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Reading problems and treatments with dyslexia -
Is it too late for remedy in adulthood?

Wong Ching Yee, Sharon

Supervised by
Dr. LEE Wai Sum Vanti
Abstract

Dyslexia, a specific learning disorder associated with reading and writing, has been under concern in recent years. More and more students are found and identified as having this learning disability. Some might not have chances to promptly remedy the learning difficulties and they in turn grow up with persisting learning problems. Previous studies have shown that phonological treatment is beneficial to both dyslexic children and children at risk for dyslexia. Can this treatment be applied to a dyslexic adult as well? This study is a case study on the effects of phonological training on a young dyslexic adult who displayed reading dyslexic symptoms in English. A short-term, tailor-made phonological training programme was designed and given to the subject. Results indicate that the subject had improvement in English reading after the training and had increased phonological awareness. The subject demonstrated increased alphabetic knowledge and phonological decoding skills in the post-training test, particularly in consonantal sound decoding and phoneme blending.
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1. Introduction

1.1 Overview

Before 1880s, when children lagged behind their peers in studies, they would only be deemed to be lazy, stupid or a slow learner. Not until 1881 when a German physician Oswald Berkhan first identified a specific learning disorder termed “dyslexia”, people started to be aware of this inborn, irreparable brain deficit and its attribution to academic failure (Mandal, 2014).

According to the International Dyslexia Association, dyslexia is, in general, the difficulties with word recognition, poor spelling and decoding abilities. Dyslexic patients usually manifest their symptoms in reading and writing, such as: inconsistent spelling, letter reversal, slow reading, substitution of words with similar meaning and affix omission.

In fact, the problems associated with dyslexia are far more complicated than the above descriptions, as it is a neurological deficiency related to the information processing of the individual and is believed to be caused by a combination of factors such as brain abnormalities and cognitive deficits independent of intelligence (Nijakowska, 2010). Though the causes and symptoms vary from person to person, it is agreed that dyslexic patients have in common deficits in phonological processing, i.e. the use of phonological or sound system of language to process written and oral information (Howard, 1996; Snowling, 1998; Gettelfinger, 2000; Nijakowska, 2010). Regarding this specific deficiency, many therapists and scholars have proposed the phonological training on dyslexic children or at-risk-of-dyslexic children as a treatment and such training has been proved effective by many researchers (Hatcher et al., 1994; Fostick et al., 2014).

In Hong Kong, the prevalence rate of dyslexia was estimated to be 12%, based on a survey conducted by The Hong Kong Specific Learning Difficulties Research Team in 2007. Tsui (2012) noted that the associated services and supports provided by both schools and the government of Hong Kong, however, could not catch up with this high rate. As a result, some dyslexic children might have been overlooked throughout their primary and secondary studies. Without proper treatments in early childhood, they, very likely, remain to be academic underachievers during their
growth period and even in adulthood.

Needless to say, if a child is found to be dyslexic, remediation shall be given as early as possible. But in reality, it cannot be guaranteed that all the dyslexics can get a chance of being assessed, or identified and even receive appropriate supports and treatments. As cases of late-identified dyslexic and non-treated dyslexic patients exist, it is wondered whether remediation is still effective in their adulthood and whether there is also a critical period for the remedy of dyslexia, similar to the case of language acquisition. These issues are to be addressed in this project.

1.2 Literature Review

*Phonological processing & Dyslexia*

The phonological deficit hypothesis claims that reading impairment is due to the core, lifelong deficit in phonological processing. This hypothesis has given rise to a large number of studies to test the hypothesis in the last few decades. Snowling (1998) reviewed and summarized the supporting evidence to the hypothesis from some of the studies (Paulesu et al., 1996; Snowling, Goulandris & Defty, 1998). She first pointed out that dyslexic children typically fail to map the visual or logographic representations with alphabetic principle, thereby having persistent difficulties in word decoding especially on new words and non-words. Nevertheless, there are dyslexic children who can master the alphabetic skills and are referred to as “surface dyslexics”. These children’s performance in reading regular words and non-words is similar to that of the non-dyslexic children, while they encounter rather big difficulties in irregular word reading. A comparison between the “surface dyslexics” and the “phonological dyslexics” with significant problems in non-word reading (Snowling, Goulandris & Defty, 1998) shows that the “surface dyslexics” perform better than the “phonological dyslexics” in phonological processing tasks, however their performance is still below the normal level for their age. This finding is a strong piece of evidence to the view of persistent phonological weaknesses among dyslexic patients.

Evidence from a biological aspect also gives support to the phonological deficit hypothesis. Snowling drew on a study by Paulesu et al. (1996) that investigated the brain functioning differences between dyslexic and normal readers. The study involved five right-handed young adults who had history of developmental dyslexia
and five controls who had no history of reading or phonological problems. Positron Emission Tomography (PET) scans on the brain activation were conducted while the subjects were working on the given phonological tasks. It was found that, firstly, the dyslexic group performed significantly worse than the controls. Secondly, the PET scans revealed distinctive differences in brain activation between the two groups. During the phonological tasks, a number of brain regions were activated in the controls; however for the dyslexics, only a subset of the brain regions was activated. A particular inactivation of the left insula, which is known to be involved in the transmission of language, was also observed in the dyslexic groups. These neurological differences in brain activation prove not only the phonological processing differences between dyslexic patients and normal readers, but also the phonological impairments of the dyslexics.

Snowling and many other researchers have provided strong pieces of evidence to the phonological deficit hypothesis. Thus, it is assumed that in general, dyslexic patients have a deficit in phonological processing no matter to which extent. It follows that remediation of phonological training to the dyslexics is required.

Phonological training & Dyslexia

There have been a lot of studies on phonological training to children at risk for dyslexia. For instance, Elbro and Petersen (2004) designed a 17-week program of phoneme awareness training to a group of Danish kindergarteners who had at least one dyslexic parent and had not yet been taught to read in school. The pre-reading abilities, phonological awareness and basic language abilities of this at-risk group of children were assessed before and after training and compared with those of the untrained at-risk group and the untrained normal group. Results showed that the trained at-risk group performed much better than the untrained at-risk group in reading after training. Their outperformances were also observed even when they got into higher grades. Furthermore, compared with the normal group, although the trained at-risk group lagged behind before receiving training, they were able to catch up after acquiring the taught phonological skills. The findings demonstrated both long and short term positive effects of phonological training on children at risk for dyslexia.

The findings reported in Hatcher, Hulme and Ellis (1994) also showed that teaching phonology to poor readers is beneficial to their phonological skills. In the study, more than a hundred 7-year-old children who demonstrated low reading
quotients were subdivided into 4 groups under different teaching conditions: reading with phonology teaching (R+P), reading alone (R), phonology teaching alone (P) and regular classroom teaching (C). Results showed that R+P and P groups performed better than R and C groups in all the post-tests on phonological ability.

In spite of the positive efficacy of phonological training revealed by the findings, it should be noted that the data were obtained from children at risk for dyslexia. Although early phonological awareness tends to be a strong preventer for the development of dyslexia, it is doubtful that the same beneficial outcomes can also be found when it is applied to real dyslexic patients, especially adults. Thus, it cannot be inferred that phonological training is effective to the remediation of reading dyslexia.

There have only been a few studies on the efficacy of phonological training to real dyslexic patients. For example, a clinical training study was conducted by Alexander et al. (1991) to investigate the effectiveness of a phonological awareness training, namely the Auditory Discrimination in Depth Program to 10 severely dyslexic children. The subjects, after they had gone through the training, were equipped with significantly improved phonological awareness and they attempted to apply the learnt skills to word reading. Since the subjects in this study were all young children ranging from 7 to 12 years old, the effectiveness of such phonological training to adults is still unknown.

**Phonological awareness & L2 acquisition**

Another area of interest in phonological awareness is its effect on the acquisition of an alphabetic L2 (second language) given that the subject’s L1 (first language) is non-alphabetic. It has been well-documented that native or first language exerts a significant effect on the acquisition of a second language such as in word identification and phonological awareness (Holm & Dodd, 1996; McBride-Chang & V.Kail, 2002; Wang et al., 2002) For instance, Holm and Dodd (1996) compared the phonological awareness of three groups of L2 English learners from China, Hong Kong and Vietnam with L1 English speakers from Australia. Both the subjects from Chinese and Hong Kong have Chinese as their first written language, which is not an alphabetic language, whereas Vietnamese is an alphabetic language. Through various phonological tasks, it was demonstrated that the Hong Kong group had significantly lower phonological awareness than all the other groups. As for the subjects from China, even though they shared the same first written language with the Hong Kong subjects, their phonological awareness was the highest among the three L2 groups and
they also performed better than L1 group in some of tasks. The researchers of the study attributed the results to the difference in the learning process of reading. For the subjects from China, they learnt to read Chinese characters through pinyin, an alphabetic system using Latin symbols that represent the spoken form of the Chinese characters. As for the Hong Kong subjects, they learnt to read Chinese characters using a ‘look-and-say’ method, which treated the whole character as a basic unit without addressing to its component phonemes. It was inferred that the pinyin knowledge resulted in a high phonological awareness for the subjects from China such that the knowledge was transferred to their L2 learning, while the subjects from Hong Kong did not receive phonological instruction when learning Chinese characters so it appeared that they have low phonological awareness.

Therefore, phonological awareness is not only linked to the remedy of reading impairment, but it is also highly related to the L2 acquisition owing to language transfer. In this study, its effects on a dyslexic patient in terms of L2 learning will be explored.

1.3 Objectives

This study is to extend the scope of previous studies from dyslexic or at-risk-of-dyslexic children to dyslexic young adults. It is a case study of an identified dyslexic Cantonese young adult in Hong Kong who did not receive phonological treatment during childhood. Its aim is to explore the effect of low phonological awareness on English Second Language (ESL) learning for a dyslexic learner, in addition to the inborn phonological deficit of dyslexia. This study will focus on the reading symptoms of the subject in the L2 language, English. The subject will take part in a series of teaching and learning activities for enhancing the phonological awareness of the English sounds, as well as the letter-sound relationships. The reading performance of the subject before and after training will be assessed and compared for determining the effectiveness of phonological training to an adult dyslexic and to the improvement of phonological awareness of ESL learning.

It is hoped that the training is also helpful for the subject to overcome the difficulty in reading English by making use of the acquired phonological skills and further apply such skills for L2 learning to L1, Chinese language learning.
2. Method

2.1 Subject

The subject of this study was a 19-year old girl who had been identified as dyslexic during childhood, but did not have a chance to receive treatment or remediation. She is a native Cantonese speaker born in Hong Kong. Just like other Hong Kong students, she started English learning since she was in kindergarten. The subject was invited to take part in a series of learning and teaching activities and to provide speech data for the project. She was informed of the aim of the project, her tasks, and the time schedule of the activities.

2.2 Procedures

A month before the phonological training program, the subject took part in an assessment on her reading weaknesses and phonological awareness in English. Based on the assessment, a set of teaching materials were designed and used for the training program. The subject was pretested on paragraph reading and word reading immediately before the training. The pre-test was based on the training contents. It measured both her reading fluency and phonological skills including letter-sound knowledge and phonological awareness. The training consisted of eight 45-minute classes, all together as a 6-hour program that was run through 4 weeks. Apart from formal teaching, there were reading aloud practices and activities to enhance the learning outcome. After the training the subject was tested again with the testing materials identical to the pre-test.

2.2.1 Assessment

In order to examine the subject’s reading skills and collect data for the design of the phonological training, an assessment was carried out before the training. The assessment consisted of two parts. In the first part, a small paragraph taken from the Story of Snow White and the Seven Dwarves was provided for her to read. This part was to evaluate her reading accuracy and fluency. The second part was single word reading to measure her reading accuracy of the target sounds. The words were some
commonly used words chosen at random. Recordings were made during the assessment.

**Assessment Part I**

Assessment materials:

*Inside the house everything was small but tidy. There was a little table with a tidy, white tablecloth and seven little plates. Against the wall there were seven little beds, all in a row and covered with quilts.*

The subject attempted two trials in this part. The results will be shown below. The first line represents the original text and the underlined words are mispronounced, repaired or non-attempted words that would be transcribed on the second line with grey font. Note that (X) represents a given-up attempt, [e] represents a verbal particle and ‘-’ represents a cut-off by the subject.

**Trial 1:**

I*nside* the house *everything* was *small but tidy.*

Instay eventhing-everything tied

T*here was a little table with a tidy.*

litu with with tired

**white tablecloth and seven little plates.**

a-and [e] litu [e]

A*gainst the wall there were seven little beds,*

[e] [e] wald [e] there wo-will [e] there were litu

**all in a row and covered with quilts.**

rood [e] callvers callvered [e] quite
Trial 2:

Inside the house everything was small but tidy.

There was a little table with a tidy.

White tablecloth and seven little plates.

Against the wall there were seven little beds,

All in a row and covered with quilts.

The subject managed to read most of the words but for some words that she did not know or she was not confident with, such as ‘tidy’ and ‘wall’, she sometimes attempted to guess the pronunciation but sometimes simply gave up on attempt. As for the other mispronounced words such as ‘were’ (mispronounced as ‘will’/’was’), ‘row’ (mispronounced as ‘rood/wood’), ‘covered’ (mispronounced as ‘called’) and ‘quilt’ (mispronounced as ‘quite’), she showed her recognition of the initial consonant, as she could pronounce the initial consonant of these words correctly and she would replace the word with another word that starts with the same initial letter. Her replacement of these words might be due to the reason that she had mixed up both words, as one of the symptoms of reading dyslexia is substituting similar-looking words (Kushwah, 2009). Especially for the word ‘quilt’ which she pronounced as ‘quite’ in both trials, the substitution might be due to the similar spelling of both words that led her to wrong word recognition. Another possible reason is that she might have retrieved the wrong sounds even though she recognized the true word. This would be related to her poor word decoding abilities and phonological skills.

Besides, she produced quite a lot of the verbal particle [e] before reading a word. This reflects that the time for her to retrieve word sounds was relatively long and she hesitated quite a lot while reading. These phenomena are in coherence with one of common reading symptoms of dyslexia – hesitation (Shaywitz, 2015).
Regarding her reading fluency, it was estimated that her reading speed was 51 and 58 words per minute (WPM) in the first and second trial respectively (calculated by the number of words in the passage divided by the amount of time used (in seconds) \( \times 60 \)). To evaluate her reading fluency, Fountas and Pinnell’s (2009) recommended oral reading rates of native English speakers are used for reference (as shown in Table 1). As quoted in Anderson’s article (1999), “Segalowitz, Poulsen, and Komoda (1991:15) indicate that the second language (L2) reading rates of highly bilingual readers are 30% or more slower than L1 reading rates.” Based on this finding, the expected oral reading rates of ESL learners are estimated in Table 2. Compared to the estimated rates, the subject’s reading rate lies on grade 1 (7 year old) level, indicating that her reading fluency lags significantly behind normal ESL learners.

<table>
<thead>
<tr>
<th>End of Grade (age)</th>
<th>Oral Reading Rate (WPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (7)</td>
<td>75-100</td>
</tr>
<tr>
<td>2-3 (8-9)</td>
<td>90-120</td>
</tr>
<tr>
<td>3 (9)</td>
<td>100-140</td>
</tr>
<tr>
<td>4 (10)</td>
<td>120-160</td>
</tr>
<tr>
<td>5 (11)</td>
<td>140-180</td>
</tr>
<tr>
<td>6 (12)</td>
<td>160-200</td>
</tr>
<tr>
<td>7-8 (13-14)</td>
<td>180-220</td>
</tr>
</tbody>
</table>

Table 1 Fountas & Pinnell (2009) Recommended Oral Reading Rates of native English learners

<table>
<thead>
<tr>
<th>End of Grade (age)</th>
<th>Oral Reading Rate (WPM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (7)</td>
<td>53-70</td>
</tr>
<tr>
<td>2-3 (8-9)</td>
<td>63-84</td>
</tr>
<tr>
<td>3 (9)</td>
<td>70-98</td>
</tr>
<tr>
<td>4 (10)</td>
<td>84-112</td>
</tr>
<tr>
<td>5 (11)</td>
<td>98-126</td>
</tr>
<tr>
<td>6 (12)</td>
<td>112-140</td>
</tr>
<tr>
<td>7-8 (13-14)</td>
<td>126-154</td>
</tr>
</tbody>
</table>

Table 2 Expected oral reading rates of ESL learners

Overall in part I, the subject’s reading mistakes were inconsistent. The mistakes that she made in the first trial might not occur in the second trial and vice versa. Moreover, she demonstrated a number of hesitations with the verbal particle [e] and wrong attempts at word decoding. Her reading speed was also relatively slow,
showing that she required more time and greater efforts in the retrieval of sound segments.

Assessment Part II

<table>
<thead>
<tr>
<th>Assessment materials:</th>
</tr>
</thead>
<tbody>
<tr>
<td>tidy</td>
</tr>
<tr>
<td>outside</td>
</tr>
<tr>
<td>address</td>
</tr>
<tr>
<td>house</td>
</tr>
<tr>
<td>thank</td>
</tr>
<tr>
<td>crab</td>
</tr>
<tr>
<td>spend</td>
</tr>
<tr>
<td>create</td>
</tr>
<tr>
<td>planted</td>
</tr>
<tr>
<td>trousers</td>
</tr>
</tbody>
</table>

The second part of the assessment is single word reading. The words were supposed to be known by post-secondary students and were chosen randomly. There was only one trial for each word. Based on the results, some reading weaknesses were identified as follow.

Confusion between /w/, /r/, and /l/ consonants

The subject frequently pronounced the initial /r/ as /w/, such as ‘rabbit’ as ‘wabbit’ and ‘rap’ as ‘wap’. She occasionally pronounced /r/ as /l/; for example ‘crab’ mispronounced as ‘climb’ and ‘grasses’ as ‘glasses’. This shows that she was not aware of the phonemic differences and the true articulation of these three sounds. Table 3 below summarizes the words that contain a mispronounced /r/ or /l/.

<table>
<thead>
<tr>
<th>words under assessment</th>
<th>words/sounds produced by the subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>rap</td>
<td>wap</td>
</tr>
<tr>
<td>rabbit</td>
<td>wabbit</td>
</tr>
<tr>
<td>crab</td>
<td>climb</td>
</tr>
<tr>
<td>grasses</td>
<td>glasses</td>
</tr>
<tr>
<td>horse</td>
<td>holes</td>
</tr>
<tr>
<td>plate</td>
<td>prate</td>
</tr>
</tbody>
</table>

Table 3 Mispronounced /r/ and /l/
Weakness in consonant cluster production

She is weak in the production of blended consonants. She was unable to read out about half of the words that begin with a consonant cluster, as shown in Table 4 ((X) denotes given-up attempts). For instance, despite her capability in the production of the consonants /b/ and /l/ respectively in ‘table’ and ‘lap’, she failed to blend the two consonants together to form an initial consonant cluster in ‘blow’. As for the plosive consonants following /s/, she was not aware of the aspiration change, i.e. she produced the /p/ sound in ‘spend’ with aspiration.

<table>
<thead>
<tr>
<th>words under assessment</th>
<th>words/sounds produced by the subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>clay</td>
<td>(X)</td>
</tr>
<tr>
<td>slake</td>
<td>(X)</td>
</tr>
<tr>
<td>spend</td>
<td>spend</td>
</tr>
<tr>
<td>scan</td>
<td>(X), [skh]</td>
</tr>
<tr>
<td>twinkle</td>
<td>(X)</td>
</tr>
<tr>
<td>create</td>
<td>(X)</td>
</tr>
<tr>
<td>clap</td>
<td>(X)</td>
</tr>
<tr>
<td>trouser</td>
<td>(X)</td>
</tr>
</tbody>
</table>

Table 4 Failed items with initial consonant clusters

Weakness in vowel prediction

The subject failed to guess the pronunciation of words by making using of rhymed words that she already knows, i.e. she is not equipped with phonics skills on vowels which are based on the orthographic spelling of words to predict the corresponding vowel sounds. For instance, she could read ‘table’ correctly but not ‘able’ nor ‘cable’. Another example group of words is ‘play’ and ‘clay’, as she could read ‘play’ but not ‘clay’. This also indicates that she might be memorizing the sounds of the words by rote, instead of making use of letter-sound relationships. Vowels seem to be a stumbling block to her, as she, very often, was able to produce the consonantal sounds in a syllable but unable to match it with a correct vowel, like the word ‘tidy’, which she read as ‘teddy’. However, it is also possible that her error was due to the mixing up between two visually-similar words as mentioned earlier in part I. Some of the words with mispronounced vowels are summarized in Table 5.
**Plural suffix and ‘-ed’ suffix**

In general, she made more mistakes on plural nouns that end with the phoneme /əs/, such as ‘buses’, ‘fixes’ and ‘matches’, as compared to those ending with the phoneme /s/, such as ‘trees’, ‘persons’ and ‘games’. For the words ending with the ‘-ed’ suffix, she was aware of the associated sounds but still, she made some mistakes, for example the words ‘planted’ and ‘watched’. Thus, she cannot master fully the decoding skills for plural and ‘-ed’ suffixes.

**Table 5 Items with mispronounced vowels**

<table>
<thead>
<tr>
<th>words under assessment</th>
<th>words/sounds produced by the subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>tidy</td>
<td>teddy</td>
</tr>
<tr>
<td>comfort</td>
<td>confas</td>
</tr>
<tr>
<td>habit</td>
<td>hobbert</td>
</tr>
<tr>
<td>crab</td>
<td>climb</td>
</tr>
<tr>
<td>stand</td>
<td>stay</td>
</tr>
<tr>
<td>treat</td>
<td>trendy, tryit</td>
</tr>
<tr>
<td>bread</td>
<td>bran, boad</td>
</tr>
<tr>
<td>fixes</td>
<td>fox</td>
</tr>
</tbody>
</table>

**Table 6 Wrongly pronounced suffixed words**

<table>
<thead>
<tr>
<th>words under assessment</th>
<th>words/sounds produced by the subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>buses</td>
<td>bus</td>
</tr>
<tr>
<td>matches</td>
<td>maxed</td>
</tr>
<tr>
<td>fixes</td>
<td>fox</td>
</tr>
<tr>
<td>watched</td>
<td>watching-[d]</td>
</tr>
<tr>
<td>planted</td>
<td>part</td>
</tr>
</tbody>
</table>

**Phonological awareness**

The subject appears to have grasped a clear distinction between consonants and vowels. For any consonantal mispronunciation she would replace a consonant with another similar consonant but never with a vowel. For example /r/ in ‘horse’ was replaced with /l/. Similar phenomenon occurs in vowel mistakes, as she would replace a vowel sound with another vowel like /æ/ with /ɑ/ and ‘ı’ with ‘ə’ in ‘habit’ (/hæbɪt/) and /ɛ/ with /ɔ/ in ‘bread’ (/brɛd/).
Moreover, she has a good knowledge of initial consonants, except initial consonant clusters and occasional confusion between ‘r’, ‘l’ and ‘w’. Other than words that begin with more than one consonant or with ‘r’, she could always pronounce the onset consonant correctly even if she made mistakes on the rime. As for vowels, she lacks sufficient letter-sound knowledge. She generated quite a lot of mistakes on vowels and could not make use of rhyming to predict the vowel sounds.

**Summary**

From the whole assessment, it was identified that the subject has 5 major reading weaknesses:
1. Low reading rate with hesitations
2. Confusion between /w/, /l/, and /l/ consonants
3. Weakness in consonant cluster production
4. Insufficient letter-sound knowledge on vowels
5. Inaccuracy in suffix decoding
2.2.2 Teaching and learning activities

Teaching approach

Two major teaching approaches commonly used in English phonological training are the phonetic approach and the phonics approach. When devising the teaching materials these two approaches have been considered and compared. Table 7 will summarize the differences between these two approaches.

<table>
<thead>
<tr>
<th></th>
<th>Phonetics</th>
<th>Phonics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>scientific study of sounds associated with human speech</td>
<td>a simplified study of phonetics that focuses on letter-sound associations</td>
</tr>
<tr>
<td>Target</td>
<td>Usually adults</td>
<td>Children, especially beginners</td>
</tr>
<tr>
<td>Subdivision</td>
<td>• Articulatory Phonetics</td>
<td>• Synthetic phonics</td>
</tr>
<tr>
<td></td>
<td>- Speech production</td>
<td>- Blending of sounds within a word</td>
</tr>
<tr>
<td></td>
<td>• Auditory Phonetics</td>
<td>• Analytic phonics</td>
</tr>
<tr>
<td></td>
<td>- Speech perception</td>
<td>- sound symbol relationships from words which have a similar letter-sound combination</td>
</tr>
<tr>
<td></td>
<td>• Acoustic Phonetics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Physical properties of sounds</td>
<td></td>
</tr>
<tr>
<td>Symbols used</td>
<td>International Phonetic Alphabet (IPA)</td>
<td>English letters, with some simplified diacritic marks</td>
</tr>
<tr>
<td>Characteristics</td>
<td>Focuses on the study and classification of speech sounds, especially with regard to the physical aspects of their production</td>
<td>Focuses on the relationship between letters and sounds</td>
</tr>
<tr>
<td>Example</td>
<td>‘cat’ is transcribed as /kæt/. It has three phonemes: /k/, /æ/ and /t/. The three phonemes have different phonetic properties: /k/: aspirated voiceless velar plosive consonant</td>
<td>‘cat’ is divided into two parts, the onset ‘c’ and the rime ‘at’. The letter ‘c’ represents a /k/ sound when followed by the vowel ‘a’, like the words ‘candy’ and ‘cap’. ‘at’ has a short ‘a’ vowel same as in:</td>
</tr>
<tr>
<td>/t/: voiceless alveolar plosive consonant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 7 Comparisons between phonetic approach and phonics approach

In regard to the level of difficulty, phonics is easier to understand and less abstract as it emphasizes on the sound representation of letter symbols and combination of letter sequences. Learners can rely on the orthographic cues to predict the pronunciation of a lot of other similar words. However, it overlooks the phonetic properties of sounds and lacks a systematic way in classifying the sounds. Without teaching the phonetic qualities, the subject may have difficulties in articulating certain sounds especially the coronal sounds and in distinguishing between different sounds, especially those sound similar, such as /t/ and /l/, and /æ/ and /ɛ/.

Whereas, phonetic approach can focus on the articulation of the phonemes and help the subject to identify the differences between the sounds that she is confused with and enhance her accuracy in the articulation. The classification of sounds according to certain phonetic properties will also facilitate the teaching as well. Nevertheless, it is less useful for predicting the pronunciation of words, since the letter-sound sequences are not covered. In addition, it may be too abstract and advanced to a dyslexic patient, especially with its use of IPA symbols.

After comparing the two approaches, a combined teaching method that includes both phonics and phonetics was adopted. Hence, the combined teaching method would:
1. Group consonants according to the place of articulation and vowels according to the front-back tongue position.
2. Introduce the consonants and vowels group by group, and, adopt a “sound-first” approach before giving examples.
3. Introduce common letter representations for the consonants, and more importantly, for the vowels.
4. Modify the symbols used to represent the sounds, using mainly the letter symbols.
5. Include abundant of learning activities for practice and review
**Teaching contents**

The training program aimed to enhance the subject’s phonological awareness by explicit teaching on the alphabetic principle of English. The teaching contents focused on the linguistic weaknesses identified in the assessment. They were divided into 5 sessions respectively on English sound system, consonants, vowels, initial consonant clusters and suffixes. And hopefully, the fluency weakness could be alleviated by the phonological and decoding skills taught. In the following, each session will be explained in details.

**Session 1- English sound system**

This session was a brief introduction of the English sound system including consonants and vowels. In order to make it more explicit, the English sound system was compared with the sound system of the subject’s native Cantonese language. Moreover, the subject was taught to distinguish between consonants and vowels in both orthographic and phonemic levels. This was to help her understand the difference between graphemes (letters) and phonemes (sounds). Another area of focus was the complexity of the letter-sound relationship in English, so as to explain to her the difficulty of English pronunciation and that the failure in word reading is not due to dyslexia alone.

**Session 2- consonants**

The assessment led to the following 3 conclusions on the subject’s production of consonantal sounds:
(1) She has fair phonemic awareness of consonantal sounds and she is able to decode consonantal sounds based on their letter symbols.
(2) She is unable to produce accurately the consonants /r/, /l/ and /w/ and occasionally mixes up the consonants with one another.
(3) She encounters difficulties in the production of consonant clusters.

In order to strengthen her phonemic awareness and realization of different similar consonantal sounds, this session focused on the articulation of consonantal sounds with the help of some phonetic concepts (place of articulation). At the same
time, common representations of the consonantal sounds were introduced to her so that she could retrieve the sounds more efficiently by letter-sound correspondences instead of rote-memorizing of the pronunciation of each single word. Moreover, before teaching her how to blend the consonants to form consonant clusters, it was essential that she could learn to produce each consonant more accurately and has an overview of the consonantal sound system first. Since the she had been found to mix up /r/, /l/ and /w/, there were more practices on these sounds such as the tongue twister practice (refer to appendix B). The consonants are grouped according to their places of articulation in Table 8 (the symbols used are represented in brackets).

<table>
<thead>
<tr>
<th>Bilabial</th>
<th>Labiodental</th>
<th>Dental</th>
<th>Alveolar</th>
<th>Post-alveolar</th>
</tr>
</thead>
<tbody>
<tr>
<td>/p/ (p)</td>
<td>/f/ (f)</td>
<td>/θ/ (th)</td>
<td>/t/ (t)</td>
<td>/tr/ (r)</td>
</tr>
<tr>
<td>/b/ (b)</td>
<td>/v/ (v)</td>
<td>/ð/ (TH)</td>
<td>/d/ (d)</td>
<td>/fl/ (SH)</td>
</tr>
<tr>
<td>/m/ (m)</td>
<td></td>
<td></td>
<td>/s/ (s)</td>
<td>/ʒ/ (ZH)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>/z/ (z)</td>
<td>/ʒ/ (CH)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>/n/ (n)</td>
<td>/ʒ/ (j)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>/l/ (l)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Palatal</th>
<th>Velar</th>
<th>Labio-velar</th>
<th>Glottal</th>
</tr>
</thead>
<tbody>
<tr>
<td>/j/ (y)</td>
<td>/k/ (k)</td>
<td>/w/ (w)</td>
<td>/h/ (h)</td>
</tr>
<tr>
<td></td>
<td>/g/ (g)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>/ŋ/ (ng)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8 Consonants to be covered in the training

**Session 3- vowels**

The assessment results indicate that the subject has little knowledge on the letter-sound correspondences of vowels. She is not aware of the alphabetic principle, i.e. relationship between letter sequences and their predictable sounds, and, she may memorize the pronunciation of words by rote-memorizing. Therefore, this session aimed to introduce her to some of the 21 vowels in British English, followed by phonics skills that can be applied to the prediction of vowel sounds.

Similar to consonants, vowels are classified into groups by comparing the tongue position. “Front-back” characteristic is chosen instead of tongue height, since the front- back contrast is more distinct than the high-low contrast. 5 front, 5 back and 1 central vowels were covered (refer to Table 9). Their common letter sequences were also introduced.
Session 4- initial consonant clusters

In this session, the subject learned how to blend two initial consonant clusters. Two methods were introduced. One way is to blend the second consonant with the rime first; then blend the syllable with the first consonant. Another way is to blend the two consonants first to form a cluster and combine it with the rime. The consonant clusters were introduced in four groups as listed in Table 10.

<table>
<thead>
<tr>
<th>Consonant + /l/</th>
<th>Consonant + /r/</th>
<th>Consonant + /w/</th>
<th>/s/ + consonant</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘cl’</td>
<td>‘cr’</td>
<td>‘sw’</td>
<td>‘sm’</td>
</tr>
<tr>
<td>‘pl’</td>
<td>‘pr’</td>
<td>‘tw’</td>
<td>‘sn’</td>
</tr>
<tr>
<td>‘bl’</td>
<td>‘br’</td>
<td>‘dw’</td>
<td>‘sp’</td>
</tr>
<tr>
<td>‘fl’</td>
<td>‘fr’</td>
<td>‘tr’</td>
<td>‘st’</td>
</tr>
<tr>
<td>‘sl’</td>
<td>‘gr’</td>
<td>‘thr’</td>
<td>‘sk’</td>
</tr>
<tr>
<td>‘gl’</td>
<td></td>
<td>‘dr’</td>
<td>‘se’</td>
</tr>
</tbody>
</table>

Table 10 Consonant clusters to be covered in the training

Session 5- Suffixes

The last session aimed to correlate sounds with common suffixes. As found in the assessment, the subject often omits or makes mistakes on plural and ‘-ed’ suffixes. Deducing that she sufficient suffix decoding skills, some other suffixes are covered. She learned to spot the suffixes and do syllable segmentation with them. Table 11 shows the suffixes covered in the training.
Suffixes that do not undergo re-syllabification:
- tion/ -sion
- ful
- ly

Suffixes that undergo re-syllabification:
- ing
- er
- es
- s
- ed

Table 11 suffixes covered in the training

PowerPoint slides and learning activities

The PowerPoint slides of each class and learning activities during classes are attached to appendix A and appendix B respectively.

2.2.3 Teaching schedules

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Expected Date</th>
<th>Exact Date</th>
<th>Major Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24/3</td>
<td>24/3</td>
<td>Introduction of English sound system</td>
</tr>
<tr>
<td>2</td>
<td>27/3</td>
<td>27/3</td>
<td>English bilabial, labiodental, dental and alveolar consonants and their representing letters</td>
</tr>
<tr>
<td>3</td>
<td>31/3</td>
<td>31/3</td>
<td>English post-alveolar, palatal, velar and glottal consonants and their representing letters</td>
</tr>
<tr>
<td>4</td>
<td>3/4</td>
<td>3/4</td>
<td>front vowels and central vowels</td>
</tr>
<tr>
<td>5</td>
<td>7/4</td>
<td>7/4</td>
<td>back vowels</td>
</tr>
<tr>
<td>6</td>
<td>10/4</td>
<td>10/4</td>
<td>consonant clusters</td>
</tr>
<tr>
<td>7</td>
<td>14/4</td>
<td>17/4</td>
<td>suffixes and their underlying sounds</td>
</tr>
<tr>
<td>8</td>
<td>17/4</td>
<td>19/4</td>
<td>Final revision and test</td>
</tr>
</tbody>
</table>

Table 12 Teaching schedules
3. Testing & Results

Testing materials:

Part I- Paragraph reading
The family is preparing for a surprising birthday party for Bill. The parents bake cakes and bread and put them on the plates. Sara and Tim blow up balloons and hang them up on the wall. Kay and Roger make a clay truck as a present. Suddenly, the lights go off. The family are shocked. Soon someone comes in with a candle lighted up and says ‘Happy Birthday to ME!’.

Part II- Single word reading

<table>
<thead>
<tr>
<th>kill</th>
<th>rip</th>
<th>lack</th>
<th>rang</th>
<th>seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>hut</td>
<td>wreck</td>
<td>heal</td>
<td>thumb</td>
<td>rod</td>
</tr>
<tr>
<td>wick</td>
<td>phase</td>
<td>flam</td>
<td>grand</td>
<td>hook</td>
</tr>
<tr>
<td>plot</td>
<td>stock</td>
<td>plow</td>
<td>clue</td>
<td>trash</td>
</tr>
</tbody>
</table>

The testing results show a significant improvement in the subject’s phonological knowledge on the two similar sounds, /r/ and /w/, and in her letter-sound knowledge on digraph consonants. As presented in Table 14, in the pre-test, she replaced all the
/r/ sound with the /w/ sound. After the training, she made fewer errors on the /r/ sound. For the digraphs, of which two letters represent a single phoneme, she also made an obvious improvement, as reported in Table 14 as well. In the pre-test, she could not predict any of the consonantal sounds represented by the digraphs. In the post-test, she scored 3 out of 4.

<table>
<thead>
<tr>
<th>WORD</th>
<th>PRE</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>initial /r, w, l/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>wall</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>roger</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>lights</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>rip</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>lack</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>rang</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>rod</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>wick</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>digraphs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>shocked</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>wreck</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>thumb</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>phase</td>
<td>×</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 14 Results on /r, w, l/

Note. ✓ represents ‘correct’; × represents ‘incorrect’.

The subject’s improvement on vowels is less prominent. Among vowel groups, she showed a relatively greater improvement on the low front unrounded vowel /æ/. In the post-test she was able to produce the vowel in 3 more words that she failed in the pre-test, as shown in Table 16. She also demonstrated some improvement on the diphthong /ei/, also shown in Table 16.

<table>
<thead>
<tr>
<th>VOWEL</th>
<th>WORD</th>
<th>PRE</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>/æ/</td>
<td>flap</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>grand</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>trash</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>/ei/</td>
<td>cakes</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>clay</td>
<td>×</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 15 Some results on /æ/ and /ei/

Note. ✓ represents ‘correct’; × represents ‘incorrect’.
Previously in the pre-test, the subject made mistakes on almost all the consonant clusters. More particularly, she had a tendency to omit the second consonant in the consonant clusters. However, after the training, she appeared to have more knowledge on the letter-sound association and she was able to pronounce some of the consonant clusters. Another strong piece of evidence is her attempt in blending of the consonants in the words ‘flam’ and ‘stock’. It was observed that she succeeded in the blending of the beginning consonants but when she pronounced the whole word she missed out the second consonant. For instance ‘flam’ was finally pronounced as ‘fam’ even though she produced the /fl/ sound before that.

<table>
<thead>
<tr>
<th>WORD</th>
<th>PRE</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>plates</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>truck</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>grand</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>plow</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>flam</td>
<td>×</td>
<td>O</td>
</tr>
<tr>
<td>stock</td>
<td>×</td>
<td>O</td>
</tr>
</tbody>
</table>

Table 16 Results on consonant clusters

Note. ✓ represents ‘correct’; × represents ‘incorrect’. O denotes her attempt to blend the consonants but she failed to pronounce the cluster sounds within the word.

After the training, she was more cautious to the plural/present tense suffixes ‘-s’, as she got all of them correct in the post-test, as referred to table 17. For the other suffixes, there was no observable improvement.

<table>
<thead>
<tr>
<th>WORD</th>
<th>PRE</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>cakes</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>plates</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>lights</td>
<td>×</td>
<td>✓</td>
</tr>
<tr>
<td>comes</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>says</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 17 Results on the suffix 's'

Note. ✓ represents ‘correct’; × represents ‘incorrect’.

As a whole, the subject has improved reading skills. In terms of accuracy, she demonstrated an increased reading accuracy of almost 20% in the post-test than the
pre-test, which is calculated with respect to the number of correct target words. As for the reading fluency, her reading rate was one-third higher in the post-test but she still lags far behind normal ESL learner as compared to the expected rates in Table 2.
4. Discussions

One of the aims of this study is to investigate the effectiveness of phonological training on a dyslexic adult. Results prove that the given phonological training is effective to the subject. Her overall improvement indicates that she has an increased knowledge on the letter-sound relationships, especially on consonants and consonant clusters, which she displayed more significant improvement in the post-test. Nevertheless, her improvement may also be attributed to her increased encounters of the words. During the training, she came across some examples which were assessed in the tests. So, this might exert certain effects on her improved reading accuracy, since she might have memorized the pronunciations of the words. Yet this is believed to be a negligible impact because dyslexic patients are proved to have poor phonological memory, i.e. the part of the working memory that deals with spoken and written material (McLeod, 2012). According to a number of researches, people with language disorders such as reading impairments are weaker in performing phonological memory tasks like word recalling, word repetition and digit repetition (Gathercole & Baddeley, 1990; Ho & Lai, 1999). This indicates that the dyslexics have limited and weak memory for holding spoken words that appear shortly. Therefore, despite the subject’s increased exposures to the assessed words, it is unlikely that she has memorized the pronunciations of those words. Her increased reading accuracy, hence, is mainly due to her enhanced word decoding skills.

Moreover, in respect to phonological awareness, the subject also showed a noticeable improvement. Results on categorized phonemes and sounds indicate that she has increased phonological awareness in each category. Another supporting evidence was observed from her reading strategies and attitudes. In the pre-test, she said “I don’t know” or “What is it” (in Cantonese) quite often for the words that she was not confident with. However, in the post-test, rather than saying these sentences, she attempted to blend the sounds based on the orthographic spellings, particularly in part II of the test which comprised of single-word reading. On one thing this shows her enriched phonological skills in sound blending and phoneme segmentation. During the word process, she would first divide the word into onset and rime; then she would blend their sound segments. She also showed a significant improvement in blending consonant clusters. Besides, she has reduced reliance on rote-memory of the pronunciation of the whole word. She used to read a word by recognition. She would first look at the spelling of the word, try to recognize it and then retrieve its pronunciation. When she found herself unfamiliar with the spelling of it, she would
panic and thought that she was not able to read it correctly because she could not recognize it immediately. After the phonological instruction, the subject has increased alphabetic and phonemic knowledge such that she tried to apply the acquired knowledge on the post-test reading and was less fear of unfamiliar words.

In short, phonological training is found effective not only to dyslexic children or children at risk for dyslexia, but also to a dyslexic adult. In view of the positive effects brought from the phonological training program in this study, the proposed teaching materials are proved to be effective as well.

One of the success of the training is the suitable teaching approach. A combined training on phonological awareness and letter-sound knowledge was adopted. It emphasized on both the phonemic articulation and common letter representations of sounds. There are a few advantages observed in the training process. Firstly, the subject exhibited her interest in learning the articulation of sounds. For instance, during the session on consonants where consonants were taught with their places of articulation, the subject was actively practicing on the articulation. She had not been aware of the difference between /l/ and dental consonants /θ, ð/, the difference between /l/ and /w/ consonants, and the voicing properties of the sounds. With the help of articulatory illustration, she understood better the properties of the consonants, as well as the differences between them. Secondly, the taught letter representations facilitated sound decoding. During the in-class practices, she was able to apply the letter-sound knowledge. For example, in the “ship hunting” game, she had to combine one of the given onsets (e.g. ‘r’, ‘sh’, ‘ch’) and one of the given rimes (e.g. ‘-ock’, ‘-uck’, ‘-ake’) in every trial. Impressively, she succeeded in predicting the sounds of the words with the use of letter-sound relationships.

In fact, this method is highly supported by several previous research studies which have given an insight into the combined training of phonology and phonics. Most of them found out that the combined teaching of phonological awareness and letter-sound correspondences can yield the best result in reading progress (e.g. Schneider et al., 2000; Hatcher, 1994; Ball & Blachman, 1991). Particularly, Schneider et al. (2000) conducted a training study to compare three types of intervention programs for children at risk of developing dyslexia: (a) letter-sound training, (b) phonological awareness training, and (c) combined training in phonological awareness and letter knowledge. It was found that, in terms of phonological awareness, though both group (b) and (c) improved drastically after the training, group (c) showed the greatest and most significant progress in the reading
test (which measured the decoding speed) and the reading comprehension test. Thus, the combined training adopted in the present study is in coherence with previous research findings.

However, the efficacy of the training is not high. In order to achieve a higher efficacy, the teaching materials have been evaluated. The teaching materials were designed based on the assessment carried out before the training program. The assessment is a rough measurement on the subject’s reading weaknesses and fluency, as well as the phonological awareness. However, it lacks a thorough and systematic examination. The assessment shall include at least 5 words for each target sound, for instance testing on each vowel, consonant and consonant cluster with 5 words respectively. In this way the assessment and evaluation on the subject’s reading weaknesses would be fairer. Moreover, a separate assessment on phonological awareness shall be carried out to test the hypothesis of phonological deficits in the subject and examine more closely her phonological awareness such that the training and testing materials can target at the subject’s phonological weaknesses more accurately.

Moreover, there are some limitations on the testing so that the results cannot reflect the complete case. The target items within each category are not evenly distributed. Especially, in the vowel category, the 38 assessed items were not chosen in equal number from the 11 different vowels. For example, more words belong to /ei/ were selected than those belonging to /ɛ/ and more words from front vowels than back vowels. The proportions of these items were chosen according to the number of corresponding representations introduced during the training as well as the level of difficulty. More front vowels were included because of its relatively higher number of common spellings than back vowels. Also, /æ, ɛ, ɒ/ are vowels that have relatively more combinations of letters so they were assessed with more items. Regarding the level of difficulty, /æ/ sound is believed to be harder because of its irregular spellings like ‘-ake’, ‘-ase’ and ‘-ay’; therefore it was also weighed higher in the test. Nevertheless, to ensure the fairness of the test, the tested items shall be revised by using an equal number of target items, as well as revising the number of letter representations to be covered for each phoneme.

The test can also include a new section that specifically tests the subject’s phonological awareness by evaluating her performances on phonological awareness tasks, such as rhyming, phoneme deletion, phoneme blending and phoneme segmentation (Torgesen & Mathes, 2000). These tasks would target more precisely
the subject’s awareness on individual sounds and sound structures such that her phonological awareness before and after training can be compared thoroughly. Furthermore, the testing can be improved by the use of non-words. Non-word reading test is commonly employed by researchers and therapists to assess the phonological processing skills of a dyslexic patient (Turner, 2003). It assesses the patient on his/her grapheme-phoneme mapping skills and minimizes the effects caused from previous exposures to the words.

One of the limitations of the whole study is that it did not employ any control for comparison. A more extensive investigation can be carried out with two non-dyslexic, Hong Kong adults with similar English level and similar age, one as the control who receives the same phonological training and one as the control who does not receive the phonological training. This would facilitate further analysis on the effects of phonological training on a dyslexic and non-dyslexic adult and the efficacy of the training.

In addition, the training hours were limited and insufficient. The training program had not started until late March since there had been preparation work on the teaching materials after the assessment. Moreover, since the subject was voluntary to take part in this study and could not contribute too much time, in total only 6 hours of training could be given to her. Indeed, as such a short training program, it is encouraging to obtain the positive improvements by the subject. Hence, the efficacy shall be measured again if the investigation can be extended by increased training hours. Besides, it was found that the subject’s reading fluency still lagged very much behind normal ESL learners after the training. This may be attributed to the reason that she was still not very familiar with the letter-sound relationships, as well as limited by her inherent phonological deficits. More practices and exposures are therefore required, so further assessment can be carried out to explore the long term effects of phonological training.
5. Conclusions

Phonological awareness is a crucial element in language acquisition. On one hand it is a strong predictor of reading success (Hulme et al., 2002). Besides, it ameliorates early reading failure and prevents the development of dyslexia (Hatcher, 1994). However, in Hong Kong, the educational environment is discouraging for the development of phonological awareness, owing to the constraints from teaching curriculum and teaching methods (Yeung et al., 2013). As a result, many students may find it painstaking to learn English as a second language which is somehow a distinct language from Chinese languages. For students with reading impairment, the impacts could be even worse and they may in turn, lag farer behind normal learners. The sense of failure may grow bigger and bigger; while the learning motivation may decline gradually. This study has shown that phonological training has positive influences on reading dyslexia, even to a dyslexic adult, implying that remedy is never too late for dyslexia in adulthood. However, the treatment does not take just a period as short as one month. Rather, it requires patience, perseverance and assistance that persist as long as months or years. It is highly hoped that phonological training could be an effective remediation for dyslexic patients and the society would be more aware of dyslexia and other learning disorders so that prompt and appropriate learning supports could be provided.
6. References


Bennett, L., & Ottley, P. (2000). *Launch into Reading Success through Phonological Awareness Training*. Austin, TX: PRO-ED.


7. Appendices

7.1 Appendix A - Powerpoint slides
Lesson 1

Session 1

 Orchestra Introduction to English sound system

OUR GOAL!!

- To enhance reading skills and speed
- To correct pronunciation mistakes
- To help you overcome the fear of reading words
- To help you build up more confidence in reading

Schedule

- 4 weeks: On Tuesdays and Fridays
- 8 lessons
- 45 minutes per lesson

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Why is English pronunciation so hard?

Ice Rise

- Which sound do the underlined letters represent?
• How about these words?
  See  Sead

• A single sound can be represented by different single letter or groups of letters

• Do you know this word?
  physics

• 'phy' represents the /f/ sound, NOT /p+h+y/
  physics

• A single sound can be represented by more than one letters

• Do the underlined letters represent the same sound?
  (1)Think  Though
  (2)Bead  Head
NONONO...
• They represent different sounds!

• How to read this word?
  Climb

• The ‘b’ is not pronounced!
• In some cases, certain letters do not represent any sound!

• How about this word?
  Read

• some words have more than one pronunciations

A short conclusion...
• English has a COMPLEX sound-symbol relationship.
• There is NO one-to-one correspondence between letters and sounds.
Dyslexia? Non-dyslexia?
- Whether or not you have dyslexia, you will find English pronunciation hard.

CALM DOWN~
- In the following classes, you will learn to predict the pronunciation by spellings
- You will have a better understanding of English sounds

English sound system
- Let's enter the sound world of English...

What is CONSONANT?
- Letters other than a, e, i, o, u?
- Sometimes, 'c' represents /k/ 
- 'k' represents /k/ as well
- Are they two different consonants?

Too abstract?
- Sound them out...
- /ba/ /ga/ /sa/
- /bu/ /gu/ /su/
- /ta/ /tu/
In English we have 21 non-vowel letters but 24 consonants in total.

But all consonants are represented only by the 21 letters, never by the vowels ‘a, e, i, o, u’

Vowels

Around 21 vowels in British English, not only the 5 vowels represented by the letters ‘a, e, i, o, u’

What is a SYLLABLE?

formed from a vowel, which may be blended with consonants in front of or after it

Syllable

English syllables

V: /æ/
CV: /ka/
VC: /ak/
CVC: /kak/
CCVC: /klak/
CCVCC: /klakt/

Sound systems

Every language has its own sound system, i.e. they have a group of consonants and vowels used in their language.

If we compare between Cantonese and English, some sounds are shared by both languages, some are not

DIFFERENCE?

Does /th/ sound exist in both languages?
The vowel in ‘bad’?
The vowel in ‘觀’?
• no voiced plosives /b,d,g/ in Cantonese
• No /l/ consonant in Cantonese
• simpler syllable formation in Cantonese (V, CV, CVC)
• ...

A concept only...
• The sounds in every language are not random sounds, but are fixed within a language.

😊 Relax! That's all for today.
Lesson 2

Recap
- What is consonant?
- What is vowel?
- Do all languages share the same sounds?

Session 2
Consonants (I)

How can we classify consonants?
- Place of articulation: the parts of oral tract that are involved in the production of the sound

Bilabial (雙唇音)
- Upper and lower lips
- /p/ (voiceless)
- Pen
- /b/ (voiced)
- Ben
- /m/
- Men
- Always represented by 'p', 'b', 'm'

Labiodental (唇齒音)
- Lower lip and upper front teeth
- /f/ (voiceless)
- Fan; Phone
- Represented by 'f' and 'ph'
- /v/ (voiced)
- Van
- Represented by 'v' only

Interdental (齒間音)
- Tongue blade and upper front teeth
- /θ/ /θi/ (voiceless)
- Thigh
- /ð/ /TH/ (voiced)
- Thy
- BOTH are represented by 'th'!!
Alveolar (齒齶音)
- Tongue tip and alveolar ridge
- /t/ (voiceless)
- Tie
- Represented by ‘t’ only
- /d/ (voiced)
- Die
- Represented by ‘d’ only

/ʃ/ (voiceless)
- Sip, Ice, Decide, Cycle, Psychology
- Represented by (1) ‘s’
- (2) ‘c’ followed by the vowels ‘e’, ‘i’, or ‘y’ (3) ‘ps’

/l/ (voiced)
- Zip; Design
- Represented by (1) ‘z’ (2) ‘s’ in some special cases

/ɪ/:
- Night; Knife
- Represented by ‘n’ and ‘kn’
- /l/:
- Light
- Represented by ‘l’

Summary
- /p/:
- /b/:
- /m/:
- /t/:
- /d/:
- /l/:
- /v/:
- /θ/:
- /ð/:

Tongue twissssssster!
- She sells sea shells by the sea shore.
- Zebras zig and zebras zag.
- If you want to buy, buy, if you don’t want to buy, bye bye!
- The big bug bit the little beetle, but the little beetle bit the big bug back
- I can think of six thin things, but I can think of six thick things too
- Three free throws

Tick
⇒ D

Tick
⇒ p

Pick
⇒ N
Nick
→ kn

Knick
→ nk

Fick

Butter
→ th

Butther
→ ff

Buffer
→ L

ZZZZZZZZ

- Easy
- Cheese
- Use
- Lose
- Was
- These

Ph practice

- Photo
- Philip
- Phase
- Physics
- Philippines

Th practice

- The
- There
- Thus
- These
- They
- Though
- Those

/TH/

/th/

- Thunder
- Third
- Thumb
- Thief
- Thank

That’s all for today!
Thank you!
Lesson 3

Recap

- How can we classify consonants?
- Which sounds did we learn last lesson?

Session 2

Consonants (II)

Read the words!

- Baleno
- Pacific
- McDonald
- Fuji
- Philips
- The North Face
- Thoughts
- Toyota
- Disney
- Smart Tone
- Center
- Citibank
- Zara
- Nikon
- Levi's

Let's continue...

Post-alveolar (齒齶後音)

- /ʃ/ (sh) (voiceless)
  - Ship, dictation, session
  - Represented by (1) 'sh'
  - (2) tion (3) sion
- /ʒ/ (zh) (voiced)
  - Vision, measure
  - Represented by (1) sion (2) sure

http://www.languagelearning.com/postalveolar/consonants.html
http://www.languagelearning.com/postalveolar/consonants_voiced.html
**Palatal (腭音)**
- /ŋ/ (ch) (voiceless)
- Chip, posture
- Represented by (1) ‘ch’ (2) ‘true’
- /dʒ/ (j) (voiced)
- Joy, George, Roger, judge
- Represented by (1) ‘j’ (2) ‘ge’ in a few cases (3) ‘dge’

**Velar (軟颚音)**
- /k/ (voiceless)
- Ken, Kick, Cat, Cushion, Copy
- Represented by (1) ‘k’ (2) ‘ck’, (3) ‘c’ followed by ‘a’, ‘u’, or ‘o’
- /g/ (voiced)
- Get
- Always represented by ‘g’

**Labio-velar (唇软颚音)**
- /w/ (w)
- Win
- Represented by ‘w’

**Glottal (聲門)**
- /h/ (h)
- Hit
- Represented by ‘h’
Tongue twisssssssssster!
- Red lorry, yellow lorry, red lorry, yellow lorry, red lorry...
- On a lazy laser raider lies a laser ray eraser.
- Chop shops stock chops.
- Rhys watched Ross switch his Irish wristwatch for a Swiss wristwatch.
- Freezy breeze made these three trees freeze.

- Tangle → t
  Angle

- Zip → sh
  Ship → ch
  Chip → r
ZH VS SH

/iZH/
- Version
- Television
- Invasion

/SH/
- Session
- Mission
- pension
- Mention
- Dictation

SH VS CH

/SH/
- Treasure
- Pressure

/CH/
- Departure
- Capture
- Picture

WR practice

- Write
- Wreck
- Wrap
- Wrong
- Wrack

End of Session 2!
Lesson 4

Session 3
Vowels (/i/)

Recap... True or false?
- English and Cantonese have exactly the same group of sounds
- Consonants can be sounded out without vowels
- English has 5 vowels (a, e, i, o, u) only

Revision on consonants
Write down the sound for the underlined letters.

Vowels
- Similar to consonants, we can classify vowels
- By the tongue position
- Example: heat VS hoot (/E/ VS /u/)
- Front, central, back

Front vowels
- The tongue moves forward to the front of the mouth

/i/ (E)
- ee
- See
- Tee
- ea
- Sea
- Tea
/E/ + I
- Heel
- Peel
- Reel

/ E/ + d
- Seed
- Need
- Feed

/ E/
- -eak/-eek: peak/peek
- -eat/eet: feat/feet
- -eam/eem: seam/seem
- -ean/een: bean/been
- Usually represented by ‘ea’ and ‘ee’

Now relax a little bit your mouth and shorten the time of the production of /E/...

/i/ (i/)

/i/ + p
- Rip
- Tip
- Hip

/i/ + t
- It
- Bit
- Hit
- Pit

/i/ + ll
- Bill
- Kill
- Poll

/i/ + ck
- Pick
- Kick
- Wick
Always represented by the letter 'i' !!!
- ing : sing, ring, wing
- in : sin, tin, bin
- ink : sink, link, drink
- im : him, rim, Tim

Bit?
Pig?
Pitch?

And the final 'y'...
- Pity
- Lily
- Picky
- Really
- Creepy

Do you recognize them?
- Read
- Lead
*They have two pronunciations!!!

/e/ (e)
/e/+d
- Head
- Read
- Lead
- Bread

/e/+ck
- Reck
- Neck
- wreck

/ɛ/ (e)
- et : bet
- ell : sell
- est : nest
- en : men
- ed : red
Always represented by the letter 'e'!!
The first letter e...
- Energy
- Egg
- Empty
- Elephant
- Every

Now open your mouth wider vertically

/a/ (æ/a)
/a/ + d/ t
• Bad
• Pad
• Sad
• Sat
• Cat

/a/ + m/ n
• Sam
• Lam
• Pan
• Fan
• Can

/a/
• -ang: rang
• - ank: bank
• - and: sand
• - act: act
• - ack: lack
• - ash: cash

Do you discover anything?

The /a/ sound is always represented by the letter ‘a’
Some more practice

- Family
- Happy
- Packing
- Rabbit
- Sammy
- Acting
- Greeting
- Since

/eɪ/ (A)

- Aaaaaa...
- -ay
  - Pay
  - Kay
  - Say
  - Bay
- -ake
  - Make
  - Fake
  - Cake

/ə/ VS /ʌ/

/ə/:
- a + consonant(s)

/ʌ/:
- ay
- a + consonant + e

Central vowels

The tongue is positioned mid-way between the front part and the back of the mouth

/ʌ/+ t
- Hut
- Cut
- But
- Dutch
Put? ???
/pʌt/?

Come
/kʌm/

/ʌ/:
- Duck
- Tuck
- Truck

- um
- Pump
- Gum
- Rum
- Drum
- Thumb

forward  
back
Lesson 5

Session 3
Vowels (II)

Revision on front vowels and central vowel

Back vowels
The tongue is positioned at the back of the mouth

/u/
- ue
- Blue
- Clue
- Glue

/ool/
- Wool
- Pool
- Cool

/oon/
- Soon
- Noon
- Loon

Now relax a little bit your mouth muscle...
/ʊ/ + k/d
- ook
  - Book
  - Hook
  - Cook

- ood
  - Good
  - Mood
  - Food
  - Wood

/ʊ/ + t
- oot
  - Boot
  - Hoot
  - Shoot

Put?????
/^/ or /ʊ/???

/ʊ/ -low
  - Low
  - Blow
  - Plow
  - Glow

- row
  - row
  - Brow
  - Throw
  - Grow

/ɔ/ -old
  - Old
  - Gold
  - Fold
  - Told
  - Bold

/ɔ/ -al
  - Talk
  - Walk
  - Chalk
  - Salt

/ɔ/ -all
  - All
  - Hall
  - Fall
  - Tall
  - Wall
\(/_e/\)

-aw
  - Awful
  - Haw
  - Saw
  - Raw

\(/o/ /o/ + t/d\)

- Hot
- Rot
- Cot
- Not
  - God
  - Rod
  - Cod
  - Pod

\(-\text{o}k\)
  - Rock
  - Sock
  - Lock
  - Shock

Some more examples...

- \(\text{o}g\): Fog
- \(\text{o}p\): Mop
- \(\text{o}b\): Bob
- \(\text{o}x\): Fox
- \(\text{o}ss\): Toss

*All contain one ‘o’ + consonant (s)
Session 3
consonant clusters

Consonant clusters?
- a group of consonants that appear together without any vowels between them.

Examples
- Pl: Play
- Cr: Cry
- Sw: Swing
- St: Stand


We will focus on word beginning consonant clusters!!!

First, we have an /l/ sound.
Repeat the /l/ sound for a few times...

Now we have a /p/ sound
- Repeat the /p/ sound for a few times
Now combine add the ‘p’ sound in front of the ‘l’ sound.

/\p\l\/+/\l/\n
/pl/

Do you remember how to pronounce ‘ay’?

- /\A/

Now combine /pl/ with /\A/.

‘play’

/pl/+/\A/\n
/pl\A/

If we change ‘p’ to ‘c’?

The ‘c’ represents a /\k/ sound

- /\k\l/+/\l/\n
- /\k/\n
- /\k/\A/

Group 1: Consonant + /l/ 11

- “cl”: clamp
- “pl”: plug
- “bl”: blow
- “fl”: flam
- “sl”: slash
- “gl”: glue

Group 1: Consonant + /l/ 12
Group 2: Consonant + /r/

First, we have an /r/ sound.
Repeat /r/ for a few times

Remember which sounds does ‘am’ represent?
/əl/+ /m/
/am/

Combine /r/ with /am/.
/r/+ /am/
/ram/

Now put a /g/ sound in front of /ram/.
/g/+ /ram/
/gram/

Group 2: Consonant + /r/
- “cr”: crab
- “pr”: prate
- “br”: bread
- “fr”: Fred
- “tr”: truck
- “gr”: green
- “thr”: throw
- “dr”: drum
Group 3: consonant + ‘w’

- ‘sw’: swing
- ‘tw’: twinkle
- ‘dw’: dwell

Can you read the words below?

- Plate
- Clay
- Plow
- Trash

Group 4: ‘s’ + consonant

- ‘sm’: small
- ‘sn’: snake
- ‘sp’: spend
- ‘st’: stand
- ‘sk’: skill
- ‘sc’: scan
- Pay attention to ‘p’, ‘t’ and ‘k’
- Unaspirated

Try these few words

- Spoon
- Steal
- Skip
- Scold

Exercise

- Plan
  → X I
- Pan
  → Pr
- Pran
  → X p

- Ran
  → Dr
- Dran
  → X r
- Dan
  → St
- Stan
- Say
  → I

- Lay
  → Cl
- Clay
  → X I

- Gay
  → K

- Kay
  → Sk
- Skay
  → Wr

- Vray
  → Xr

- Way
Lesson 7

Session 5
Resolving suffixes

- Many multisyllabic words are formed from affixation
- Tense-markers: -ing, -ed
- Plural-markers: -s, -es
- Noun: -tion, -sion, -ment, -ify, -ness
- Adverb-marker: -ly

Examples

Class
Class-ify
Class-iffication

Play
Play-ful
Play-ful-ly

- In this lesson, we are going to recognize some common suffixes and see how they are related to the pronunciation of the words.

Common suffixes

1. -tion / -sion
2. -ful
3. -ly
4. -ing
5. -er
6. -es
7. -s
8. -ed

Group 1

- Suffixes that do not undergo re-syllabification
Schwa sound /ə/  
- “a”

-tion/sion  
- Tion/sion usually represents a /SHan/ sound
- Fiction → fiction
- Mention → mention
- Vision → vision

-ful  
- Ful represents a /ful/ sound
- Careful → careful
- Awful → awful
- Successful → successful
- → success/ful

-ly  
- Sadly → sadly
- Awfully → awfully
- Really → really

Group 2  
- Suffixes that undergo re-syllabification

-ing  
- Represents a /ing/ sound
- Interest → interest
- Interesting → interesting
- Surprise → surprise
- Surprising → surprising
- Prepare → prepare
- Preparing → preparing
- Shock
  - Shocking
  - → shocking

- Hold
  - Holding
  - → holding

- *-es*
  - ‘*es*’ can be a plural marker or present tense marker
  - After the consonants “z”, “s”, “ch”, “sh”, “x”
  - Represents a /es/ sound
  - Blended with previous consonant

  - Matches → matches
  - Washes → wa/shes
  - Mixes → mix/ez
  - Buses → bu/ses
  - Buzzes

- *-s*
  - Represents an /s/ or /z/ sound
  - Combines with the previous syllable

  - Pen
  - Pens

  - Candle
  - Candles → cand/les

- *-er*
  - Represents /ar/ sound
  - Blended with the previous consonant

  - Father → fa/ther

  - Pack
  - Packer
  - → pack/er

  - Soon
  - Sooner → soo/ner

- *Makes*
  - Makes or makes?

  - Why /makes/?
    - the ‘*es*’ is NOT followed by
      - "z"/ "s"/ "ch"/ "sh"/ "x"
-ed

Case 1
• After 't' or 'd'
• Represents /d/ or /d/
• Blended with the consonant /t/ or /d/
• Landed → lan/ded
• Shoot → shoot/ed
• Pleaded → plea/ded
• Lighted → Light/ed

Case 2
• After unvoiced consonants
• /p/ /t/ /th/ /ts/ /ch/ /sh/ /f/ /k/
• Represents 't'
• Added to the previous syllable

• Pump
• Pumped

• Laugh
• Laughed

• Kiss
• Kissed

• Fetch
• Fetched

• Crush
• Crushed

• Shock
• Shocked

Case 3
• Other voiced consonants
• Represents /d/ sound
• Added to the previous syllable
• /b/ /m/ /n/ /TH/ /ts/ /sh/ /r/ /l/ /n/ /l/ /g/

• Grab
• Grabbed

• Ban
• Banned

• Judge
• judged
Practice

- Rolled
- Lived
- Controlled
- covered

END OF ALL SESSIONS!!!
7.2 Appendix B - In-class practices

*Tongue Twister*
To read out a phrase or sentence which is formed from alliteration and a sequence of nearly similar sounds. Used for the practice of consonants.

Examples used in class:
- She sells sea shells by the sea shore.
- Zebras zig and zebras zag.
- If you want to buy, buy, if you don't want to buy, bye bye!
- The big bug bit the little beetle, but the little beetle bit the big bug back
- I can think of six thin things, but I can think of six thick things too
- Three free throws
- Red lorry, yellow lorry, red lorry, yellow lorry, red lorry...
- On a lazy laser raiser lies a laser ray eraser.
- Chop shops stock chops.
- Rhys watched Ross switch his Irish wristwatch for a Swiss wristwatch.
- Freezy breeze made these three trees freeze.

*Spoonerism*
To interchange the initial consonantal sounds of the first and second words.
For example big dog → dig bog.

Given phrases:
- poor teddy (→ toor peddy)
- dark ship (→ shark dip)
- soft cheese (→ choft seese)
- chilly seats (→ silly cheats)
- short date (→ dort shate)
- chip shop (→ ship chop)
- sharp chain (→ charp shain)
- crowd play (→ plowd crown)
- clown prince (→ prown clince)
- red way (→ wed ray)
- stand clamp (→ cland stamp)
**Consonant Change practice**

To change the phoneme(s) of the underlined consonant letter(s) to another given phoneme(s). For example, given “Tick → D”, the subject has to read “Dick” in replacement for “Tick”. This exercise for practicing consonants and consonant clusters.

**Consonant Letter-Sound Exercise**

To match the underlined consonant letters with their sounds.

Write down the sound for the underlined letter(s) in each question. You can choose from the sounds below:

/p/ /b/ /m/ /f/ /v/ /th/ /TH/ /s/ /z/ /ch/ /sh/ /j/ /y/ /l/ /n/ /k/ /g/ /r/

1. Sally [ ] 11. Yannis [ ]
2. Joe [ ] 12. Cherry [ ]
3. Kelly [ ] 13. Zinc [ ]
5. Cathy [ ] 15. Sharon [ ]
6. Cellia [ ] 16. Samantha [ ]
7. Miki [ ] 17. Vicky [ ]
8. Ryan [ ] 18. George [ ]
10. Roger [ ] 20. Gary [ ]

<table>
<thead>
<tr>
<th>Figure 1 Questions</th>
<th>Figure 2 Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, S</td>
<td>11, Y</td>
</tr>
<tr>
<td>2, J</td>
<td>12, ch</td>
</tr>
<tr>
<td>3, K</td>
<td>13, z</td>
</tr>
<tr>
<td>4, f</td>
<td>14, l</td>
</tr>
<tr>
<td>5, k</td>
<td>15, sh</td>
</tr>
<tr>
<td>6, s</td>
<td>16, th</td>
</tr>
<tr>
<td>7, m</td>
<td>17, v</td>
</tr>
<tr>
<td>8, r</td>
<td></td>
</tr>
<tr>
<td>9, f</td>
<td></td>
</tr>
<tr>
<td>10, ch + j</td>
<td></td>
</tr>
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Rhyming exercise

To answer the questions related to rhymes.

1. Which word has the same vowel as that in "hot"?
   A. Boot    B. Wool    C. Rock    D. Bold

2. Which word has the same vowel as that in "fall"?
   A. Ray    B. How    C. Hook    D. Haw

3. Which words have the same vowel as that in "pool"?
   A. Glue    B. Look    C. Moon    D. Blow

4. Which words have the vowel "O"?
   A. Lock    B. Throw    C. Fold    D. Glow

5. Which words have the same vowel as that in "put"?
   A. Food    B. Shut    C. Truck    D. Root

Figure 3 Rhyming exercise 1

1. Which word rhymes with 'heat'?
   A. hat    B. head    C. heel    D. het

2. Which word rhymes with 'pump'?
   A. luck    B. put    C. rule    D. blue

3. Which 2 words rhyme with 'pot'?
   A. Fox    B. Tool    C. now    D. shock

4. Which 2 words rhyme with 'bet'?
   A. Bad    B. wall    C. head    D. red
**Ship Hunting**

To practice the blending of onsets with rimes and the letter-sound relationships. The investigator and the subject are given a table with head row on rimes and head column on onsets. They have to mark a number of ships respectively on their own table. Afterwards, they have to guess the locations of the ships turn by turn, by reading the words formed from the corresponding onset and rime.

<table>
<thead>
<tr>
<th></th>
<th>-ake</th>
<th>-ock</th>
<th>-all</th>
<th>-ay</th>
<th>-uck</th>
<th>-eck</th>
<th>-od</th>
<th>-ang</th>
<th>-eat</th>
<th>-ook</th>
<th>-ill</th>
</tr>
</thead>
<tbody>
<tr>
<td>ch</td>
<td></td>
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</table>

Figure 5 Table for Ship Hunting (I)

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<th>ead</th>
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</thead>
<tbody>
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</tbody>
</table>

Figure 6 Table for ship Hunting (II)
**Single Word practice**

To read a word printed on each card.

<table>
<thead>
<tr>
<th>Heed</th>
<th>Case</th>
<th>Fool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal</td>
<td>Phase</td>
<td>Book</td>
</tr>
<tr>
<td>Hip</td>
<td>Fate</td>
<td>Fall</td>
</tr>
<tr>
<td>Fitch</td>
<td>Pack</td>
<td>Saw</td>
</tr>
<tr>
<td>Tim</td>
<td>Dash</td>
<td>Raw</td>
</tr>
<tr>
<td>Hill</td>
<td>Gut</td>
<td>Glow</td>
</tr>
<tr>
<td>Pick</td>
<td>Tum</td>
<td>Gold</td>
</tr>
<tr>
<td>Wick</td>
<td>Pump</td>
<td>Cot</td>
</tr>
<tr>
<td>Neck</td>
<td>Come</td>
<td>Rock</td>
</tr>
<tr>
<td>Bread</td>
<td>Glue</td>
<td>Boss</td>
</tr>
</tbody>
</table>

Figure 7 List of words