which gives an indication of how the character is read (Yeung, Siegel, & Chan, 2013). Therefore, phonological awareness is also important for Chinese. Second, each syllable of the Chinese language is typically associated with several tones, and these tone syllables represent different words with different meanings. Tonal awareness, a component of Chinese phonological awareness, is thus important for differentiating among words. Third, in line with the Universal Phonological Principle (Perfetti, Zhang, & Berent, 1992), research has shown that phonology is activated in the reading of any script, including Chinese (Chow, McBride-Chang, & Burgess, 2005; Lin et al., 2010). The only difference is that different levels of phonological awareness are activated due to the characteristics of the writing system. In the case of Chinese, as syllables represent the smallest unit of phonology, syllabic awareness is activated during reading (Chow et al., 2005).

Phonological awareness and Dyslexia. Research shows that English dyslexic children have deficits in phonological awareness. Stanovich and Siegel (1994) found that as compared to normal readers, monolingual English dyslexic children performed worse on tests measuring pseudo-word processing despite having similar levels of general processing abilities. They thus
suggest that children with dyslexia have severe difficulties understanding phoneme-grapheme relationships because pseudo-words can only be read through the application of this process. Similarly, McArthur and Castles (2013) found that children with dyslexia had moderate to severe deficits in representing phonemes and discriminating phonemes and phonemic awareness. This problem appears to extend to English L2 readers from Chinese backgrounds. Chung and Ho (2010) found that Chinese dyslexic children in Hong Kong had significantly lower phonological awareness as compared to typically developing children.

Findings with regard to the relationship between phonological awareness and Chinese dyslexia are mixed. On one hand, researchers such as Wang, Georgiou, Das, and Li (2011) found phonological awareness to be a factor that distinguished children with and without dyslexia. They found that Grade 4 Chinese dyslexic readers performed more poorly on all phonological awareness measures as compared to typically developing children in the same grade and Grade 2 children matched on word reading abilities. On the other hand, others have shown that dyslexic and non-dyslexic Chinese children perform comparably on measures of phonological awareness (e.g., Ho et al., 2004; Shu et al., 2006).

Rapid automatized naming. Rapid automatized naming (RAN) assesses the rate and accuracy of retrieval of phonological information from long-term memory (Wagner et. al., 1997). RAN is typically measured with letter-naming, object-naming, colour-naming, and digit-naming tasks. In these tasks, participants are required to name the stimuli they are presented in the fastest time possible. Chinese RAN tasks are similar to the English ones, with the exception of the letter-naming task, where a Chinese phonetic symbol naming task such as a Zhu-Yin-Fu-Hao naming task (e.g. Liao, Georgiou, & Parrila, 2008) is used instead.
RAN has been found to be a predictor of reading in both English (e.g., de Jong & van der Leij, 1999; Kirby, Parrila, & Pfeiffer, 2003) and Chinese (McBride-Chang & Kail, 2002; Bowers & Wolf, 1993). Klein (2002) as well as Manis, Seidenberg, and Doi (1999) postulate that RAN is important for English reading because both tap into the relationship between visual stimuli and their phonological representations. Researchers also propose that RAN taps into the efficiency of retrieving phonological representations, therefore, RAN serves as a good predictor of reading (Lervag & Hulme, 2009; Wagner & Torgesen, 1987; Wimmer, Mayringer, & Landerl, 2000), especially of reading fluency (Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004).

As compared to English, RAN tasks are more closely associated with Chinese reading because character recognition and RAN tasks involve the automatic mapping of language and print information as Chinese is phonologically unpredictable (Xue, Shu, Li, Li, & Tian, 2013). According to McBride-Chang and Ho (2000), the importance of rapid naming skills for Chinese could also be a result of instruction. Rote learning and drilling are typical strategies adopted by Chinese teachers to develop character recognition skills (Ho et al, 2002; McBride-Chang & Ho, 2000). These strategies may in turn increase the role of naming speed in Chinese reading acquisition.

Although RAN has been associated with both English and Chinese reading, the types of RAN tasks that relate to reading differ across the two languages. RAN tasks of letters and digits have been found to have a stronger link to English reading (e.g., Compton, 2003; Savage & Federickson, 2005) while objects and digits tasks appear to be more highly correlated to reading in Chinese (e.g., McBride-Chang & Ho, 2000; McBride-Chang & Zhong, 2003). The differential association is possibly due to the different characteristics of each orthography. In addition, the longitudinal relationship between RAN and reading varies between the two languages. With
English reading, the contribution of RAN decreases as readers become more proficient in the language (Wagner et al., 1997). In Chinese reading however, the importance of RAN appears to increase over time (Tan, Spinks, Eden, Perfetti, & Siok, 2005). This suggests that the influence of RAN on Chinese may be bigger as compared to English over time.

**RAN and Dyslexia.** A growing body of research points to the significance of RAN in differentiating between children with and without dyslexia in English (e.g., Berninger, Abbott, Thomson, & Raskind, 2001; Liao et al., 2008; Wolf & Bowers, 1999). Specifically, children with dyslexia often have significantly lower performance on RAN tasks as compared to children with no reading problems. For instance, Fawcett and Nicholson (1994) found that English-speaking dyslexic children between the ages of 8 and 17 performed significantly lower on RAN tasks as compared to typically developing children of the same age range as well as younger children who were matched on reading ability.

Similarly, severe problems with rapid naming that characterize English-speaking children with dyslexia have also been observed with Chinese children diagnosed with dyslexia. For instance, in a study conducted by Ho and colleagues (2002) with school-aged Chinese children in Hong Kong, it was found that about half of the dyslexic participants in the study had significantly lower scores on rapid naming tasks as compared to non-dyslexic children of the same age as well as younger children of similar reading proficiency. In addition, McBride-Chang, Liu, Wong, Wong, and Shu (2012) found that Chinese children who had problems with reading in both English and Chinese had profoundly lower performance on RAN measures as compared to typically developing Chinese children, leading them to suggest that RAN might be a particularly important predictor for predicting English reading difficulties for Chinese children.
The Double-Deficit hypothesis. Research integrating the different facets of phonological processing has found that there exists variation among dyslexic children. While some children exhibit weak phonological awareness, others may be impaired on rapid automatized naming, yet others show deficits in both areas (e.g., Ackerman & Dykman, 1993; McDougall, Hulme, Ellis, & Monk, 1994). Wolf and Bowers (1999) thus propose that difficulties with phonological awareness and rapid naming present two distinct contributing factors to reading problems such as dyslexia. Dyslexic children with deficits in both of these areas have significantly more difficulties in reading as compared to those with deficits in either area.

Overall, phonological processing plays an important role in reading and it differentiates between dyslexic and typically developing children in English and Chinese. While there is some research showing similar relationships between phonological processing and English L2 reading, our understanding is still limited. There needs to be a closer examination of these three skills and reading among Chinese dyslexic children, whose L1 has different characteristics from English.

Word reading strategies

Strategies are actions taken by readers to aid in learning (Schmeck, 1988). Research has shown that reading strategies that target the word-level are strong predictors of word reading. For example, in a 3-year longitudinal study with four- and five-year-old beginning readers, Tunmer and Chapman (2002) found that children who reported using more word-based strategies in reading demonstrated better performance on reading related measures as compared to the children who reported using predominantly text-based strategies. Word reading strategies refer to strategies that make use of grapheme-phoneme correspondences and relations between letters, digraphs and phonemes and orthographic patterns (clone - lone) whereas text-based strategies refer to strategies that make use of pictorial, syntactic and semantic cues (Tunmer & Chapman, 2002).
Currently, there is a dearth of research on the strategies English children use to read words (e.g., Byrne & Freebody, 1992; Freebody & Byrne, 1988; Walton & Walton, 2002). The consensus among proponents of the psycholinguistic view of reading is that readers invoke strategies that make use of syntactic, semantic and grapho-phonic (sound and letters) cues when they encounter a text (Arnold, 1982). During reading, a child may use syntactic information to read, meaning that the child relies on the grammatical structure of the language to assist with reading (Goodman, 1969). When readers make use of these cues, they evaluate whether words sound grammatically correct (Goodman, 1969; Goodman & Watson, 1998). Meanwhile, a child could rely on background knowledge when using semantic information. Semantic cues refer to the meaning conveyed through language (Beatty & Care, 2009). If readers lack background knowledge, it is difficult to use this strategy (Goodman, 1969). Lastly, grapho-phonic cues refer to the knowledge of letters, sounds and the application of this knowledge to reading (Beatty & Care, 2009). Readers use these cues to determine whether a word makes sense.

A common method used to examine the strategies readers use during reading is miscue analysis, which examines the errors made during oral reading as a means to understand the cues (syntactic, semantics, and grapho-phonic) readers use (Pumfrey & Fletcher, 1989). Goodman (1979) defines a miscue as “an observed response in oral reading which does not match the expected response” (p.5). During reading, a student may come across a word he or she does not know how to read. The oral misreading of a word is considered a miscue. This is an informative approach because it provides teachers and researchers with an opportunity to observe students during reading to gain insight into the knowledge students have with regard to reading (Goodman, 1996). By examining students’ miscues, educators will have a better understanding of the word reading strategies children use in their reading and plan instruction accordingly.
Research with English L1 readers has shown the link between the ability to effectively make use of all three types of cues and reading success (e.g., Clay, 1982). For example, Pumfrey and Fletcher (1989) investigated the quality of miscues of 7- to 8-year-old English L1 children from high, average, and low reading attainment groups on a reading task. They found that the quality of semantic, syntactic, and grapho-phonic miscues (i.e., similarity of miscue to the target word) made by the high reading-ability group was higher than the average and low ability groups. The average readers also used syntactic and semantic miscues that were more acceptable as compared to the low reading attainment group.

Kaye (2006) also found that proficient readers used a variety of strategies to resolve problems with comprehension when they came across unfamiliar words. They were able to focus on letters and sounds as well as draw upon orthographic and phonological knowledge with much flexibility. Proficient readers were also able to focus on larger units of words when solving an unfamiliar word in addition to sounding out phoneme by phoneme.

Emerging research shows that among the variety of cues that readers use in reading words, the ability to effectively use grapho-phonic cues (i.e., visual and sound cues) is significant in distinguishing between good and poor readers (e.g., Vellutino, Fletcher, Snowling, & Scanlon, 2004; Adams, 1990). For instance, in a study with 6 to 8 year-old good, average, and poor readers, Beatty and Care (2009) found that good and average readers showed a better understanding of graphic and phonic representations as compared to poor readers and were able to make use of these representations to aid reading.

Martin and Kragler (2011) examined young readers’ metacognitive processes and strategies they used during reading. Good, average and poor readers in kindergarten and grade one were compared on the strategies that they used when they encountered an unfamiliar word. In
general, sounding out was an important reading strategy for all three groups of learners but the good readers in both grades reported a higher frequency of using visual and auditory cues in sounding out words than the other two groups. Other researchers also found that good readers demonstrated better letter sound knowledge skills required for reading as compared to poor readers (Gough & Tunmer, 1986; Gough & Juel, 1991; Rack, Snowling, & Olson, 1992).

McGeown, Medford, and Moxon (2013) investigated the use of phonological and orthographic reading strategies in reading. A phonological strategy was considered if the subject employed phoneme-grapheme rules. On the other hand, it was determined that a child was using an orthographic strategy if the errors the child made were visually similar to the target word (e.g. “broad” read as “board”). The findings suggest that children with superior decoding skills were more effective at using a phonological strategy. In other words, they relied on grapheme-phoneme correspondence rules while reading. The use of a phonological reading strategy was also highly correlated with vocabulary, reading fluency, orthographic processing, decoding and spelling skills. On the other hand, children with weak decoding skills were more likely to implement an orthographic reading strategy and not a phonological strategy.

As clearly represented in the literature, differences in strategy use are evident between skilled and unskilled readers. Skilled readers use word-based strategies more frequently as compared to text-based strategies to read unfamiliar words (Tunmer & Chapman, 2002). In addition, proficient readers are superior in their ability to use grapho-phonic cues in reading as compared to poor readers because they have stronger letter-sound knowledge (Tunmer & Chapman, 2002). On the other hand, poor letter-sound knowledge makes phonological strategies less viable for poor readers, therefore, they have to depend on text based strategies as compensatory strategies to make sense of unfamiliar words due to phonological processing deficits.
(Tunmer & Chapman, 1996). Finally, proficient readers make use of semantic, syntactic and grapho-phonetic cues effectively to negotiate word reading rather than rely on one strategy like poor readers. In summary, differences occur between English speaking skilled and unskilled readers in terms of strategies chosen while reading.

Despite extensive research on reading strategies on English-speaking children, little is known about the word reading strategies used by Chinese speakers with and without dyslexia in reading English. In particular, it is important to understand the strategies used by Chinese children with dyslexia when they read English words so that classroom teachers can develop methodological recommendations to help these children.

Metacognition and reading

Researchers have acknowledged the importance of metacognitive awareness in reading because it serves to distinguish between good and poor readers (e.g., Auerbach & Paxton, 1997; Pressley & Afflerbach, 1995). Metacognitive awareness refers to readers’ knowledge of the processes that they engage in during reading and the strategies they use to monitor their comprehension (Mokhtari & Reichard, 2002). Pressley and Afflerach (1995) described good readers as having an awareness of the material that they were reading and engaged in self-monitoring. They also had a set of strategies that they used to help them resolve difficulties in comprehension that they might encounter in the process of reading. In contrast, researchers such as Paris and Jacobs (1984) as well as Paris and Winograd (1990) agree that unskilled or poor readers demonstrate lower metacognitive awareness. Instead of focusing on extracting meaning from what they read, unskilled or poor readers are more engaged in decoding words (Baker & Brown, 1984). Research has shown support for this distinction between the metacognitive knowledge of skilled and unskilled readers. For instance, Kaufman, Randlett, and Price (1985)
found that adolescent good readers reported a higher incidence of the use of strategies that help them resolve conflicts in English reading as compared to poor readers.

Research with Chinese reading also draw similar conclusions with regard to the link between metacognition and skilled reading (e.g., So & Siegel, 1997). For instance, Lau and Chan (2003) found that among seventh graders in Hong Kong, good readers used more reading strategies, including metacognitive strategies as compared to poor readers. Similarly, in his examination of the think alouds of children among grade 7 children in Hong Kong, Lau (2006) also found that good readers reported a stronger awareness of the strategies that they used in reading and were better able to apply these strategies as compared to poor readers. These findings echo that of the literature in the English context. This is not surprising as the general consensus among researchers is that while the decoding processes involved in English and Chinese vary, there is universality in the use of higher-order reading skills such as reading strategies across these orthographically dissimilar languages because these skills are language-independent (Hoosain, 1986; Hung & Tzeng 1981).

**Goal orientation, dyslexia, and reading**

Increasingly, research has shown that motivation plays an important role in the reading achievement of students with dyslexia (e.g., Garcia & de Caso, 2004). Goal orientation refers to beliefs towards achievement that impact subsequent response to learning (Ames, 1992).

According to the achievement goal theory (Dweck & Leggett, 1988), learners may exhibit an orientation towards mastery (i.e. mastery-oriented) or towards performance (i.e. performance-oriented) in reading and learning. Dweck (1986) described mastery-oriented learners as those who are focused on learning and persist even in the face of challenges on a task. Learners with this orientation engage in adaptive behaviours in learning. Dweck and Leggett (1998) characterize this
group of learners as having the belief that intelligence can be enhanced with practice and effort. Performance-oriented learners, on the other hand, can be further categorized into performance-approach and performance-avoidant learners. Performance-approach learners aim to do better than others on a task while the main objective of performance-avoidant learners is to avoid failure.

Children who experience repeated failure have often been characterized as having a performance-avoidant orientation. These children develop a learned helpless outlook and helplessness with regard to learning after experiencing multiple failures. Over time, these children develop the idea that learning outcomes would always be the same regardless of what they do and believe that nothing they do would change the situation or outcome (Licht, 1983; Rholes, Blackwell, & Walters, 1980). Researchers have associated performance-avoidant learners with maladaptive behaviours such as negativity in their emotions and thinking in the face of challenges (e.g., Elliot & Church, 1997). Learners in this group view intelligence as fixed (Dweck & Leggett, 1998).

Research findings with students with dyslexia have suggested that these students tend to have a performance-avoidant goal orientation. For example, Glazzard (2010) found that children with dyslexia felt they were not in control of their success or learning and attributed their lack of success on tasks to insufficient ability. In addition, they reported feeling stupid, disappointed and isolated when comparing their work to that of their peers. Specifically, students did not feel that the quality of their work was comparable to that of their peers and these feelings led them to give up. Botsas and Padeliadu (2003) provided support for the relationship between dyslexia and performance orientation. They found that Greek children with dyslexia were mostly performance-avoidance oriented. They avoided situations that could result in failure, which led to fewer opportunities to engage in learning and perpetuated further failures. In comparison, children
without dyslexia in the study were characterized as mastery-oriented learners. They were focused on the task and this often led to success on learning tasks.

In summary, Dweck’s goal theory of achievement motivation offers a possible explanation as to why students with dyslexia may develop a learned helplessness in the face of repeated failures.

**English learning in Hong Kong**

The current study was situated with Chinese children enrolled in Hong Kong elementary schools. Cantonese, a form of spoken Chinese, is the dominant societal language and the medium of school instruction in Cantonese schools in Hong Kong. Children learn to read and write Chinese characters when they start formal education at the age of three (Ho, Law, & Ng, 2000). Given the colonial history of Hong Kong, children are encouraged to learn English from the time they enter kindergarten (Cheung & Ng, 2003). Despite the early introduction of English into the formal curriculum, the level of English proficiency varies among individuals because English is not commonly used outside of the classroom (Cheung & Ng, 2003). The “look-and-say” method is used in both Chinese and English instruction in Hong Kong (Holm & Dodd, 1996). The premise of this method is that children are shown a word by the teacher and the teacher says the word, after which children repeat the word to learn it. Since children are focused on the visual characteristics of words, they are largely de-sensitized to the grapheme and phoneme correspondences. Rote learning thus becomes the primary method of learning both English and Chinese words among Hong Kong children (McBride-Chang & Treiman, 2003).

Dyslexia is identified based on students’ performance on Chinese language and reading measures developed in Hong Kong. Children diagnosed with dyslexia in Chinese are also often given additional support in English reading because of the belief that their difficulties in Chinese
would translate into similar difficulties in English (McBride-Chang et al., 2012). Yet, research has not systematically examined difficulties in English reading among Hong Kong children.

The present study

The present study sought to understand the English reading profiles of Chinese dyslexic and typically developing children by examining dyslexic and typically developing children in Grades 4, 5 and 6 in Hong Kong who were learning English as a second language. Specifically, word and nonword reading, reading fluency and three phonological processing abilities, namely, phonological memory, phonological awareness, and rapid automatized naming were compared between the two groups of readers in order to gain insight into the difficulties the dyslexic group faced in relation to the typically developing children. The present study also compared the reading strategies, goal orientation in English reading and feelings towards learning English in the two groups of children.
Chapter 3
Method

To date, the majority of studies investigating the profiles of Chinese students with dyslexia learning English as a second language has adopted a quantitative approach. In contrast, my study used a mixed methods research design which incorporates both quantitative and qualitative approaches to address multifaceted questions in real world contexts (Creswell & Plano Clark, 2007). My experience as a special education teacher led me to adopt a pragmatist worldview of research. The premise of this study was thus to use a combination of complementary data collection approaches to offer plausible and comprehensive explanations about English word reading profiles of Chinese dyslexic children. Through the use of mixed methods, the present study also intended to strengthen and expand existing knowledge bases by paying attention to children’s learning styles, experience with reading success or failure, and their emotional responses to reading instruction.

Participants

Dyslexic and typically developing Chinese children learning English in Hong Kong were recruited for this study to examine if similarities and differences in English word reading existed between them.

**Dyslexic group.** A total of four students (three males) were recruited from a learning centre for children with learning disabilities located in Hong Kong. All four students were English language learners who had been previously diagnosed with dyslexia by a clinical psychologist. All participants were enrolled in Grades four to six in local elementary schools and were learning English in school. Students from these grades were recruited because of the large number of referrals to the centre for students in this age range. Based on the information collected via a questionnaire designed by the researcher, all participants lived in a family home with
approximately four to seven members which included at least one sibling. All participants lived in Hong Kong since birth and had never resided abroad. Cantonese was reported as the language spoken by both parents of the students in this group. Participants reported speaking Cantonese, most of the time, with the exception of one student who mentioned Mandarin (Putonghua). Only two participants reported that they were able to read and write in English.

**Typically developing group.** Five typically developing students (two males) were recruited from Hong Kong elementary schools in the Kowloon area. The purpose was to establish a comparison group for the researcher to determine the English reading performance of typically developing Hong Kong Chinese students. Participants in this group were grade five or six students learning English in school. The family background of the participants in this group was similar to that of the dyslexic group. As with the dyslexic group, participants reported Cantonese to be the preferred language used by their parents. Cantonese and English were listed as the preferred languages used by participants in their daily life. All five participants reported that they were also able to read and write in English.

**Measures**

Both quantitative and qualitative measures were used in this study. Quantitative measures included standardized measures of phonological awareness, rapid naming, word and non-word reading and reading fluency. Qualitative measures included an oral reading passage, a demographic questionnaire on students’ home environment, a goal-orientation questionnaire as well as an interview with regard to learning English in the classroom.

**Quantitative measures**

**Word reading.** English letter and word reading was measured using two tasks. The first task was the Word Reading subtest of the Wide Range Achievement Test – Fourth Edition (WRAT
– 4) battery developed by Wilkinson & Robertson (2006). Participants read a list of 55 words of increasing difficulty and complexity. Testing was stopped after 10 consecutive errors. The internal consistency of the test was between .87 and .96 (Wilkinson & Robertson, 2006). The second test of real word reading was the Word Identification subtest of the Woodcock Reading Mastery Test (WRMT) battery (Woodcock, 1998). In this task, participants read a list of 106 words of increasing difficulty and complexity, and testing was discontinued when the participant made six consecutive errors. The results were reported in terms of percentage correct out of 106 items.

**Non-word reading.** The Word Attack subtest from the WRMT was administered to assess non-word reading. Participants read 45 pseudo-words that complied with English orthographic rules (e.g. ift, vunhip). The ceiling rules were identical to the Word Identification subtest. The results were reported in terms of percentage correct out of 45 items.

**Phonological memory.** Phonological memory was assessed using the Memory for Digits and Nonword Repetition subtests of the Comprehensive Test of Phonological Processing (CTOPP; Wagner, Torgesen, & Rashotte, 1999). The Memory for Digit subtest consisted of 21 items. Participants listened to a series of numbers played on a CD player and were required to repeat the numerals in the same order they heard them. Testing was discontinued when participants made three consecutive errors. The Nonword Repetition subtest consisted of 18 items. Participants listened to made-up words on a CD player. Testing was stopped after 3 consecutive errors. The individual scores on each subtest as well as a composite score of both tasks were tabulated. The phonological memory scores provided an overall measure of the participant’s ability to code information phonologically for temporary storage in working or short term memory.

**Rapid automatized naming.** The Rapid Digit and Letter Naming subtests of the CTOPP were administered to assess participants’ ability to retrieve phonological information from long-
term memory. In these tests, participants read a series of digits or letters presented on a page and were timed. Testing was discontinued when 3 consecutive errors were made. A digit or letter read correctly was given a score of 1 and an incorrect response was scored as 0. The individual scores on each subtest as well as a composite score of both tasks were tabulated.

**Phonological awareness.** Phonological awareness was measured using the Phonological Awareness Test (PAT) developed by Robertson & Salter (1997). This measure was designed to identify strengths and weaknesses in phonological processing and knowledge of phoneme-grapheme correspondence. The PAT consisted of eight subtests: Rhyming, Segmentation, Isolation, Deletion, Substitution, Blending, Graphemes, and Decoding.

**Reading accuracy and fluency.** The Test of Word Reading Efficiency (TOWRE) was used to assess students’ reading accuracy and fluency. The participants were presented with a list of words and were required to read as many words as possible in 45 seconds.

**Qualitative measures**

**Student demographic questionnaire.** The demographic questionnaire adapted from Jimenez, Garcia, and Pearson (1996) consisted of two parts. The first part of the questionnaire consisted of questions on the students’ background, the language(s) heard and spoken at home, their attitudes towards reading and the strategies they used during reading. In the second part of the questionnaire, questions related to the reading and leisure activities of students were posed.

**Goal orientation questionnaire.** The second questionnaire was a goal orientation questionnaire developed by Jang, Dunlop, Park, and van der Boom (2015). The questionnaire consisted of 17 opinion statements that sought to measure whether participants were mastery-oriented, performance-approach oriented or performance-avoidance oriented. For each statement, participants were required to indicate the extent (1 = Not true at all, 5 = Very true) to which each
sentence described their English learning (e.g., *I try to look like I can do tasks even when I don’t really understand*). The first 5 questions on the questionnaire measured the performance-approach orientation, the next 6 measured performance-avoidant orientation and the last 6 questions measured mastery orientation. The score for performance on each construct was calculated by taking an average of the scores on the questions that corresponded to each construct.

**Interview.** An unstructured interview was conducted individually with each participant to understand how participants learned English in the classroom and their thoughts on the English learning activities they participated in. Each interview lasted between 60 to 90 minutes. Five main questions were posed to the participants in the interview. The questions were:

1. Describe how you learn English in class.
2. Do you find learning in this way helpful?
3. Is there anything you don’t find helpful?
4. Do you speak in English to your friends and teachers in class?
5. What fun activities do you do in class to learn English?

During the interview, students were asked to describe the teaching strategies used by their Chinese teachers in class and express their thoughts on the effectiveness of these strategies in helping them read in English. They were also asked to describe the English learning activities that they participated in the classroom. During the interview when I was unsure of a response given, I probed with additional questions to obtain a thorough or clearer response. Further, if I was unsure of what the student meant, the Cantonese translator was available to assist throughout the interview.

**Oral reading passage.** A narrative reading passage titled “Special birthdays in Hong Kong” taken from the Territory Wide System Assessment English Language Reading and Writing books
used in Hong Kong was given to participants for the read aloud activity. The text consisted of 158 words and was organized into four paragraphs. The passage was taken from a resource book that was used in the centre where the study was conducted to ensure that it was culturally appropriate for the participants. A child in the dyslexic group was offered an alternative text titled “Students are doing too little exercise” because this passage was too difficult for him.

Students were prompted during reading with questions such as, “What are you thinking about?”, “Could you tell me as much as you can about what you are thinking?”, “What do you do when you come across a word you can’t read?” and “What do you look at?”. Participants were encouraged to respond in the language they felt most comfortable. During reading, the researcher prepared a written record of participants’ reading by marking any errors they made in decoding (known as miscues) on a record sheet.

**Procedure**

Children were tested individually in a quiet room at the Polytechnical University of Hong Kong. Testing was conducted after school hours or during the weekends. I met with each child two or three times. During testing, an interpreter was available at all times, to provide translation or clarification.

In the first session, the questionnaires were administered by the researcher or research assistants. The collection of data from the questionnaire took approximately 90 to 120 minutes. To develop a positive rapport with participants and to relieve test anxiety, the standardized measures were not administered during the first session with the participants.

The standardized measures were usually administered in the second session and administration was conducted in English by the researcher. Instructions were translated into Cantonese when clarification was necessary. The battery of tests took approximately 90 to 120
minutes or longer to complete. The order of the administration of the tests was the same for all participants. Short breaks were given in between to prevent fatigue effects.

The interview took place after the administration of the quantitative measures. The interview typically lasted approximately 60 minutes. The final activity that participants took part in was the read aloud activity, which lasted approximately between 60 and 90 minutes.

Data analysis

The quantitative and qualitative measures were analyzed separately. At the interpretation stage, both data sets were reviewed together to provide a complete picture of the questions posed in the study.

Quantitative measures. Raw scores, standard scores and percentiles were used in the analyses of the participants’ performance on the phonological memory, rapid naming, word and nonword reading and reading fluency tasks. Only raw scores were used in the analyses of their performance on the PAT subtests. Since PAT is normed and standardized for the population of children between 5 and 9 years old, and children in the study sample were older than this age range, standardized scores for this test could not be used. Therefore, only raw PAT scores were used in this study. Given the small sample size, Mann Whitney U tests were conducted to compare and contrast the performance of the two groups of participants (dyslexic and typically developing groups) on the standardized measures administered. The value of r was also computed for each of the non parametric test conducted to examine the effect sizes.

Student questionnaires and interview. The mean responses of the students from both groups on the variables of home environment (i.e., language use in the home, leisure activities and home literacy activities) in the demographic questionnaire were computed. In addition, Mann Whitney U tests were conducted to compare the demographic variables and goal orientations of
the two groups. The interview responses were analyzed by looking for commonalities and differences among the individual participants’ responses within each group and across both groups. Specifically, the following questions guided the analysis of the responses:

1. Were there any similarities or differences among the participants regarding what they ‘thought’ of decoding given their knowledge?
2. Were there any similarities or differences in the process of decoding?
3. What were the strategies the students used to decode words?

**Oral reading passage.** The audio recordings of the participants’ reading were first transcribed and translated into English by research assistants who were effectively bilingual in both English and Cantonese. Oral Reading Miscue Analysis (ORMA) was used to analyze students’ reading of the oral passage in order to understand the strategies Chinese dyslexic and typically developing children use to read English words and examine whether they use the same strategies.

In the current research study, I made use of a combination of the approaches to ORMA used by Goodman (1979) as well as Beatty and Care (2009). Similar to the approach used by Goodman (1979), I recorded the miscues of the participants to determine if these errors were syntactic/structural, graphophonetic and/or semantic in nature. A syntactic/structural error was qualified as a miscue that preserved the grammatical structure of the word. For example, a student might say ‘picnic’ instead of ‘present’ when reading the sentence ‘I gave him a birthday present’. Although it was a different word used, the miscue was of the same part of speech (verb) as the original word and does not change the grammatical structure. At times a child may not use a structural cue which creates a grammatical error. For example, a student might say ‘sat’ instead of ‘sitting’ in the following sentence: “The dog was sitting (sat) on the porch”. Replacing ‘sat’ for
‘sitting’ does not follow the rules of language. In this case, the child does not use a structural cue. On the other hand, a graphophonic (visual) error was recorded when the miscue looked similar to the original word (e.g., The small (smell) dog sat quietly). In this case, the child used the same beginning blend ‘sm’ and the middle consonant ‘l’. A child is unable to use visual cues when the substituted word has no similarity to the original word. For example, a child might say the word “little” instead of “small” in the sentence “The small dog was sitting on the porch”. The word ‘little’ has no visual similarity to the original text. However, in this case a semantic (meaning) error would be recorded instead because the miscue made sense in the context of the sentence (“little” is similar in meaning to “small”). Similarly, a semantic miscue would be recorded if a child says “horse” instead of “pony” in the sentence “The little girl rode a pony at the farm”. On the other hand, a child does not use a meaning cue when the substituted word does not make sense in the sentence. An example is if a child says “pipe” instead of “pony” in the sentence “The little girl rode a pony on the farm”. Research has shown that miscues could reflect the use of more than one cueing system (Wallace, 1992). Miscues could be coded as being either a syntactic, graphophonic (visual) or semantic error or belonging to two or all three systems (refer to Appendix A for examples of the types of miscues). An additional category based on Beatty and Care (2009) was also added to analyze the graphic and sound similarity of the miscues to the printed word. Miscues were coded as sharing high similarity, sharing some similarity or sharing no similarity (refer to Appendix A for the coding scheme for graphic similarity).

The researcher coded all the transcripts of all nine participants. In addition, to establish inter-rater reliability, all the transcripts were assigned to an experienced Special Assignment Teacher (SAT) from a local school board. The miscue analysis was considered reliable because more than 95% agreement was obtained between the researcher and the inter-rater.
Chapter 4
Results

The results from the different measures used in the study are presented in this section. The results from the quantitative measures are first presented, followed by those from the student questionnaires, miscue analysis and interview.

Quantitative measures

The mean performance of both groups on each of the standardized tests is presented in the sections below. A summary of the findings is presented at the end of the section.

Phonological memory. Table 1 shows the means (M) and standard deviations (SD) of the tests in the CTOPP battery used to measure phonological memory (Memory for Digits and Nonword Repetition subtests) for the dyslexic and typically developing groups. The effect sizes of the mean differences between the two groups (r) and the statistics from the Mann-Whitney U tests are also presented in the same table. As seen in the table, children in the typically developing group scored higher as compared to the children in the dyslexic group on all subtests and the effect size of these differences ranged from moderate to large (r > .5). However, the differences were only significant for the Nonword Repetition and Phonological Memory tasks. The results suggest that the participants in the typically developing group were better able to keep sounds they recognize in working memory. In contrast, the students within the dyslexic group were less competent in this area. Additionally, the results also show that participants in the typically developing group processed information more quickly compared to the dyslexic group. The individual scores of all nine participants on these subtests are presented in Figure 1 in Appendix B.
Table 1 Performance of the Dyslexic and Typically Developing Groups on the Phonological Memory and Rapid Naming Tasks

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Dyslexic group</th>
<th>Typically developing group</th>
<th>r</th>
<th>Mann-Whitney U</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Memory for Digits (Raw Score)</td>
<td>9.3</td>
<td>2.2</td>
<td>12.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Memory for Digits (Standard Score)</td>
<td>5.3</td>
<td>2.2</td>
<td>8.6</td>
<td>2.2</td>
</tr>
<tr>
<td>Memory for Digits (Percentile)</td>
<td>9.3</td>
<td>2.1</td>
<td>34.2</td>
<td>24.9</td>
</tr>
<tr>
<td>Nonword Repetition (Raw Score)</td>
<td>6.5</td>
<td>1.6</td>
<td>9.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Nonword Repetition (Standard Score)</td>
<td>6.0</td>
<td>1.6</td>
<td>8.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Nonword Repetition (Percentile)</td>
<td>11.3</td>
<td>9.7</td>
<td>25.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Phonological Memory (Sum of Standard Scores)</td>
<td>11.3</td>
<td>11.3</td>
<td>16.6</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Note: *p<.05; **p<.01; ***p<.001

**Rapid automatized naming.** Table 2 shows the means (M) and standard deviations (SD) of the tests in the CTOPP battery used to measure rapid naming (Rapid Letter and Digit Naming subtests) for the dyslexic and typically developing groups. The results show that children in the dyslexic group scored significantly lower on the Rapid Letter Naming task as compared to the typically developing group. The individual scores of all nine participants on these subtests are represented in Figure 2 in Appendix B.

Table 2 Performance of the Dyslexic and Typically Developing Groups on the Rapid Naming Tasks

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Dyslexic group</th>
<th>Typically developing group</th>
<th>r</th>
<th>Mann-Whitney U</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Rapid digit Naming (Raw Score)</td>
<td>55.0</td>
<td>9.4</td>
<td>41.4</td>
<td>9.3</td>
</tr>
<tr>
<td>Rapid Digit Naming (Standard Score)</td>
<td>5.0</td>
<td>1.6</td>
<td>7.0</td>
<td>2.1</td>
</tr>
<tr>
<td>Rapid digit naming (Percentile)</td>
<td>6.8</td>
<td>6.4</td>
<td>20.2</td>
<td>16.1</td>
</tr>
<tr>
<td>Rapid Letter Naming (Raw Score)</td>
<td>42.8</td>
<td>5.4</td>
<td>31.2</td>
<td>4.0</td>
</tr>
<tr>
<td>Rapid Letter Naming (Standard Score)</td>
<td>7.3</td>
<td>1.3</td>
<td>10.4</td>
<td>1.3</td>
</tr>
</tbody>
</table>

34
Table 3 shows the descriptive and inferential statistics of each subscale of the eight PAT subtests for the dyslexic and typically developing groups. The results show that while children in the typically developing group performed better on most PAT subtests as compared to the dyslexic group, the differences between the groups were only significant for the Rhyme Production, Segmentation (Phonemes), Isolation (Medial Sounds), Substitution with Manipulatives, Graphemes (Consonant Blends), Decoding (Consonant Digraphs), Decoding (Consonant Blends), and Decoding (r-controlled vowels) subtests. Of the eight subtests of the PAT, there were no differences in performance between the two groups on all of the Blending subscales. For each of the other seven areas, the groups were different on at least one of its subscale. The two subtests in which most differences were observed between the groups were the graphemes and decoding subtests. Individual performance on the PAT subtests are presented in figure 3 in Appendix B.

Note: *p<.05; **p<.01; ***p<.001
Table 3 Performance of the Dyslexic and Typically Developing Groups on the PAT Subscales

<table>
<thead>
<tr>
<th>Subtest (Subscale)</th>
<th>Dyslexic group</th>
<th>Typically developing group</th>
<th>r</th>
<th>Mann Whitney U</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhyme (Discrimination)</td>
<td>9.0</td>
<td>9.6</td>
<td>0.3</td>
<td>7.0</td>
</tr>
<tr>
<td>Rhyme (Production)</td>
<td>3.0</td>
<td>7.4</td>
<td>0.8</td>
<td>0.0*</td>
</tr>
<tr>
<td>Segmentation (Sentences)</td>
<td>9.0</td>
<td>9.8</td>
<td>0.3</td>
<td>6.5</td>
</tr>
<tr>
<td>Segmentation (Syllables)</td>
<td>9.5</td>
<td>10.0</td>
<td>0.6</td>
<td>5.0</td>
</tr>
<tr>
<td>Segmentation (Phonemes)</td>
<td>1.8</td>
<td>6.8</td>
<td>0.8</td>
<td>1.0*</td>
</tr>
<tr>
<td>Isolation (Initial Sounds)</td>
<td>9.8</td>
<td>10.0</td>
<td>0.4</td>
<td>7.5</td>
</tr>
<tr>
<td>Isolation (Final Sounds)</td>
<td>9.0</td>
<td>9.8</td>
<td>0.4</td>
<td>6.0</td>
</tr>
<tr>
<td>Isolation (Medial Sounds)</td>
<td>7.3</td>
<td>9.8</td>
<td>0.8</td>
<td>0.5*</td>
</tr>
<tr>
<td>Deletion (Compounds &amp; Syllables)</td>
<td>8.3</td>
<td>9.0</td>
<td>0.6</td>
<td>5.0</td>
</tr>
<tr>
<td>Deletion (Phonemes)</td>
<td>7.3</td>
<td>10.0</td>
<td>0.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Substitution with Manipulatives</td>
<td>7.8</td>
<td>10.0</td>
<td>0.9</td>
<td>0.0*</td>
</tr>
<tr>
<td>Blending (Syllables)</td>
<td>9.3</td>
<td>9.0</td>
<td>0.2</td>
<td>8.0</td>
</tr>
<tr>
<td>Blending (Phonemes)</td>
<td>5.8</td>
<td>8.0</td>
<td>0.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Graphemes (Consonants)</td>
<td>19.3</td>
<td>20.8</td>
<td>0.1</td>
<td>9.0</td>
</tr>
<tr>
<td>Graphemes (Long &amp; Short vowels)</td>
<td>8.5</td>
<td>8.4</td>
<td>0.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Graphemes (Consonant Blends)</td>
<td>4.3</td>
<td>9.8</td>
<td>0.9</td>
<td>0.0*</td>
</tr>
<tr>
<td>Graphemes (Consonant digraphs)</td>
<td>3.0</td>
<td>4.0</td>
<td>0.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Graphemes (r–controlled vowels)</td>
<td>1.0</td>
<td>3.2</td>
<td>0.7</td>
<td>2.0</td>
</tr>
<tr>
<td>Graphemes (Vowel digraphs)</td>
<td>2.8</td>
<td>3.4</td>
<td>0.2</td>
<td>8.0</td>
</tr>
<tr>
<td>Graphemes (Diphthongs)</td>
<td>1.5</td>
<td>2.8</td>
<td>0.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Decoding (Verb-Consonant)</td>
<td>7.0</td>
<td>9.6</td>
<td>0.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Decoding (Consonant-Verb-Consonant)</td>
<td>6.0</td>
<td>9.2</td>
<td>0.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Decoding (Consonant Digraphs)</td>
<td>3.8</td>
<td>9.6</td>
<td>0.8</td>
<td>0.0*</td>
</tr>
<tr>
<td>Decoding (Consonant Blends)</td>
<td>2.5</td>
<td>7.8</td>
<td>0.8</td>
<td>0.5*</td>
</tr>
<tr>
<td>Decoding (Vowel Digraphs)</td>
<td>4.3</td>
<td>7.6</td>
<td>0.6</td>
<td>3.0</td>
</tr>
<tr>
<td>Decoding (r–Controlled Vowels)</td>
<td>2.8</td>
<td>2.0</td>
<td>0.7</td>
<td>1.5*</td>
</tr>
<tr>
<td>Decoding (CVCE words)</td>
<td>6.0</td>
<td>5.8</td>
<td>0.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Decoding (Diphthongs)</td>
<td>3.0</td>
<td>8.0</td>
<td>0.7</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Note: *p<.05; **p<.01; ***p<.001

Word and nonword reading. Descriptive and inferential statistics of the performance of the dyslexic and typically developing groups on the Word Identification and Word Attack subtests of the Woodcock Reading Mastery test battery and the Word Reading subtest of the Wide-Range Achievement battery were presented in Table 4. In addition, individual student performance for this test is represented in Figure 4 of Appendix B.
From Table 4, the children in the typically developing group outperformed children with dyslexia on all subtests and the magnitude of most of the differences were large on all subtests.

Table 4 *Performance of the Dyslexic and Typically Developing Groups on the Word and Nonword Reading Subtests*

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Dyslexic group</th>
<th>Typically developing group</th>
<th>Mann Whitney U</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M  SD</td>
<td>M  SD</td>
<td></td>
</tr>
<tr>
<td>Word Identification (Raw Score)</td>
<td>36.8 5.2</td>
<td>62.8 14.9</td>
<td>0.8 0.0*</td>
</tr>
<tr>
<td>Word Identification (Standard Score)</td>
<td>71.0 4.7</td>
<td>88.6 10.5</td>
<td>0.8 0.0*</td>
</tr>
<tr>
<td>Word Identification (Percentile)</td>
<td>2.8 2.1</td>
<td>26.0 22.1</td>
<td>0.8 0.0*</td>
</tr>
<tr>
<td>Word Reading (Raw Score)</td>
<td>24.0 1.4</td>
<td>37.8 12.1</td>
<td>0.8 0.0*</td>
</tr>
<tr>
<td>Word Reading (Standard Score)</td>
<td>72.8 2.1</td>
<td>96.4 27.2</td>
<td>0.8 0.0*</td>
</tr>
<tr>
<td>Word Reading (Percentile)</td>
<td>3.8 1.3</td>
<td>32.0 38.1</td>
<td>0.8 0.0*</td>
</tr>
<tr>
<td>Word Attack (Raw Score)</td>
<td>13.5 10.3</td>
<td>28.0 8.5</td>
<td>0.7 2.0*</td>
</tr>
<tr>
<td>Word Attack (Standard Score)</td>
<td>84.3 10.0</td>
<td>97.8 9.4</td>
<td>0.6 3.0*</td>
</tr>
<tr>
<td>Word Attack (Percentile)</td>
<td>18.3 18.6</td>
<td>44.6 22.2</td>
<td>0.6 3.0*</td>
</tr>
</tbody>
</table>

Note: *p<.05; **p<.01; ***p<.001.

*Reading fluency.* The results of TOWRE for each group in the study are summarized in Table 5. Three children in the dyslexic group had percentile scores lower than the first percentile. To be able to plot TOWRE percentile scores and present them in the descriptive statistics table I assigned three students percentile scores of 0.5. Individual student scores of the TOWRE of the two groups are represented in Figure 5 of Appendix B.

As seen from Table 5, children in the typically developing group outperformed children with dyslexia on the TOWRE and these differences were large and significant.
Table 5 Performance of the Dyslexic and Typically Developing Groups on the Test of Word Reading Efficiency (TOWRE) Subtest

<table>
<thead>
<tr>
<th>Subtest</th>
<th>Dyslexic group</th>
<th>Typically developing group</th>
<th>M</th>
<th>SD</th>
<th>M</th>
<th>SD</th>
<th>r</th>
<th>Mann Whitney U</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOWRE (Raw Score)</td>
<td>25.8</td>
<td>6.6</td>
<td>60.6</td>
<td>13.4</td>
<td>0.8</td>
<td>0.0*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOWRE (Standard Score)</td>
<td>64.0</td>
<td>14.9</td>
<td>80.6</td>
<td>12.6</td>
<td>0.8</td>
<td>0.0*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOWRE (Percentile)</td>
<td>0.9</td>
<td>0.8</td>
<td>26.4</td>
<td>15.9</td>
<td>0.8</td>
<td>0.0*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *p<.05; **p<.01.

Summary

Based on the comparisons of the average performance of the two groups on a number of standardized reading tests, a cluster of reading skills that distinguished between the two groups was identified. The results show that in general, the dyslexic children had lower performance on most phonological processing tasks, particularly for the integrated skills that required use of multiple discrete skills (word identification, nonword repetition, sentence completion etc.). These results could be the outcome of using a small sample because the group differences in those integrated skills were larger due to a cumulative effect of the differences in the discrete skills. Further evidence of this could be the fact that even for skills that were not significantly different between the groups, the effect sizes were moderate or large.

Word reading strategies used in reading by both groups

The reading strategies used by the two groups were examined with ORMA of student errors on the oral reading passage and the transcripts of student responses during the read-aloud activity. Table 6 shows the summary of the miscues and observed reading strategies derived from ORMA and analyzing the transcripts.
<table>
<thead>
<tr>
<th>Child</th>
<th>Number of miscues</th>
<th>Graphic similarity (high/some/none)</th>
<th>Sound similarity (high/some/none)</th>
<th>Type of miscue</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Specific to Typically developing group</td>
<td>Specific to Dyslexic group</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MUSCLE Visual</td>
<td>MUSCLE Structural</td>
</tr>
<tr>
<td>Kathy</td>
<td>12</td>
<td>11/1/0</td>
<td>8/3/1</td>
<td>6</td>
<td>11 4 8 5</td>
</tr>
<tr>
<td>Mark</td>
<td>2</td>
<td>2/0/0</td>
<td>2/0/0</td>
<td>2</td>
<td>2 1 2 1</td>
</tr>
<tr>
<td>Wendy</td>
<td>3</td>
<td>2/1/0</td>
<td>2/1/0</td>
<td>4</td>
<td>2 1 3 1 1 1</td>
</tr>
<tr>
<td>Vicky</td>
<td>8</td>
<td>7/1/0</td>
<td>4/4/0</td>
<td>4</td>
<td>8 1 5 6 2</td>
</tr>
<tr>
<td>Boris</td>
<td>15</td>
<td>5/5/5</td>
<td>5/6/4</td>
<td>1</td>
<td>14 4 10 8 2 1 1 2</td>
</tr>
<tr>
<td>Bruce</td>
<td>7</td>
<td>2/1/1</td>
<td>1/2/1</td>
<td>2</td>
<td>1 1 2 1</td>
</tr>
<tr>
<td>Carin</td>
<td>28</td>
<td>10/10/10</td>
<td>8/6/15</td>
<td>21</td>
<td>7 7 5 3</td>
</tr>
<tr>
<td>John</td>
<td>29</td>
<td>19/8/3</td>
<td>13/8/7</td>
<td>27</td>
<td>17 6 2 1 1 9</td>
</tr>
<tr>
<td>Tony</td>
<td>15</td>
<td>4/6/5</td>
<td>3/2/11</td>
<td>14</td>
<td>3 1 11</td>
</tr>
</tbody>
</table>

Table 6  Summary of Miscues and Strategies Observed in the Reading Task
Types of miscues. A close look at Table 6 indicates there were more miscues for children in the dyslexic group as compared to the typically developing group. The miscues ranged from two to fifteen in the typically developing group and seven to twenty-nine in the dyslexic group. Of the four types of miscues evaluated in the analysis, the most common miscue for both groups was grapho-phonic (visual/sound). While the overall numbers of miscues were comparable in both groups, one child with dyslexia had an extremely large number of nineteen miscues as compared to one to seven for all other children. In addition, partial grapho-phonic (visual/sound) miscues were identified only for children with dyslexia, ranging between one and seven miscues. Meanwhile, semantic (meaning) miscues were present only for children in the typically developing group which ranged between one and six in number.

In the typically developing group, most of the participants’ errors had high graphic (visual) and sound (phonics) similarity. Overall, there were more errors belonging to the category of graphic (visual) similarity as compared to that of sound (phonics). Within the dyslexic group, the majority of miscues identified were classified as graphic (visual) and none as semantic (meaning). The participants also made miscues that were considered syntactic (structural). Meanwhile the typically developing group made miscues categorized as graphic (visual) syntactic (structural) and semantic (meaning). Table 7 presents a selected sample of miscues.
<table>
<thead>
<tr>
<th>Student name</th>
<th>Original word</th>
<th>Grapho-phonics (visual/sound) miscue</th>
<th>Partial grapho-phonics (visual/sound) miscue</th>
<th>Syntactic (Structural) miscue</th>
<th>Semantic (Meaning) miscue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ben (Dyslexic)²</td>
<td>Having</td>
<td>Hi (error One)</td>
<td></td>
<td>People visit temples and have <em>heafing</em> vegetarian meals to celebrate that day.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heafing (error two)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carin (Dyslexic)</td>
<td>Special</td>
<td>Snap</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carin (Dyslexic)</td>
<td>Festivals</td>
<td>Fastivals</td>
<td></td>
<td></td>
<td>There are many <em>festivals</em> (<em>fastivals</em>) in Hong Kong</td>
</tr>
<tr>
<td>Carin (Dyslexic)</td>
<td>Patron</td>
<td>Personal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carin (Dyslexic)</td>
<td>Celebrations</td>
<td>Cley/brat/ines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>John (Dyslexic)</td>
<td>Festivals</td>
<td>Festeevoz</td>
<td></td>
<td></td>
<td>There are many <em>festivals</em> (<em>festevoz</em>) in Hong Kong.</td>
</tr>
<tr>
<td>John (Dyslexic)</td>
<td>Believe</td>
<td>Bellive</td>
<td></td>
<td>It is an important day for fisherman because they <em>believe</em> (<em>bellive</em>) Tin Hau keep them safe, gives them fine weather and full nets.</td>
<td></td>
</tr>
<tr>
<td>John (Dyslexic)</td>
<td>Celebrations</td>
<td>Keelbraytion</td>
<td></td>
<td>Do you know that almost half of Chinese festivals are birthday <em>celebrations</em> (<em>keelbraytion</em>) like Christmas?</td>
<td></td>
</tr>
<tr>
<td>Kathy (Typically developing)</td>
<td>Fisherman</td>
<td>Fishman</td>
<td>Fishman</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ The errors indicate what a child knows and does not know about reading words. An error could be coded as one or more miscues. For example, error one and error two indicated both a grapho-phonemic and syntactic miscue for the same response.

² Names of participants have been changed to preserve anonymity.
Common word reading strategies across groups. The most common strategies used by all the participants in both groups were syllables, phonics, sounding out, reading small words within larger words and use of word shapes. These strategies were more or less used equally by both groups. Of these three strategies, phonics/sounding out was most commonly used and seeing small units within larger words was the least commonly used approach.

Word reading strategies unique to the dyslexic group. The strategies unique to the dyslexic group included using the beginning and end sounds of words as well as chunking word parts (e.g. disappointed – dis/appoint/ed). Both of these strategies were used in about 19 instances by the children with dyslexia. Overall, the students in the dyslexic group appeared to be limited to using strategies such as phonics, sounding out, syllables, finding small words within larger words, reading familiar words first, chunking, word shape, beginning and ending sounds. In particular, it was difficult for students with dyslexia to articulate their strategies. Instead, they chose to point to sections of words and letters to explain their thinking. For example, when Carin read the word ‘gambling,’ she mistook the sound ‘b’ for ‘d’ in her pronunciation. She explained that she looked at ‘gamb’ but then said ‘gramd’ and subsequently ‘gramling’. Carin read the word ‘gambling’ as ‘grand’. She inserted the letter ‘r’ and reversed the letter ‘b’ for ‘d’. Finally, when she tried to blend the word parts for gambling, she omitted the letter ‘d’ and inserted the letter ‘l’. She read ‘gamblin’ as ‘gramling’. When reading the word ‘patron’, Carin made a partial miscue. She still used the letters ‘p’, ‘o’, ‘n’, ‘a’, and ‘r’ but not in any correct order. She read the word ‘patron’ as ‘personal’.

In addition, Carin confused the short vowel sound ‘a’ for ‘e’ when reading the words ‘temple’ and ‘net’. When she read the word ‘fishermen’ she read the word part ‘erm’ as ‘rem’. Therefore, because she reversed the order of the letters she could not blend word parts to form the
word. Overall, from the miscues Carin made, it seemed when she blended the word parts she either added sounds or omitted. Therefore, the word parts she tried to blend were not usually the same. It may be when Carin was required to hold on to a lot of information all at once, it was difficult for her to manage.

Similarly, another student with dyslexia, John, struggled with the word ‘gamblers’ by reading it as ‘gramb – pling.’ He omitted the final sounds ‘ers’ in the word. At the same time, he transposed the letter ‘b’ for ‘p’. Due to these struggles with decoding, John could not read the word ‘gamblers’.

Tony, a participant with dyslexia gave up quite a bit during the oral reading as he seemed overwhelmed by the task. In any event, a partial miscue analysis was still possible. When he read the word ‘celebration’ he misread it as ‘claypra’. He pointed to each letter in the sequence but did not describe or provide any type of explanation to his approach. He also transposed the letter ‘b’ for ‘p’ during reading.

When Tony read the word ‘Christmas’, he simply said ‘ch’. When questioned about his process, he pointed to parts of words but did not enunciate any sounds. It seemed that he had a lot of difficulty blending phonemes. When he read the word ‘patron’, he was sub-vocalizing. It appeared as if he was trying to use phonics and blend the word parts but once again he struggled with this process. Nonetheless, the researcher was able to elicit from Tony that he used ‘pinyin’ to help him read words.

**Word reading strategies unique to the typically developing group.** Self-correction, cross checking, word shape, looking up pronunciation in dictionary, asking teacher for help, thinking of Chinese translation, thinking of similar sounding words, finding vowels or consonants first and
using context clues to guess at words were strategies exclusive to the typically developing group. Each student was able to describe the strategy used and explain why the strategy was used.

The results showed that students in the typically developing group were able to use self-monitoring strategies. For example, Mark in the typically developing group demonstrated his ability to use strategies that helped him decode unfamiliar as well as longer words. His ability to remember words as a picture or drawing (word shape) might be a strategy he adopted from reading a character-based language and it transferred to an alphabet-based language. Mark’s ability to use a self-monitoring strategy is well illustrated in the following excerpt:

I will look at the first and last letters. I will look at all but concentrate on the first and last letter. Um … because those help me to figure out how to pronounce the word. I look at the letter g…. I focus on it because it’s bigger than the other letters. I got the ‘g’ sound, -guh and the ‘o’ -- long vowel sound…I will skip to the last few letters like ess… I will say to myself good.

I will try to guess the words, the meaning of the word. Like Goddess (pronounced as goodess) I know it’s about God, then I know …. I will try to guess the word... the meaning of the word. There is a space in between the capital letter, “G” and the ‘o’ … in the middle … this helps me remember the shape…I look at the rest of the letters and space… I remember the shape of the word… I look at the word and I think I’m looking at a picture, and then I can find it looks like a drawing … it helps me to remember it more when I look at the word first and I’ll remember it fast, quickly. I only do this for longer words. I learned this by myself… I figured it out by myself. Sometimes I look for patterns… Like goddess has the word God… so when I see God I know it’s about god when I see the word. If the word has a meaning than I can guess it. I’ll try to guess the meaning out, then it’ll help me to pronounce it better. If I think about its meaning maybe I’ll think about the Cantonese word.
Wendy, another student from the typically developing group, also described in detail the strategies she used to read single words. When she read the word ‘patron’ she described she used her phonics skills to say each letter. For example: ‘puh’, ‘a’ (short vowel) ‘tuh’, ‘ruh, ‘o’(short vowel), ‘n’. On the other hand, when she read the word vegetarian it seemed that she was using morphology. Wendy noticed the base morpheme ‘vegetable.’ She described that she was thinking of the word ‘vegetables’ because the word part ‘veget’ reminded her of vegetables. She tried to apply phonics rules to help her divide the word into parts to assist her with the pronunciation. She divided the word into ‘ar’ and then ‘ian’. She explained that phonics helped her read a word that she did not know how to read. If she still had difficulty, she would check the dictionary for the pronunciation.

Interestingly, Wendy described that during reading, she asked herself whether an unfamiliar word reminded her of a related familiar word (e.g. thought of vegetable for vegetarian). She thought of other vocabulary words that had the same word parts to assist her with decoding. Therefore, Wendy used specific strategies to read English and Chinese when thinking about the meaning of the English word. If her strategies did not work, she referred to the dictionary to assist her with pronunciation or asked the teacher for assistance.

In summary, there were certainly differences between the two groups in terms of decoding unfamiliar words. It was clear that Chinese children with dyslexia reversed letters, used transpositions and read words with letters out of sequence. In addition, skills that were required for reading such as blending, segmenting and isolation were also areas of challenges. On the other hand, the participants from the typically developing group were able to use more strategies when decoding unfamiliar words compared to the dyslexic group.
Student perceptions of reading in Chinese and English

The analysis of the interview transcripts also provided insight into the perceptions of students with regard to reading in Chinese and English.

Common perceptions towards reading in both groups. A common perception of reading in Chinese among children was the importance of reading more and different kinds of books to become a better reader. In doing so, children felt it would be possible to learn more vocabulary. The shared perception between groups was that learning more vocabulary was good reading practice but the perception of how to develop new vocabulary was slightly different between groups. Readers with dyslexia believed that through reading, they could train their memory and develop memory skills, whereas students from the typically developing group explained that good readers studied the textbook, paid attention, looked at other sources, and recited vocabulary.

The students expressed the belief that in order to be a good reader, one needed to practice reading regularly. Interestingly, a common opinion between the groups was the necessity of listening, paying attention in class and completing workbook exercises to become a good reader. Students believed that classroom was the place for students to develop the necessary skills to become good English readers.

Differences in perceptions towards reading across groups. The difference between the groups, however, was that students from the typically developing group were aware of the specific knowledge they used to decipher both Chinese and English words. For example, students mentioned in Cantonese that it was important to understand the semantic and the phonetic component of characters while reading Chinese characters. More importantly, knowing the theme of a paragraph was perceived by students to enhance comprehension. Specifically, in English, children described that knowing more vocabulary would lead to better comprehension of
sentences. In addition, understanding how to separate words into units, using phonics and grammar rules were all strategies students thought good readers used to read English.

On the other hand, children from the dyslexic group explained that knowing what a Chinese paragraph was about in advance helped their reading but could not explain how this would help them in their reading. Interestingly, students mentioned that it was important to know how to speak in both Cantonese and English to be good readers.

In summary, it was clear that students in the typically developing group had a good understanding of what it meant to be a good reader in both Chinese and English. Students in this group were able to describe good reading practice behaviours for both Chinese and English. In comparison, the dyslexic students were limited in their descriptions of what constituted effective reading strategies for good readers in both Chinese and English.

**Common perceptions of reading Chinese and English in both groups.** Children from the dyslexic and typically developing groups described that reading Chinese characters was very different from reading in an alphabetic language such as English. The primary difference that students discussed was that Chinese involved a lot of memorizing. In fact, children expressed that they were taught to memorize characters. Unlike English, the Chinese language does not contain clues for pronouncing a word. Memorization was necessary. Interestingly, one student with dyslexia explained that it was easier for her to learn strokes of a Chinese character but not learn phonics. However, the typically developing group described that understanding the number of strokes in a Chinese character was more difficult than learning the number of letters in an English word.

On the other hand, both groups acknowledged that reading English was difficult due to phonetics. The dyslexic group described that it was easier to memorize letters in English than
characters in Chinese, although it was difficult to pronounce and remember letter clusters when they were required to combine all of the sounds together to form a word. Children from the typically developing group shared a similar opinion that despite their awareness of phonics, it was not easy to read English words because there were many different possible sound combinations.

It was noteworthy that a few children from both groups expressed that translating English words into Cantonese made it easier to understand the meaning of words. Both Carin and Tony from the dyslexic group found this to be a good strategy for comprehension. Meanwhile, Kathy from the typically developing group explained, “I try to think of what it is in Cantonese when I read an English word. I translate every English word in Cantonese than I combine all the Cantonese meanings to make a sensible sentence to myself”. Similarly, Mark and Wendy from the typically developing group used the same approach.

In summary, participants in both groups presented similar perspectives on how to read a word in Chinese. Most of the children considered ‘memorizing’ a strategy used for reading Chinese characters. The slight differences between the groups were that children in the typically developing group were able to provide clearer explanations regarding the dissimilarities between Chinese and English (e.g. grammar, number of strokes) as compared to children with dyslexia. Additionally, regardless of the presence of dyslexia, some students depended on their primary language skills to assist them with reading an English word or understanding meanings of words.

**Classroom experiences**

The responses from the student interviews were analyzed to gain insight into the perceptions of the students in both groups about their classroom experiences. A variety of responses was obtained from broad-based questions which were coded according to categories such as specific teacher-led activities, various instructional strategies and support, punishment, co-
operative learning, co-teaching, games, self-concept, self-motivation and student emotion (refer to the coding scheme in Appendix C).

**Similarities in classroom experiences for both groups.** Students in both groups attended regular classes in different schools. According to the descriptions given by the students, teachers from Hong Kong used comparable instructional methods to teach English regardless of student learning style. For example, both groups reported that they learned English by copying from the board, completing grammar worksheets and dictation. Other activities that were reported by both groups included working in groups (instruction in large groups as well as in small groups for students who require additional assistance in English), games, using the same text, choral reading, getting instructions in Cantonese, receiving lessons from a foreign English teacher and a Chinese teacher from Hong Kong.

In addition, some children expressed during the interviews that they felt they were punished for not being able to keep up with the pace of the English class. Children described specific situations that led to their perceptions.

It was noted that both groups of learners mentioned participating in copying activities. Interestingly, students from the dyslexic group described that copying type activities were not useful. Ben explained through the interpreter “I copy words from word cards, or the board, or copy passages from the board. I don’t find it useful to learn this way. The teacher only asks to copy, copy, and if you are slow you lose recess”. Tony also indicated that copying words and sentences from the board was a regular daily experience for him. On the other hand, the typically developing students described copying grammar rules and notes from the board as a process of learning English but did not indicate whether it was a daily experience. Although both groups of students experienced copying type activities, the perception of the task was different. For students in the
typically developing group, copying type activities reinforced key learning objectives while students from the dyslexic group felt that copying was a laborious task associated with consequences (e.g., missing recess) if they were too slow to finish.

Completing worksheets was another activity reported by both groups. Students from the typically developing group considered completing worksheets as an opportunity to demonstrate their skills in a specific area in English, whereas the students in the dyslexic group pointed out that completing worksheets was another boring task in learning English.

Dictation was another common strategy used for teaching and assessing English in both groups. In fact, dictation tests are a regular practice in Hong Kong and these tests involve a lot of memorizing. Students in the dyslexic group described their frustration with dictation tests because of their difficulty with spelling and their consistent poor marks. A negative connotation was associated with dictation for children with dyslexia. In the typically developing group, students considered dictation as a way to monitor their development and areas for improvement in English.

Participants reported having the opportunity to do group work with other students in class. The group work was considered a form of cooperative learning for in-class activities. Based on student responses on the interviews, cooperative learning took place more often for students in the typically developing group and not the dyslexic group. In the typically developing group, cooperative learning was facilitated during book talk, student-led discussions on various topics, practicing English speaking skills, and developing dictionary skills. On the other hand, in the dyslexic group, cooperative learning only took place during student group discussions and book talk. Students in the dyslexic group expressed that they enjoyed group work but that it was not a typical in class practice or a common shared experience by all. Meanwhile, group work was a typical enjoyable classroom activity for students in the typically developing group.
Both groups described working in large or small groups. During large or small group lessons, using the same text was a typical practice in Hong Kong classrooms regardless of learning style. Neither group expressed positive or negative opinions with this approach.

In English class, receiving instructions in Cantonese was a phenomenon that was reported by students from both groups although there were notable differences in the way instruction was given as perceived by both groups. More children from the dyslexic group reported that they received consistent and frequent instruction in Cantonese when learning English. Students with dyslexia explained that it was easier to understand English language learning expectations when instructions were in Cantonese and not English. Interestingly, students from the typically developing group perceived that they only received instruction in Cantonese when they were learning difficult English concepts. Most students from the typically developing group stated that instruction was usually in English and not Cantonese.

Both groups reported experiencing team-teaching (having both a Chinese and an English native speaker) in the classroom. Typically, one teacher would teach the class while the other observed and facilitated student learning. The typically developing group indicated an English L1 teacher taught an English class twice per week. Similarly, two dyslexic students reported a Chinese native teacher and foreign teacher co-teaching as well.

Both groups described that when the foreign teacher led the class, there were more opportunities to play fun and different games. The dyslexic students could not explain the different type of games. However, participants from the typically developing group reported that they played word and vowel matching games, hangman and designing card games. Interestingly, one student from the dyslexic group described only playing traditional spelling games when the class was led by a native Chinese speaker.
Lastly, punishment was perceived as a common experience by one student in the typically developing group and two children in the dyslexic group. Specifically, in-class experiences were perceived in a negative manner and children felt punished. Students from the dyslexic group felt that their inability to keep up with the pace of class led to them missing recess to catch up or redo work. If the student was unable to follow a reading passage during class, then the participant had to read it aloud in English despite their reading difficulties. Similarly, if homework was incomplete, then the participant had to write a letter to the teacher in English and copy an English reading passage. Children perceived these experiences as a form of punishment which added to their feelings of inadequacy.

Interestingly, Kathy from the typically developing group also described being punished during English class. She described, “All the kids have to answer in English. If not answering in English will get punished. Either copy the whole book once or the chapter ten times.” Based on this account and from students in the dyslexic group, it seemed that second language classroom management was reflective of a teacher’s style and not whether a child had dyslexia. Attending English class for some participants was not enjoyable due to the possibilities of being punished. Through the eyes of the participants, the interviews helped clarify how some students felt when learning English.

**Unique experiences and attitudes of the Dyslexic group.** A number of unique experiences were relevant to the dyslexic group. Most of the students expressed negative emotions associated with learning English such as feeling ignored in class, angry, nervous and bored. Ben expressed, “I feel nervous and tense because I don’t know what is going on in the passage. I don’t feel confident about myself. John described, “I feel nervous when the teacher asks me questions and I
don’t understand.” Carin portrayed similar feelings. She felt avoided in class and expressed a
dislike for the teacher who she felt did not help her understand English.

Additionally, Ben voiced that when he could not keep up with the pace of the lesson, he
was required to stay in for recess to catch up with English school work. More importantly, he felt
that delaying snack time to lunch time left him feeling hungry and sad. Furthermore, incomplete
homework meant that he had to write a letter to the teacher and copy a passage from the board.

Overall, the above-mentioned experiences left children with dyslexia feeling negative
about learning English. The dyslexic students expressed an uneasiness and discomfort when they
attended English class despite the fact that they attended different schools. The students developed
a pessimistic attitude due to their negative self-perceptions which were defeating and affected
student self-esteem. Thus, the negative emotions developed towards learning English might be
directly related to their in-class experiences which affects students’ ability to take risks in English
reading.

**Unique experiences and attitudes of the typically developing group.** Students from the
typically developing group were able to describe the steps taken to continue to foster their English
language skills better. They demonstrated a positive attitude towards learning as well as explained
the strategies chosen to develop their English skills. Mark explained “I read books to develop the
vocabulary. I read the Fellowship of the Ring by J. R. Tolkien. Now I read the Lord of The Rings
Part One”. The typically developing group expressed that they challenged themselves by
developing richer vocabulary, developing a strategy to remember words, using a dictionary
independently to learn new words or look up words, and reviewing homework or rereading the
same English books to reinforce concepts or skills taught throughout the course of learning
English. Students also reported learning English via phonics and letter identification. The typically
developing group described watching English TV shows or You Tube clips to assist with oral language developments whereas the dyslexic group did not describe any similar experience related to activities to develop oral language skills.

Unlike the dyslexic group, the typically developing group generally expressed a positive attitude towards learning English. Even in situations when they faced difficulties reading words, the typically developing group did not attribute their lack of understanding to their ability. Instead, students in this group adopted a positive approach to learning and did not give up despite the difficulty of the task.

**Home environment**

An analysis of the responses on the demographic questionnaire provided insight into students’ language use in the home, leisure activities and home literacy activities and how they were related to English reading.

*Language use in the home.* In both groups, the language heard most often within the home from both parents, siblings, and other relatives was Cantonese. English was the language that was least often heard from family members and relatives in both groups. However, English was still present in the communication with a few families of children with and without dyslexia. Similarly, Cantonese was the most frequently spoken language in the families of both groups of children and English was spoken least often. Only one child from the dyslexic group had a home environment enriched with English communication as he reported using English most often to communicate with his nanny.

Overall, we can conclude that children in the two groups had similar home environment in terms of opportunities to use English language and, therefore, home environment was not likely to have contributed to their difference in English reading performance.
Leisure activities. The responses to the questions in the student demographic questionnaire regarding the leisure activities of students were analyzed to understand the reading habits of students.

Table 8 below shows the frequency and type of leisure activities the children in both groups engaged in. As seen in the table, children in the typically developing group read more often after school or on weekends (not including the homework). Participants in the typically developing group also read books more often, and engaged in online activities such as texting, You Tubing, chatting, and using Facebook. The two groups were similar in the frequency of activities and reading practices such as reading comic and picture books, magazines and computer games. Interestingly, these activities were the most visual ones and tended to contain little if any text to read. None of the observed differences were statistically significant, though. This result could possibly be explained by the extremely small sample size used in the study.

Overall, we can conclude that in the study sample, the children in the typically developing group had more communication and reading-related activities that might have contributed to the enrichment of their learning of English and offered them additional opportunities to master English reading.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Dyslexic group</th>
<th>Typically developing group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Reading or writing after school or on weekends (not including homework)</td>
<td>1.8</td>
<td>1.5</td>
</tr>
<tr>
<td>Reading magazines</td>
<td>1.8</td>
<td>1.0</td>
</tr>
<tr>
<td>Reading comic books</td>
<td>2.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Reading picture books</td>
<td>2.8</td>
<td>1.3</td>
</tr>
</tbody>
</table>
Reading chapter books & 2.0 & 0.8 & 2.8 & 1.1 \\
Reading science books & 2.3 & 1.3 & 1.8 & 1.3 \\
Texting & 2.0 & 1.4 & 2.8 & 1.1 \\
YouTube & 2.5 & 0.6 & 3.4 & 0.5 \\
Chat online & 1.3 & 0.5 & 1.8 & 0.8 \\
Computer games & 2.5 & 0.6 & 2.4 & 1.1 \\
Facebook & 1.3 & 0.6 & 2.6 & 0.9 \\

**Home literacy practices.** With regard to reading habits of both groups, on average (see Table 9), children in the typically developing group reported a higher frequency of reading with their family as compared to the dyslexic group. On average, participants in the typically developing group read books on their own once or twice per month or week. In the dyslexic group students read books once or twice per year or month. This pattern was observed for both reading in Chinese and English. Overall, we can conclude that in the sample children in the reference group tended to read for pleasure more often in both Chinese and English. This difference in reading practices might have contributed to better performance of children in the typically developing group and enriched their learning of English.

The differences observed in the sample were not statistically significant for any of the questions. This result was likely due to a very small sample size used in the study.

<table>
<thead>
<tr>
<th>Question</th>
<th>Dyslexic group</th>
<th>Typically developing group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read English books with family</td>
<td>1.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Read Chinese books with family</td>
<td>2.3</td>
<td>2.8</td>
</tr>
<tr>
<td>Read English books with friends</td>
<td>2.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Read Chinese books with friends</td>
<td>2.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Read English books independently</td>
<td>3.3</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Table 9 *Descriptive Statistics of Home Literacy Activities for the two Groups*
Goal orientation

The Mann Whitney U test conducted for the items that measured performance-approach orientation on the goal orientation questionnaire was significant, $U = 0.0$, $p = .002$. The typically developing group ($M = 3.0, SD = 0.6$) had significantly higher scores as compared to the dyslexic group ($M=2.1, SD= 0.5$). This suggests that the typically developing group was more performance-approach oriented. The Mann Whitney U test conducted for the 6 items that measured performance-avoidance orientation was not significant, $U =2.0, p = .06$. The typically developing group ($M=2.7, SD=0.4$) did not have significantly higher scores on the performance-avoidance items as compared to the dyslexic group ($M=1.9, SD=0.6$), suggesting that the both groups were just as performance-avoidant oriented. Finally, the Mann Whitney U test showed that there was no significant difference between the two groups on the mastery-oriented items, $U = 3.0, p = .11$. The typically developing group ($M = 3.9, SD = 0.7$) and dyslexic group were just as mastery-oriented ($M= 3.2, SD = 0.6$).
Chapter 5
Discussion

This study investigated the similarities and differences between the English word reading profiles of Chinese dyslexic and typically developing students. The objectives of the study were three-fold. First, I sought to gain insight into the difficulties the dyslexic group experienced with word and nonword reading, reading fluency and three phonological processing abilities, specifically, phonological awareness, phonological memory, and rapid automatized naming when compared to the typically developing children. Second, the reading strategies the two groups used in English reading and their goal orientations were examined. Third, the study explored the students’ feelings towards learning to read English as well as their learning experiences.

The present study yielded several key findings. First, the dyslexic readers performed significantly worse than the typically developing readers on several measures of phonological processing. Second, the dyslexic readers made use of fewer reading strategies as compared to the typically developing readers. Third, the dyslexic readers had less awareness of the strategies they used during reading as compared to the typically developing readers. Fourth, unlike the typically developing readers, the dyslexic readers reported no self-monitoring strategies during reading. Finally, in terms of achievement goal orientations, students with dyslexia exhibited a significantly lower performance-approach orientation as compared to typically developing children. The children with dyslexia also expressed in the interviews that they believed failure was due to their lack of ability, a belief that was a trademark of a performance-avoidant orientation.
Reading profiles of dyslexic and typically developing children

In the current study, the findings from the standardized tests were corroborated with those obtained from the interviews, reading observations and miscue analysis to understand the reading profiles of the dyslexic readers in relation to typically developing children.

The results of the Mann Whitney U tests with regard to the standardized measures in the current study showed that the dyslexic readers performed significantly worse on some measures of phonological processing as compared to the typically developing group. Despite the small sample size, the effect sizes of differences in performance on the tasks between the two groups were large (r > .5). The difficulties exhibited by the dyslexic readers are discussed in more detail in the following sections.

First, dyslexic readers were less competent in producing oral rhymes as compared to typically developing readers. Chinese dyslexic readers’ challenges with rhyme production suggests not only a poor awareness of rhyming but may indicate struggles with word retrieval and storage of phonological representations (e.g. b/at, s/at).

In addition, in comparison to typically developing children, children with dyslexia demonstrated weaknesses with segmentation, isolation of medial sounds and recognizing consonant blends. These findings suggest that the dyslexic readers lacked the skills to break down words into their phonemes. Difficulties with recognizing consonant blends (two discrete consonant sounds e.g. bl, gr), consonant digraphs (a cluster of consonants that produce one sound e.g. sh, ch) and r-controlled vowel words (e.g. ar, er, ir, or, ur) were also observed. These findings suggest that blending phonemes to form different structures of words including bi-syllables (two syllables), tri-syllables (three syllables) and polysyllables (more than three syllables) will become a strenuous task as the demands of word reading increase in English for Chinese dyslexic readers.
These findings were corroborated on tasks involving word identification, word reading, reading observation and miscue analysis. Children with dyslexia demonstrated weaknesses with segmenting words into smaller parts and blending phonemes. Although children with dyslexia could segment some of the phonemes while sub-vocalizing, they could not blend phonemes of larger words. The miscue analysis showed that dyslexic participants had difficulty blending phonemes of larger words. For example, the dyslexic children made errors such as reading the word ‘celebrations’ as ‘claypra’ and the word ‘gambling’ as ‘gamein’, ‘graming’, ‘grambling’, ‘gramding’ or ‘gramling’. Collectively, these results support findings of current literature on English L1 dyslexic children (Stanovich & Siegel, 1994; Wang, Georgiou, Das, & Li, 2012; McArthur & Castles, 2013) that suggest the decoding difficulties experienced by Chinese children with dyslexia are due to phoneme awareness. Lack of phoneme awareness causes difficulties with decoding because dyslexics lack the ability to recognize letter combinations and put them together to form words. The dyslexics in this study demonstrated an inability to manipulate, isolate and blend word parts. Therefore, when more cognitive resources are required to read more complex English words, Chinese dyslexic readers are more likely to manifest deficits indicative of dyslexia and not difficulties arising from the dissimilarity between the English orthography and Chinese.

From the reading task, we learned that the Chinese dyslexic students had difficulty remembering how to read an identical word within the same reading passage. The data showed evidence of letter insertion, b/d reversal, transpositions and substituting a letter for another. These findings again align with previous research that examined the reading of English L1 dyslexic children (Terepocki, Kruk, & Willows, 2002). In addition, this finding also lends support to research showing that dyslexic children have difficulty recognizing a string of letters, words with similar visual features, or analyzing the internal structure of words (Terepocki et al., 2002).
Similar to English L1 children with dyslexia (Terepocki et al., 2002), the dyslexic readers did not read words with automaticity. Their reading lacked fluency and was marked with multiple hesitations. The difficulties Chinese dyslexics exhibited could be related to weaknesses in storing information in their short-term or working memory. However, despite difficulties in reading, it was observed that the dyslexic readers persisted in completing the reading task. Students attempted various ways to read words and did not cease from reading despite the struggles.

To continue, this study found that the dyslexic students had significantly lower scores on phonological memory as well as letter naming as compared to the typically developing children. Since phonological memory helps learners retain phonological information briefly in reading, the English reading problems the dyslexic children exhibited could be due to the not being able to temporarily store phonological information to form an English word (see also Gathercole et al., 1992). Interestingly, although the dyslexic and typically developing readers showed similar performance on syllable segmentation on the PAT, results from the miscue analysis showed that the dyslexic readers made more errors with syllable segmentation (e.g. lunar – lun/ar, goddess – go/ddess, weather – we/at/r). These findings suggest that even manipulation of syllables, the most basic level of phonological awareness, is difficult for dyslexic readers. Syllable segmentation is important to Chinese reading. In Chinese, the syllable and the morpheme are typically the same unit, unlike in English. One fact to consider is that morphemes and syllables might divide differently. For example, using syllable segmentation, the word ‘understand’ could be divided into ‘un/der/stand’. However, if we segmented the word into morphemes, it would be ‘under/stand’. Given that these children were diagnosed with dyslexia in Chinese, it is possible that they had difficulties with syllable segmentation in Chinese and these difficulties transferred to English reading.
Overall, two conclusions can be drawn in light of these findings. First, the phonological processing and word reading difficulties dyslexic readers face in relation to typically developing children indicate that phonological processing is closely related to literacy acquisition in English, even for English L2 learners with a non-alphabetic L1 such as Chinese. Second, it appears that Chinese dyslexic readers exhibit similar reading difficulties as English L1 students with dyslexia. This suggests that the difficulties observed among Chinese dyslexic readers are not due to learning an additional language that had a different writing system from their L1 but due to being dyslexic.

**Word Reading Strategies**

By observing students during the reading task as well as using miscue analysis, we were able to examine similarities and differences in reading strategies between the two groups of students. In addition, through an interview, children were given the opportunity to explain their understanding of the word reading strategies they used.

Both dyslexic and typically developing children reported using syllables, phonemes, sounding out and reading small words within larger words during reading. These strategies were what students in Hong Kong were typically taught in English classrooms. These similarities in strategy use suggest that regardless of the presence of dyslexia, both groups of children were able to use commonly developed word reading strategies taught in Hong Kong schools for English reading. These findings also corroborate previous research (e.g., Beech, 2010) that phonological strategies were the most prominent ones used in reading English, regardless of reading ability. The typically developing group reported strategies such as dividing the word in three or more parts, saying the first part of word before reading the whole word, first saying the consonant cluster or sound of word before saying the whole word as well as using parts of words such as syllables or parts of compound words to aid reading. These strategies were similar to those reported by skilled
readers in the study by Kaye (2006), suggesting also that Chinese L1 children with no reading problems employ similar strategies as English L1 readers in English reading.

As for the dyslexic readers in this study, while they were able to draw upon similar word reading strategies (e.g. use parts of words, looks at the beginning of the word) to the typically developing group, the reported frequency was lower. These findings are also similar to current literature on English reading that suggest some poor readers are less likely to use grapho-phonic cues in texts, possibly due to their difficulties with letter-sound correspondences (Beatty & Care, 2009; Vellutino et al., 2004). A closer look at the miscue analysis indicated that when dyslexic students did use grapho-phonic cues in reading, they relied slightly more on visual cues as compared to phonological ones. A possible explanation for the higher reliance on visual cues could be influence from children’s L1. Chinese is a language that requires visual discrimination and memory for reading (Tong & McBride-Chang, 2010). Therefore, using visual cues in reading is a more salient strategy that Chinese readers use. Given weaker phonological abilities as compared to typically developing readers, it is possible that the dyslexic readers had to rely more on visual processing skills to read English words since visual processing is something that they are more familiar with in reading. Typically developing readers on the other hand, do not need to employ as much visual processing because of relatively stronger phonological skills.

Miscue analysis also showed that dyslexic readers used fewer types of cues during reading. The typically developing students relied on grapho-phonics, syntactic and semantic cues in reading. On the other hand, the dyslexic readers relied mainly on grapho-phonic cues (specifically visual cues) to decode words, although the frequency of use of these cues was lower than that reported by the typically developing group. These findings confirm previous English research that as compared to semantic and syntactic cues, grapho-phonic cues were more commonly used for
less skilled readers in English (Pumfrey & Fletcher, 1989). These findings further align with previous studies that suggest that good typically developing readers are able to integrate different types of cues in reading better as compared to dyslexic readers (e.g., Adams, 1990; Beatty & Care, 2009; Pumfrey & Fletcher, 1989). The lower frequency of use of grapho-phonetic cues among dyslexic readers as compared to typically developing readers is also in line with previous research on English readers (Beatty & Care, 2009; Vellutino et al., 2004). Therefore, the current study extends findings of studies with native English speakers to English L2 learners, suggesting that among English L2 learners, dyslexic children are also less flexible in their use of word reading strategies during reading.

The reading observation also showed that the typically developing readers were able to use a wider range of strategies in reading such as morphemes, similar-looking words and context clues to figure out how to read a word. A particularly interesting finding was that two of the typically developing children made use of word shape to remember words. Although one dyslexic reader also mentioned using word shape as a strategy, he was unable to offer an explanation for how it supported his reading or elaborate on the strategy. It would appear, therefore, that this strategy was not commonly practiced for this reader. On the other hand, the two typically developing readers were able to provide thorough explanations on how word shape helped them remember a word as a picture. Students’ descriptions were important because it clearly demonstrated their level of awareness and how they made sense of a word. For example, one of the typically developing readers described “I remember the shape of the word… I look at the word and I think I’m looking at a picture… it helps me to remember it … I learned this by myself”.

An analysis of the interview responses suggests that the dyslexic readers were less aware of the strategies they used in reading as compared to the typically developing readers, as evidenced
by their difficulties in verbalizing the strategies. The typically developing children, on the other hand, were able to describe in more detail the strategies they used to help them negotiate reading. In addition, when asked to describe what good readers do while reading in both Chinese and English, while both groups listed similar qualities of good readers (e.g. good readers practiced reading in both languages, memorized Chinese characters, were attentive in class and completed workbook exercises), the typically developing readers were better able to explicitly describe the strategies proficient readers used to decipher words. They expressed that good readers could make connections between radicals and phonetic components, understand how to separate words into units and use phonics and grammar rules. Dyslexic readers had difficulty explaining the strategies good readers used. Therefore, awareness of decoding strategies may be an important factor in reading development while lack of awareness contributes to poor reading skills.

Participants interview responses also revealed that in addition to decoding strategies for figuring out a word, there was, however one key finding that clearly distinguished the groups. The typically developing readers used self-monitoring strategies to check the accuracy of their decoding. They reported that they used self-correction, cross-checking, checking the pronunciation of a word using an online dictionary, asking the teacher for help and thinking of the Chinese translation of a word. In addition, typically developing readers described that during reading a common self-monitoring strategy was deciding whether an unfamiliar word was similar looking to another word. One student described, during the reading observation, she thought of ‘vegetable’ when reading ‘vegetarian’ while another thought of ‘God’ while reading ‘Goddess’. It seemed here that both students were using morphology to assist with reading unfamiliar English words. The dyslexic readers, on the other hand did not report using self-monitoring strategies. This may be due to the difference in awareness of strategies between the two groups. With greater awareness
of the strategies they used, the typically developing readers were able to put in place measures that ensured that the original strategies were used effectively. Another possibility could be as described by Goldup (2010) that “dyslexic students and literacy strugglers often don’t get to look at, or understand, words in this way because they are too busy struggling with basic skills” (p.25).

In summary, there are certainly differences between the typically developing and the dyslexic group in terms of reading strategies. While dyslexic readers’ strategy use was mainly restricted to using grapho-phonic cues, typically developing readers were able to make use of other cues and integrate them to aid reading. In addition, typically developing readers showed awareness of the strategies they used in reading whereas the dyslexic readers had little or no insight into their strategy use.

**Students’ experiences and perceptions in learning to read English**

Interview responses with regard to student perceptions of what it was like to learn English in Hong Kong classrooms showed similarities and differences in attitudes and perceptions between the groups towards learning English. Students’ responses provided an in-depth understanding of their thoughts on the effectiveness of the activities and strategies in learning English.

In the present study, both typically developing and dyslexic readers described that they learned to read English mainly by copying from the board, completing grammar worksheets and dictation tests. Other common learning experiences included working in groups (heterogeneous and homogenous), having the same text, choral reading, instructions in Cantonese, playing games and receiving lessons from a foreign English teacher, Cantonese teacher or both. Therefore, this pattern of responses suggests that children perceived that instructors used multiple approaches to teach reading in English. As teachers’ perspectives were not investigated in the present study, the
extent to which a certain activity was used more often or less in one class compared to the other was not obtained.

Nonetheless, the findings of the present study suggest that both groups of students enjoyed learning English in a game-like setting rather than a traditional classroom. These insights are particularly important given that Hong Kong Chinese dyslexic students’ reported at times feeling nervous, angry, bored, punished and uncomfortable in English class particularly when called upon to answer a question. These results align with previous research that suggests dyslexics eventually give up after repeated failures because they develop the idea that the outcome would always be the same (Dweck & Leggett, 1988). This, in turn, leads to poor negative feelings, anxiety, sadness and expressed boredom (Diener & Dweck, 1978). With this in mind, perhaps using games on a regular and consistent basis may be the motivator needed for dyslexics to re-engage into learning to read an alphabet based language while developing confidence and diminishing negative feelings.

Equally important, children from the typically developing group described that there were many opportunities to participate in co-operative learning tasks during book talk, student-led group discussions, practicing English speaking skills with peers and developing dictionary skills. Children expressed that these types of activities were beneficial to learning English. In contrast, in the dyslexic group, children perceived that co-operative learning was not a typical in-class practice but on occasion students participated in group discussions or book talks. It is interesting that there were differences in perceptions between the two groups despite being in similar classroom settings. It is possible that because of their greater confidence in English, typically developing students were more inclined than the dyslexic children to participate in co-operative learning activities that provided them with opportunities to practice using the language. Another possible explanation could be that teachers have provided differential opportunities for students’ participation in co-
operative activities based on their learning pace, thus the observed differences in perception between the groups. However, these explanations need to be validated in future studies with data on classroom teaching practices.

Participants from both groups explained that during English class, instructions were given in Cantonese. The difference between the groups was that the participants from the typically developing group reported that they received instructions in Cantonese only for difficult concepts. Meanwhile, children from the dyslexic group reported obtaining Cantonese instructions on a regular and consistent basis. It is possible thus, that teachers were more inclined to use Cantonese in their instructions with students who were perceived to be weaker. This finding, coupled with the finding that children in the typically developing group engaged more often in reading chapter books, online activities, You Tubing, chatting, and using Facebook in English as compared to children with dyslexia, suggest that the dyslexic readers did not have as much exposure to English as compared to the typically developing group. It is plausible that limited exposure to the English language, poor English skills as well as lack of student initiatives further impeded dyslexics’ ability to recognize and produce sounds and sound sequences that make up language and heard vocabulary. However, this possibility needs to be further investigated in future with input from teachers and parents.

Another interesting finding from the study is the difference in perspectives between the typically developing group and the dyslexic group on dictation tests and copying tasks. The activities were well received by the typically developing children but not the dyslexic children. In fact, the findings reveal dyslexic children perceived copying activities to be laborious and associated with consequences if they were too slow in copying from the board or word cards. In addition, children from the dyslexic group were frustrated with dictation tests because of their
difficulty with spelling and the consistently poor marks they obtained on the tests. The importance of these findings highlight the possibility that dyslexic children developed a negative attitude towards learning English and a learned helplessness due to perceived failures. These findings demonstrate the need for teachers to develop an engaging environment to maximize student learning and decrease feelings of frustration.

**Goal orientation**

From the goal orientation questionnaire, it was found that the typically developing children were more performance-approach oriented as compared to the dyslexic children. The negative attitude towards failure could be a possible reason for the dyslexic group being less performance-approach oriented. The responses of the dyslexic children in the interviews appear to support this finding. Dyslexic children reported negative affect such as feeling angry, nervous and bored when learning English, which fit the profile of performance-avoidant oriented learners as described by Dweck (1986). Interestingly, both typically developing and dyslexic children were just as performance-avoidant oriented. This could be attributed to the learning environment of the children in general. In Hong Kong, students’ English development is typically measured via dictation tests. Given the strong emphasis on performance relative to others, the children could be more attuned to avoiding failure, regardless whether they have dyslexia or not.

**Educational Implications**

The cultural context of how children learn to read in Hong Kong is quite different when compared to the Ontario educational system. The dissimilarities in orthography and how reading is taught in Hong Kong provide an understanding of the teaching strategies used in academic contexts to learn to read a character based language. Providing Canadian teachers with knowledge of the Chinese orthography sets the foundation for the primary language expectations and
differences inherent in learning an alphabetic language. The current dissertation is relevant in that it provides both Hong Kong and Canadian educators with an understanding of Chinese students’ English word reading profiles, home literacy practices, reading strategies, goal orientations, perceptions of in class experiences and students attitudes towards reading in English.

The current findings provide an in-depth understanding of students’ feelings towards and perceptions of the literacy practices in learning to read a second language such as English. In addition, an important finding is the dyslexic students’ pessimistic attitude and negative self-perceptions about their ability in English word reading. For both Hong Kong and Canadian teachers, these data provide insight into students’ English learning experiences. Above all, the findings suggest the importance of student engagement in strengthening English word reading skills for dyslexic students.

Based on the current study, it is important when developing reading curricula that educators take into consideration the number of immigrants to Ontario schools whose primary orthography is not alphabetic. For example, there is a large number of immigrants from Hong Kong (137 630, Canada Census, 2011) in the Toronto metropolitan area, so educators should consider the disparity of these children’s L1 and L2 and how L1 would affect their English learning. Specifically, when developing reading programs for Hong Kong Chinese dyslexic students, educators would benefit from understanding the differences in the two orthographies so that they can incorporate appropriate reading strategies and develop curriculum to meet the learning needs of students with reading difficulties (Cunningham, A. E., Nathan, R. G., & Schmidt Rather, K., 2011; Ehri, L. C., 2014 ). It is important to consider that Chinese children learn to read characters that are composed of logograms and that these characters do not represent phonemes like the English language does (Perfetti, Cao, & Booth, 2013). For this reason, using reading
strategies and a curriculum approach of ‘one size fits all’ might not be fair for children with dyslexia emigrating from Hong Kong or other countries.

At present, the current Ontario reading curriculum and teaching methodologies might not be effective for Chinese students with dyslexia given the results of this study. We cannot simply make the assumption that English teaching approaches are suited for Chinese dyslexic readers learning to read English.

**Special Education Programs and Special Education Teacher Professional Development**

Special education programs need to be reconsidered for Chinese students with dyslexia who attend Ontario schools. Based on the literature review and the current findings, it will be counterintuitive to implement for Chinese dyslexic students the same intervention and teaching strategies that are largely based on studies conducted with English L1 students. At this time, it is important that teacher special education programs emphasize the importance of considering the primary orthographic writing system of all students as well as those that differ from an alphabetic language. In doing so, teachers will develop an understanding of the disparities between the languages and the importance of not making assumptions that the same teaching strategies are suitable for all students with dyslexia. The same professional development is also needed within school boards for special education teachers. Improving teacher capacity while developing a repertoire of skills will be in the best interest of all students.

Therefore, based on the current findings, the following teaching strategies are recommended for Chinese students with dyslexia.
Suggested Teaching Practices

A. Consider increasing oral conversation in class to assist Chinese students with dyslexia to build vocabulary skills. By focusing on oral conversation during class, students will develop a better foundation of the sound structure of the English language.

B. A pure phonological approach may be ineffective for Chinese students with dyslexia learning to read English words. In Chinese, segmenting, blending, and isolation are not naturally inherent in reading characters. Given these considerations, perhaps a ‘look say method’ to teach word families and spelling patterns in the later stages of reading acquisition may be a teaching strategy to incorporate into a reading program after phonological instruction.

C. Teaching Chinese students with dyslexia how to read via a morphological strategy may be beneficial. Students with dyslexia in this study tended to look for smaller familiar words or word parts within a word. By teaching Chinese dyslexic readers through a direct explicit morphological instructional program, students may develop word knowledge and improve their literacy skills.

D. Based on the student interviews, children were bored from in-class activities involving copying from the board and completing worksheets. Children perceived these tasks as meaningless and tiresome. As such, based on the results, it is recommended that educators incorporate games in teaching to engage students. Teaching through games may make learning more interesting for students with dyslexia and increase risk taking. Research has shown that learning via games may be more engaging than a traditional type classroom for students with dyslexia (Baines & Slutsky, 2009; Sedig, 2008). Baines and Slutsky (2009) suggest that ‘student boredom is one reason why traditional approaches have produced
mediocre results in recent years according to the national and international benchmarks’’ (p. 98).

E. Develop dyslexic readers’ self-awareness of decoding strategies through explicit instruction. There is a need to draw students’ attention to various decoding strategies to improve their repertoire of skills while learning to apply these strategies.

Limitations and future directions

This study had a number of limitations. First, the small sample size used in the study limits the generalizability of the results. Second, student and family characteristics such as socioeconomic status that are related to reading were not controlled. Third, time constraints limited the methodological options available. Given that the participants were from different elementary schools all over Hong Kong, it was not possible for the researcher to travel to all the different schools within the period of data-collection. Therefore, it was not possible to include in-class observations and teacher interviews in the study. Given that these inputs would provide valuable insight into obtaining a holistic view of reading of children, future work could consider including these methods. Fourth, the present study did not collect data regarding the teaching practices and strategies used by educators to teach English word reading. The lack of data does not provide a clear understanding of the educational practices within Hong Kong classrooms.

In future work, to fully understand the educational needs of Chinese students with dyslexia learning to read, researchers will need to conduct longitudinal studies to examine the trajectories of reading development of Chinese dyslexic children. More research is also needed to examine the educational experiences, feelings and perceptions of this population. In doing so, educational environments could be created that fosters student engagement and well-being within a 21st century classroom for students who struggle with the process of reading. In addition, teaching strategies
need to be reviewed, assessed and implemented to determine the level of effectiveness for this population. By conducting an exploratory study where various intervention strategies are compared, special education teachers will be able to devise suitable word recognition programs for the learner based on research. Finally, given the findings on goal orientation, it would be interesting to investigate the effect of the learning environment on goal orientation of dyslexic children in different cultures in future studies.
References


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### Appendix A

### Coding Scheme (Miscue Analysis)

<table>
<thead>
<tr>
<th>Graphophonic miscues</th>
<th>Similar in visual or phonetic properties to target word</th>
<th>Criteria</th>
<th>Example (target-miscue)</th>
</tr>
</thead>
</table>
| High                 | - Most parts of the miscue are present in the target word  
                        - Miscue is visually (shape/length) very similar to target   |          | Small – Smell           |
| Some                 | - One or some parts of the miscue is present in the target word or similar to the target word  
                        - Miscue is visually quite similar (shape/length) to target |          | Descriptor – Prescription |
| None                 | - None of the parts of the miscue resembles the target word |          | Laptop – Door           |

<table>
<thead>
<tr>
<th>Syntactic miscues</th>
<th>Preserves the grammatical structure of target word</th>
<th>Criteria</th>
<th>Example (target-miscue)</th>
</tr>
</thead>
</table>
| High              | - Most parts of the miscue are present in the target word  
                        - Miscue is visually very similar (shape/length) to target   |          | Waiting – Wanting       |
|                   | (Sentence: Victoria is waiting for the cab driver.) |          |                         |
| Some              | - One or some parts of the miscue is present in the target word or similar to the target word  
                        - Miscue is visually quite similar (shape/length) to target |          | Present – Picnic         |
|                   | (Sentence: …send him a birthday present)          |          |                         |
| None              | - None of the parts of the miscue resembles the target word |          | Pony – House            |
|                   | (Sentence: Andreana rode her pony down the street) |          |                         |
Appendix B

Individual Performance on Quantitative Measures


*Figure 1.* Individual Results on the Phonological Memory Subtests of the CTOPP.

*Figure 2.* Individual Results on the Rapid Naming Subtests of the CTOPP.
**Figure 3.** Individual results on Phonological Awareness Test (PAT)

**Figure 4.** Individual Results on the TOWRE Test
Figure 5. Individual Results on the Tests of Word Reading of the WRMT and WRAT
Appendix C

Coding Themes for Student Interviews

Teacher-led instructional strategies

- copying from the board
- worksheets
- grammar sheets
- spelling or phrase dictations
- choral reading
- vocabulary development (teacher explains word meanings)
- dictionary skills
- teacher reads to the class
- teacher underlines key words in text
- instruction in English for easy concepts
- instruction in Cantonese for difficult concepts
- repeat after teacher
- teacher correction of mispronunciation

Other instructional strategies and support

- same text for all students
- homogenous groups for English instruction
- respond to questions in English
- phonics
- letter identification
- watch English TV shows
- YouTube clips to assist with oral language
- extra time provided
- extra classes provided
- review homework

**Games**

- Design card games for foreign teacher
- Play games with foreign teacher
- Spelling games
- Word and vowel matching games
- Hangman – vocabulary

**Punishment**

- Incomplete work - copied whole book or part of book in English
- Not keeping up with lesson - stayed in for recess to catch up and snack delayed till lunch; felt hungry
- Not keeping up with lesson - teacher moved on to next lesson
- Incomplete work – missed recess to write letter to teacher in English and copied English passage
- Not following reading passage – read out loud in English to class

**Self-Concept**

- Part of low group
- Can’t keep up with pace of lesson
- Teacher avoids me she does not help me understand
- Don’t like English because it’s too difficult
- Happy when we play games
- Poor reader

**Self-Motivation**

- Teaching self-challenging vocabulary
- Independent usage of dictionary skills
- Read challenging books
- Reread same English books
- Reading and Reviewing homework

**Student Emotion**

- Feels disengaged when lesson is too simple
- Feels ignored in class
- Feels English lesson is boring
- Angry
- Nervous
Appendix D

Student Interview

Who are you?
1. What is your name? First Name: Last Name:
2. When were you born? D.O.B.
3. Where were you born?
4. How old are you?
5. Do you have any siblings? How many?
6. How many people are there in your family?
7. Have you lived abroad? Where? If yes, what language did you speak there?

Home Language Environment (Language Spoken)
8. What language do you speak at home? With who?
9. What language do you speak with your siblings (brother or sister)?
10. At what age did you start to speak English?
11. What language is spoken at home most often to the one spoken least often?

<table>
<thead>
<tr>
<th>Language Spoken</th>
<th>Mother</th>
<th>Father</th>
<th>Siblings</th>
<th>Other Relatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most often</td>
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<tr>
<td>Occasionally</td>
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<td>Least often</td>
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</table>

12. What percentage of time do you speak each language at home.

<table>
<thead>
<tr>
<th>Language</th>
<th>Always (75-100%)</th>
<th>Frequently (50-74%)</th>
<th>Sometimes (25-49%)</th>
<th>Rarely (0-24%)</th>
<th>Never (0%)</th>
</tr>
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<tbody>
<tr>
<td>English</td>
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<td>Other:</td>
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<td>Other:</td>
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</table>

Language heard at home
13. What language do you hear at home?
14. What language do you hear from your siblings?
15. What language do you hear from your mom?
16. What language do you hear from your dad?
17. What language do you hear at home most often to the one heard least often?

<table>
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<tr>
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<tr>
<td>Other:</td>
<td></td>
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</tbody>
</table>

**Attitude towards reading in Cantonese**

20. What types of Cantonese books do you like reading?
21. What do you find interesting and challenging about reading Cantonese books?
22. When you don’t know how to read a Cantonese word how do you feel about yourself?
23. Do you enjoy reading Cantonese books with your mom/dad?
   Very much ____  A little _____  Not at all ____

**Attitude towards reading in English**

24. How do you feel about reading in English? Tell me your feelings.
25. What types of English books do you like reading?
26. What do you find interesting and challenging about reading English books?
27. When you don’t know how to read a word in English how do you feel about yourself?
28. Do you enjoy reading English books with your mom/dad?
   Very much ____  A little _____  Not at all ____

**Strategies Used in reading Cantonese books**

29. What do you do when you don’t know how to read a word in Cantonese?
30. What different ways have you learned how to read a word in Cantonese?
31. How is reading in Cantonese different than reading in English?
32. What does a student need to know to be a good reader in Cantonese?
33. When reading in Cantonese do you read out loud or silently? Why?

**Strategies Used in reading English books**

34. What do you do when you don’t know how to read a word in English?
35. What different ways have you learned how to read a word in English?
36. How is reading in English different than reading in Cantonese?
37. What does a student need to know to be a good reader in English?
38. When reading in English do you read out loud or silently? Why?
39. When reading an English word do you think about it in Cantonese and then translate to English? Explain.
40. How often do you do the following activities?
<table>
<thead>
<tr>
<th>Home Literacy Activities</th>
<th>Every Day</th>
<th>Once or twice per week</th>
<th>Once or twice per month</th>
<th>Once or twice per year</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read English/Cantonese books with family member(s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read English/Cantonese books with friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading English/Cantonese books Independently</td>
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</tr>
</tbody>
</table>
Appendix E

Goal Orientation Questionnaire

My name is ____________________________________________

Hello! Here are some statements about you. Read each statement carefully and fill in the circle that shows how true each sentence is for you. ‘Tasks’ means activities you do for learning. Tasks can include classwork, homework, assignments, practice exercises, projects and other activities you do for learning. Here is a practice statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Not at all true</th>
<th>Somewhat true</th>
<th>Very true</th>
</tr>
</thead>
<tbody>
<tr>
<td>I like strawberry ice cream.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1 I feel successful on a task if I at least do well compared to other students doing the same task.</td>
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<tr>
<td>2 I avoid asking questions that might make me look stupid.</td>
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<tr>
<td>3 It’s important to me that I learn a lot in tasks I do.</td>
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<tr>
<td>4 It’s important to me that I don’t look stupid on tasks.</td>
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<tr>
<td>5 Challenging tasks give me a chance to learn more.</td>
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<tr>
<td>6 I try to look like I can do tasks even when I don’t really understand.</td>
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<tr>
<td>7 It’s important to me that other students think I am good at the tasks we do.</td>
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<tr>
<td>8 I like to show other students that the tasks we do are easy for me.</td>
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<tr>
<td>9 It’s important to me that my teacher doesn’t think that I know less than others doing the task.</td>
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<tr>
<td>10 When doing tasks I really try to keep others from thinking I’m not smart.</td>
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<tr>
<td>11 It’s important to me that others tell me I am good at the tasks I do.</td>
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<tr>
<td>12 When doing tasks I want to learn a lot of new skills.</td>
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<tr>
<td>13 I avoid tasks where other students might think I’m not smart.</td>
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<tr>
<td>14 I prefer tasks that make me learn new things.</td>
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<tr>
<td>15 When doing tasks I avoid looking like I have trouble doing the task.</td>
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<tr>
<td>16 It’s important to me that I really understand the tasks I do.</td>
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<tr>
<td>17 When doing tasks I want to learn as much as I can.</td>
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<tr>
<td></td>
<td>Statement</td>
<td></td>
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<td>--------------------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>18</td>
<td>It’s important to me that I look smart compared to others doing the task.</td>
<td></td>
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</tr>
<tr>
<td>19</td>
<td>I like to show other students that I’m good at the tasks we do.</td>
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<tr>
<td>20</td>
<td>It’s important to me that I improve the skills that I use in tasks I do.</td>
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<tr>
<td>21</td>
<td>I think if students work hard enough, they will get smart.</td>
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<tr>
<td>22</td>
<td>I am good at reading.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>I am good at writing.</td>
<td></td>
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</table>