國小三五年級學童中英文音韻覺識測驗與單字閱讀能力之關聯性研究

The Relationship among Chinese Phonological Awareness, English Phonological Awareness, and English Word Reading of the Third and Fifth Graders

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ABSTRACT

L1 studies in alphabetic or non-alphabetic languages have confirmed a significant correlation between phonological awareness (PA) and word reading. L2 studies have also confirmed that learners' L1 PA was a strong predictor for their L2 word reading at a later stage. This study was conducted to further examine the relationship between L2 PA, L1 PA and L2 word reading.

Twenty 3rd graders and sixteen 5th graders from an elementary school located in a suburban area of central Taiwan voluntarily participated in the study. A Chinese PA test, an English PA test, and an English word reading test were administered to the participants within a week in their English classrooms. The participants were tested on their ability to distinguish vowels and consonants in the onset or coda positions. They were asked to choose the most appropriate answer from three options for each test item on the Chinese and English PA test sheets after listening to the test items read loud by the researcher. They were also asked to read out loud 30 words on an English word reading test including 15 real words and 15 pseudowords.

The results from the regression analyses show that the correlation between English PA and English word reading was significant in both the 3rd grade group (r

= .721, p < .001) and the 5th grade group (r = .620, p = .005). In the 3rd grade group, English PA can explain 52% of the variance of the pupils' English word reading test scores. In 5th grade group, 38.4% of the variance of the pupils' English word reading test scores can be explained by English PA. Chinese PA, on the other hand, was not significantly correlated with English word reading in either group. A significant correlation was found between English PA and Chinese PA in the 3rd grade group (r =.398, p = .041) and in the 5th grade group (r =.352, p = .048). The results imply that although Chinese is a non-alphabetic language and English is an alphabetic language, the participants' development in L1 Chinese PA could possibly make significant contribution to their development in L2 English PA and hence indirectly make contribution to their English word reading. T-tests were also performed to examine whether there existed a significant difference between the two groups in terms of their performance on the tests. The results show that the 5th graders performed significantly better than the 3rd graders on the Chinese PA test (t = -3.117, p = .004), English word reading test (t = -4.350, p < .001) and also on the English PA test (t = -2.260, p = .030).

Keywords: phonological awareness, English phonological awareness, Chinese phonological awareness, English word reading

國小三五年級學童中英文音韻覺識測驗與單字閱讀能力之關聯性研究

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摘要

音韻覺識與字彙閱讀的關聯性已經於拼音文字或非拼音文字為母語的研究中被證實。第二語言的研究中也證實了母語的音韻覺識可以預測未來第二語言的字彙閱讀能力。本研究則更進一步探討母語音韻覺識、第二語言音韻覺識與第二語言單字閱讀三者的關聯性。

本研究的受測對象為台灣中部郊區的二十位三年級以及十六位五年級學童。研究者在一周內於受測者的英文課室中施予中文音韻覺識測驗、英文音韻覺識測驗與英文單字閱讀測驗。本測驗主要測試受測者中文、英文的母音與子音在首音與尾音位置的判讀能力。英文與中文的音韻覺識測驗中，每題皆有三個選項，研究者會唸出三個選項，受測者則需在這三個選項當中選出最適當的答案。英語字彙閱讀測驗中，受測者則被要求依序唸出測驗卷中十五個真字與十五個符合發音原則的假字。

本測驗的結果經過回歸分析後指出三年級學童的英文音韻覺識與英文單字閱讀有顯著性相關($r = .721$, $p < .001$)；五年級學童的英文音韻覺識與英文單字閱讀亦然($r = .620$, $p = .005$)。三年級學童中，英文音韻覺識可以解釋 52%的英文單字閱讀表現；38.4%的五年級受測者的英語字彙閱讀的表現則可被英語音韻覺識解釋。反之，中文音韻覺識則無法找出與英文單字閱讀的直接性關聯。本研究更進一步探究中文音韻覺識與英文音韻覺識的關聯，研究結果指出三年級($r = .398$, $p = .041$)與五年級皆有顯著性相關($r = .352$, $p = .048$)。以上研究結果可以暗示雖然中文不如英文是拼音文字，但是中文母語的音韻覺識卻可能對英文音韻覺識帶來

正面的影響；又因為英文音韻覺識與英文單字閱讀的相關性，則中文音韻覺識可能間接影響英文單字閱讀。再者，三年級與五年級的組間差異則以 T 檢定分析之。結果指出，五年級學童在中文音韻覺識測驗中表現顯著高於三年級學童($t = -3.117$, $p = .004$)；英文音韻覺識測驗表現也顯著高於三年級學童($t = -4.350$, $p < .001$)。最後，同樣的關係也存在於英文單字閱讀中($t = -2.260$, $p = .030$)。

關鍵字：音韻覺識、英文音韻覺識、中文音韻覺識、英語單字閱讀

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

There has been a heated debate in Taiwan regarding the best time for young learners to begin learning English as a foreign language (EFL) in the public school system. The debate mainly centers on whether the pupils should focus on developing their Chinese literacy skills only or should spare time developing English language skills. Some scholars claim that children should not start learning English as a foreign language (EFL) at a young age, because it might affect the structure of their native language. (Lee, 2004), whereas others argue that for any language learning, the earlier it is begun, the better, and young learners can benefit greatly from learning a foreign language from the socio-linguistic and psycholinguistic point of view (Mitchell and Myles, 1998).

For much of previous history, the first year of junior high school was the starting point for most Taiwanese students to learn English. In the early 1990s, some elementary schools started to include English as an extracurricular course. In 1997, English was added to the elementary school curriculum as a required course in Taipei, Tainan, Keelung, and Kaohsiung (Chan, 2004). In 1998, half of the elementary

schools in Taiwan added English to their regular curriculum. The present practice appears to reflect the dominance of the latter viewpoint about learning English as L2 in Taiwan. This present view is partially based on the linguistic perspective of language learning.

According to Moats (2000), the ability to read is an essential skill that all children need to possess in order to be successful in school as well as in their adult life (Cited in Morton, 2011). For reading, word reading has been regarded as fundamental for effective reading. Successful word reading relies largely on the learner's ability to map word forms onto sounds. Research (Stuart & Coltheart, 1988; Bishop, Bird & Freeman, 1995) shows that learners' ability to identity grapheme-phoneme relationships is closely related to their phonological awareness (Cited in Morton, 2011). In other words, successful reading comprehension relies on good word reading ability, while good word reading ability in turn comes from good phonological awareness. As can be seen, PA plays an important role at least in the beginning stages of reading development. L1 researchers (e.g. Torgesen, Wagner, Rashotte, Burges, & Hecht, 1997; Huang & Hanley, 1997; Tan & Perfetti, 1998; Hu & Catts, 1998; Ho, Law & Ng, 2000; Spinks, Liu, Perfetti & Tan, 2000; Hogan, Catts, & Little, 2005; Verhagen, Aarnoutse, & Van Leeuwe, 2008; Shu, Peng & McBride-Chang, 2008) have carried out empirical studies and collected substantial

evidence to show that PA is a strong predictor of reading success for young learners at the elementary school level. This line of research has primarily been carried out in alphabetic language settings (English, Spanish, Dutch), though a few studies (e.g. Huang & Hanley, 1997; Tan & Perfetti, 1998; Hu & Catts, 1998; Ho, Law & Ng, 2000; Spinks, Liu, Perfetti & Tan, 2000; Shu, Peng & McBride-Chang, 2008) have been carried out in logographic language settings (i.e. Chinese).

Substantial evidence indicates the strong likelihood of linguistic transfer from L1 PA to L2 PA and hence its impact on L2 word reading. For example, Chinese as an L1 PA will influence the English as an L2 PA. However, only a few studies (e.g. Hu, 2008) have focused on the impact of logographic L1 PA on alphabetic L2 PA and word reading. This present study collected evidence to add to the database in this field as well as further illuminates issues of English teaching and learning in Taiwan.

1.2 Purpose of the Study

In the present study, the researcher attempted to examine the relationship between PA in Chinese as an L1, PA in English as an L2, and English as an L2 word reading. To be specific, the purpose of the present study was two fold: (a) to examine the relationship between PA in Chinese as an L1, PA in English as an L2, and word reading in English as an L2 for EFL young learners at different grade levels (i.e. 3rd

grade and 5th grade). (b) To compare the contributions of PA in Chinese as an L1 and PA in English as an L2 to word reading in English as an L2 between the two groups of learners and determine whether there was a significant difference between two different grade levels.

1.3 Significance of the Study

The present study sought to generate additional evidence for the L2 PA and L2 word reading data base by considering the impact of Chinese as an L1 on L2 learning. It has become a common practice in the United States to use the PA tests to identify children who may have reading difficulties in their later stage of literacy development. For example, in Hogan, Catts & Little (2005), children who did poorly on the PA test upon entering the kindergarten received special training on PA, while results showed that they gained a number of benefits from the training and became effective readers in a timely manner.

To the researcher's knowledge, studies conducted in Taiwan, an EFL setting, usually recruited a batch of participants at kindergarten and traced their word reading development all the way through the 4th grade. Such longitudinal studies were interested in examining the predictive power of pupils' PA in their word reading in the later years of English learning, and based on their confirmatory findings, wished to

provide help to those with poor PA, as is done in the U.S. Using measures similar to those adopted in most PA studies, the present study, however, examined the contributions of young learners' PA in Chinese as an L1 and their PA in English as an L2 to their performance in English word reading. In other words, the present study focused on the explanatory power of PA in word reading. Such a study is much needed because most studies focus on the predictive power of PA in word reading. Thus, the present study intended to investigate the phenomenon as it presently exists in the research site. Furthermore, the researcher wished that the findings of the present study can act as a reference for remedial teaching in elementary schools. In other words, before teachers discover that the students have problems in reading English words, they can examine whether their students also have problems with their Chinese PA.

1.4 Research Questions

The present study was designed to answer the following research questions.

1. Are there any significant associations between phonological awareness in Chinese as an L1, phonological awareness in English as an L2 and English word reading for Taiwanese 3rd graders who learn English as a Foreign Language? How strong are these associations?

2. Are there any significant associations between phonological awareness in Chinese as an L1, phonological awareness in English as an L2 and English word reading for Taiwanese 5th grade who learn English as a foreign language? How strong are these associations?

3. Are there any differences between 3rd grade and 5th grade in terms of the participants' Chinese phonological awareness, English phonological awareness and English word reading performance?

1.5 Definition of Terms

1.5.1 Phonological Awareness

In the present study, phonological awareness (PA) refers to learners' consciousness of the mapping of word forms onto their pronunciation. It can be seen as a metalinguistic skill that involves manipulation of units of speech, such as words, syllables, intrasyllabic units and phonemes (Cheng, 2008).

PA is an essential skill in reading English words. For example, when the learners see a word, *map*, they will need to have the ability to recognize its separate phonemes (e.g. m-a-p), and put them together according to the grapheme phoneme correspondence rules (GPC) before sounding it out. Though Chinese is a logographic language and the GPC rules of English do not apply to Chinese character reading,

most reading researchers agree that PA plays an important role in the process of reading Chinese. The formation of 80% of Chinese characters basically consists of morpheme and phoneme elements. The phonetic radicals provide helpful hints to the pronunciation of the characters (Katz & Frost, 1992). When pupils begin to learn Chinese characters, the awareness of phonetic radicals in addition to morphological elements is an important component of their literacy development. For instance, when learners learn to read 爸 (bà), the awareness of the vowel of the phonetic radical 巴, (ba) can help the learners develop their word reading abilities. Thus, research tends to support the important role PA plays in Chinese character reading.

1.5.2 English Word Reading

In the present study, English word reading refers to the reading aloud of words in the phonetically correct manner. For example, when a learner sees *stop*, he / she should be able to read it out loud correctly as [stap].

CHAPTER TWO

REVIEW OF THE LITERATURE

The present study examined the relationship between Chinese phonological awareness, English phonological awareness and English word reading. The following sections first provide a detailed review of the importance of phonological awareness in word reading both in English as an L1 and Chinese as an L1. Then, research on cross linguistic transfer is reviewed, including transfer from alphabetic L1 to alphabetic L2 (e.g. English as an L1 transfer to Spanish as an L2 learning), and transfer from logographic L1 to alphabetic L2 (e.g. Chinese as an L1 transfer to English as an L2 learning). A variety of PA tests have been developed and used in PA studies. Thus, phonological awareness tests is also reviewed in this section.

2.1 Phonological Awareness in First Language Setting

2.1.1 Alphabetic Orthography

Many Phonological awareness studies have been conducted in alphabetic L1 setting (e.g.Torgesen, Wagner, Rashotte, Burges, & Hecht, 1997; Hogan, Catts, & Little, 2005; Verhagen, Aarnoutse, & Van Leeuwe, 2008). Typically, PA researchers recruited kindergarteners or first graders as participants. They administered different

types of PA tests and English word reading tests to the participants and had them retake the tests each year after the initial test for a few years. Their aims were to examine the strength of association between PA and word reading over the primary school years. It is believed that the better one's phonological awareness, the better their word reading ability is. For instance, Torgesen, Wagner, Rashotte, Burges, & Hecht (1997) conducted their study in Florida, USA. Two hundred and sixteen kindergarteners from six different elementary schools participated in this study. The researchers gave seven different tests categories to the participants including a PA analysis test consisting of a phoneme elision test, a sound categorization test, and a phoneme segmentation test. The phoneme elision test is similar to the sound oddity test of Gottardo et al. (2001). In it, the researcher asked the participants to delete a sound from a word. For example, the researcher gave the participants a word such as *cup*, and then asked the participants to answer if they deleted the *k* sound, and pronounce the rest of the sound in the word. The second subtest is a sound categorization test, also similar to the sound oddity test of Gottardo et al. (2001). Participants must identify whether there was a different sound among the test items. The last subtest was phoneme segmentation. This test was also used in Sutherland Phonological Awareness Test (SPAT). The researcher read a word to the participant, for example, *cap*, and the participants must answer with the phonemes they heard, in

that case, *c-a-p*. The next category of test was the PA synthesis test. In this category, the participants were guided to pronounce the words and non words after the researcher reads the phoneme to them (e.g. the researcher would read b-a-l-l, and the participants would have to read ball.) The third category was the phonological memory test, which asked the participants to listen to a recorded sentence consisted of four to five words, and to repeat it. This test examined the participants' phonological memory. The fourth was the serial naming test, in which participants were guided to read a digit and a letter displayed on a card out loud as fast as they can. This subtest measured participants' naming speed. The word level reading measure asked participants to read a word out loud phonetically. Some of the words on the list given to the participants to read were pseudowords. The verbal aptitude measure was slightly different from word level reading measure. In the verbal aptitude measure, participants were asked to provide the meaning of the words correctly, in order to measure how good their vocabulary abilities were. The final measures were letter-name knowledge tests. In this test, a capital letter card was provided to the participants, and they must read it out loud. The seven tests were administered to the participants each year from kindergarten through 4th grade.

The results indicated that PA scores in kindergarten were significantly correlated with the 1st grade PA score ($r = .83$, $p < .05$), and this correlation also appeared in the

PA memory, the serial naming, and the word level reading tests. Not only did the score correlated between kindergarten to first grade, but also across different grade levels. These results could also be found between word-level reading and PA ($r = .96$, $p < .05$). The results in the relationship between PA and word- level reading also suggested that the higher PA score obtained, the more skilled the reader.

A reciprocal relationship was confirmed by later studies. Hogan, Catts, and Little (2005) conducted a large-scale study in which more than 7000 students participated. Only a total of 570 kindergarten children completed all the tests. The researchers administered a PA test, which included syllable and phoneme deletion (e.g. the participants were asked to delete one sound from a word read by the researcher), and a letter identification test. In the letter identification test, the participants were asked to read out the all the letters that printed on the test sheet. The last two tests comprised a word reading and a phonetic decoding test. All the tests were tested three times respectively when they were in kindergarten, second grade, and fourth grade. The test score were analyzed by path analysis, which is similar to regression analysis. The significance of the path coefficient was examined by z test ($\beta > 0$). The result indicated that kindergarten PA could predict second grade word reading. ($\beta = .37$, $p < .05$) Furthermore, when the participants were in the fourth grade, the researchers found that the word reading performance in second grade, could predict the PA when

the participants were fourth graders. ($\beta = .21$, $p < .05$) The researchers hence argued that PA can be regarded as an important factor in early reading development and word reading development can also enhance PA development. In other words, PA and word reading performance have a reciprocal relationship.

Many previous studies confirmed that phonological awareness can predict word reading accuracy. Verhagen, Aarnoutse, Van Leeuwe (2008) investigated the relationship between phonological awareness, naming speed and word reading accuracy in a longitudinal study. The aim of the study was to determine the relationship between phonological awareness and naming speed when the participants were in the 2nd and 8th months of grade 1, and also to examine the relationship between PA, naming speed, and word recognition accuracy at 9th months of grades 1 and 2. Two hundred and twenty six participants were invited from two different elementary schools in an urban area of Holland. All the participants took part in the three stages of test. The tests included phonological analysis of pseudowords, which measured the participants' ability to analyze a pseudoword into its constituent phonemes. Furthermore, based on the difficulty level, this test was separated into pseudowords test 1 (e.g. ig) and test 2 (e.g. koosgruip). The next test was a phonological synthesis test, which measured the participants' ability to reconstruct a word from its constituent phonemes (e.g. the researcher provided i-c-e, which the

participants should read out as *ice*). A phonological synthesis of pseudowords measured the participants' ability to construct a pseudoword from its constituent phonemes. The last test was similar to the phonological synthesis test. The only difference was that all the words that provided in the phonological synthesis of pseudowords are all non words, while phonological syntheses test, all real words were included. Further, in this test, two level tests were distributed to the participants, PA synthesis pseudowords 1 (e.g. oos) and 2 (e.g. stoukwerp). Another section of the test measured the naming speed. The final section consisted of the grades one and two word recognition accuracy test. In this accuracy test, all the participants were guided to read out loud 100 words without a time limit. All the tests were given to the participants in three different stages. In stage 1 the researchers gave the participants PA test and naming speed test after they have received 2-3 months of formal school instruction. In stage 2, all the participants received the tests again and a word recognition accuracy test was added after they received 8-9 months of school instruction. Stage 3 was the time that all the participants received 19 months of the formal school instruction. However, at this stage, the participants were tested only by word recognition accuracy test.

The results indicated that the naming speed and phonological synthesis tests were not significantly correlated (r ranged from .06 ~ .26). It is clear that

phonological awareness and naming speed are two independent factors that each affects word reading accuracy. The other aim of this study was to examine which of the factors, naming speed or phonological awareness, has the stronger relationship with word reading accuracy. The results showed that phonological awareness was the factor that is significantly correlated to word reading accuracy ($r = .64$, $p = .016$). Nevertheless, naming speed was not significant correlated to word recognition accuracy ($r = .05$, $p = .000$)

2.1.2 Logographic Orthography

There is little doubt that PA makes a great contribution to word reading in alphabetic L1 learning. Research had also shown that PA plays a significant role in Chinese character reading. Chinese is known as logographic-phonetic system, which means a typical Chinese character is composed of two different parts, one to provide visual cues to the meaning of the word, the other to provide partial phonetic symbols. For instance, when readers read 材(material), the left-hand radical 木 (tree) indicates that this character is related to wood, while the right hand radical 才 signals the sound of the character, (tsai). This is very different from alphabetic orthography. Many researchers hypothesize that when Chinese readers decode Chinese characters, they might rely more on the visual and semantic decoding procedure than on phonological

procedures (Siok, 2001; William & Bever, 2010). However, recent research contented that phonetic decoding made a significant contribution to reading Chinese (Huang & Hanley, 1997; Tan & Perfetti, 1998; Hu & Catts, 1998; Ho, Law & Ng, 2000; Spinks, Liu, Perfetti & Tan, 2000; Shu, Peng & McBride-Chang, 2008). The following discussion reviews empirical research supporting this view.

Huang and Hanley (1997) conducted their study in Changhua County in central Taiwan. The researchers compared the effect of visual decoding skills, which means that when participants read a character, they relied more on memorizing the form of the character than on the pronunciation of the character and their phonological skills. The researchers recruited 40 first graders from an elementary school in Changhua. Four tests were used in this study. An IQ test was given to collect evidence that all the participants had average intelligence. Chinese character recognition tests were also given to assess the character recognition ability of the participants. In this test, the participants had to read out ten words that were randomly chosen from a textbook that was published by the National Institute for Compilation and Translation (1967) of Taiwan. Furthermore, visual skill test and phonological awareness test, which include odd word out and phoneme deletion test, were also administered. The researchers were interested in investigating which skills would make a significant contribution to the participants' character recognition performance. The participants were tested three

times on all the tests: first at the beginning of the semester, a second time ten weeks after formal school instruction began, and a final time at the end of the first year of elementary school. Pearson correlations were calculated to examine the relationships between character reading, visual skill, and phonological skills.

According to the results, Chinese recognition was only significant correlated with the visual skills in sessions two and three (session 2, $r = .33$, $p < .05$; session 3, $r = .39$, $p < .05$) However, in the first session of visual skill test, no significant relationship to word recognition ($r = .25$, $p < 0.5$) was found. The results were different for phonological awareness. In this study, two subtests were included in the phonological awareness test: odd word out and a phoneme deletion test. Both subtests showed a significant correlation to each other in all three sessions, especially in the first session, which showed the highest correlation among the three sessions. The first odd word out test had the highest relationship with character recognition ($r = .50$, $p <.001$) Furthermore, in the phoneme deletion test, the first test was also the most significantly related to the character recognition test ($r = .61$, $p < .0001$). These findings showed that although Chinese is considered to have logographic orthography, phonological awareness also plays a very important role in learning to read Chinese.

The evidence that PA is a predictor for character reading performance also can be found in Hu and Catts (1998). Hu and Catts invited 50 first graders in Taipei city,

Taiwan, an urban area, to participate in this study. All the participants were asked to take six different tests which consisted of phonological awareness, visual skills and word recognition. The researcher used sound categorization task to distinguish whether the participants have the ability to identify different sounds in each set of test items. This test is similar to the odd word out test (Huang & Hanley, 1997). The visual skill test assessed whether the participants have the ability to memorize the correct shape of the character they read. The participants were shown a set of three cards with different characters on it. The participants were allowed to read the character once, and then all the cards were placed face down and repositioned. The participants were then asked to put the three cards into the order they had seen first seen them in. The last section of the test was a word reading test. In this section two tests were included, alphabetic word reading and logographic character reading. Alphabetic word reading tested the participants' abilities when they read the word written in Zhuyinfohao, a phonetic symbol system for representing the sounds of Chinese characters used in Taiwan. The logographic character reading asked the participants to read Chinese characters. The first week of the semester, the researchers gave the participants phonological processing tests and visual memory tests. Two weeks after the tests, the participants received two word reading tests, alphabetic word reading, and logographic character reading test.

The relationship between PA and Chinese character reading was examined in Hu and Catts (1998). Pearson's product-moment r was calculated. Statistics showed a significant correlation between phonological processing and Alpha (r ranging from.55 to .76, $p < .001$) and phonological processing and Logo (r ranging from .53 to .68, $p < .001$) However, results of the visual memory tests showed no significant association with the two Chinese character reading tests (Coefficients ranging from .03 to .16, $p > .05$). This finding was similar to the findings for alphabetical languages. Thus, phonological awareness can also be a predictor for future character reading performance in logographic languages.

Although PA plays an important role when native Chinese speakers learn to read Chinese characters, visual skills, rely on memorizing the form of the Chinese character when learners learn to read Chinese, also affects native Chinese speakers' Chinese character reading. For example, Siok (2001) recruited 154 pupils including 37 first graders, 36 second graders, 42 third graders, and 39 fifth graders from a local elementary school in Hong Kong. Participants took a PA test, a visual processing skill test, an orthographic processing skill test, both visual-orthographic and phonological processing tests, and a reading test. For each test, several subtests were provided. For instance, the PA test contained a rhyme alliteration test, a tone oddity test, and sound isolation and sound blending tests, using PA synthesis and analysis skills to evaluate

the phonological awareness of the participants. For the visual processing skill test, the researcher provided several cards with Chinese characters printed on them. Participants were allowed to see the cards in order once, and the cards were then shuffled. Participants had to place the cards in their original order. This visual test was similar to Huang and Hanley's (1997) visual skills test. In the test of orthographic processing, the participants were asked to do two tasks. First, they had to identify characters with the components that the researcher provided. For example, participants were asked to find all the words containing the radical 口. Next, participants had to find which character is wrong and then correct errors. For example, the participants were asked to read a set of twenty characters, ten correct and ten incorrect. After reading all the characters, the participants were asked to point out which ten characters had mistakes and to rewrite them in their correct forms. The final test was a reading test. To determine whether the participants can read out loud each character, Siok (2001) designed two subtests for character reading, a character reading test and a two character word reading test. Both tests allowed participants to read the characters out loud phonetically without a time limit. Each test was provided differently based on the participants' proficiency levels. Participants from lower grades were given easier test items while participants from higher grades were given more difficult test items. The data were analyzed by hierarchical multiple regression

analysis to examine the correlation between visual skills and phonological skills in Chinese character reading.

The results indicated that PA is not significantly related to Chinese character reading in the first grade, but it is correlated with character reading among higher grade level participants. In the first grade, visual skill was the only significant predictor of Chinese character reading ($r = .392$, $p<.01$) (Siok, 2011). For second graders, the PA test was significantly correlated with character reading ($r = .493$, $p < .01$), and the similar results were also found in the third and fifth grades. For third graders, PA was highly correlated to Chinese character reading ($r = .423$, $p < .01$). Similarly, for fifth graders PA was also significantly correlated with Chinese character reading ($r = .451$, $P < .01$). This evidence shows that as students learn to read Chinese, they will rely more on visual skills when they are in the early learning stages, but as they gradually become a skilled reader, PA plays a more important role in learning to read Chinese characters.

In sum, previous studies conducted in logographic language settings (Chinese) show that although visual skills can affect character reading (Siok, 2001; Williams & Benver, 2010), phonological awareness also has a significant effect on (Chinese) character reading.

2.2 Cross Language Transfer on Phonological Awareness

As stated in the previous section, it is widely accepted among researchers that phonological awareness plays an important role in word reading in L1 settings. Cross linguistic evidence had also been found in studies where learners perform well in PA of their mother tongue also perform well in PA of their L2. The following sections describe studies investigating the role PA plays across languages.

2.2.1 Alphabetic L1 and Alphabetic L2

Mishra and Stainthrop (2007) reported that PA in Oriya can significantly contribute to word reading in both Oriya and English. Oriya is an alphasyllabary language and the official language in Orissa, India. The researchers invited 99 fifth graders, and gave them four tests, including an English word reading test, an Oriya word reading test, an Oriya PA test, and an English PA test. All tests were conducted in an oral form. The participants were tested individually in a quiet room. Hierarchical regression analyses were conducted. The results indicated that PA in both English and Oriya were significantly correlated with English word reading. In Mishra and Stainthrop, although the orthography of Oriya is not the same as English, Oriya PA still correlated with English word reading. The researchers thus concluded that the results were evidence of cross-linguistic transfer.

In another study, Anthony, Solari, Williams, Schoger, and Zhang (2009) recruited Spanish immigrants living in America as participants. One hundred and fifty-eight students were enrolled in an ELL program. The researchers examined whether their PA in Spanish made contributions to their English word reading. Thus, English PA, Spanish PA and English word reading test were included in this study. Path analysis was used to analyze the hypotheses of the researchers. Between Spanish PA and English PA the path was significant ($\beta = .24$, $p < .01$). Between Spanish PA and English word reading ($\beta = .27$, $p < .01$) the path was also significant. The results support the hypotheses of the researchers. The PA in Spanish L1 did contribute learners' learning English as their L2.

2.2.2 Logographic L1 and Alphabetic L2

Gottardo, Yan, Siegel, and Wade-Woolley (2001) conducted a study in Canada. The researchers invited 65 students whose native language was Cantonese and who were learning English as their second language. The researchers administered Chinese PA tests, English PA tests, and English and Chinese word recognition tests to the participants. The Chinese PA test contained rhyme detection, tone detection, rapid automatized naming, and pseudoword repetition tests. The English PA test included rhyme detection, phoneme detection, phoneme deletion, rapid automatized naming,

and pseudoword repetition tests. The results suggested that PA in Chinese as an L1, and PA in English as an L2, were correlated. The data also showed relationships between Chinese rhyme detection, English rhyme detection ($r = .52$, $p < .001$) and English phoneme deletion ($r = .54$, $p < .001$) Generally speaking, if the participants could do well on the Chinese PA test, they also scored high on the English PA test. This result was considered evidence in support of cross-linguistic transfer from logographic L1 PA to alphabetic L2 PA and word reading.

Hu (2008) conducted a PA study in Taipei, an urban area of Taiwan. She invited 74 elementary school students from the third and fifth grades and had them take the Chinese PA test at the beginning of one semester in order to classify them into different groups based on their performance on the Chinese PA test. During the semester the teacher taught them color words (i.e rust, ecru, sage, and spruce) by asking them how to pronounce the words, and also used pictures for them to identify the meaning of the words. At the end of the semester, they were tested on the color words to see if there was any difference between the two groups on learning the color words. Further, the researcher also asked the participants to read the synonyms of all the color terms in order to test how fast they can read out all the words by measuring their naming speed. The results showed that the students with higher scores in their L1 PA test learned the target L2 words more rapidly on the test. This result can also be

taken as evidence of cross-linguistic transfer. To sum up, transfer of PA seems to be so prevalent that it has significant impact on English L2 word reading whether the L1 is an alphabetic or logographic language.

2.3 Phonological Awareness Tests

Researchers have developed a variety of phonological awareness tests to examine the effect of PA on word reading (Huang & Hanley, 1997; Hogan, Catts & Little, 2005; Hu, 2008; Verhagen, Aarnoutse & Van Leeuwe, 2008; Shu, Peng & Chang. 2008; Anthony, Solari, Williams, Schoger & Zhan, 2009; O'connor, Arnott, Mclntosh & Dodd, 2009). The following sections review the tests used by Gottardo, Yan, Siegal and Wade-Woolley (2001); Ho, Law and Ng (2000); Hu and Catts (1998), and Siok & Fletcher (2001) for measuring Chinese phonological awareness, and Gotardo, Yan, Siegel and Wade-Woolley (2001) and Neilson (1995) for measuring phonological awareness.

2.3.1 Chinese Phonological Awareness Test (CPA)

According to Zhang and Simon (1985), Mou and Anderson (1981), and Yik (1978) conducted their studies to examine working memory. Their evidence also indicated that when native Chinese learners read Chinese characters, the phonological

transformation is more efficient than the visual coding, because phonological skills can enhance learners' working memory which can accelerate the word decoding and reading process (Cited in Koda, 2004). Subsequently, many studies have been conducted to examine the relationship between Chinese PA and Chinese character reading, resulting in the development of several Chinese PA tests (Gottardo, Yan, Siegal & Wade-Woolley, 2001; Ho, Law & Ng, 2000; Hu & Catts, 1998; Siok & Fletcher, 2001). Two main categories, Chinese PA synthesis and Chinese PA analysis, will be summarized in the following sections (Table 2.1).

Table 2.1. Major Categories of Chinese Phonological Awareness Tests

	PA synthesis tests	PA analysis tests
Purpose of the test	In order to help the researcher identify the participants' ability to combine the phoneme together.	In order to help the researcher distinguish the participants' onset-rime awareness.
Example	Rapid Automized Naming Zhuyinfuhao Spelling Zhuyinfuhao blending	Rhyme Detection Rhyme Alliteration Oddity Test Sound Isolation Chinese Sound Deletion Chinese Sound Oddity Test
Studies	Hu & Catts (1998), Gottardo, Yan, Wade-Woolley (2001), Siok (2001), Hu (2008)	Huang & Hanley (1997), Gottardo, Yan, Wade-Woolley (2001), Siok (2001), Hu (2008)

2.3.1.1 Chinese PA Synthesis Test

In the Chinese PA synthesis test Rapid automized naming (RAN) and Zhuyinfuhao spelling test were commonly used (Hu & Catts, 1998; Gottardo, Yan, Wade-Woolley, 2001; Siok, 2001; Hu, 2008). In the RAN test, characters with phonetic radicals were provided to the participants in order to examine the participants' ease of retrieval of phonemes in their first language. RAN was also used in Gottardo et al. (2001). In this RAN test, the participants were provided with an 8x6 array of characters, and asked to read all the characters in the array out loud. They have to follow the rules of starting reading from left to right and from top to bottom. The participants' performance and response time were recorded.

Zhuyinfuhao is a phonetic symbol system for Chinese that gives the pronunciation of the characters. In Chinese characters, phonetic symbols are the parts that help the learners to read the character (e.g. 爸, 巴 is the phonetic symbol that help pronunciation). However, Zhuyinfuhao is the system that invented to help the learners know the phonetic parts of the character. In this way, Zhuyinfuhao is used in PA synthesis test because it is the closest form of Chinese PA, compared to alphabetical languages. The PA synthesis test examined whether the students have the ability to combine phonemes together so that they can pronounce the character.

Zhuyinfuhao was used in Siok (2001) and Hu (2008). In Siok (2001) a sound blending test was combined with the Zhuyinfuhao reading test. The researcher said two separate sounds and asked the participants to combine the two different sounds to form a character. For instance, the researcher read ㄏ[h] and ㄠ[au] to the participants, and the participants were asked to combine those two sounds together and pronounced them as ㄏㄠ (hau). In Hu (2008), the PA synthesis was known as the Zhuyinfuhao spelling test. Thirty three wordlike items were provided to the participants. In this Zhuyinfuhao spelling test, 10 high frequency words, 13 low frequency words and 10 pesudowords were included to examine the participants' ability to perform PA synthesis.

In PA synthesis test, participants are evaluated on whether they have the ability to combine the phonemes together and read out the characters phonetically correct. Thus, in these previous studies, the RAN, the Zhuyinfuhao Spelling test, and the Zhuyinfuhao blending test were used to examine the participants' ability to perform PA synthesis.

2.3.1.2 Chinese PA Analysis Test

The PA analysis test was designed to assess the participants' onset-rime awareness. If the participants could distinguish the different sounds and rhymes in this

section of the test, then they would be found to have higher PA analysis abilities. For example, when the researcher says a set of three Zhuyingfuhao symbols ㄨㄟˇ (wei), ㄇㄟˇ (mei), and ㄅㄢˇ (ban) to the participants, and then asked them to point out which one does not rhyme with the others, the participants must indicate ㄅㄢˇ. Hence, sound detection, sound deletion, rhyme detection, sound oddity, and rhyme deletion tests are used in this PA analysis test.

Chinese sound deletion, Chinese sound oddity, rhyme deletion, and sound deletion tests were used in Huang and Hanley (1997). In detection tests, the researchers said a set of three characters to the participants, and the participants had to determine which character did not rhyme with the others, or which character did not share the same sound as the others. As for the deletion test, the participants were instructed to delete certain sounds in the character spoken to them by the researcher, and then read the remaining sounds out loud. Ten test items were included in each test section. Similar tests can be found in other studies (Gottardo, Yan, Wade-Woolley, 2001; Siok, 2001; Hu, 2008).

To sum, in the present study, the Chinese PA analysis test was used as the form of Chinese sound deletion test and Chinese sound oddity test used to examine the participants' Chinese PA. Because PA synthesis tests assess participant ability to read the character out loud, which was similar to character reading, and the present study

didn't examine Chinese character reading ability, PA synthesis tests were excluded from the present study.

2.3.2 English Phonological Awareness Test (EPA)

English phonological awareness has been an important issue in the research field of English word reading, and English phonological awareness. Many researchers believe that young children with good phonological awareness will perform better on English word reading in future reading development (Bowey, Cain & Ryan, 1992; Bowey, Cain& Ryan, 1992; Gottardo, Yan, Siegel & Wade-woolley, 2001; Siok, 2001; Chikamatsu, 2006; Mishra & Stainthorp, 2007; Anthony, Solari, Williams, Schoger & Zang, 2009; Morton, 2011). Many tests of English PA have been designed to measure this (Gottardo, Yan, Siegel & Wade-Woolley, 2001; Neilson 1995). Furthermore, these tests can be classified into two main categories, PA synthesis and PA analysis, same as with Chinese PA tests (Table 2.2)

Table 2.2.Major Categories of English Phonological Awareness Tests

	PA synthesis tests	PA analysis tests
Purpose of the test	In order to help the researcher identify the participants' ability to combine the phoneme together.	In order to help the researcher distinguish the participants' onset-rime awareness.

Table continued

	PA synthesis tests	PA analysis tests
Example	Pseudoword Reading Non Word Reading	Rhyme Detection Test Phoneme Detection Test Phoneme Deletion Test Phoneme Elision Test Sound Categorization Phoneme Segmentation
Studies	Neilson (1995), Gottardo, Yan, Wade-Woolley (2001), Verhagen et al (2008)	Neilson (1995), Torgesen et al (1997), Gottardo, Yan, Wade-Woolley (2001)

2.3.2.1 English PA Synthesis Test

In the field of English PA testing, PA synthesis is popular, because it can help the researcher recognize whether the participants have the ability to read out the words by reading or listening to the separate phonemes. Pseudoword reading and non-word reading are the main tests used to evaluate PA synthesis ability (Neilson, 1995; Gottardo, Yan, Wade-Woolley, 2001; Verhagen et al, 2008). To prevent orthographical familiarity, pseudoword or non-word readings were chosen.

In Gottardo et. al (2001), a psuedoword test was used because their participants were from classes of different language levels. They included 18 word-like stimuli and all the test items were presented by a video tape. The 18 pseudowords were

presented on a screen. When the participants saw the words, they had to read the word out loud or phonetically.

Another example is the Sutherland Phonological Awareness Test (SPAT) developed by Neilson (1995). SPAT is the most popular PA test among pre-school educators in the United States. It was specially designed for determining the problems of the students who need help with literacy. SPAT was thus designed for diagnostic purposes. Thus, many aspects of PA testing are included. One of the subtests is a non-word reading test. The test takers of this subtest were informed that none of the words in the test were real words, but they had to read it out loud, and their performance would be recorded. Non-words are used to avoid orthographical familiarity. If this effect can be avoided, then the production from the students will closely rely on their phonological processing.

2.3.2.2 English PA Analysis Test

The second category of English PA test is the PA analysis test. The English PA analysis test is a way to examine participants' onset-rime awareness. If participants have good onset-rime awareness they should not experience problems with deleting phonemes or detecting phonemes and vowels. Phoneme deletion, phoneme detection, rhyme detection, and sound categorization were commonly used in previous studies.

In Gottardo et. al (2001), rhyme and phoneme detection were used. The researchers asked to participants to listen to a set of three words, and distinguish which word did not rhyme or share the same sound as the others. However, the test was not conducted in an oral format. An answer sheet was given to each test taker, so they could circle the correct answer on the answer sheet. In each subtest, ten items were included.

In SPAT, the subtest of rhyme detection can be seen as representative of PA analysis. This subtest of SPAT was similar to that used in Gottardo, Yan, Siegel and Wade-Woolley (2001). However, Gottardo, Yan, Siegel, and Wade-Woolley designed this subtest as a multiple choice question, which is different from SPAT. In SPAT, the test administrator had to provide several pictures and ask the participants to name the picture. They then they have to identify the rhyming words. Unlike Gottardo et.al, SPAT examines whether the participants have the ability to distinguish rhymes from a top-down perspective. Gorttardo et al.'s test was designed using a bottom-up perspective to distinguish rhymes. In SPAT, the participants must have the ability to identify the exact rhyme, but in Gottardo et al's, the participants have to identify the word different from the other two.

Based on the tests reviewed above, both PA analysis and PA synthesis tests have been widely used in previous research. Therefore, in the present study, these two tests

were used to examine the relationship between PA and word reading. In the present study, an English sound deletion test and an English sound detection test will be used as the PA analysis tests to evaluate participant ability to analyze English phonemes. As previous studies show, pseudoword reading can facilitate learners' phonological processing (Gottardo et. al, 2001). Thus, pseudoword reading was used as the PA synthesis in the present study.

2.4 Participants of Previous Studies

The educated context of the present study was different from previous studies. As demonstrated in Table 2.3, two of the studies were conducted in Taipei, Taiwan, one in Beijing, China; one was in Vancouver, Canada, one in urban areas of the Netherlands, and another in a city of the U.S.. Thus, a total of six studies were conducted in large cities. It is important to know the difference between urban and rural areas in Taiwan. In urban areas the socio-economic level of the participants' families is in general higher than that of rural areas. Hence in cities, parents provide greater learning resources to their children, such as cram school classes, books, or computers. Pupils are also more likely to be exposed to the target language (i.e. English) which is prevalent in the urban areas of many industrialized countries. Thus, pupils in urban areas may have begun developing their PA earlier in life than students

in the rural areas.

By contrast, in the present study, given the low socio-economic status of the families and the large proportion foreign spouses, the school seemed to be the major, if not the only place where the participating pupils were exposed to Chinese and English language reading materials. The present study targeted this population, because they can provide greater information on the learning differences between Chinese PA and English PA when evaluating the importance of PA on younger learners' literacy development.

Table 2.3.Participants of Previous Studies

Studies	Total number	Age	Location
Hu & Catts (1998)	51	6 years ten months (Kindergarten)	Taipei, Taiwan
Gottardo, Yan, Siegel and Wade-Wooley (2001)	65	5~6 year-old (Kindergarten)	Vancouver, Canada
Shu, Peng, and Chang (2008)	146	2~5 year-old (Kindergarten)	Beijing, China
Hu (2008)	74	8~9 year-old (Grade1~2)	Taipei, Taiwan
Verhagen, Aaroutse, Leeuwe (2008)	226	5 year-old (Kindergarten)	Urban areas in Dutch
Anthony, Solari, Williams, Schoger, and Zhang (2009)	640-800	3~4 year-old (Kindergarten)	A large city in Texas, USA

CHATER THREE

METHODOLOGY

The present study aimed examine the relationship between Chinese phonological awareness (Chinese PA), English phonological awareness (English PA), and English word reading for young Taiwanese EFL learners in two different grade levels of elementary school (Grade 3 & Grade 5). The study also examined whether there was any differences by comparing the contributions of Chinese PA and English PA to English word reading between the two grade-level groups. The following sections provide detailed descriptions of the participants, the instruments, the data collection procedure, and the methods of data analysis.

3.1 Participants

A total of thirty-six students participated in the present study. Two classes of the third graders, each consisting of 10 students, and one class of the 5th graders consisting of 16 students were recruited. The target school is a small school which had at most 200 students, located in a rural area of Taichung City. The students' family backgrounds were very different from those of urban areas. Most of the students came from families with low socio-economic status. Some mothers were originally from

foreign countries. Thus the languages that were spoken in their household vary and may include Chinese, Taiwanese, Hakka, Vietnamese, and Indonesian. Therefore, in the present study, the participants' Chinese and English phonological awareness and word reading ability might be related to their family background.

Before the research was conducted, the interview with the participants' homeroom teacher and English teacher was held. The information collected from them shows that all pupils participating in the present study were normal students with no reading difficulties. Furthermore, the third grade group had learned at most 200 words of the 1200 word list published by MOE. The fifth grade group had learnt at most 500 words of the 1200 word list.

3.2 Instruments

Three tests and one questionnaire were used to collect data for the present study. Three tests consisted of a Chinese PA test, an English PA test, and an English word reading test. The questionnaire included questions on participants' background information. The following paragraphs provide detailed descriptions of each of the instruments.

3.2.1 The Student Background Questionnaire

A questionnaire was designed to collect the demographics about the participating pupils, to be filled out by their parents. The consent of the parents was vital to safeguarding both the participants and the study. Thus, the first part of the questionnaire was a statement regarding the purpose of the study and the procedures of data collection. Parents were assured that the information they provided remain anonymous and were used only for data analysis in the present study. Then the parents were asked to indicate whether they agreed for their children to participate in this study. If they gave consent, they can proceed to answer the questions that followed. If not, their children were excluded from participating in this study. In order to recruit as many participants as possible, the researcher presented all the time at the research site to explain to the parents the purpose of the study.

The second part of the questionnaire was adopted from Cheng (2008). Cheng designed a questionnaire to investigate what languages his participants used at home in order to determine whether household language was an important factor in the participants' performance on the Chinese PA test. Modifications to this instrument were made to fit the needs of the present study. For questions related to the languages used at home, the researcher asked the parents of the participating pupils to list the languages used at home in the order of frequency of use. Other questions were related

to the reading experience the parents had with their children either in English or Chinese (e.g. the time the parents spent reading to their children). A few questions were designed gain information about the background of the participants' family, such as the birth place of both parents. All the questions were designed in a way that the answers may help the researcher further interpret the results of the study. The questions in the questionnaire for the present research can be seen in appendix II.

3.2.2 The Chinese Phonological Awareness Test (The Chinese PA Test)

Huang and Hanely (1995) emphasized the importance of Chinese PA in Chinese reading by pointing out that before children learned to read Chinese characters, they have to develop a certain degree of PA by learning explicitly or implicitly the phonetic radicals of Chinese characters. Many phonetic radicals are themselves characters (e.g. 馬, 工). In addition to learning the phonetic radicals, the pupils also have to learn Zhuyinfuhao. Zhuyinfuhao is a phonetic symbol system taught alongside Chinese characters in Taiwan classrooms, provided for pupils to gain phonetic information about the characters. This helps children to pronounce the Chinese characters before they learn to recognize them. Zhuyinfuhao is a basic tool for pupils learning to read Chinese in Taiwan.

Two subtests was included in the Chinese PA test, a Chinese sound deletion test, and a Chinese sound oddity test. These types of tests have been broadly used in

Chinese PA studies (Hu & Catts, 1998; Gottardo, Yen, Siegel, & Wade-Woolley, 2001; Hu, 2008; Siok, 2001). A total of twenty test items were included in the Chinese PA test, 10 sound deletion tests and 10 sound oddity tests. The participants had to write their answers down on the answer sheet. The two subtests are introduced in the table below. All the test items were piloted with 26 students (14 third graders and 12 fifth graders) from elementary schools in Taipei in which the participants were separated into two different groups whose language level was parallel. The purpose of this pilot study was to examine whether the procedure and student responses were acceptable, and as shown in the following sections, revisions were made to clarify the test procedures and lower the anxiety level of participants.

Table 3.1. Two Subtests on Chinese Phonological Awareness Test

Chinese PA subtests	Purpose of the subtest	Test examples
Chinese sound deletion test	To see if the participants have the ability to distinguish each single phoneme.	The participants were instructed to listen to the sound ㄅㄟ and to delete ㄅ, then they should answer ㄟ and write it down on the answer sheet.
Chinese sound oddity test	To see if the participants have the ability to distinguish the different consonant and vowels	The participants listened to (1) ㄕㄢˇ (2)ㄉㄢˇ (3) ㄕㄡˇ, they had to circle (2) that is printed on the answer sheet as the correct answer.

3.2.2.1 Chinese Sound Deletion Test

In previous research, Chinese sound deletion tests were conducted orally in the form of an interview (e.g. Siok, 2001; Hu, 2008), because the goal of testing PA was to assess student ability to analyze consonants and vowels. Another reason for testing PA was to examine whether the students had the ability to match the sound and the form of each character. Thus, in previous studies, a Chinese sound deletion test was conducted in written response form (e.g. Gottardo, Yan, Siegal and Wade-Woolley, 2001). However, based on the results of the pilot study (Table 3.2), the developmental change was clearer for the written response test than the oral.

Table 3.2. Mean Scores of the Chinese Sound Deletion Test (pilot study)

	Written response test	Oral response test
Third graders	5.6	8.5
Fifth graders	9.3	9.3

In the process of written response test, the participants were asked to circle the sound after deleting a certain sound. For example, the participants were instructed to delete ㄅ from a character with the sound ㄅㄟ. On the answer sheet, participants read (1) ㄅ (2) ㄟ (3)ㄝ. The correct answer is (2), which must be circled. The participants should thus had the ability to match the sound and form of the Zhuyinfuhao symbols. In the oral response form of the test, participants were required

to answer the questions orally. Thus, the researcher read ㄅㄟ to the participants and had them delete ㄅ, so the participants merely had to answer ㄟ directly. The researcher had conducted a basic screening test to insure all pupils recruited had no hearing difficulties. Hence, this test format evaluated participant ability to analyze the sound.

Several problems appeared during the pilot study. After each test, the participants were interviewed by the researcher about the test process. Some of the participants, especially third graders, had problems matching the form and the sound in the written response test. However, for fifth graders this was not a serious problem. This was probably because third graders were less familiar with Zhuyinfuhao symbols than fifth graders. Another issue was that the participants thought the recording was not clear and had problems identifying the sounds. In the oral response form of the test, most of the participants stated that due to unfamiliarity with the researcher, they were anxious during the process of testing. Hence, sometimes they knew what the answer was, but had problems talking to the researcher. They said they felt safer doing the written response test.

Based on the results of the pilot study and the responses from the participants as described above, the researcher intended to conduct the Chinese sound deletion test in written response form in order to test their Chinese PA and their ability to match the

sound and form of Zhuyinfuhao. Thus, all the test items were read by the researcher to the participants in person, so that the quality problem could be avoided. Further, based on the responses from the participants, the test was conducted in written response form to reduce participant anxiety. In the Chinese sound deletion test, a total of 10 items were included. Each correct answer was awarded one point for a total of ten points of all answers were correct.

3.2.2.2 Chinese Sound Oddity Test

In previous studies, Chinese sound oddity tests were conducted in oral response (Siok, 2001' Hu,2008) and written response form (Gottardo, Yan, Siegal and Wade-Woolley, 2001). In the oral response form, the participants had to distinguish whether the sound was different from two other sounds in the test items by answering orally, and the test items were read to the participants, not printed on a test sheet. Further, all the participants must answer the questions orally. This tested participants' ability to perform PA analysis as well as their phoneme memory. In the written response form of Chinese sound oddity test, the researcher also wanted to test both the participants' ability to analyze PA and the phoneme memory. However, in the oral response form the participants had to answer by speaking the word out loud, while in

the written response form, the participants had to circle the correct answer on the answer sheet.

Table 3.3. Mean Scores of the Chinese Sound Oddity Test (pilot study)

	Written response test	Oral response test
Third graders	4.5	8.1
Fifth graders	9	8.5

Based on the results of the pilot study (Table 3.3), the written response form was used to test participants' ability to perform PA analysis in the Chinese sound oddity test. Table 3.4 shows that in the written response group the developmental change was clearer than in the oral response test group. This implied that if the researcher wanted to see the developmental change between the third grade and fifth grade, written response form of the test was better than the oral response form.

In the test procedure adjustments were made to clarify the test procedure and benefit the students. Nevertheless, the same problem as in Chinese sound deletion test occurred. The test items were recorded in advance, but the quality of the recording caused difficulties for students when answering the test questions. Some participants reported that they had problems identifying the sound in the test items. Further, the test items were played twice to the participants, but the intermission between the first and second presentation of the test was too short. Hence, some participants suggested

that more time should be provided between the first and the second presentation of the test to lower their anxiety level.

Based on the performance and the suggestions from the participants, in the Chinese sound oddity test, ten test items were included. Of these ten, five required the participants to choose one character that does not share a vowel with the other two characters, while the other five items required them to choose one character that did not share the initial consonant with the other two characters, and circled the best answer. The participants heard: You will hear the sounds of three Chinese characters. Please choose the one whose vowel is different from vowels contained in the other two characters. For example, they heard: (1)ㄕㄢˇ (2)ㄉㄢˇ (3) ㄕㄡˇ. Thus, (1) and (2) both contain the vowel "ㄢ"and (3) contains "ㄡ", which is different from "ㄢ". You have to circle (3) on the answer sheet.

After completing the first five items, the participants proceeded to the next part. They heard three sounds, one of which had a different initial consonant from the other two characters. For example, the participants heard, (1) ㄇㄟˇ (2) ㄅㄟˇ (3) ㄇㄟˋ. They must choose the character whose initial consonant was different from the other two, (2). Five items were included in this section. A total of ten test items were included in Chinese sound oddity test. Each correct answer was awarded one point, for a maximum of ten points.

3.2.3 The English Phonological Awareness Test (The English PA Test)

The English PA test in the proposed study included two subtests, an English sound oddity test and an English phoneme deletion test. These types of the tests were commonly used in PA studies (Gottardo, Yan, Siegal & Wade-Woolley, 2001; Neilson, 1995). The two subtests were also piloted with the same group as the Chinese PA Test. Revisions were made based on the results of the piloting.

Table 3.4 displays the examples and purposes of each subtest. The purpose of the English phoneme deletion test was to see whether the participants could blend the sounds. Thus, they were asked to circle the correct phoneme after certain consonants are deleted. In the English sound oddity test, the researcher wanted to know whether the participants had the ability to detect the same vowel or consonant. They were guided to choose the one that did not rhyme with the others or to distinguish which one of the three did not share the same initial sound as the other two.

Table 3.4. English Phonological Awareness Test

English PA subtests	Purpose of the subtests	Test examples
English phoneme deletion	To see whether participants have the ability to blend the sounds.	When participants hear *bless*, and delete *b* they had to circle the correct answer on the answer sheet.
English sound oddity test	To see if the participants have the ability to identify which word does not rhyme or share the phoneme with the other two words.	Between *ring, sing, dog* participants should have the ability to know *dog* does not rhyme with the other two

3.2.3.1 English Phoneme Deletion Test

The phoneme deletion test was similar to the Chinese sound deletion test. It measured the participants' ability to perform PA analysis. In this test, pseudowords were used because the researchers wanted to eliminate the possible effects of orthographic familiarity on learners' performance (Gottardo, Yan, Siegal & Wade-Woolley, 2001). When the group was composed of students of various levels, pseudowords would be better enable researchers to avoid the problem of orthographic familiarity. In other words, if real word used in the English phoneme deletion test, the language level of the participants should be similar. In the present study, real words were used, because the participants were at a beginner's level of English learning. All the words were chosen from the 1200 word list published by the Taiwan Ministry of Education (MOE). The researcher deleted some words that the participants had

learned from the word list. A teacher at the target school was consulted when the test was designed to check whether the words used in the present study had not been learned by the third and fifth grade students.

Table 3.5. Mean Scores of the Test Takers on English Phoneme Deletion Test (pilot study)

	Written response test	Oral response test
Third graders	5.5	6.5
Fifth graders	6.1	8

In the pilot study, the researcher separated all the participants into two different groups. In each group, the participants' level was paralleled. One group was tested using the written response form, on which the participants had to match the sound with its form of Zhuyinfuhao, while the other group was tested using the oral response format, for which the participants needed only answer the questions orally.

In the pilot study, the performance of the oral response group was better than that of the written response group. The reason for the low scores in the third grade written response group was that one of the participants in this group did not cooperate during the test and did not answer any of the questions on the English phoneme test. Thus, the mean score of the English phoneme deletion test was reduced (Table 3.5).

In order to identify the main difference between the two groups, the researcher interviewed the participants in each group after the pilot test. Because most of the

participants were at the beginner level, matching the sound to the form may be challenging for them. However, in the oral response test the participants did not have to face the problem of matching the sound to the form and thus got a better grade than the written response group. Nonetheless, as stated in the Chinese sound deletion test, the PA test examines whether the participants had the ability to match the sound to the form. Thus, though the participants reported that they could perform well when they were tested in the oral response form, the researcher was forced to use a written response test in the present study, because matching the sound to the form is an important element of the present study.

For this subtest, ten test items with two practice items were included. The participants were instructed to circle the correct answer on their answer sheet. For example, the researcher first said, *bless* and then asked the participants to delete the "*b*" sound. On their answer sheet they read (1) less (2) bess (3) ess, and then they were expected to circle the correct answer, (1). One point was awarded for each correct answer for a maximum of ten points.

3.2.3.2 English Sound Oddity Test

English sound oddity test was directly adopted from Gottardo, Yan, Siegal and Wade-Woolley (2001). They used the rhyme detection test and the phoneme detection

test items to measure whether the students had the ability to identify the word which did not rhyme or share phonemes with the other words. Both sections of the test were used in the present study. The test items were piloted in the same group as the previous PA tests. The results of the pilot test are reported in Table 3.6.

Table 3.6. Mean Scores of the English Sound Oddity Test (pilot study)

	Written response test	Oral response test
Third graders	4.5	6.0
Fifth graders	7.6	6.3

Table 3.6 shows that the developmental change was more obvious in the written response group. However, in the oral response group the developmental change was not as obvious as that in the written group. Although the developmental change was clear in the written response group, problems remained. In the written response group, the quality of recording was the main problem. Second, in the pilot test, the test items were recorded in advance, and played twice for the participants. The intermission between the first and second time was too short for the participants. Thus, the participants were anxious when they took this subtest. In the present study, the researcher read the instructions and the test items in person to the participants, and the participants circled the answer on the test sheet.

For the present study, the English sound oddity test was separated into two different sections. Numbers one to five in the test consisted of rhyme detection. The participants were asked to listen to the instructions read by the researcher directly, and circle the word that does not rhyme with the other two words on their answer sheet. For example, the participants heard (1) sing (2) ring (3) dog, identify (3) as the word that did not rhyme with the other two, and circle (3) on their answer sheet. Numbers six to ten were the phoneme detection test. In this part of the test, the students were also instructed to listen to the researcher, and circle the correct answer that was printed on their answer sheet. For instance, the participants heard (1) bag (2) nine (3) beach. They must circled (2) on their answer sheet since its initial sound was different. One practice item and ten test items were included in this section. For each correct answer one point was awarded, for a maximum of ten points.

3.2.4 The English Word Reading Test

In the English word reading test, two subtests were included, an English real word reading test, and an English pseudoword reading test. In a previous study (Gottardo, Yan, Siegal & Wade-Woolley, 2001), pseudowords were found to better exclude the orthographic familiarity effects. However, in the present study, as reported by the English teacher in Tai An elementary school, the participants of third

and fifth grade were at the beginners' level of English learning, so they have learned fewer words than the participants in previous studies. Thus, real words were used in the present study. Furthermore, to make sure that the participants had no orthographic familiarity with the English real word reading, the English pseudoword reading was included as another subtest.

3.2.4.1 The English Real Word Reading Test

In the present study, the researcher selected a total of 15 words from the 1200 word list for this test. This word list was compiled and published for the general public and school teachers by the Ministry of Education (MOE) as a reference for vocabulary teaching and learning at the elementary level. The researcher categorized the words based on the regularity of the spelling of the words in correspondence with the pronunciation of the word. For example, the vowel [I] in pig is categorized as a regular word, whereas the vowel [a ɪ] in *pint* is classified as a irregular form. Another example is the vowel [æ] in apple, regarded as the regular pronunciation. However, water; because it is pronounced [ɔ], it is classified as irregular. An English teacher at the research site (Tai-An elementary school) was consulted and asked to point out words the participants may have learned. Those possibly known words were excluded as well. This procedure left 200 words available for use in the test. Finally

15 words were chosen randomly and included in the test (e.g. crane, clay, mass, mule, pile, pride, dim, cast, bud, ash, yard, wire, track, steam, rare). Participants in the previous PA tests were invited to participate in the English real word reading test. The results are given in Table 3.7.

Table 3.7. Mean Scores on English Real Word Reading Test (pilot study)

	Third Graders	Fifth Graders
Mean Score	9.1	13.3

Table 3.7 shows the clear developmental change between the two groups. The mean score is higher for third graders than fifth graders. After the English real word reading test, the researcher asked the participants to report the words that they have learned before. Based on their responses, the five words (greet, lane, leak, slip, flow) were deleted from the present study. Thus, a total of 15 words were included in the English real word reading test.

In the actual study, this test was administered individually to the participants. Before the test started the participants were informed out of the test procedures and the researcher gave the participants two practice items. After the practice run, a 3x5 array of words were presented to the participants and they had to read the words out loud from right to left and from top to bottom. The whole process of reading out loud was recorded. Each correct answer was awarded one point. A total of fifteen points

were included in this test.

3.2.4.2 English Pseudoword Reading Test

The English pseudoword reading test was adopted from Neilson (1995). The pseudoword reading was used here to ascertain whether the participants had the ability to read a word they did not know using the regular rules of pronunciation. A total of 15 test items were piloted with the same group of students in the English real word reading test. Before the test, the participants were not told that the words in this test were not real words.

Table 3.8. Mean Scores on the English Pseudoword Reading Test (pilot study)

	Third Graders	Fifth Graders
Mean Score	8.2	11.3

Based on the pilot study, this subtest was difficult for participants regardless of grade (Table 3.8). After interviewing the participants, the researcher concluded that using psudowords was difficult for the participants. Thus, the practice items were not sufficient for the participants. In the present study, three practice items were included, one more than previously. Further, more positive feedback were given by the researcher when the participants took the practice section to encourage performance.

The test items were printed on a 3x5 array list, and the list shown to the participants. Participants had to follow the rules of from top to bottom and from left to

right to read all the words on the list. Three practice items were conducted before the formal test. Furthermore, participants were not informed that the words were not real words, to reduce the participants' anxiety. Three practice items and ten test items were included in this sub-test. Participants were rewarded one point for each word spell correctly for a maximum of ten points.

In sum, the Chinese PA test, the English PA test, and the English word reading test were used to collect the data. The Chinese PA test has a total of 30 items; the English PA test had a total of 30 items and the English Word Reading Test also had a total of 30 items. Thus, for the present study, a total of eight points were awarded to the participant who answered all the questions correctly.

Table 3.9.Three Tests for the Present Study

Test	Chinese phonological awareness test	English phonological awareness test	English word reading test
	Chinese sound deletion test	English phoneme deletion	English real word reading test English psuedoword test
	Chinese sound oddity test	English sound oddity test (including phoneme detection test and rime detection test)	
	(Participants responded in written form)		(Participants responded in oral form)

3.3 Data Analysis Procedure

To answer the first two research questions that examined the relationship between Chinese PA, English PA, and English word reading in third and fifth graders, the researchers conducted regression analysis. A correlation coefficient was calculated to examine the strength of association among the three variables, Chinese phonological awareness, English phonological awareness, and English word reading. A step-wise regression analysis was performed to compare the relative contributions of English PA and Chinese PA to English word reading at each grade level.

Another aim of the study was to examine whether there was any significant differences between third graders to fifth graders. T test was conducted to examine whether the significant differences existed.

CHAPTER FOUR

RESULTS AND DISCUSSION

The purpose of the study is to examine the relationship between English phonological awareness (English PA), Chinese phonological awareness (Chinese PA), and English word reading. Thirty six students participated, 20 third graders and 16 fifth graders. Each participant took three tests: a Chinese PA test, an English PA test, and an English word reading test. Regression analyses were conducted to examine the relationship between the three variables for the third and fifth graders. T-tests were performed to examine the differences in performance on the three tests between the third and fifth graders. The results are presented in the following sections.

4.1 Results of the Study

4.1.1 Results of the Student Background Questionnaire

4.1.1.1 Results of Student Background Questionnaire for Third Graders

Twenty questionnaires were completed by the parents of the 20 third graders. Of the 20 third graders, 11 were boys and 9 were girls. The mean age of the group was 9.6 years old (range: between 9 years old and 10.2 years old). The third graders' fathers were all Taiwanese local. Half of their mothers were Taiwanese local and the other half were either aboriginals or foreigners. None of the parents reported that their

children had lived or studied in any English speaking countries. Five reported that their children had studied English in cram schools before they entered elementary school. The mean length of learning in a cram school was 2.6 years (range: between 2 and 3.2 years). The demographic results are summarized in Table 4.1.

Table 4.1. Demographics of Third Graders

Participants	11 boys and 9 girls
Mean age	9.6 years old
Nationalities of mothers	10 Taiwanese and 10 other were either aboriginals or foreigners from Vietnam, Indonesia, and China.
Ever lived in English speaking countries	None
Ever Learned English at cram school	5 (mean length of learning: 2.6 years)

Regarding the amount of reading time the parents spent with their children in both English and Chinese story books, out of 20 parents 19 parents reported that they made a habit of reading Chinese story books with their children at home, while 16 parents reported that they made a habit of reading English story books with their children at home.

Table 4.2 summarizes the amount of reading time the 20 parents said they spent with their children reading Chinese story books. One set of parents reported that they did not spend any time reading Chinese story books with their children. Ten reported that they spent less than one hour a week reading Chinese story books with their

children. Four parents said that they spent at least an hour a week reading with their children, one spent two hours a week reading with their children, and four reported that they spent at least three hours per week reading Chinese story books with their children.

Table 4.2. Amount of Time Parents Spent with Third Graders Reading Chinese Story Books (n=20)

Reading time	Number of parents
Zero hour	1
Less than 1 hour a week	10
One hour a week	4
Two hours a week	1
At least three hours a week	4
Total	**20**

For English reading, 4 parents of the participants reported that they spent no time reading with English their children, while 16 parents reported that they spent some time reading English story books with their children at home. Table 4.3 shows that among the 16 parents, 10 spent less than one hour a week reading English story books, 3 of them spent at least an hour a week reading English story books with their children, none reported spending two hours a week reading with their children, and three sets of parents reported that they spent at least three hours per week reading English story books with their children.

Table 4.3. Amount of Time Parents Spent with Third Graders in Reading English Story Books (n=20)

Reading time	Number of parents
Zero hour	4
Less than 1 hour a week	10
One hour a week	3
Two hours a week	0
At least three hours a week	3
Total	**20**

Table 4.2 and Table 4.3 all together show that whether reading English or Chinese story books, most of the parents spent less than one hour a week with their children reading English and Chinese story books. Apparently, these parents did not spend much time reading with their children.

The next section of the questionnaire was about the participants' family background information. Half of their mothers were either aboriginals or originally from foreign countries such as Vietnam, Indonesia, and China. Since the parents' ethnic backgrounds varied, the languages they used at home varied as well. The languages below in Table 4.4 are listed in the order of the priority of use at home. The English that was used in the participants' household was mainly functional English. Nine parents reported that they used both Mandarin Chinese and Taiwanese at home. Five parents reported that they spoke Mandarin Chinese, Taiwanese, and English with their children at home. Two parents mentioned that they only spoke Taiwanese at

home. Furthermore, 2 parents claimed that they used four languages with their children at home, Mandarin Chinese, Hakka, Taiwanese, and English. One parent mentioned that they spoke Mandarin Chinese, Taiwanese, English and Vietnamese at home. Last, one parent reported that they used Mandarin Chinese, Hakka, and Taiwanese at home with their children.

Table 4.4. Languages Used at Home, Third Graders (n = 20)

Languages	Number of parents reporting using the languages at home
Mandarin Chinese + Taiwanese	9
Mandarin Chinese + Taiwanese+ Hakka	1
Mandarin Chinese + Taiwanese + English	5
Mandarin Chinese + Taiwanese + Hakka + English	2
Mandarin Chinese + Taiwanese + English + Vietnamese	1
Taiwanese	2
Total	**20**

Clearly, the 3rd graders were exposed to not only Mandarin Chinese but also Hakka, Taiwanese, and some English and Vietnamese. Half of the mothers were foreign spouses and may not have been able to provide much help with the participants' Chinese literacy development. Furthermore, those participants were mostly from families with low socioeconomic status and their parents' educational backgrounds were not good enough to provide help with the participants' English

literacy development. The participants in the present study were different from children in the urban area in terms of the assistance and resources they had access to. In urban areas, the parents' educational backgrounds are often higher than those of parents in the rural area and hence they are better able to provide help with their children's Chinese and English literacy development. Further, students in urban areas have more opportunities to encounter Chinese and English texts. By contrast, the participants in this study had limited resources and gained only limited help from their parents. Thus, it seems safe to say that the participant' performances on the tests were mainly results of their learning at school.

4.1.1.2 The Result of Student Background Questionnaire in Fifth Grade

The family background of the fifth graders was similar to that of the third graders, and the students were almost all from families with low socioeconomic status. Sixteen questionnaires were completed by the parents of 16 fifth graders. Of the 16 students, 7 were girls and 9 were boys. Their mean age was 11.8 years old (range: between 11 years old and 13 years old). The third graders' fathers were all Taiwanese local. Half of their mothers were Taiwanese local and the other half were either aboriginals or foreigners. None of the parents reported that their children had lived or studied in English speaking countries. Seven students had studied English at cram schools, and

their mean length of learning in a cram school was 3 years (range: between 2 years and 4 years). The demographic results are summarized in Table 4.5.

Table 4.5. Demographics of Fifth Graders

Participants	9 boys and 7 girls
Mean age	11.8 years old
Nationalities of mothers	12 Taiwanese and the other 4 were either from Vietnam, or aboriginals.
Ever lived in English speaking countries	None
Ever Learned English at cram school	7 (mean length of learning: 3.0 years)

Regarding the amount of time they spent with their children reading both English and Chinese story books, only one of the 16 sets of parents did not spend any time with their child reading Chinese story books. Seven of the parents reported that they did not spend any time reading English story books with their children. Table 4.4 lists the amount of time they spent with their children reading Chinese story books. One parent reported that they did not spent any time reading Chinese story books with their children. Twelve of them reported that they spent less than one hour a week with their children reading Chinese story books, one spent at least an hour a week with their children reading Chinese story books, none checked the two-hour a week option, and two parents reported that they spent at least three hours per week with their children reading Chinese story books.

Table 4.6. Amount of Time Parents Spent with Fifth Graders in Reading Chinese Story Books (n=16)

Reading time	Number of the parents
Zero hour	1
Less than 1 hour a week	12
One hour a week	1
Two hours a week	0
At least three hours a week	2
Total	**16**

As for English reading, nine of the parents reported that they read English story books with their children at home. Table 4.5 shows that one set of parents did not spend any time reading English story books with their children, 8 parents read with their children less than one hour a week, one spent at least an hour a week with their children reading English story books, and none checked the two or three-hour options.

Table 4.7. Amount Time Parents Spent with Fifth Graders in Reading English Story Books (n=16)

Reading time	Number of parents
Zero hour	7
Less than 1 hour a week	8
One hour a week	1
Two hours a week	0
At least three hours a week	0
Total	**16**

Similarly, Tables 4.6 and 4.7 together show that the parents of the fifth graders did not spend much time reading with their children either in Chinese or in English.

Similar to the ethnic background of the parents of the third graders, the ethnic background of the parents of the fifth graders varied. One mother was originally from Vietnam, three were aboriginals, while remaining 12 were local Taiwanese. The languages they used at home varied. The languages reported below in Table 4.8 are in the order of priority of use at home. Similar to the use of English among the families of the third graders, in the fifth graders' families functional words were used instead of complete sentences. Six parents reported that they spoke both Mandarin Chinese and Taiwanese with their children at home. Four reported that Mandarin Chinese, Taiwanese and English were the three languages they used with their children at home. Only one parent stated that they spoke Mandarin Chinese, Hakka, and Taiwanese with their children. One parent reported that they used Mandarin Chinese, Hakka, Taiwanese and English at home. One parent said that Hakka was the only language they used at home. Furthermore, Taiwanese was the only language used in one family. One family used both Mandarin Chinese and aboriginal languages at home, and also one family mentioned that they used Mandarin and Vietnamese at home.

Table 4.8. Languages Used at Home, Fifth Graders (n = 16)

Languages	Number of parents reporting using the languages a at home
Mandarin Chinese + Taiwanese	6
Mandarin Chinese + Taiwanese+ Hakka	1
Mandarin Chinese + Taiwanese + English	4
Mandarin Chinese + Taiwanese+ Hakka + English	1
Mandarin Chinese + Aboriginal	1
Mandarin Chinese + Vietnamese	1
Taiwanese	1
Hakka	1
Total	**16**

Likewise, the fifth graders were exposed to a multilingual environment. Although Mandarin Chinese was used in most of the families, the fifth graders had limited help from their parents in their Chinese literacy development. One parent was originally from foreign country and her Chinese proficiency was not as good as that of native Taiwanese parents. In addition, most of the participants were from families with low socioeconomic status. Their parents did not appear to be able to help them with their English literacy development.

4.1.2 Correlations between Chinese PA English PA and English Word Reading Third Graders

The third graders' mean scores on the three tests are summarized in Table 4.9. The 20 third graders' mean score on the English PA test is 10.06 with a standard

deviation of 5.00. Their mean score on the Chinese PA test is 12.9 with a standard deviation of 5.41. Their mean score on the English word reading test is 7.2 with a standard deviation of 6.79. As can be seen, the third graders did relatively better on the Chinese PA test than on the English PA test. They did poorly on the English word reading test.

Table 4.9. Means and Standard Deviations of Test Scores, Third Graders (n = 20)

Tests	Mean	SD
English PA	10.06	5.00
Chinese PA	12.9	5.41
English Word Reading	7.2	6.79

Note 1: Maximum possible score on the English PA is 20.

Note 2: Maximum possible score on the Chinese PA is 20.

Note 3: Maximum possible score on the English word reading is 30.

To answer research question 1 "Are there any significant associations among phonological awareness in Chinese as an L1, phonological awareness in English as an L2 and English word reading for Taiwanese 3rd graders who learn English as a foreign language? How strong are these associations?" Correlation coefficients were calculated. Pearson's r correlation coefficients between English PA test scores, Chinese PA test scores and English word reading test scores for the 20 third graders are summarized in Table 4.10.

Table 4.10. Pearson's r Correlation Coefficients between English PA Test Scores, Chinese PA Test Scores, and English Word Reading Test Scores, Third Graders (n = 20)

	English word reading	Chinese PA	English PA
English word reading	1.000	.346	.721**
Chinese PA	.346	1.000	.398*
English PA	.721**	.398*	1.000

* α = .05, ** α = .01

As can be seen, for the third graders, the correlation between the English PA test scores and English word reading test scores was significant (r = .721, p < .001). The correlation between the Chinese PA and the English PA was also significant (r = .398, p = .041). Nevertheless, there was no significant correlation between Chinese PA and English word reading (r = .346, p = .068).

A stepwise linear regression analysis was performed to examine the amount of variance in the English word reading test scores that could be accounted for by the English PA and the Chinese PA test scores. The analysis employed the forward method and the results are shown in Table 4.11.

Table 4.11. Regression Analysis Employing Forward Method, Third Graders (n = 20)

	B	SE	R^2 change	F change	p
English PA	.981	.222	.520	19.525	<.001

In the stepwise regression analysis, the English word reading test score was the dependent variable and the English PA and Chinese PA test scores were the

independent variables. In this regression model, the Chinese PA score entered first and the English PA score entered second. Chinese PA was excluded from the model because it did not make significant contribution to the English word reading test scores. Thus, English PA was the only significant variable that could be used to explain English word reading. The β of English PA is .981 and the R^2 change is .520, which means that the English PA test score was a significant factor in English word reading and could explain 52% of the variance of the English word reading test scores.

In sum, the results from the regression analysis suggest that only English PA, not Chinese PA, made a significant contribution to English word reading in third graders. However, given that Chinese PA was significantly correlated with English PA, Chinese PA could be said to be indirectly related to English word reading in the third graders.

4.1.3 Relationship between Chinese PA English PA and English Word Reading Fifth Graders

The fifth graders' mean scores on the three tests are summarized in Table 4.10. The16 fifth graders' mean score on the English PA test is 13.9 with a standard deviation of 3.32. Their mean score on the Chinese PA test is 17.0 with a standard

deviation of 2.26. Their mean score on the English word reading test is 16.9 with a standard deviation of 6.52. As can be seen, the fifth graders did relatively better on the Chinese PA test than on the English PA test. Their mean score on the English word reading test is 16.9 with a standard deviation of 6.52. A comparison of the third graders' performances and fifth graders' performances shows that fifth graders did better than the third graders on all three tests, especially the English word reading test (fifth graders' mean = 16.9 vs. third graders' mean = 7.2).

Table 4.12. Means and Standard Deviations of Test Scores, Fifth Graders (n=16)

Tests	Mean	SD
English PA	13.9	3.32
Chinese PA	17.0	2.26
English Word Reading	16.9	6.52

Note 1: Maximum possible score on the English PA is 20.

Note 2: Maximum possible score on the Chinese PA is 20.

Note 3: Maximum possible score on the English word reading is 30.

To answer research question 2 "Are there any significant associations among phonological awareness in Chinese as an L1, phonological awareness in English as an L2 and English word reading for Taiwanese 5th graders who learn English as a foreign language? How strong are theses associations?" Correlation coefficients were calculated. Pearson's r correlation coefficients between English PA test scores, Chinese PA test scores and English word reading test scores in the 16 fifth graders are

summarized in Table 4.13.

Table 4.13. Pearson's r Correlation Coefficients between English PA Test Scores, Chinese PA Test Scores, and English Word Reading Test Scores, Fifth Graders (n = 16)

	English word reading	Chinese PA	English PA
English word reading	1.000	.068	.620**
Chinese PA	.068	1.000	.352*
English PA	.620**	.352*	1.000

* α = .05, ** α = .01

As can be seen, for the fifth graders, the correlation between English PA test scores and English word reading test scores was significant (r = .620, p = .005). The correlation between Chinese PA and English PA was also significant (r = .352, p = .048). Nevertheless, there was no significant correlation between Chinese PA and English word reading (r = .068, p = .401).

A stepwise linear regression analysis was then performed to examine the amount of variance of English word reading test scores that could be accounted for by the English PA and Chinese PA test scores. The analysis also employed the forward method and the results are shown in Table 4.14.

Table 4.14. Regression Analysis Employing Forward Method, Fifth Graders (n = 16)

	B	SE	R^2 change	F change	P
English PA	1.218	.412	.384	8.740	.010

Chinese PA was excluded from the model because it did not make a significant contribution to the English word reading test scores. English PA was the only significant variable that could be used to explain English word reading. The β of English PA is 1.218, and the R^2 change is .384, which means the English PA test score was a significant contributor to English word reading and could explain 38.4% of the variance of the English word reading test scores.

Similar results were found in both third and fifth graders. English PA is the only variable that could explain English word reading. Chinese PA could not. In sum, the results from the regression analyses suggest that only English PA, not Chinese PA, made significant contribution to English word reading in both third and fifth graders. However, given that Chinese PA was significantly correlated with English PA, Chinese PA could be said to be indirectly related to English word reading in the third and fifth graders.

4.1.4 Differences between Third and Fifth Graders.

Table 4.15 summarizes the means and standard deviations of the three test scores of the two groups. To answer research question 3 "Are there any significant differences between 3rd grade and 5th grade in terms of the participants' Chinese phonological awareness, English phonological awareness and English word reading

performance?" Independent sample t-tests were conducted. The results indicate that there was a significant difference (t =- 4.350*, p <.001) in English word reading. There was also a significant difference between the two grade levels in Chinese PA test scores (t = -3.117*, p = .004). Finally, there was a significant difference between the two different grade levels in the English PA test scores (t = -2.260, p = .030). In short, significant differences exist between two groups in Chinese PA, English PA, and English word reading. The results show the fifth graders performed better than the third graders on all tests.

Table 4.15. A Comparison of Performance of Third and Fifth Graders on Chinese PA, English PA, and English Word Reading Tests

Variables	Grade Level	n	Mean	Std. Deviation	Mean Difference	t	p
Chinese PA	Third	20	12.90	5.41	-4.16	-3.117*	.004
	Fifth	16	17.06	2.26			
English PA	Third	20	10.65	5.00	-3.29	-2.260*	.030
	Fifth	16	13.94	3.32			
English Word Reading	Third	20	7.20	6.80	-9.74	-4.350**	<.001
	Fifth	16	16.94	6.52			

* p < .05, ** p < .001

Figure 4.1 clearly illustrates that the fifth graders performed better than the third graders on all three tests. The greater variances of the third graders on the Chinese PA test and the English PA test indicate greater variation among the participants when

they were in the third grade. Such variation decreased among fifth grade participants. The chart in Figure 4.1 gives a rough idea of the differences between the two grade levels.

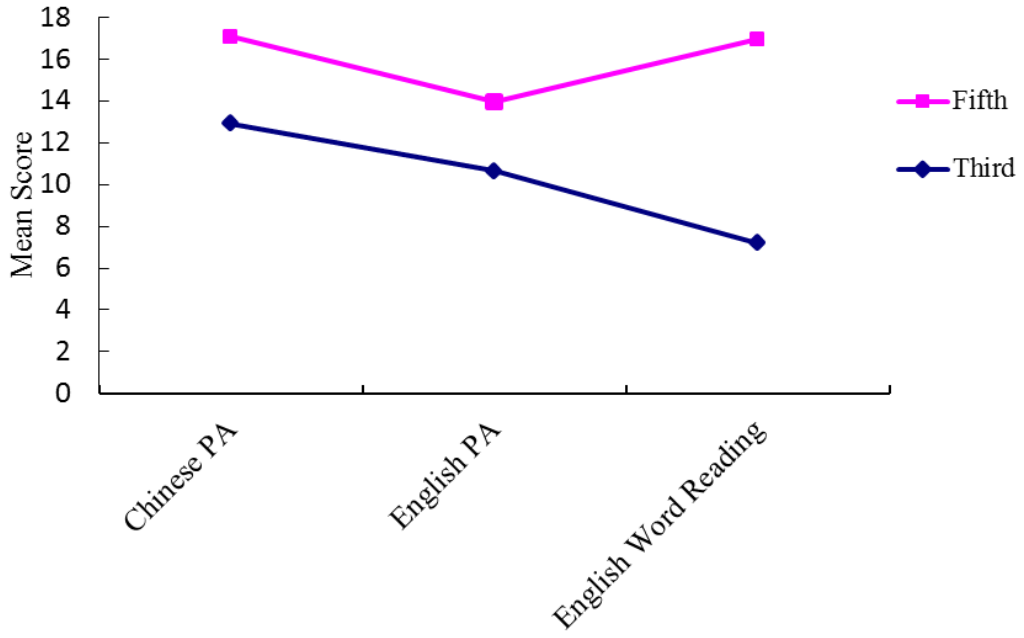

Figure 4.1. Mean Scores of the Third and Fifth Graders on the Three Tests

4.2 Discussion

4.2.1 Relationship Among Chinese Phonological Awareness, English Phonological Awareness, and English Word Reading, Third and Fifth Graders

The results of the present study show that in both third and fifth graders there was a significant correlation between English PA and English word reading, and there was also a significant correlation between Chinese PA and English PA. However, the correlation between Chinese PA and English word reading was not significant.

The results of the present study are consistent with the results of previous studies (Burges, & Hecht, 1997; Gottardo, Yan, Siegel, & Wade-Woolley, 2001; Torgensen et al., 2008) where the significant relationship between English PA and English word reading has been confirmed. Torgesen et al. (1997) in their L1 study found that English PA test score in kindergarten could effectively predict learners' English word reading performance in the first grade. Verhagen et al (2008) further explored this issue by examining whether English PA could predict English word reading accuracy and naming speed. The results of Verhagen et al (2008) indicate that English PA could effectively predict English word reading accuracy while naming speed could not. Gottardo et al. (2001) conducted their study in an L2 setting and also found a significant correlation between English PA and English word reading. The results of this study replicate theirs in some ways by indicating that learners' performance on an English PA test could effectively explain English word reading in both the third and fifth grades.

It needs to be noted that the previous studies were conducted to examine the predictive power of English PA and Chinese PA to English word reading. The present study was different in that it was designed to examine the explanatory power of English PA and Chinese PA to English word reading. Clearly, the results of the present study show that English PA could be seen as a powerful factor that can explain the

variance in English word reading scores in both third and fifth graders. The data from the previous studies and the present study collectively tend to imply that English PA scores could effectively predict and explain English word reading scores.

Moreover, the significant correlations between Chinese PA and English PA scores found in third and fifth graders were consistent with the findings of Gottardo et al (2001) who also found that third and fifth graders English (L2) PA test scores were significantly correlated with their Chinese (L1) PA test scores. The results imply that when the participants do well on the Chinese PA test, they may do well on the English PA test, and vice versa.

Last, the present study found that Chinese PA was not significantly correlated with English word reading. This finding was different from those of previous studies (Gottardo et al. , 2001; Hu, 2008), where a significant correlation was found between Chinese PA score and English word reading. The relatively small sample size of the present study might result in the non-significant correlation. Previous studies such as Hu (2008) and Gottardo et al. (2001) enrolled 74 and 65 participants respectively in their PA studies. The present study enrolled 36 pupils. The variance of their test scores was relatively small, implying that the participants were quite homogeneous in terms of their test performance. This homogeneity was very likely to lead to a low correlation between Chinese PA and English word reading. Thus, the comparatively

low number of participants in the present study may explain the discrepancy of the results between this study and previous studies.

4.2.2 Differences Between Third and Fifth Graders

The test results show the fifth graders performed significantly better than the third graders on the English PA, Chinese PA, and English word reading tests. The results imply that the older the learners became, the more instruction they received, and the better they were at analyzing phonemes and reading words. According to previous research (Huang & Hanely, 1997), PA can be improved by training learners of Chinese in logographic orthography or learners of English in alphabetic orthography. Furthermore, previous studies found a reciprocal relationship between PA and word reading (e.g. Hogan, Catts, & Little, 2005), which implies that the better the learners' PA, the better their word reading is. Thus, in the present study, fifth graders received more exposure and instruction in both English and Chinese training and thus obtained significantly higher scores than third graders on all three tests.

4.2.3 Correlations between English PA Subtest Scores, and English Real Word and Pseudoword Reading Subtest Scores

The present study found that English PA score was the only significant variable

that could explain English word reading score, while Chinese PA score could not. The researcher further examined the relationship between the English PA subtest scores and English word reading subtest scores. The English PA test is composed of 3 subtests: sound deletion test, phoneme detection test, and rime detection test, while the English word reading test is composed of 2 subtests: a real word reading test and a pseudoword reading test. The correlations between the subtest scores are listed in Table 4.16.

Table 4.16. Correlations between English PA Subtest Scores and English Real Word and Pseudoword Reading Scores

		English PA		
		Phoneme Deletion	Sound Oddity Test (Phoneme Detection)	Sound Oddity Test (Rime Detection)
English Real Word Reading	3rd grade	r = .620* p = .002	r = .394* p = .043	r = .025 p = .458
	5th grade	r = .413* p = .048	r = .136 p = .308	r = .210 p = .218
English Pseudoword Reading	3rd grade	r = .719** p < .001	r = .575* p = .004	r = .440* p = .026
	5th grade	r = .724** p =< .001	r = .116 p = .334	r = .080 p = .384

* α = .05, ** α < .001

As can be seen in Table 4.16, the English phoneme deletion test score was significantly correlated with the English real word reading score for both third graders

(r = .620, p = .002) and fifth graders (r = .413, p = .048). In addition, the English phoneme deletion test score was also significantly correlated with the English pseudoword reading score for both third graders (r = .719, p < .001) and fifth graders (r = .724, p <.001). These results are similar to those of Gottardo et al. (2001), who while examining the relationships among Chinese PA, English PA and English word reading, also found that English phoneme deletion was a significant factor correlated with English real word and pseudoword reading. The results, as claimed by Gottardo et al. (2001), can be seen as evidence in support of the viewpoint that phoneme deletion as literacy skills developed at the early stage is an essential component contributing to literacy development at a later stage.

Other variables that were significantly correlated with the English pseudoword reading scores are the phoneme detection test scores and rime detection test scores. In the third grade group, English phoneme detection test scores (r = .575, p = .004) and English rime detection test scores (r = .440, p = .026) were significantly correlated to English pseudoword reading. However, these significant correlations did not exist for the fifth graders. That is, English rime and phoneme detection test scores were only correlated to English pseudoword reading in the 3rd grade, not in the 5th grade. This result seems to imply that PA lost its power in explaining word reading performance variance when the learners progressed to a higher grade level.

4.2.4 Correlations Between Reading Time and English Word Reading.

In the present study, the amount of time parents spent with their children reading both Chinese and English story books was very limited and was not significantly related to the participants' English word reading performance. Research findings on home literacy have confirmed that the amount of time parents spent with children reading story books is significantly correlated with children's literacy development (Tett & St. Clair, 1996). In the present study, since the reading time parents spent with the participants was little and the variance between them was small, it was not surprising that the correlation between the reading time and word reading performance was not significant.

The limited amount of time the parents spent reading with their children may be indirectly related to the ethnic background of the mothers and the socioeconomic status of the families. As mentioned in the demographic information section of the participants, several mothers of the participants were foreign spouses. Their Chinese language ability was not good. Though they spoke some English, it is mainly for functional purposes. Therefore, they might have difficulties reading Chinese and English story books with their children.

Moreover, owing to their comparably low socioeconomic status, many parents were laborers and had very little time staying at home. They did not seem to have the

knowledge or skills to assist their children's literacy development in Chinese and English. Given the fact that the participants' parents did not provide much help with their literacy development, the participants' performance on the tests was largely due to their learning at school. Thus, the house hold reading time did not provide as much help as that of their learning at school.

To sum up, the results of the study indicate that Chinese PA and English PA were significantly correlated. Furthermore, English PA was a significant contributor to learners' English word reading performance, in both real word reading and in pseudoword readings. Chinese PA was not significantly correlated with English word reading. However, given that Chinese PA was significantly correlated with English PA and English PA was significantly correlated with English word reading, it can be inferred that Chinese PA was indirectly correlated with English word reading. Furthermore, the correlations among Chinese PA, English PA, and English word reading were stronger for the third graders than for the fifth graders, which imply that PA in the early learning stages played a more important role as it could better explain the learners' performance on the English word reading test. When the learners progress to a higher grade level, the explanatory power of PA in English word reading tended to decrease.

In addition, the researcher examined the correlations among the subtest scores.

The results demonstrate that for the third graders, English sound deletion, English phoneme detection, and English rime detection were all strongly correlated to English pseudoword reading. English sound deletion was the only subcomponent among the three subcomponents of English PA correlated to English real word reading. The findings were slightly different between the fifth grade group and the third grade group. English sound deletion test was the only variable that was significantly correlated with both English real word and pseudoword reading in the fifth grade group. The results imply that first, sound deletion test, which is focused on the onset-rime awareness, is the fundamental variable that influences English word reading performance on the early reading development stages.

Furthermore, the amount of time that parents spent with their children reading English/ Chinese story books was not significantly correlated to their English word reading performance which is different from previous studies. This result might be caused by the small variance of the amount of reading time the parents spent reading English/Chinese story books with their children. According to the demographic information of the participants, most of participants were from families with low socioeconomic status. Further, almost all the parents of the participants worked in working class occupations. Therefore, it is difficult for them to find the time to read with their children. Due to the homogeneity of the participants, the relationship

between reading time and English word reading performance was not significant.

CHAPTER FIVE

CONCLUSION

Phonological awareness (PA) is believed to be closely related to word reading ability. Previous studies, either in L1 or L2, have usually focused on the predictive power of PA for word reading at a later stage of language learning. This present study focuses on the explanatory power of L1 Chinese phonological awareness and L2 English phonological awareness to L2 English word reading and compares the differences between the performances of third graders and fifth graders in Chinese PA, English PA, and English word reading. The major findings and pedagogical implications of this study are presented in this chapter. This chapter then concludes with the limitations of the study and suggestions for future research.

5.1 Summary of the Study

The purpose of the study was to examine whether there was a significant relationship between Chinese phonological awareness, English phonological awareness, and English word reading in Taiwanese third and fifth graders. Furthermore, whether the significant differences existed across different grade levels was also examined in the present study. A total of 36 participants were enrolled in the present study, 20 third graders and 16 fifth graders. All the participants were given a

Chinese PA test, an English PA test, and an English word reading test within a week. All the data were calculated by Pearson correlation coefficient. The differences between different grade levels were calculated by t-test. The major findings are summarized below.

5.2 Summary of the Major Findings

The Pearson correlation coefficient shows that English PA was the only significant variable that explains English word reading in both third and fifth graders. English PA explains 52% of English word reading performance in the third grade group, and 38.4% of English word reading performance in the fifth grade group. In other words, the explanatory power of English PA has been confirmed in the present study. This finding, in some sense, was similar to that of previous studies (Gottardo, Yan, Siegel, & Wade-Woolley, 2001; Hogan, Catts, & Little, 2005; Torgesen, Wagner, Rashotte, Burges, & Hecht, 1997; Verhagen, Aarnoutse, Van Leeuwe, 2008) where they found out that English PA was a significant predictor of English word reading whether conducted in L1 or L2 settings.

Chinese PA was significantly correlated to English PA in both the third and fifth grade. This finding is consistent with the findings of Gottardo et al. (2001) where their results indicated that Chinese rime detection test scores was significantly correlated

with English rime detection. Those researchers contended that this finding could provide some evidence of cross-language transfer of phonological awareness (Gottardo et. al., 2001). Hence, the reciprocal relationship between Chinese PA and English PA is confirmed in the present study.

Last, Chinese PA was not a variable that can significantly explain English word reading performance. One explanation for the non-significant relationship between Chinese PA and English word reading might be that the small number of the participants. Due to the limited variance among the participants, statistical significance may have been difficult to find.

The researcher also compared the performances of the third and fifth grade groups. The results showed that the fifth graders performed significantly better than the third graders on all three tests, the Chinese PA test, the English PA test, and the English word reading test. This result supports the findings of Huang & Hanely (1997) where they found that PA can be improved by training for both learners of logographic orthography and learners or alphabetic orthography learners. In addition, the reciprocal relationship between PA and English word reading has been confirmed in a previous study (Hogan et. al, 2005). Hence, the relationship between PA and word reading is clear: the better the participants' PA, the better their word reading. In the present study, the fifth graders obtained more instruction in both English and Chinese.

Thus, it is not surprising that the fifth graders performed better than third graders on all three tests.

English PA is the only variable which explains English word reading in the present study. Given this, the researcher further examined the relationship between the English PA subtests and English real word and pseudoword reading tests. The researcher found that English real word reading was significantly correlated with English sound deletion in both third and fifth graders and phoneme deletion in third graders. However, pseudoword reading was correlated with English sound deletion in both third and fifth graders and phoneme detection and rime detection in the third grade group. It is clear that pseudoword reading was more highly correlated with the English PA subtests.

The final conclusion of this study is that the time that the parents spent reading Chinese or English story books with their children was not significantly correlated with English word reading. There are two possible reasons for this outcome. First, most of the participants were from families with low socioeconomic status and their parents were in working class occupations, giving them limited time reading Chinese or English story books with their children. Second, the children had a variety of ethnic backgrounds. Several mothers were foreign spouses. Their Chinese language ability was not good. Though they spoke some English, it was only functional, and it appears

likely that they might have had difficulty reading Chinese and English story books with their children. For these reasons, it seems intuitively obvious that the participants' performance in English was driven mainly by their learning experiences at school. Therefore, the time the parents spent reading Chinese and English story books at home is not significantly correlated to their English word reading.

5.3 Pedagogical Implications

In this study, English PA was the most significant variable in explaining English word reading, while Chinese PA had no direct effect. Further, Chinese PA was significantly correlated with English PA. It may thus be inferred that Chinese PA indirectly affected English word reading, while English PA directly affected English word reading. Hence, to help the students with word reading difficulties, teachers could train their English PA. Additionally, given this association between Chinese PA and English PA, teachers might also train students' Chinese PA in the hope that improved Chinese PA will affect their English PA. When students' English PA is strengthened, their English word reading might be improved.

5.4 Limitations of this Study

This study has several limitations which may be identified to benefit future

research in this field. In the present study, the participants were from a suburban area in central Taiwan. The size of the school is small, so that the participants in the present study were limited. Only 36 students participated in the study. Thus, for the correlation coefficients, the small sample only fit the low bar. If the number of participants could be increased, the results of the study would be more reliable.

Secondly, the aim of the PA study is to examine whether the participants have the abilities to blend the sounds. Hence, it is better for the participants take the PA test in the earlier stages of their language learning. All the elementary school students had studied English as part of their regular curriculum since the second grade. Hence, third and fifth grade students may not be the best choice for PA-based research.

Thirdly, the researcher had developed a good relationship with the participants through winter camp activities before the study was formally conducted. The advantage of the familiarity between the researcher and the participants is that the pupils trusted the researcher and were not afraid of taking the tests in the study. However, the drawback is that the pupils were playful during the tests and might not pay full attention to the tests, which might then cause threat to the reliability of the test results.

Fourthly, the original number of the participants recruited in the first place was higher. However, before the study was formally conducted, several parents changed

their mind and did not agree for their children to participate because the final exam date was approaching at the time the study was conducted. Hence, the data collected in the study were mainly from the pupils with higher motivation on taking the tests and the results may not generalize to the entire group at the research site.

Lastly, the participants were recruited from an elementary school located in suburban Taichung, the results may not generalize to other EFL populations.

5.5 Suggestions for Future Research

The study concludes with four suggestions for future research. First, to recruit sufficient participants and increase the validity and reliability of research, researchers can recruit more participants by visiting more than one elementary school in a suburban area. Second, in order to better fit the design of the PA correlational studies, the researcher suggests future researchers invite first or second graders to participate in the study so that the data collected will be more reliable. The third suggestion is about test administration. If the researcher is familiar with the participants, the researcher can ask another person to administer the tests, so that the test results might be more reliable. Fourth, a follow-up interview can be used to reconfirm the participants' responses to the test items and to find possible reasons account for their performance on the tests.

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APPENDIXES

Appendix I

家長同意書

親愛的家長您好：

我是東海大學外文系英語教學研究所的研究生，現在正在進行中文與英文音韻覺識能力的研究，目的是希望藉由音韻覺識找出貴子弟未來在英語閱讀學習上可能會遇到的困難，由衷的希望貴子弟能夠參與這一項研究。我們將會利用貴子弟在校的空餘時間進行測驗。本計畫主要利用紙筆測驗的方式並佐以少部份口語測驗，測驗貴子弟的中英文音韻覺識能力，以及英語字彙閱讀能力，所有有關貴子弟資料將只會在此研究中使用，並絕對保密您所提供的資料。施測過程中並不會對貴子弟造成任何的影響或傷害，請各位家長放心！您的參與能夠使我們對於小學生中英文音韻覺識能力有更進一步的了解。若您同意貴子弟參與這項研究，請在您勾選同意後，填妥以下的資料表，由貴子弟帶回學校，謝謝您的協助！

敬祝 萬事如意

東海大學外國語文學系 碩士班

研究生黃培嫥

……

學生姓名：_____

就讀班級：_____

☐ 我同意我的孩子參與這項研究計畫。

☐ 我不同意我的孩子參與這項研究計畫。

Appendix II

受試者基本資料

親愛的家長您好：

此份問卷目的在於協助我們了解學生英語學習環境之狀況，此份資料只在本研究中使用，所以您所提供的資訊將會被完全保密。敬請各位家長放心。您所提供的資訊將能協助我們更有效率的分析研究結果。感謝您抽空填寫。

東海大學外國語文學系 碩士班

研究生黃培嫥

……

1. 貴子弟姓名：
2. 貴子弟性別：□ 男 □ 女
3. 貴子弟就讀班級：_____ 年 _____ 班
4. 貴子弟的實際年齡：_____ 歲_____月
5. 請問您與貴子弟父親/母親的出生地分別為？父親_____ 母親_____
6. 請問貴子弟是否有在英語系國家居住過，如果有請問居住過多久？

   □ 有，國家 _____ 居住時間 _____ 年 _____月

   □ 沒有
7. 在小學以前是否有在其他機構學習過英語？(例：補習班)如果有，請問學過多久？

   □ 有，學習時間 _____年 _____ 月

   □ 沒有
8. 在家中你大約花多少時間與貴子弟一同閱讀課內與課外讀物？

   □ 中文

   □ 每週少於一小時 □ 每週一小時 □ 每週兩小時 □ 每週三小時以上

   □ 英文

   □ 每週少於一小時 □ 每週一小時 □ 每週兩小時 □ 每週三小時以上

9. 在家中您與貴子弟使用的語言有哪些，請依照使用頻率依序填入1、2、3…

□ 中文 □ 英文 □ 客家話 □ 閩南語 □ 原住民語 □ 越南語

□ 泰語 □ 印尼語 □ 其他 _____。

~問卷到此結束 再次感謝您撥冗完成~

Appendix III

中文音韻覺識答案卷

這個測驗主要分為兩部份，每個部份各有十道題目。小朋友們必須在每個題目中選出最好的答案填入答案卷中。

第一部份、中文語音刪除測驗

請將正確答案圈出來

練習一、(1) ㄇ (2) ㄢ (3) ㄅ

練習二、(1) ㄝ (2) ㄟ (3) ㄅ

答案區

1.	(1) ㄅ	(2) ㄜ	(3) ㄆ	**6.**	(1) ㄐㄧㄟˋ	(2) ㄧㄝˋ	(3) ㄐㄝˋ
2.	(1) ㄧㄥˊ	(2) ㄤˊ	(3) ㄥˊ	**7.**	(1) ㄨㄥ	(2) ㄓㄨ	(3) ㄓㄥ
3.	(1) ㄢ	(2) ㄎ	(3) ㄉ	**8.**	(1) ㄉㄢˋ	(2) ㄧㄢˋ	(3) ㄉㄧㄟˋ
4.	(1) ㄡˇ	(2) ㄛˇ	(3) ㄍˇ	**9.**	(1) ㄒㄧㄟˋ	(2) ㄒㄝˋ	(3) ㄧㄝˊ
5.	(1) ㄈ	(2) ㄇ	(3) ㄅ	**10.**	(1) ㄅㄢˋ	(2) ㄅㄧㄟˋ	(3) ㄧㄢˋ

第二部份、中文辨音測驗

請圈選出正確的答案

練習一、1 2 3

練習二、1 2 3

答案區

1.	1	2	3
2.	1	2	3
3.	1	2	3
4.	1	2	3
5.	1	2	3
6.	1	2	3

7.	1	2	3
8.	1	2	3
9.	1	2	3
10.	1	2	3

Appendix IV
中文音韻覺識題目卷

第一部份、中文語音刪除測驗

小朋友們請注意，本部份共有十題。你們必須聽從題目的指示在答案區中圈選出最適當的答案。例如：你會聽到：現在你將聽見一個字：ㄅㄟ，在聽完這個字後，請將其中的ㄅ音刪去，請問，會讀做下列那個音呢？在答案卷上，你會讀到：(1) ㄅ (2) ㄟ (3) ㄝ，正確答案為(2)，那麼就請你將(2)ㄟ圈起來。測驗正式開始前，有兩題練習題。

練習一、ㄇㄢˊ，試問，若將ㄢˊ刪去後，這個字會讀做下列那個音呢？

練習二、ㄆㄟ，試問，若將ㄆ刪去後，這個字會讀做下列哪個音呢？

題號	試題
1.	ㄆㄛ，試問，若將ㄛ刪去後，這個字會讀做下列哪個音呢？
2.	ㄧㄤˊ，試問，若將ㄧ刪去後，這個字會讀做下列哪個音呢？
3.	ㄋㄠˇ，試問，若將ㄠˇ刪去後，這個字會讀做下列哪個音呢？
4.	ㄍㄡˇ，試問，若將ㄍ刪去後，這個字會讀做下列哪個音呢？
5.	ㄇㄟˇ，試問，若將ㄟˇ刪去後，這個字會讀做下列那個讀音呢？
6.	ㄐㄧㄝˋ，試問，若將ㄝ刪去後，這個字會讀做下列哪個讀音呢？
7.	ㄓㄨㄥ，試問，若將ㄨ刪去後，這個字會讀做下列哪個讀音呢？
8.	ㄉㄧㄢˋ，試問，若將ㄉ刪去後，這個字會讀做下列那個音呢？
9.	ㄒㄧㄝˊ，試問，若將ㄒ刪去後，這個字會讀做下列那個音呢？
10.	ㄅㄧㄢˋ，試問，若將ㄧ刪去後，這個字會讀做下列哪個音呢？

第二部份、中文辨音測驗

小朋友們請注意，本部份共有十題。你們必須聽從題目的指示在答案區中圈選出最適當的答案。第一題到第五題要請你選出第一個音不同的字，例如：你會聽到：(1)ㄕㄢˇ (2)ㄉㄢˇ (3)ㄕㄡˇ。聽完後，答案卷上你將會讀到，1 2 3 答案是

2，則將 2 圈起來。第六題到第十題，要請你選出母音不同的字，例如，你會聽到；(1)ㄊㄞˋ (2)ㄉㄞˋ (3)ㄅㄢˋ。聽完後，答案卷上你將會讀到，1 2 3 答案是 3，則將 3 圈起來。測驗正式開始前，有兩題練習題。

練習一、請選出第一個音不同的字 (1) ㄅㄣ (2) ㄆㄞ (3) ㄅㄟ

練習二、請選出母音不同的字(1) ㄇㄟ (2) ㄅㄞ (3) ㄇㄞ

題號	試題
第一到五題，請選出第一個音不同的字。	
1.	(1) ㄓㄠˋ (2) ㄓㄡˋ (3) ㄕㄡˋ
2.	(1) ㄑㄧˋ (2) ㄒㄧˋ (3) ㄒㄧㄡˋ
3.	(1) ㄊㄨㄟˋ (2) ㄉㄨㄟˋ (3) ㄊㄢ
4.	(1) ㄢㄨㄛˊ (2) ㄌㄨㄛˊ (3) ㄌㄡˊ
5.	(1) ㄍㄨ(2) ㄎㄨ (3) ㄍㄜ
第六題到第十題，請選出母音不同的字。	
6.	(1) ㄒㄧˋ (2) ㄉㄧˋ (3) ㄅㄢˋ
7.	(1) ㄆㄨ (2) ㄅㄛ (3) ㄊㄨ
8.	(1) ㄈㄤˇ (2) ㄊㄤˇ (3) ㄉㄥˇ
9.	(1) ㄏㄨㄣˋ (2) ㄉㄨㄣˋ (3) ㄊㄨㄟˋ
10.	(1) ㄉㄥ (2)ㄅㄣ (3) ㄆㄣ

Appendix V

英文音韻覺識答案卷

這個測驗主要分為兩部份，每個部份各有十道題目。小朋友們必須在每個題目中選出最好的答案填入答案卷中。

第一部份、英文語音刪除測驗

請將正確答案填入空格中

練習一、(1) ar (2) j (3) g

練習二、(1) r (2) ra (3) an

答案區

1.	(1)	am	(2)	a	(3)	gam	**6.**	(1) pa	(2) pi	(3) po
2.	(1)	wan	(2)	san	(3)	sam	**7.**	(1) pus	(2) lu	(3) lus
3.	(1)	g	(2)	ug	(3)	uk	**8.**	(1) rem	(2) ren	(3) re
4.	(1)	u	(2)	uch	(3)	su	**9.**	(1) ob	(2) o	(3) og
5.	(1)	ak	(2)	ck	(3)	eg	**10.**	(1) ak	(2) ank	(3) ang

第二部份、英文辨音測驗

請圈選出正確的答案

練習一、1 2 3

練習二、1 2 3

答案區

1.	1	2	3
2.	1	2	3
3.	1	2	3
4.	1	2	3
5.	1	2	3
6.	1	2	3

7.	1	2	3
8.	1	2	3
9.	1	2	3
10.	1	2	3

Appendix VI

英文音韻覺識題目卷

第一部份、英文語音刪除測驗

小朋友們請注意，本部份共有十題。你們必須聽從題目的指示在答案區中圈選出最適當的答案。例如：你會聽到：現在你將聽見一個字：bark，在聽完這個字後，請將其中的 b 音刪去，請問，會讀做下列那個音呢？在答案卷上，你會讀到：(1) ar (2) ark (3) bar，正確答案為(2)，那麼就請你將(2)ark 圈起來。測驗正式開始前，有兩題練習題。

練習一、jar，試問，將 j 刪去後，這個字會讀做下列哪個音呢？

練習二、ran，試問，將 n 刪去後，這個字會讀做下列哪個音呢？

題號	試題
1.	jam，試問，若將 j 刪去後，這個字會讀做下列哪個音呢？
2.	swan，試問，若將 w 刪去後，這個字會讀做下列哪個音呢？
3.	hug，試問，若將 h 刪去後，這個字會讀做下列哪個音呢？
4.	such，試問，若將 ch 刪去後，這個字會讀做下列哪個音呢？
5.	lack，試問，若將 l 刪去後，這個字會讀做下列那個讀音呢？
6.	pan，試問，若將 n 刪去後，這個字會讀做下列哪個讀音呢？
7.	plus，試問，若將 p 刪去後，這個字會讀做下列哪個讀音呢？
8.	rent，試問，若將 t 刪去後，這個字會讀做下列那個音呢？
9.	rob，試問，若將 r 刪去後，這個字會讀做下列那個音呢？
10.	tank，試問，若將 t 刪去後，這個字會讀做下列哪個音呢？

第二部份、英文辨音測驗

小朋友們請注意，本部份共有十題。你們必須聽從題目的指示在答案區中圈選出最適當的答案。第一題到第五題要請你選出第一個音不同的字，例如：你會聽到：(1)light (2)liar (3)die。聽完後，答案卷上你將會讀到，1 2 3 答案是 3，則將 3 圈

起來。第六題到第十題，要請你選出母音不同的字，例如，你會聽到； (1)ring (2)sing (3)dog。聽完後，答案卷上你將會讀到，1 2 3 答案是 3，則將 3 圈起來。測驗正式開始前，有兩題練習題。

練習一、請選出第一個音不同的字 (1) ban (2) man (3) book

練習二、請選出母音不同的字 (1) peak (2) pick (3) tick

題號	試題
第一到五題，請選出第一個音不同的字。	
1.	(1) den (2) ten (3) tin
2.	(1) cheek (2) cheer (3) kick
3.	(1) fruit (2) food (3) vote
4.	(1) lick (2) rug (3) lit
5.	(1) beak (2) pick (3) pig
第六到十題，請選出母音不同的字。	
6.	(1) apple (2) egg (3) bag
7.	(1) rent (2) bed (3) bid
8.	(1) ice (2) buy (3) bug
9.	(1) boat (2) shock (3) pot
10.	(1) put (2) but (3) bat

Appendix VII

英文單字閱讀測驗

crane	**mule**	**wire**
clay	**pride**	**track**
flow	**dim**	**steam**
lane	**bud**	**rare**
mass	**ash**	**yard**

tof	**diken**	**pank**
zuk	**prag**	**stad**
gif	**rog**	**hile**
thit	**mok**	**speg**
visk	**brade**	**fleek**