

THE CROSS-LINGUISTIC MORPHOLOGICAL AWARENESS TRANSFER:
THE DEVELOPMENT OF CHINESE-SPEAKING ADOLESCENT LEARNERS'
ENGLISH MORPHOLOGICAL AWARENESS

A Dissertation

by

YI-FEN YEH

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of
DOCTOR OF PHILOSOPHY

May 2010

Major Subject: Curriculum and Instruction

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ABSTRACT

The Cross-linguistic Morphological Awareness Transfer: The Development of Chinese-speaking Adolescent Learners' English Morphological Awareness.

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Cross-linguistic transfer has been found to exist, at different degrees, in the process of second/foreign language acquisition. Both the level of orthographic depth and the orthographic distance between L1 and L2 affect the rate of the word learning process in language acquisition. Compared to English, Chinese orthography encodes morphemes within and via characters, lacks inflectional affixation, and contains a significant number of compound words. Extensive morpho-syllabic characters may develop Chinese readers' morphological awareness, as well as their vocabulary. This study examined how Taiwanese children apply decoding skills they have developed in learning Chinese, while they read English words. The degrees of transfer from Chinese to English within a structural model of morphological awareness are examined and analyzed. In addition, moderation effects resulting from regional differences and the length of time spent learning English are also discussed.

Students' morphological awareness is measured in six subtests which individually emphasize inflectional morphemes, derivational morphemes, and morphemes of compound words in Chinese and English, respectively. The results show that middle school students' Chinese morphological awareness facilitates their English morphological awareness development. These students also demonstrated the ability to detect morphemes in English, but only to a limited extent. They were skilled at decoding genuine compound words and were able to detect high frequency morphemes within pseudo-words. Their lengthy experience with morphologically complex characters and words in Chinese was most likely the major factor leading to such skill. Finally, in the development of English morphological awareness, the total length of time spent learning English and the length of formal English instruction experienced at the junior high school level were both found to positively correlate with the level of students' English morphological awareness, but not with the length of formal English instruction at the elementary school level. Such a discrepancy can be attributed to the current curriculum prevalent in elementary school which is only aimed at developing students' listening and speaking skills.

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NOMENCLATURE

L1	Native Language
L2	Second Language
M.A.	Morphological Awareness
ESL	English as Second Language
EFL	English as Foreign Language
SD	Standard Deviation
Ch. Infl.	Chinese Inflectional Concepts
Ch. Deri.	Chinese Derivational Awareness
Ch. Deri.1	Chinese Derivational Awareness – Affixation
Ch. Deri.2	Chinese Derivational Awareness – High-frequency Morphemes
Ch. Com.	Chinese Awareness of Compounds
Ch. Com.1	Chinese Awareness of Compounds – Morpheme Combination
Ch. Com.2	Chinese Awareness of Compounds – Morpheme Compounding
En. Infl.	English Inflectional Awareness
En. Deri.	English Derivational Awareness
En. Deri.1	English Derivational Awareness - Decomposition
En. Deri.2	English Derivational Awareness – Derivation
En. Comp.	English Awareness of Compounds
En. Com.1	English Awareness of Compounds – Morpheme Identification
En. Com. 2	Compound Word Decoding

M.S.	The Length in Middle School
E. S.	The Length in elementary school
P.E.	The Length prior to the starting grade of formal English instruction

TABLE OF CONTENTS

	Page
ABSTRACT	iii
ACKNOWLEDGEMENTS	v
NOMENCLATURE	vii
TABLE OF CONTENTS	ix
LIST OF FIGURES.....	xi
LIST OF TABLES	xii
CHAPTER	
I INTRODUCTION.....	1
II LITERATURE REVIEW.....	4
Morphological Awareness.....	5
Cross-linguistic Morphological Awareness	6
The Development of English Morphological Awareness	10
The Development of Chinese Morphological Awareness.....	15
The Present Study: Morphological Awareness Transferring Effects from Chinese to English.....	23
III METHODS.....	26
Participants	26
Materials.....	27
Procedures	35
Data Analysis	36
IV RESULTS.....	37
Structural Equation Models of Morphological Awareness Development	40
Separate Predictive Ability from the Chinese Morphological Sub- Awareness	44

CHAPTER	Page
English Morpheme Detecting Ability	48
The Development of English M.A. Awareness by Grades	50
Moderation Effects	58
V DISCUSSION	66
Morphological Awareness Transfer	67
English Morpheme Detecting Ability	70
Regional Differences in the Development of the English M.A.	72
VI CONCLUSION	75
Suggestions for Future Studies.....	76
REFERENCES.....	78
APPENDIX A	86
APPENDIX B	88
APPENDIX C	91
APPENDIX D	94
APPENDIX E	98
APPENDIX F	101
APPENDIX G	103
APPENDIX H	105
APPENDIX I	108
APPENDIX J	112
VITA	114

LIST OF FIGURES

FIGURE		Page
1	The Model of Cross-linguistic Morphological Awareness Transfer	25
2	The Structure Model of Morphological Awareness	42
3	The Path Model of the Chinese Inflectional Knowledge to the English Morphological Awareness Components	45
4	The Path Model of the Chinese Derivational Awareness to the English Morphological Awareness Components	46
5	The Path Model of the Chinese Awareness of Compound Words to the English Morphological Awareness Components	47
6	The Structure Model of the 7 th Graders' Morphological Awareness	51
7	The Structure Model of the 8 th Graders' Morphological Awareness	52
8	The Structure Model of the 9 th Graders' Morphological Awareness	53
9	The Acutal Distribution of the Starting Grades and Their Corresponding Numbers of Learning Years by Different Grade Levels and Districts.....	60
10	The Moderation Effects on the Structure Model of Morphological Awareness	63

LIST OF TABLES

TABLE		Page
1	The Number of Test Items, the Test Reliabilities, and the Means (SDs) by Grade Levels on Morphological Awareness Measures.....	38
2	Correlations between Verbal Aptitude, Chinese Morphological Awareness, and English Morphological Awareness Measures.....	39
3	Fit Indices of Measurement Models and Structure Model.....	43
4	The Goodness-of-fit Statistics for Testing the Invariance of Transferring Effects between Grade Levels.....	55
5	The Means (SDs) of Students' Starting Grades and Starting Ages in English Learning	61
6	The Goodness-of-fit Statistics for Testing the Moderational Effects on the Development of English M.A.	64

CHAPTER I

INTRODUCTION

The major purpose of this study is to investigate how children in Taiwan develop their English morphological knowledge based on their acquired Chinese morphological awareness. Speaking Mandarin Chinese as their native language, children in Taiwan officially begin their learning of English no later than the third grade. Mandarin Chinese differs from English not only in terms of graphologic constructs but also in terms of orthographic rules. It will be a primary focus of this investigation to learn how the morphological awareness in native language (L1) facilitates the development of the morphological knowledge in a second language (L2), especially when two languages share few similarities as, for example, with Chinese and English. The results of this investigation will be highly applicable to English as a Foreign Language (EFL) instruction in Taiwan.

Cross-linguistic transfer is found to exist in the process of second/foreign language acquisition at differing degrees, depending upon how similar two languages are, or how transparent the target language is. Meta cognition and reading strategies are often transferable among language acquisitions at different levels (Anderson, 1984; Bernhardt & Kamil, 1995; Pichette, Segalowitz & Connors, 2003). However, the level of orthographic depth affects the rate of language learning, not only in the first language,

This dissertation follows the style of *Scientific Studies of Reading*.

but also in the second language/foreign language acquisition (Landerl, 2000; Seymour, Aro & Erskine, 2003).

Language learners develop their orthographic knowledge through phonological and morphological awareness. In terms of phonology, Chinese is a syllabic language, while English is an alphabetic language with complex spelling rules. While learning English spellings, Chinese children follow a pattern similar to English speakers when they are acquiring their first language; they transition through the pre-alphabetic stage, to a partial alphabetic stage, and finally to the full alphabetic stage (Yin, Anderson & Zhu, 2007). As for the morphological aspect, English encompasses a significant number of inflectional and derivational morphemes, whereas Chinese has many compound words and complex compound rules – not only on the word, but also on the character level (Packard, 2000). Less adapted to inflectional and derivational affixes, Chinese children may encounter trouble acquiring inflectional and derivational morphemes in their learning of English. Conversely, Chinese children's well-developed sense of compound rules in Chinese may facilitate their English inflectional or derivational morpheme acquisition. English teachers may develop a more adaptive curriculum if Taiwanese children are found to be naturally assisted in their learning of English from their already established Chinese morphological knowledge. However, since linguists have just begun exploring Chinese morphology in recent years, there has been limited research conducted regarding Chinese children's morphological awareness development and cross-linguistic transfer.

Since there are some similarities with regards to orthographic structures, but dissimilarities in terms of scripts and spelling, it has been hypothesized that Chinese learners facilitate their English morphological awareness development by transferring their previously-developed Chinese morphological awareness to their absorption of English. Specifically, this study will investigate the potential differences between Chinese and English morphologies, to observe the universalism of morphological awareness transfer, and to examine how Chinese speakers utilize their already-developed compound-word knowledge to facilitate English orthography, as well as morphological rules. The study will also discuss if the resource imbalances resulted from regional disparities or different starting grades may interfere with the development of students' English morphological awareness.

The findings of the present study should: 1) help teachers of English in Taiwan anticipate and prepare for potential learning difficulties that their students might encounter during their English morphological development; 2) help teachers to teach English more efficiently by building off of students' L1 morphological awareness; and 3) add empirical research to the cross-linguistic literature currently available on Chinese children's English morphological awareness development.

CHAPTER II

LITERATURE REVIEW

Reading is a complex mental activity that may be processed differently in different languages (Seymour, 2006). The ability to read a word requires not only phonological but also morphological ability. Children develop their oral language abilities first by being exposed to a rich language environment, and then by continuously interacting with people in that language. Children develop their reading abilities by learning and associating the scripts with the corresponding words they've acquired in their oral language, rather than by learning a brand new skill (Chall, 1983; Fries, 1963). Learning to read in L2 may be much more complicated, since the language transfer mechanism is determined not only by the structure of two languages, but also by the linguistic distance between them. Being bilingual and multilingual has always been a global trend, and as such it will be valuable if more of children's instinctive cross-linguistic transferring and learning processes can be investigated.

Since the study focuses on how learners increase their L2 words with the assistance of the L1 morphological awareness transfer, related literature will be reviewed concerning the functions of morphological awareness and the cross-linguistic transfer of morphological awareness. Furthermore, in order to predict how Chinese learners of English potentially are influenced by their L1, this paper also discusses English and Chinese language features in terms of their morphology, morphological awareness development, and reading acquisition, respectively.

Morphological Awareness

Morphology is the study of how morphemes, the smallest unit of meaning, construct meanings within and among words in a language. Morphological awareness refers to a child's "conscious awareness of the morphemic structure of words and their ability to reflect on and manipulate that structure" (Carlisle, 1995, p. 194). Children with a high level of morphological awareness are able to parse out or compose words with constituent morphemes in order to construct meaning. In other words, morphological awareness functions as a major approach for boosting a language learner's vocabulary growth. Such an awareness is partially innate and partially developed. Chomsky (1986, 2006) believes that children are born with an innate "language faculty" which helps in organizing and decoding received linguistic signals, as well as in encoding those signals to create meaningful messages. Continuous practice with those signals, through social interaction with others, assures knowledge development with regards to these signals.

Morphological awareness is actually more than an ability to encode or decode morphemes; instead, it is a high-order ability called *Grapho-morphological awareness*, which coordinates orthographic awareness, phonological awareness and semantic awareness (Kuo & Anderson, 2006). Besides functioning as a framework helping to organize acquired lexicons and expand vocabulary size, morphological awareness also helps speakers/readers take advantage of syntactic and semantic clues among morphemes in order to distinguish homophones. Consequently, knowledge of morphological structures is critical to literacy development.

Morphological structures are present in every language, and morphological awareness is developed through exposure to vocabulary. Chinese is a morpho-syllabic language, which means that the morphemes are also represented in scripts. Chinese morphemes are monosyllabic and consume the same visual space as any other character. By contrast, English is a morpho-phonemic language, which means that morphemes can phonemically be spelled and combined in a sequence of letter sounds. Dissimilar in nature due to their symbols, Chinese and English still share similar orthographic structures – “meaning + phonetics” morphemes are coded in the respective spellings (DeFrancis, 1989). Furthermore, in terms of morpheme categorization, Packard (2000) stated that Chinese and English are morphologically similar, with respect to inflectional morphemes, derivational morphemes and compound words. Even with these fundamental morphological similarities, learners of English for whom Chinese is their native language have been found to have inferior skills in orthography than those who speak alphabetic languages (Akamatsu, 2003; Home & Dodd, 1996; McBride et al., 2005). This will be discussed further in the sections that follow.

Cross-linguistic Morphological Awareness

Morphological awareness is found to be transferrable between different languages. During L2 development, language learners may engage their overall knowledge, not exclusively the knowledge of their native language, as well as form a unique inter-language which blends both L1 and L2 grammars (Gass & Selinker, 1992; Selinker, 1972). Slightly different from the notion of an inter-language, many other researchers support the idea that language learners use their prior knowledge of L1 and

limited knowledge of L2 to build up a specific L2 system that approximates the L2 target language system (Adjemian, 1983; Broussard, 1999; Corder, 1981; Faerch & Kasper, 1987; Schachter, 1992; Smith, 1980; Zhang, 1990). The fundamental linguistic similarities (i.e., the similar orthographic structures) between Chinese and English may expedite morphological awareness formation on the one hand, but on the other hand, linguistic discrepancies (i.e., orthographic formation) may hinder its further development.

Children's morphological awareness that is developed in their native language constrains the formation of their L2 morphological awareness. The orthographic distance between L1 to L2 orthographies may influence L2 word learning process and its effects (Hamada and Koda, 2008; Koda, 2000). McBride-Chang et al. (2005) found that phonological awareness plays the most critical role in Korean and English reading, as opposed to the morphological awareness essential to Chinese reading, due to the fact that Korean and English are morpho-phonemic languages but Chinese is a morpho-syllabic language. Even though receiving pre-lexical phonological trainings (such as the Zhu-Yin-Fu-Hao or Pinyin systems) to facilitate Chinese character reading in the early stages may facilitate acquisition, Chinese speakers were still found to pay more attention to visual-orthographic information when reading English words (Wang, Koda & Perfetti, 2003). Extensive morpho-syllabic characters develop Chinese readers' morphological awareness and their reading habits.

The level to which L1 linguistic awareness fits into L2 linguistic structures may cause different learning patterns in students with different linguistic backgrounds. While

pronouncing English pseudo-words, Korean ESL learners perform faster and more accurately than Chinese ESL learners (Hamada and Koda, 2008). In the task of analyzing morphologically complex English words, Korean learners performed better on intra-word structures, but Chinese learners were better at detecting semantic inconsistencies (Koda, 2000). In terms of word identification, Chinese speakers attained a higher accuracy rate on less similarly-spelled words, but Koreans were better on similar words (Wang, et al., 2003). Indonesian ESL learners, another example of students who grow up learning an alphabetical language, also outperformed Chinese learners on English lexical identification tests (Muljani, Koda & Moates, 1998). Briefly speaking, with a similar alphabetic background to English, Korean ESL learners are able to transfer their Korean orthographic awareness to their English learning, and hence acquire English orthography comparatively easily. On the contrary, the great number of compound characters and words in Chinese forces Chinese speakers to be adept at analyzing the sub-lexical elements of a word in word-based process.

Beyond the morphological and orthographic level, the syntactic features of morphemes may also determine the competence of suffixes. In order to investigate if morphological awareness improve as the maturation of L2 language ability, Long (1997) and Lardiere (1998) observed two individual ESL adult participants who were native speakers of Chinese and Japanese respectively for seeing if their English morphological errors improved over eight to ten years. Both of their results showed no significant improvement in terms of the errors they made on their first test, even though they were married to native speakers and lived in the United States for over 20 years. Moreover,

adult ESL learners' performances regarding sentences involving all inflectional morphemes (except *-ing*) was far inferior to that of native speakers (Johnson and Newport, 1989). Jiang (2004) further points out that some morphological features are language specific; that is, some distinctive L2 morphological features are hard to fully integrate into a student's morphological awareness. Especially regarding the singular and plural disagreement between subjects and verbs, Chinese ESL learners responded much more slowly and showed a lower sensitivity, since there is no number agreement in the Chinese language.

Though greatly influenced by the L1 background, L2 morphological awareness is still naturally developed in later stages of language learning. Wang, Koda and Perfetti (2003) described the cross-linguistic transfer as follows: "both the transfer from L1 to L2 and the nature of the L2 system may jointly contribute to L2 reading acquisition" (p. 144). However, they also emphasized that Chinese learners' logographic transfer effects may occur only in preliminary English learning; the alphabetic spelling effects dominate the consequent English awareness development as the learners' English proficiency increases. That is, a separate L2 morphological awareness development is critical for L2 acquisition, especially for Chinese speakers learning English.

Does the cross-linguistic morphological awareness transfer have to be from L1 to L2? An atypical cross-lingual transfer, from English to Chinese, was also found among a group of bi-literate immigrant children (Wang, Cheng & Chen, 2006). This group of children showed rapid improvement in their English reading skills, as compared with their Chinese counterparts. Additionally, their English compound word awareness could

be used as a powerful indicator of their Chinese character and Chinese reading comprehension, but their English derivational awareness could not, due to the scarcity of derivational morphemes in Chinese. Consequently, language transfer indeed exists, but the extent of that transfer depends upon the distance between the two languages, and the direction goes from the proficient language to the less proficient one. Cummins' Interdependence Hypothesis (1977, 1979) explained the phenomenon that high levels of L1 proficiency facilitate L2 acquisition, and conversely, a high proficiency in L2 has a positive effect on L1 development.

The Development of English Morphological Awareness

Before we move on to a discussion of children's acquisition of English morphology, we need to clarify the definitions of different types of morphemes. There are two major types of morphemes – free morphemes and bound morphemes. Free morphemes refer to those smallest meaningful units (e.g., *sad*). Those which cannot be meaningful individually are called bound morphemes (e.g., the suffix *-ness* in *sad-ness*). Free morphemes can be termed root words; bound morphemes can be classified into inflectional roots and derivational roots.

English Morphemes

Children's acquisition of bound morphemes is a linear learning process. They build up their morphological awareness through continuous adjustment of the rules by which they use to generalize or organize the words they have encountered. The following is a brief description of the morphemic features and the children's acquisition process of bound morphemes.

Inflectional morphemes. Inflectional morphemes are used to mark stem-words (i.e., root words) grammatically, without altering parts of speech, in order to help stem-words reach agreement with other surrounding words in a sentence (e.g., I slice an apple. → She slices an apple). Common and regular inflectional roots include plural forms of nouns (e.g., dog-s), tense forms of verbs (e.g., prove-s, prov-ing, prov-ed, prov-en), and comparative and superlative forms in adjectives (e.g., quick-er, quick-est). English-speaking children usually develop a simple inflectional rule first, over-generalize the rule to possible morphemes, and then make adjustments to the rule through encounters with irregular items, e.g. *foots**, *goed** (Berman, 1981; Cazden, 1968; Kuczaj, 1977, 1978; Kuo & Anderson, 2006; Marcus, Pinker, Ullman & Hollander, 1992).

Derivational morphemes. Derivational morphemes encode extra information onto the stem-words, but the change exhibited on parts of speech may be optional (i.e. the suffix *-ship* in *friend-ship* gives an extra meaning, “state of being an X” to the stem-word *friend* without changing its parts of speech; the suffix *-ity* in *pur-ity* codes the meaning “property of being X” to the root word *pure*, with the changes in part of speech from adjectives to nouns). Bound roots, which make up words only by combining with other derivational roots or free roots, e.g. magn-ify, dis-like, are also categorized as derivational morphemes. However, bound roots do not change the parts of speech of the stem words. Such a derivational awareness is dominated by a complicated (1) relational knowledge, which refers to an ability to see the relationship between the stem words and suffixes in morphologically complex words (e.g., teach – teacher); (2) syntactic knowledge, which helps learners mark stem words with different parts of speech, (e.g.,

reduce – reduction); and (3) distributional knowledge, which determines why some affixes are constrained only to certain stem words by the syntactic category of the stem, e.g. “beautifully” is accepted but not “beautyly*,” since –ly cannot be attached to adjectives. For English learners, the complex morphological knowledge of derivational morphemes requires time to build upon (Kuo and Anderson, 2006; Mahony *et al.*, 2000; Tyler and Nagy, 1989).

Compound words. Except affixation, word compounding (which means combining at least two free roots) is another way to make up complex words. Three major compounds include compound verbs, compound adjectives, and compound nouns. Compound words of verb are composed of a base verb but preceded by a free root from the same word class (e.g., stir-fry) or from other word class, like nouns, adjectives or prepositions (e.g., hand-wash, dry-clean, under-estimate). English compound words are usually right-headed which means that the rightmost morpheme usually holds the core meaning of compound words, but the constituent morphemes in some words may be of little relevance to their overall meanings (e.g., redcap, lazybones, greenhouse) (Carstairs-McCarthy, 2002; Fabb, 1998; Nicoladis, 2002). Such right-headedness facilitates English speakers’ inferences regarding unfamiliar compound words and their word-compounding ability when they need to express new compound ideas. However, knowledge of compound words cannot be assessed as effectively as knowledge of inflectional or derivational words, since some compound words are frequently used, and thus fewer people can notice them as a combination of two or more free morphemes (e.g., *breakfast* and *holiday*) (Berko, 1958). For those compound words containing

unfamiliar component morphemes, learners might perceive them as single lexical entries without making any other inferences.

English Morphological Awareness

The combination rules mentioned above help English learners to systematically acquire English vocabulary as input and creatively make up words as output. The structure of most words can be analyzed with a binary tree which is a technique used to parse the constituents in a sentence, except for a few structurally or semantically irregular lexical items. Not only semantic meanings, but also word structures, can guide readers' interpretation of words.

Generally speaking, some morphemes are more easily acquired, especially those which are frequently used and easily recognized, occupying a fixed position relative to the stem and having a perceptually salient sound (Hoff, 2009; Peters, 1997). In Byrne's (1996) study, English-speaking children in the early stages of reading development were able to notice morphological distinctions like cup/cups, but had a greater difficulty recognizing phonological distinctions like bus/bug. Brown (1973), in his long-term study on three children's language development processes, found that both frequent morphemes and irregular morphemes are comparatively easier to be acquired. A constancy in the developmental order of 14 grammatical morphemes existed, but the learning rate or age varied. In most cases, the first three morphemes to be acquired included present progressive, and the prepositions *in* and *on*. They were roughly followed by plurals, past irregular, possessive, uncontractible copula, articles, past

regulars, third person regulars and irregulars, uncontractible auxiliary, contractible copula and auxiliary.

Neither morphological knowledge nor morphological awareness can be acquired in a short time since such knowledge requires intense vocabulary exposure as input. Researchers (Kuo and Anderson, 2006; Mahony, et al., 2000) found that English-speaking children's acquisition of derivational structures lags behind compound and inflectional structures. The major reasons are that derivational suffixes like *-able* and *-ment* are large in number, but less frequent in language utilization, and their affixation usually activates complex phonological and semantic alterations, as compared with inflectional suffixes.

All in all, English words can be free roots individually, bound roots affixed with inflectional or derivational roots, or compounds of two free roots. The morphemes which are common, stable, and marked in speech are easily acquired, especially as compared to those less-frequently used derivational morphemes. A constant learning pattern and rate are also found among English-speaking children in their word acquisition and morphological awareness development.

English Morphological Awareness Development

Some English reading theories investigate how readers process or code these smallest meaningful chunks of letters which are morphemes. The Restricted-Interactive Model (Perfetti, 1991) explains that skilled readers' word identification is triangulated through multiple sources of information (e.g. letters, phonemes, and morphemes). The acquisition of regular and irregular inflectional morphemes is conceptualized in the Dual

Mechanism Model (Baayen et al., 1997; Clahsen, 1999; Freiderici et al., 1993; Marslen-Wilson and Tyler, 1997, 1998; Pinker, 1999; Pinker and Prince, 1988; Pinker and Ulman, 2002; Ullman, Bergida, & O’Craven, 1997) and the Augmented Addressed Morphology Model (Chialant & Caramazza, 1995).

In the Dual Mechanism Model, regular morphology reflects the classic grammatical rules, like plural suffix *-s*; whereas irregular compounds are stored whole as pairs of lexicons, like *mouse* and *mice*. Though viewed as different lexical entries, these irregular compounds are still semantically and phonologically related to their original morpheme. In the Augmented Addressed Morphology Model (AAM), readers are assumed to approach known morphologically-complex words through whole-word access and unfamiliar morphologically-regular words through morpheme-sized decomposition. Irregular forms (e.g. *went* for *go*) and partially irregular forms (e.g. *built* for *build*) are processed as a whole set of independent lexical units. Obvious decodable morphemic units (e.g. the third person *-s* or past tense *-ed*) seems to be stored as distinguishing units that convey meanings by attaching to other basic morphemic units.

The Development of Chinese Morphological Awareness

Chinese words are encoded as characters, but they can also be spelled in pinyin in Mainland China or Chinese phonetics in Taiwan. Whether or not Chinese words could be morphologically analyzed in the same way as English words aroused numerous debates among linguists, due to the definition of Chinese morphemes. Li and Thompson (2003) viewed Chinese as “an isolated language” – a language in which a word is composed of one morpheme and cannot be further analyzed and there is no syntactical

agreement between words. However, most of these Chinese morphemes, in fact, can be further decomposed into semantic and phonological components (Perfetti & Tan, 1999; Taft & Zhu, 1997a, 1997b). In order to manage the dilemma that Chinese has morphemes and morphemic components, a level is set below morphemes and is called sub-morphemes. In the following, I shall introduce how Chinese words are spelled through two levels of morphemes, and then shall discuss how Chinese native speakers develop their morphological awareness.

Chinese Morphological System

Sub-morphemes. Chinese has complicated orthographic rules, since Chinese morphological information is coded not only in character combinations, but also in character compositions. Approximately 90% of the characters are ideo-phonetic – a combination of a semantic component (the radical) and a phonetic component (the phonetic) (Ho, Wong & Chan, 1999; Zhu, 1988). Both Chinese radicals and phonetics cue sub-morphemic information to meanings and pronunciations at different levels. For example, the radical 木 [mu4] *wood* cues the semantic meaning of trees to 林 [lin2] *forest*, but the radical 心 [xin1] *heart* cues 戀 [lian4] *love* opaquely, and 雨 [yu3] *rain* cues 需 [xu1] *need* irrelevantly. Not all Chinese radicals are meaning-transparent; those conveying their meanings opaquely and irrelevantly may result from long term character derivation.

As for phonetic components, Chinese readers can guess how characters sound alike if the phonetic components are familiar to them. The characters that share the same phonetic components may be pronounced totally identically, like homophones, partially

identically (only differing in tone or resembling one another in rhymes), or totally differently from the phonetic components themselves. There are approximately 7,000 morphemes in the Chinese language, but they exist in only 1200 syllables, which means that on average each identical syllable has 5 homophones, e.g. /ma3/ refers to 馬 *horse* and to 碼 *yard*, etc. The feature of a great number of homophones makes most Chinese morphemes polysemic. Chinese speakers usually differentiate meanings either by tone or by the neighboring morphemes to which the target morphemes attach (Shu, 2003). Yet, through an actual estimation of characters, Liu (1999) pointed out that the validity of phonetic components for the pronunciation of characters only ranged from 27% to 48% (Fan, et al., 1984; Zhou, 1978). Phonological activation can be more accurately achieved if phonetic components are decoded simultaneously with radicals (Paap, Chen & Noel, 1987; Wu and Liu, 1997).

Radicals and phonetic components make Chinese morphemes more accessible, especially for those people who use traditional Chinese scripts, like individuals from Hong Kong and Taiwan. Direct instruction on radicals and phonetic components can effectively improve children's word-identification ability (Shu and Anderson, 1997); natural (non-instructional) exposure to unfamiliar but radical-transparent characters can increase their vocabulary size (McBride-Chang, Shu, Zhu, Wat, & Wagner, 2003). From both studies, Chinese children's knowledge of morphology develops as they progress through the various grade levels. First graders were found to read Chinese characters holistically, but children as young as third grade were found to be able to infer meanings

by differentiating radicals and integrating the semantic information embedded in different parts of characters or segments of words.

The fact that most characters are semantically clued by radicals and phonemically hinted at by phonetics actually increases learners' vocabulary size. Ho, Wong and Chan (1999) found that Chinese students tend to make analogies of radicals, which are legally bound in most characters, after systematic and explicit instruction on radicals (Semantic Analogy Training) that teaches radical recognition and character decoding. However, they also admitted that novice readers' vocabulary size may be excessively estimated, since these readers may take advantage of the feature that characters with the same radicals are semantically related. Additionally, similar phonological analogous training was found to negatively affect students' learning effects on previous semantic analogous training, because they may easily take phonetic components mistakenly as semantic components. From this research, it can be inferred that children naturally took advantage of component analogies and acquired semantic categories of Chinese characters independently from their pronunciation.

Besides radical transparency, conceptual ease and character familiarity were found to serve as reading tactics for students (Shu and Anderson, 1999). Children performed better at conceptually easy and morphologically transparent characters, especially those that contained familiar radicals. Even in China where radical instruction was not common, students still showed an awareness of radicals, as well as an ability to make inferences and memorize unfamiliar characters. Stevenson and Stigler (1992) point out that Chinese readers demonstrated homogenous learning behaviors and reading

scores, whereas many more American young readers were found reading either above or below their current level. They attributed the reason for this averaging of Chinese readers to the abundant morphemic features of Chinese characters. On the contrary, the irregularities between English spelling and sounds can act as a barrier for readers.

Morphemes. Almost all Chinese morphemes are scripted as single characters that consist of sub-morphemes, as mentioned above. The fact that characters are mono-syllabic directly explains why people view Chinese morphemes as mono-syllabic, too. However, some exceptions - poly-syllable morphemes, i.e. 葡萄 [pu2tao2] *grape* – are still found in Chinese, usually because they are borrowed from other languages.

Li and Thompson (2003) categorize Chinese word formation process as follows: (1) reduplication, which means a morpheme that is repeated to form a new word; (2) affixation, by which prefixes, infixes, and suffixes are attached to the root words to form new words; and (3) compounds, by which the semantic value could be related or unrelated to the compound component's semantic information. The scarcity of affixes but prevalence of compound words are unique features of the Chinese language. Chinese compound words are difficult to define because morphemes may be uni- (in most words) or poly-syllabic, the meaning of component morphemes may not be reflected in the literal meaning of compound words, or even components themselves may no longer be morphemes in modern Chinese words.

Different from Li and Thompson's categorizations, Packard (2000) quad-sects Chinese morphemes according to two features – bound versus free, and content versus function. Historically, Chinese morphemes have been analyzed according to their

meanings if they describe the qualities of entities/actions or report the relationships among entities. Based on this criterion, Chinese morphemes can be categorized into four groups – function words ([+free, +function]), root words ([+free, -function]), bound roots ([-free, -function]), and affixes ([-free, +function]). Affixes can even be sub-categorized into *grammatical affixes* and *word-forming affixes*, which are similar to inflectional and derivational affixes, respectively, if termed according to English morphology. However, these two types of affixes do not share some universal features with most other languages, like grammatical agreement, morphological paradigms and morphophonemic alternations. For example, a Chinese inflectional morpheme 著 [zhe] – *ing* is used to denote only the aspects with no concern for tenses.

Though limited in quantity by comparison to other languages, Chinese grammatical affixes include 1) plural suffixes: 們 [-men] (a human plural noun suffix); 2) resultative potential infixes: 得 [-de] (a resultative infix to verbs) and 不 [-bu4] (a negative resultative infix to verbs); 3) aspect markers: 過 [guo4] (an experiential suffix), 了 [le] (a perfective suffix), 著 [zhe] (a durative suffix), 起來 [qi3 lai2] (an inchoative suffix), 在 [zai4] (a progressive suffix) (Chu & Chi, 2000; Li & Thompson, 2003; Packard, 2000). The Chinese word-forming affixes include the nominalizing suffixes (性 [xing4] and 度 [du4]), the verbalizing suffix (化 [hua]), the negative prefixes (無 [wu2], 未 [wei4] 非 [fei]), the adverbial suffix (然 [ran2]), the agentive suffix (者 [zhe3]) (Packard, 2000), and the adjectivalizing prefix (可 [ke3]) (Li & Thompson, 2003).

Chinese compound words are composed in a similar way to English compound words. Packard categorizes word types into compound words (two root words), bound

root words (root words plus bound roots, or two bound roots), derived words (bound roots or root words plus word forming affixes), and grammatical words (words plus grammatical affixes). Noun- and verb-compound words are in the majority. Briefly speaking, from Packard's point of view, Chinese native speakers' knowledge of word formation is derived from the knowledge of word classes and the internal structure within compound words. The limited inflectional affixes and derivational affixes force Chinese speakers to effectively utilize their morphemes through combining bound roots (Ku and Anderson, 2003).

The reason why Chinese is so distinctive from other languages is that Chinese features a collection of many properties that are individually universal and common but infrequently combined together, including “monosyllabism, existence of isolated morphemes, preponderance of bound roots, absence of morphophonemic alternation, paradigmatic alternation, grammatical agreement and so forth” (Packard, 2000, p. 131). Furthermore, different from other alphabetic languages, Chinese words are essentially compounds of characters and free from inflectional changes to the formation of morphemes (characters) themselves.

Chinese Morphological Awareness Development

In contrast to the lengthy history of research development in English acquisition, applied linguists only began to investigate Chinese language acquisition in the disciplines of Phonology, Syntax, Morphology and Semantics within the previous two decades. No vocabulary reading theories (such as the Dual Mechanism Model mentioned in the previous discussion) have emerged specifically for Chinese language until now.

For the most part, the only theories regarding Chinese language acquisition have been more focused on word identification.

Regarding Chinese character identification, Taft and Zhu (1997a, 1997b) proposed a multilevel interactive-activation framework which stratifies the word composition into sub-morphemic components (e.g. strokes and radicals) as basic elements at the lowest level, morphemes (characters), and finally words that are combinations of both. Besides original orthographic units, this framework was later implemented with phonological and semantic units to levels above the morpheme (Taft, Liu & Zhu, 1999).

Similar to Taft and Zhu's hierarchical analysis, Perfetti and Tan (1999) also proposed a word identification system that especially clarifies the existence and semantic value of radicals. In this system, Chinese reading is viewed as an activation across four subsystems, including two types of orthographic (non-characters and characters) subsystems, one phonological subsystem, and one semantic subsystem. Either character or non-character orthographic subsystems are activated through stroke analysis as visual inputs, whereas phonological subsystems are activated through segment analysis as auditory inputs. Their model not only explains how characters can be identified, but also how words are comprehended.

Chinese has a complicated morphology of compounds, represented by compound characters and compound words. With compound characters, students can infer the meaning and pronunciation of new characters by making analogies to the components of familiar characters. As for compound word formation, the more words readers encounter

and implicit rules they develop in their mind, the larger their vocabulary size will be. Learners who can triangulate the information from characters and words are believed to have better vocabulary acquisition.

The Present Study: Morphological Awareness Transferring
Effects from Chinese to English

Briefly speaking, Chinese morphology is distinct from English morphology in the following ways. First, Chinese morphemes can be analyzed as having two layers, character composition and word formation. Second, Chinese is a tonal and non-inflectional language, while English is an intonational and inflectional language. Third, English has more inflectional and derivational affixes, but Chinese has a great deal of complex compounding rules. Fourth, phonological changes usually occur while combining with bound morphemes in English. Chinese word formation, on the contrary, seldom involves phonological or orthographic changes; the pronunciation of each character is fixed and tones are utilized to mark distinctions from other homophones.

The purpose of the present study is to test three hypotheses in view of the previous findings. First, Chinese has the same morpheme categories (Packard, 2000), such as inflectional, derivational and compound words, as does English. Regardless of the imbalanced distribution of each category within two languages, Chinese learners who perform well on inflectional, derivational, or compound words are assumed to perform as well in the English counterpart categories. That is, they are assumed naturally transferring their morphological awareness which was developed in their L1 to the

counterpart one in English as their L2. Such a cross-linguistic morphological awareness transfer was modeled in Figure 1.

After the whole transferring model had been developed, the second research question is to know if abundant compound characters/words with complex compounding rules in Chinese help their speakers master English compound words and derivationally-affixed words. Another similar question is asked, “if rare inflectional morphemes and related concepts in Chinese make Chinese students less competent in inflectionally-affixed English words.” The third research question asks if Chinese speakers read English vocabulary through detecting and making inferences about the morphemes embedded within the words, due to their ability to be trained to obtain semantic cues in Chinese reading.

These assumptions are all about how Chinese speakers’ morphological awareness in their L1 benefited the development of their English morphological awareness. However, besides the maturity level of Chinese morphological awareness, the quantity and the quality of English instruction might also determine how their English morphological awareness is developed. It is common to see students in Taiwan starting their English instruction at different ages or receiving it in different number of hours per week. Finally, the study will also discuss if the starting age as well as the quantity of the school instruction influence students’ English morphological awareness development.

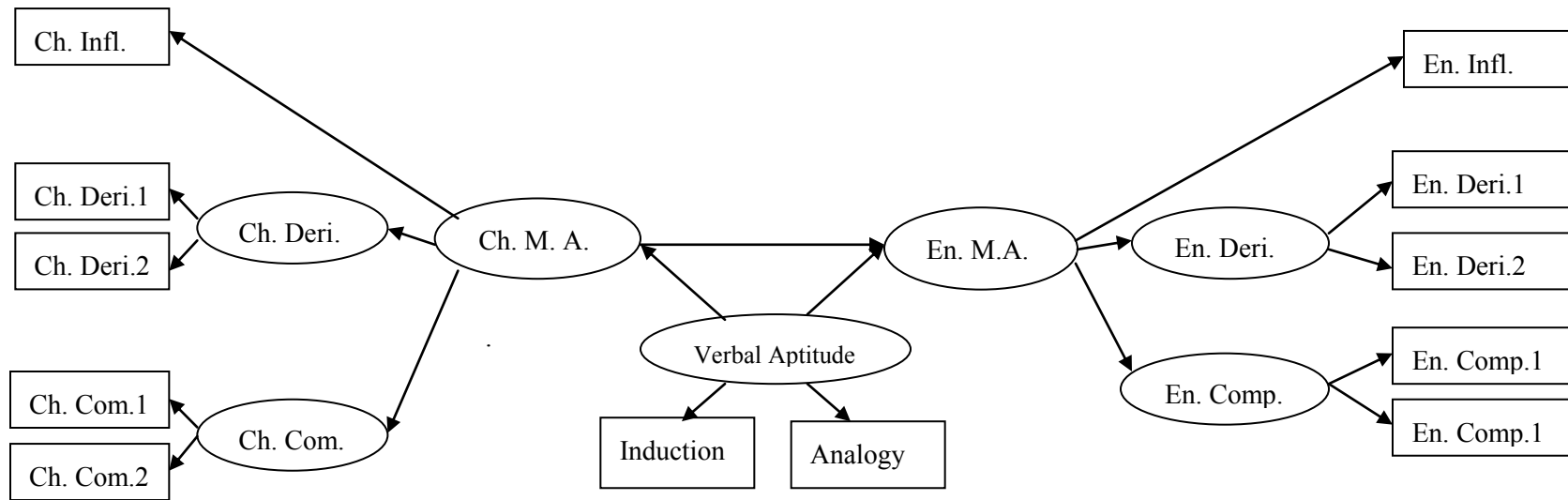


Figure 1. The Model of Cross-linguistic Morphological Awareness Transfer.

Note. * means significance at the level of .001. ^a means significance at the level of .05.

CHAPTER III

METHODS

Participants

The assessments in this study were administered in June, 2009, at the end of the 2008 school year. Considering that the cumulative years of English learning may result in students' English development, the study invited the students in three junior high schools from the districts where the starting grade of English instruction varied. A stratified sampling strategy was used, and the selection criterion was based on different starting grade levels of English instruction in different cities. One school from Taipei city, Taichung city, and Taoyuan city participated in the study. According to the official announcement from the municipal educational agencies, Taipei city claimed that they assisted the schools in their district to offer English instruction as early as the 1st grade since 2000. The schools in Taichung city were expected to offer English instruction from the 2nd grade since 2002; the schools in Taoyuan started from the 3rd grade since 2003. In other words, due to the early starting grade and the early starting year, the 9th-grade students in Taipei may not only have received longer English education in middle school compared to the younger grades but also in the primary school stage by comparing to the same-grade peers from the other district.

In total, 99 students were recruited from the 7th grade (35 from Taipei, 32 from Taichung, and 32 from Taoyuang); 99 students in the 8th grade (37 from Taipei, 30 from Taichung, and 32 from Taoyuang); and 89 students in the 9th grade (30 from Taipei, 32 from Taichung, and 27 from Taoyuang). In terms of schools, 102 students were from

Taipei city, 89 students were from Taichung city, and 96 students were from Taoyuan city.

Materials

This study investigated Taiwanese students' individual and composite awareness of inflectional morphemes, derivational morphemes, and compound words as transfer effects from Chinese to English as a foreign language. Besides the Junior High School Students' Scholastic Aptitude Test, Morphological Awareness tests in Chinese and in English were also administered. Some subtests within the Chinese Morphological Awareness Test appear in the same format as the English Morphological Awareness Test. The details of these three ability tests are introduced, according to the order in which they were administered, in the following sections. Students' performances on tasks were transformed into z-scores.

Junior High School Students' Scholastic Aptitude Test

The Junior High School Students' Scholastic Aptitude Test (Lu et al., 2001) is a standardized test designed for measuring the verbal and mathematical ability of students in grades seven to nine. Modified from the Scholastic Aptitude Test (SAT), the test items are composed by considering the daily life and cultural environment of students in Taiwan. The subtest for verbal ability evaluates the students' verbal analogy and verbal induction through 50 multiple-choice questions. In the section dealing with verbal analogy, students need to select a best answer from *clothes*, *shoes*, *watch*, and *belt*, for the test item: "*Head* is to *hat* as *feet* is to ____." As for the section concerning verbal induction, students were asked to select a term that best describes the mutual category of

mice, ants, and rabbits from possible answers like *animals, livestock, insects, and beasts*. The internal correlation consistency (Cronbach's Alpha) for the two subtests are .86 and .91, respectively. Each correct answer is worth 1 point.

Chinese Morphological Awareness Tests

In order to avoid the ceiling effects that adolescent students may have on Chinese vocabulary, all of the target vocabulary items, except for the section entitled "Chinese Inflectional Morpheme," were selected according to word frequency. The frequency of words was based on an on-line linguistic corpus database - Word List with Accumulated Word Frequency in Sinica Corpus. Sorted by the frequency of appearances in major linguistic resources, the collected Chinese words in the database are ranked from 1 to 93,826, which implies that the number of words a Chinese literate reader may need in modern society is approximately 90,000. To ensure that the target words in the different frequency levels are appropriate, the selection of each word not only must meet the intended testing categories, but was also randomly selected from each stratum of 5,000 words. However, no words were selected within the frequency ranges of 45,000 to 50,000, 60,000 to 70,000 and 75,000 to 90,000, since the corpus database itself lists no words within these strata. For example, all the words appearing three times in the database are ranked at 57,995, but those appearing two times are ranked at 70,282. Each task is a free-response format, with one- or two- morpheme words. The entire Chinese morphological Awareness test took students approximately 40 minutes to complete.

Chinese Inflectional Awareness Task. This subtest was conducted to measure students' knowledge of Chinese inflectional morphemes. The target morphemes in each

test item in this task were selected from the grammatical affixes (Li & Thompson, 2003). Students were given 13 sentences with a blank appearing in each, and were required to fill in the blank with an appropriate morpheme, according to the context. The intended morphemes in this section includes not only grammatical affixes but also a comparative morpheme (i.e. 越 [yue4]) and the superlative morpheme (i.e. 最 [zui4]), as counterparts to the relevant concepts in English. For example, students need to fill in the question “*I studied (____) late last night, which made me almost miss the bus in the morning*” with a resultative potential infix 得, which is an adverbial morpheme but has no corresponding word in English.

Students’ responses in this task were evaluated and scored in two steps. First, all the answers which were collected from the students’ responses were listed as choices under the test items, and then three Chinese native speakers were involved to evaluate if these answers completed the target sentences grammatically. They were encouraged to read the sentences which were alternated with potential answers a few times and intuitively judge if the sentences grammatically and semantically make sense. Answers were viewed correct only when all three evaluators agreed on the appropriateness of the word to the context. In step 2, with the list of appropriate answers to test items, the researcher scored all the students’ responses and gave 1 point to the answer word if it was on the list.

Chinese Derivational Awareness Task. Li and Thompson indicated that Chinese has a limited number of word-forming affixes, which is similar to the derivational affixes in English. Due to the limited exposures, Chinese speakers may be less aware of

the derivational concepts or even view the derivational words as compound words. For knowing if Chinese students are sensitive to derivational concepts or morphemes, this study designed a task among which 16 items were intended to measure students' awareness on specific word-forming affixes and 10 were designed to measure their derivational concepts on high-frequency morphemes. The test items from these two types were intermixed in the same task.

As for the test items involved with the specific word-forming affixes, they were designed to measure students' syntactic and derivational knowledge. In order to make sentences syntactically and semantically correct, students had to make up words with the clue morphemes. The word-forming affixes in this section include the nominalizing suffixes (性 [xing4] and 度 [du4]), the verbalizing suffix (化 [hua]), the negative prefixes (無 [wu2], 未 [wei4] 非 [fei]), the adverbial suffix (然 [ran2]), the agentive suffix (者 [zhe3]) (Packard, 2000), and the adjectivalizing prefix (可 [ke3]) (Li & Thompson, 2003). One test item, for example, asks students to add a prefix 無 [wu2] *non-* to the clue morpheme 憂 [yo1] *worry*, in the sentence: “*His application for the position of state staff is accepted. The salary is not high, but he will _____ for basic needs in living at least.*”

Furthermore, on the rest of 10 test items, students need to make up words with high-frequency morphemes that can be used to form verbs, nouns or other grammatical categories when combined with other potential morphemes. For example, students might need to add a morpheme 故 [gu4] *reasons* after the clue verb morpheme 變 [bian4] *change*, if they think the blank in the exam question requires a noun. These 10 test items

measure more of students' knowledge of Chinese syntax and semantics, both of which are critical to knowing when the student being evaluated is aware of derivations.

Awareness Task of Chinese Compounds. In this section, the Morpheme Combination task and the Morpheme Compound task are employed in order to assess students' knowledge and awareness of Chinese compounds. The study designed the Morpheme Combination Task for measuring students' sense of word formation and the size of their vocabulary. Students are required to paraphrase the underlined phrase (4 to 10 morphemes in length) in the stem sentence into a two-morpheme long word. In other words, the underlined phrases explain the intended phrases in the test taker's answers. For example, students are told to paraphrase an underlined phrase such as 檢查測量 [jian3cha2 ce4liang2] *check and measure* into a brief expression 檢測 [jian3 ce4]. Usually students make up these words by retrieving and reorganizing the morphemes within the underlined phrases, but they are not given hints to do so. The intended phrases included in this subtest are variously composed. For example, 檢測 [jian3 ce4] is composed of the first and third morphemes in 檢查測量 [jian3cha2 ce4liang2] *check and measure* is the only grammatically and semantically correct paraphrasing phrase, instead of 檢量* [jian3liang2], 查測* [cha2ce4], or even 查量* [cha2liang2]. In other cases, possible compound paraphrasing could consist of the first morpheme and the fourth morpheme (i.e., 培育 [pei2yu4] for 培養教育 [pei2yang3 jiao4yu4] *develop and cultivate*), the second morpheme and the third morpheme (i.e., 險阻 [xian3cu3] for 艱險阻礙 [jiansian3 cu3ai4] *danger and difficulty*), or the second and the fourth morpheme (i.e., 勸導 [quan4dao3] for 規勸引導 [gui1quan4 ying3dao3] *persuade and guide*.)

Based on the Morphological Construction Test (McBride-Chang *et al.*, 2003), the Morpheme Compound Task requires students to create a two-morpheme word based on a previously-given sample word, accompanied by a rationale for how the word is created. For example, “*We call the ability of eyes to see objects as “vision”; then we call the ability of ears to hear sounds as “_____.”*”

Students’ responses in the Chinese Derivational Awareness tasks and the Awareness Task of Chinese Compounds were also evaluated in three steps. First, in order to ensure if students’ responses were all real words, the Chinese Lexicon Dictionary – the Edited and Amendment Version was used. It is also an on-line dictionary being used for leaving out those made-up words or pseudo-words in this study. For example, in order to write the antonym of the term 優越感 [yo1yue4gan3] *superiority* in the test item, some students may compose a term like 低越感 [di1yue4gan3], in which only the first morpheme is the antonym to the first morpheme of *superiority*. However, no one uses a phrase like that. After excluding the pseudo-words, three native speakers were also asked to evaluate the list of possible answers, which was the same as the one in the Inflectional Awareness task. Lastly, each correct answer is worth 1 point.

English Morphological Awareness Tests

All the words and sentences used in these test items are curriculum-based. Almost all the words are within the 1,000 essential vocabulary that the Ministry of Education in Taiwan officially expects junior high school graduates to acquire. The English section of The Basic Competence Test for Junior High School Students, which

functions as a high school entrance exam, is also based on the same list. Only a few words are from the list of 2,000 essential vocabulary words, which is the expanded list of the 1,000 vocabulary. The vocabulary in this 2,000 word list is recommended to be acquired, for junior high school graduates.

English Inflectional Awareness Task. The researchers who in the past have investigated ESL students' acquisition of inflectional morphemes usually conducted their studies through longitudinal observations (Jia, 2003; Jia & Fuse, 2007; Paradise, 2005). Rather than proceeding qualitatively, this subtest asks student to fill in the blanks in sentences by modifying the clue words according to the context, which is slightly different from asking students to simply determine if aurally received sentences are grammatically correct, as in the Grammatical Comprehension subtest of TOLD-I:3 (Hammil & Newcomer, 1997). The target inflectional affixes in this section include tenses, aspects, numbers, and comparative/superlative suffixes. For example, students might need to modify the word *boy* by adding a suffix *-s* to the sentence “*Bill is a boy and John is a boy. They are both _____. (boy)*”

English Derivational Awareness Task. This section includes the Word Decomposition Task and the Word Derivation Task. Each task is composed of 20 test items, and both are based in Carlisle's study (2000). Approximately one quarter of her test items were directly used for this investigation because the target words are on the list of 1,000 essential vocabulary words.

These two tasks measure students' ability to decompose clue words and derive clue morphemes, respectively, by providing a relevant context. Both tasks require

students to detect the grammatical category first by figuring out where the blank is in the sentence, and then make the appropriate modifications to the clue words. For example, in the Decomposing Task, students must transform the derived word “density” into its base form “dense,” for the purpose of making the sentence “*The smoke in the room was very _____*” grammatically correct. Conversely, in the Deriving Task, students are required to modify the clue word “farm” with the suffix “-er” in order to fit it into the sentence “*My uncle is a _____.*”

Awareness Task of Compound Words. Modified from Ku’s (2001) subtests for measuring native speakers’ English morphological awareness, the English Morpheme Task and the Compound Word Decoding Task were both employed in this study to observe whether Chinese speaking students read English words holistically or morphemically, and if they take advantage of morphemes while reading words.

Morpheme Identification Task. Students were required to respond to each pair of words by circling YES if they thought the second word came from the first word in the pair, or NO if it did not. For example, students would circle YES to the pair “sun” and “sunny,” but NO to the pair “pen” and “penny.” The majority of pairs were adapted from Ku (2001).

Compound Word Decoding Task. Twenty real words and twenty possible (pseudo-) words were employed to test if students possessed the ability to read unfamiliar compound words by detecting the morphemes in the word. Students were encouraged to make logical guesses if the words were new to them. The target words were intermixed with ten real compound words, real derived words, possible compound

words, and possible derivatives, respectively. Possible compounds and derivatives were composed of basic morphemes taken from the list of 1,000 essential vocabulary words.

Students were instructed to circle YES if they were sure of the target word, such as “*afternoon*,” and then were to write its Chinese meaning. However, taking a pseudo-word such as “*unangry*,” for example, students could have interpreted it to mean “not angry” if they could detect the morphemes “*-un*” and “*angry*.” They were instructed to circle NO if they thought the words were possibly real words but they felt unable to explain the words. Or, when reading a pseudo-word like “*waterwinner*,” students might be able to detect the morphemes inside but still face difficulties deciphering convincing meanings. If they felt the compound word made no sense (i.e., “*sunplay*”), they were instructed to circle PS, which stands for pseudo-word.

Except in the Compound Word Decoding Task, the correct responses in all other tasks in the English Morphological Awareness Tests were scored with 1 point each. As for the Compound Word Decoding Task, one point were credited only when 1) they marked pseudo-words with PS, or 2) they marked real words with YES and also wrote down their Chinese meanings correctly.

Procedures

These three ability tests for measuring the participants’ vocabulary and morphological awareness were administered over two independent-study hours. On the first day, the students were given the Junior High Student Scholastic Aptitude Test (15 minutes), followed by the Chinese Morphological Awareness Test (40 minutes). On the second day, the English Morphological Awareness Tests were administered (40

minutes). The test sheets were provided to the students who voluntarily participated in the study. After the researcher briefly explained the intention of the study, the students started to respond to the tests independently. Instructions regarding how to answer the test items and relevant examples were provided in the beginning of each task. The researcher was also present in the classrooms, in case students had questions regarding the test items.

Data Analysis

A structural equation model was constructed in order to determine if Chinese EFL learners' native M.A. facilitated their English M.A. development. Students' M.A. in Chinese and English were proposed as two separate hierarchical concepts. These two concepts are proposed to be composed of another level of latent variables, such as the Derivational Awareness or the Awareness of Compounds. Students' performance on each tasks served as the indicators of these first-level latent variables. For knowing the development of Taiwanese students' M.A. in Chinese and English, the strengths and the inter-relationships of the paths within the model will be discussed. The study also examined how each subset of Chinese M.A. individually contributed to the development of the three subsets in English M.A.

Two statistical programs were used to analyze the data. All the participants' responses were coded and entered into SPSS 16.0. Amos 16.0 was used to evaluate if the model fitted to the data. The factor loading of the paths from the Awareness of Chinese Compounds to the Chinese M.A. and from the Derivational Awareness to the English M.A. were constrained to 1, for the purpose to scale other latent variables in the model.

CHAPTER IV

RESULTS

The descriptive statistics of Chinese and English morphological awareness (M.A.) tasks are presented in Table 1. The Cronbach's Alpha statistics are also presented to show the internal consistency reliability in each task. Table 2 presents the intercorrelations among tasks as well as the means and SDs observed on each task. Low to moderate correlations ($.36 \leq r \leq .68$) were found among the tasks in Chinese, but moderate to high correlations ($.52 \leq r \leq .72$) were found among tasks in English. While comparing Chinese tasks and English tasks, their inter-correlations were between .28 and .45.

Table 1

The Number of Test Items, the Test Reliabilities, and the Means (SDs) by Grade Levels on Morphological Awareness Measures

<i>Measures</i>	<i>Item</i>	<i>Alpha</i>	<i>7th Graders</i>		<i>8th Graders</i>		<i>9th Graders</i>	
Chinese								
Inflectional Awareness	10	.58	8.23	(1.67)	8.34	(1.52)	8.74	(1.27)
Derivational Awareness*		.82						
Affixation	16	.77	7.12	(2.98)	8.78	(3.47)	9.05	(3.24)
High-frequency Morphemes	10	.58	5.52	(2.00)	6.26	(1.99)	6.47	(2.00)
Awareness of Compounds								
Morpheme Combination	26	.84	16.94	(4.88)	17.91	(5.01)	19.72	(3.64)
Morpheme Compounding	26	.82	12.42	(4.27)	14.62	(5.93)	14.66	(4.17)
English								
Inflectional Awareness	16	.88	6.84	(3.65)	8.95	(4.15)	10.34	(4.48)
Derivational Awareness								
Derivation	15	.77	7.33	(4.58)	8.39	(5.65)	10.25	(5.01)
Decomposition	15	.85	7.72	(3.45)	8.65	(3.58)	9.97	(3.75)
Awareness of Compounds								
Morpheme Identification	20	.73	14.85	(2.82)	14.64	(3.50)	16.37	(2.92)
Compound Word Decoding	40	.90	16.11	(7.70)	19.95	(9.90)	20.28	(7.54)

* means that the sub-tasks in the category were placed in one inclusive task when the measurements were administered.

Table 2

Correlations between Verbal Aptitude, Chinese Morphological Awareness, and English Morphological Awareness Measures

	1	2	3	4	5	6	7	8	9	10	11	12
1. Verbal Induction	-											
2. Verbal Analogy	.59*	-										
3. Ch. Inflectional Awareness	.41*	.33*	-									
Ch. Derivational Awareness	.53*	.42*	.51*	-								
4. – Affixation					-							
5. – High-frequency Morphemes	.45*	.36*	.45*	.68*	-							
6. Awareness of Ch. Compounds – Morpheme Combination	.45*	.37*	.42*	.61*	.49*	-						
7. Awareness of Ch. Compounds – Morpheme Compounding	.42*	.38*	.54*	.68*	.64*	.57*	-					
8. En. Inflectional Awareness	.38*	.24*	.28*	.37*	.36*	.33*	.37*	-				
9. En. Derivational Awareness – Derivation	.43*	.24*	.30*	.39*	.34*	.29*	.32*	.72*	-			
10. En. Derivational Awareness – Decomposition	.35*	.24*	.28*	.28*	.33*	.28*	.32*	.75*	.72*	-		
11. Awareness of En. Compounds – Morpheme Identification	.36*	.24*	.30*	.36*	.36*	.34*	.35*	.60*	.54*	.53*	-	
12. Awareness of En. Compounds – Compound Word Decoding	.33*	.20*	.34*	.42*	.42*	.35*	.45*	.60*	.52*	.58*	.54*	-
Mean	18.23	17.67	8.43	8.30	6.07	18.15	13.88	8.67	8.62	8.75	15.26	8.64
SD	4.16	3.35	1.52	3.34	2.03	4.70	4.96	4.33	5.22	3.69	3.17	18.73

Structural Equation Models of Morphological Awareness Development

The model was evaluated with several fit indices, including chi-square tests, the root means square error of approximation (RMSEA), the comparative fit index (CFI) and the Tucker-Lewis coefficient (TLI). A non-significant chi-square statistic usually means good-fitting of a model to the collected data. However, due to its sensitivity to large sample size, the chi-square statistic cannot be a solely reliable indicator to evaluate the fitness of a model. Bollen (1989) suggested the normed chi-square (X^2_M / df_M), by which a reasonable fit is indicated when the value is 2.0, 3.0 or even as high as 5.0. As a Goodness-of-Fit index, RMSEA measures the error of approximation to the population covariance matrix and favors simple models. A good model fit is suggested when the RMSEA value is smaller than .05. A reasonable fit can also be accepted when the value is less or equal to .08, but a poor fit model is identified when the value is larger than .10 (Bentler, 1999). While evaluating the incremental fit in the model, the values of CFI and TLI which are greater than .90 and approaching 1 suggest a good fitting of the model (Hu & Bentler, 1999; Tucker and Lewis, 1973). CFI has been found even more appropriate to measure the fit of the model when the sample size is smaller (Rigdon, 1996).

Prior to the construction of the structural model, confirmatory factor analysis (CFA) was used to test the measurement models of latent variables individually (e.g., Chinese M.A. and English M.A.). The indices from both CFAs (shown in Table 3) indicate that the individual Chinese M.A. and English M.A. models fit the data well. As assumed in the hypothesis, students' verbal aptitude and Chinese M.A. should be

predictive of the development of their English M.A. Consequently, a structural model which connects the three latent variables was tested. The relevant indices of model fitness suggest that the model did fit with the data well (see Table 3). Estimates of standardized path coefficients and factor loadings in the structure model are given in Figure 2. All tasks showed significantly high loadings ($\lambda > .65$) to their related latent variables. These high loadings suggested that the tasks reliably explain the proposed latent variables: Verbal Aptitude, Chinese Morphological Awareness and English Morphological Awareness.

As assumed in the hypothesis, the overall Chinese Morphological Awareness significantly predicted the development of students' English Morphological Awareness. The path coefficient was .37, which suggests that every 1-point increase on the Chinese Morphological Awareness scale may directly improve the student's English Morphological Awareness by .37 points. However, Taiwanese students' verbal aptitude, which was estimated through their verbal induction and verbal analogy abilities in Chinese, was found predictive of their development of Chinese Morphological Awareness directly ($B = .70$), as well as their English Morphological Awareness through both direct and indirect paths ($B = .51$).

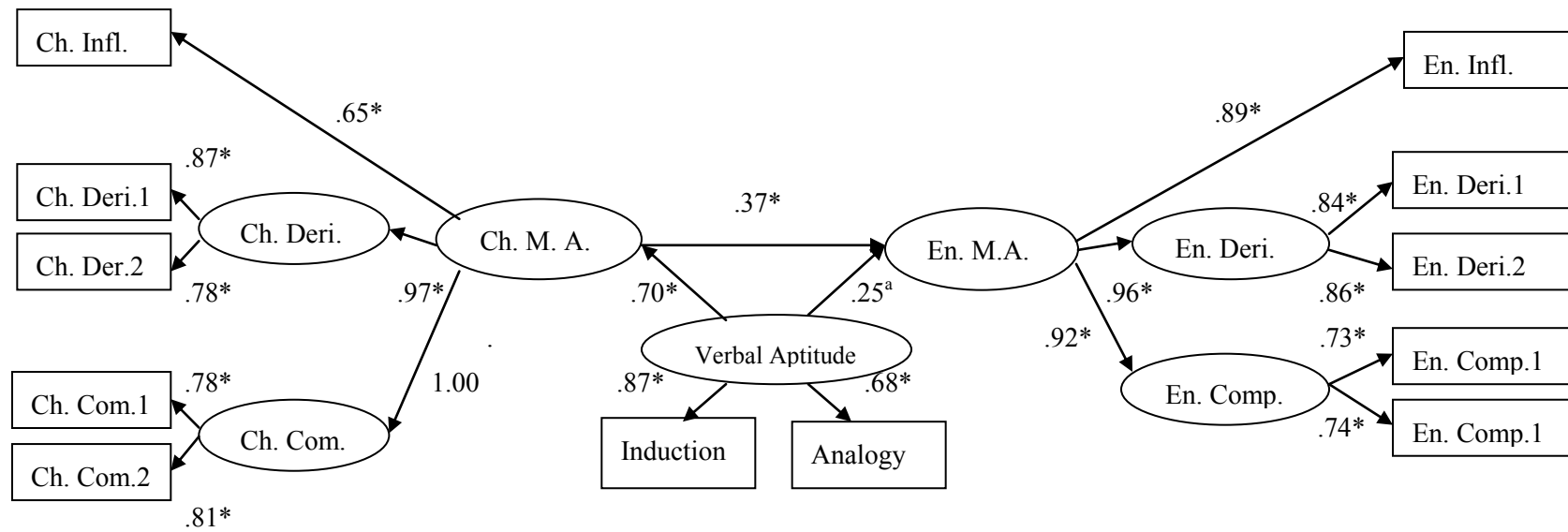


Figure 2. The Structure Model of Morphological Awareness.

Note. * means significance at the level of .001. ^a means significance at the level of .05. All values are in standardized forms.

Table 3

Fit Indices of Measurement Models and Structure Model

Model	χ^2 (df)	<i>p</i>	CFI	TLI	RMSEA
Measurement model for Ch. M.A.	6.0 (4)	.197	.997	.992	.042
Measurement model for En. M.A.	2.3 (3)	.514	1.000	1.005	.000
Structural model	80.7 (48)	.002	.982	.970	.049

Separate Predictive Ability from the Chinese Morphological Sub-Awareness

Though a direct prediction from the overall Chinese M.A. to the overall English M.A. has been proved, the extent of how each awareness in Chinese (e.g., the awareness of Chinese compound words) affects awareness in English counterparts needs to be investigated. In Figure 2, excessively high coefficients (almost 1.00) from the Derivational Awareness and the Awareness of Compounds in Chinese suggested their potential multicollinearity. To avoid such a concern, separate path analyses were used to explain how the Chinese Inflectional Awareness might contribute to the development of each awareness in English, as did the Chinese Derivational Awareness and the Awareness of Chinese Compounds. Relevant path coefficients and model fit indices of these three models are presented in Figures 3, 4 and 5.

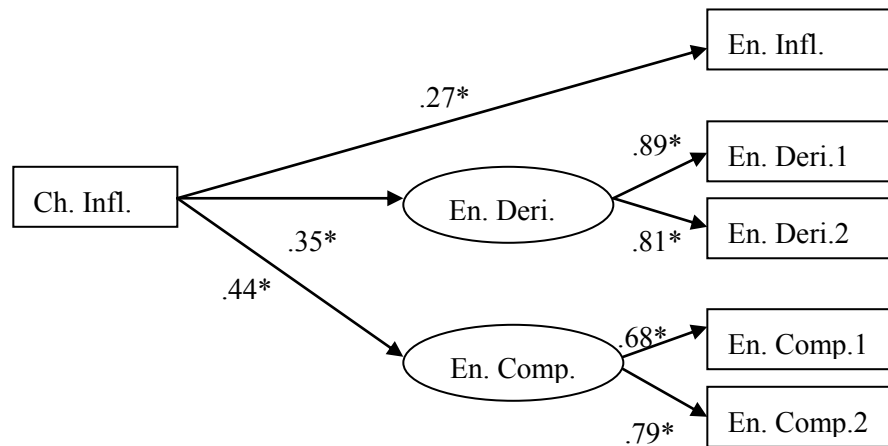


Figure 3. The Path Model of the Chinese Inflectional Knowledge to the English Morphological Awareness Components.

Note. $X^2(8, N=287) = 436.3, p < .001, X^2/df$ ratio = 54.54, RMSEA = .433, CFI = .477, TLI = -.373. * means significance at the level of .001. All values are in standardized forms.

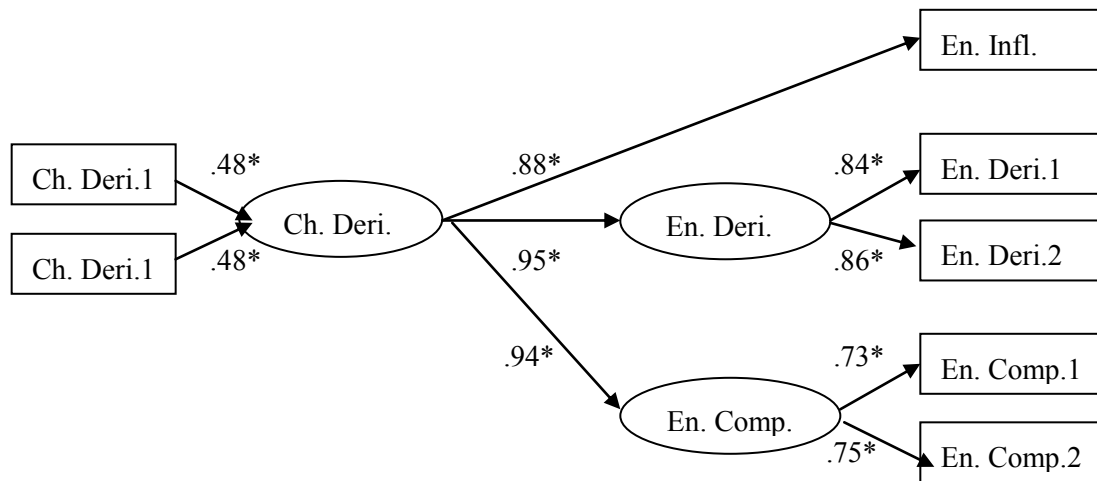


Figure 4. The Path Model of the Chinese Derivational Awareness to the English Morphological Awareness Components.

Note. $\chi^2(12, N=287) = 159.7, p < .001, \chi^2/df \text{ ratio} = 13.31, \text{RMSEA} = .207, \text{CFI} = .858, \text{TLI} = .668.$ * means significance at the level of .001. All values are in standardized forms.

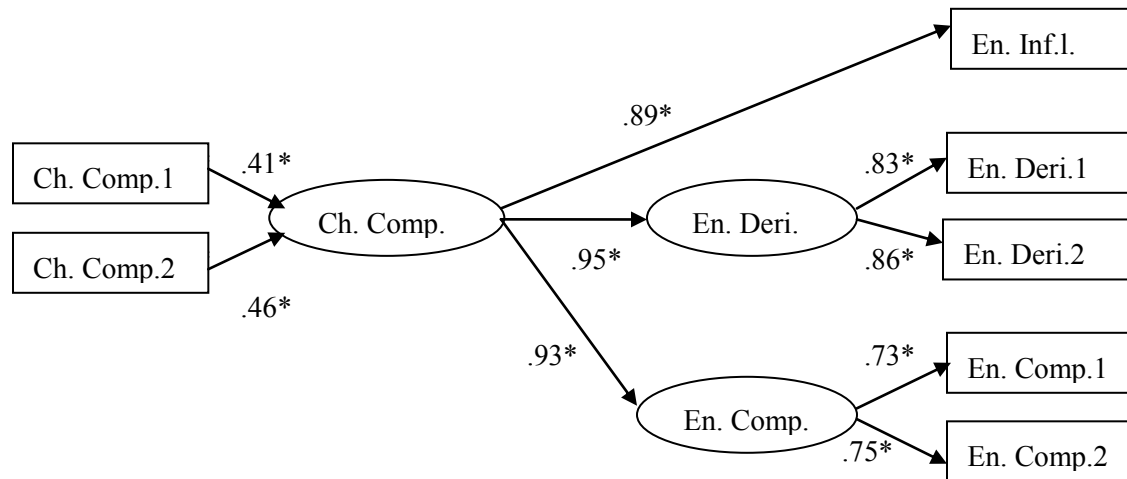


Figure 5. The Path Model of the Chinese Awareness of Compound Words to the English Morphological Awareness Components.

Note. $X^2(12, N=287) = 95.6, p < .001, X^2/df \text{ ratio} = 7.97, \text{RMSEA} = .156, \text{CFI} = .913, \text{TLI} = .797.$ * means significance at the level of .001. All values are in standardized forms.

English Morpheme Detecting Ability

The English Awareness of Compounds – Compound Word Decoding was constructed to learn whether Chinese speakers decode English words with a morpheme detecting ability they already developed in their native language. There were 10 test items associated with each type of word (e.g., real/pseudo- derivational words, real/pseudo- compound words); consequently, with 287 participants, there were 2,870 responses for each type of word, and 11,480 responses in total. Among them, 5,376 (47.83%) responses were correctly answered, which means that the participants reported: a) the real words as REAL words and also gave them appropriate translations, or b) the pseudo-words as PSEUDO-words. In terms of word types, the accuracy rates were 61.15% for real compound words, 42.13% for real derivational words, 40.35% for compound pseudo-words, and 43.69% for pseudo-derivational words. The especially high accuracy rates on real compound words indicated that Taiwanese students' familiarity with this type of word may be attributed to their long term exposure to morphologically complex characters and words in Chinese.

Besides the correct responses mentioned above, there were 5,125 (44.64%) responses misidentified that also lacked any verbal translation (i.e., the participants reported pseudo-words as real words, but gave no translations). Neither the correctly answered nor the misidentified responses offered the means for knowing if students possessed a decoding ability in English. Consequently, by excluding the correctly answered and misidentified responses, the remaining 979 (8.53%) responses students determined to be real or uncertain words, but about which gave inaccurate verbal

translations, provided the targets for the subsequent error analysis. Among these inaccurate translations, the most common word type was compound pseudo-words (32.07%), followed by real derivational words (27.17%), pseudo-derivational words (25.84%), and real compound words (14.91%).

After conducting the error analysis, five categories of students' morpheme-detecting ability in inaccurate translations emerged. In the first category, *Detecting Partial Morphemes*, the participants might only detect the partial morpheme “angry” and then only write “生氣” [sheng1qi4] *angry*, while facing a pseudo-word such as UNANGRY. In the category of *Detecting All the Morphemes*, they might detect every morpheme within a verbal translation, but combine these individual meanings in a way uncommon to the spoken language (e.g., they wrote “房間茶” [fang2jian1 cha2] *room tea* for ROOMTEA). The verbal translations in the third category, *Mis-recognizing the Phonologically- and Orthographically-alike Morphemes* showed that students were misled by similarly spelled words. For example, they might write “駭客” [hai4ke4] *hacker* for HIKER, a situation in which “hacker” sounded like “hiker.” Or they might write “魔術師” [mo2shu4shi1] *magician* for MUSICIAN, resulting from the similar spellings of “magician” and “musician.” As for the last two categories, students wrote associated translations (e.g., they wrote “多雲的” [duo1yun2de] *cloudy* for WINDY) in the category of *Reporting Associated Meanings*, or they wrote totally unrelated meanings (e.g., they wrote “沙發” [sha1 fa1] *sofa* for OFFICING) in the category of *Reporting Unrelated Meanings*.

Over all, when Chinese speakers read English words, the category of *Detecting All the Morphemes* (43.11%) was the most frequently used decoding pattern. It was also common to decode words in ways like *Detecting Partial Morphemes* (26.66%), *Misrecognizing the Phonologically- and Orthographically-alike Morphemes* (14.10%), and *Reporting Associated Meanings* (12.77%). Very few responses were found in the category of *Reporting Unrelated Meanings* (3.37%).

The Development of English M.A. Awareness by Grades

Now that we found that students' Chinese M.A. and Verbal Ability contributed to the development of their English M.A., the next research question was to explore if such transferring effects differed by grades. Separate analyses on each grade level were used to discover the variations in path coefficients from pooled models. The models for the 7th graders, the 8th graders, and the 9th graders are shown in Figures 6, 7, and 8, respectively. Factor loadings from measurements were moderate to high across these three separate models ($.53 < \lambda < .98$), and the model-data fit indices (i.e., RMSEA, CFL, TLI) showed the data from each grade level in middle school fitted to the model adequately.

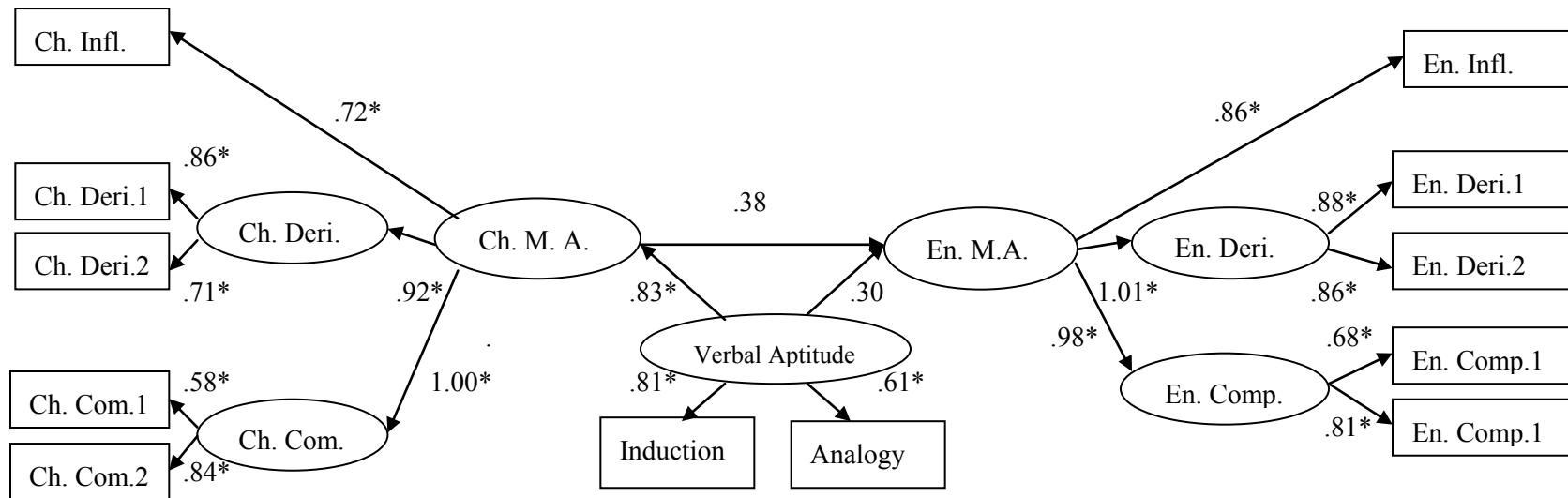


Figure 6. The Structure Model of the 7th Graders' Morphological Awareness.

Note. $X^2(48, N=99) = 49.3, p=.422, X^2/df$ ratio = 1.027, RMSEA = .016, CFI = .998, TLI = .997.. * means significance at the level of .001. All values are in standardized forms.

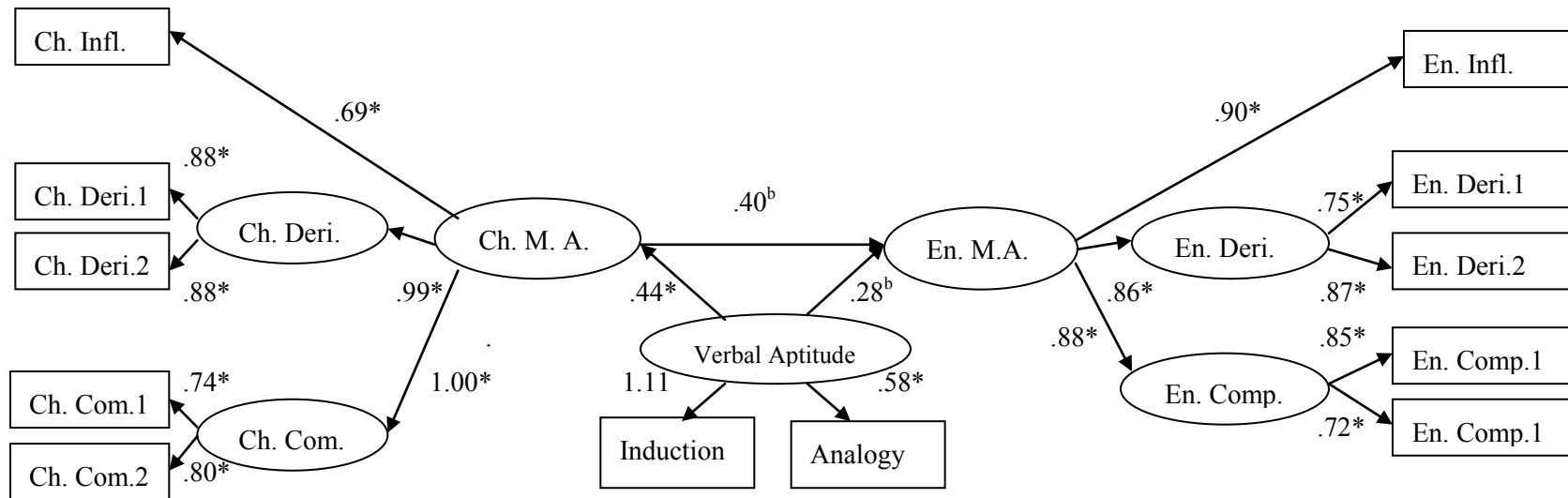


Figure 7. The Structure Model of the 8th Graders' Morphological Awareness.

Note. $X^2(48, N=96) = 87.6, p < .001, X^2/df$ ratio = 1.83, RMSEA = .016, CFI = .938, TLI = .914. * means significance at the level of .001 and ^b means significance at the level of .01. All values are in standardized forms.

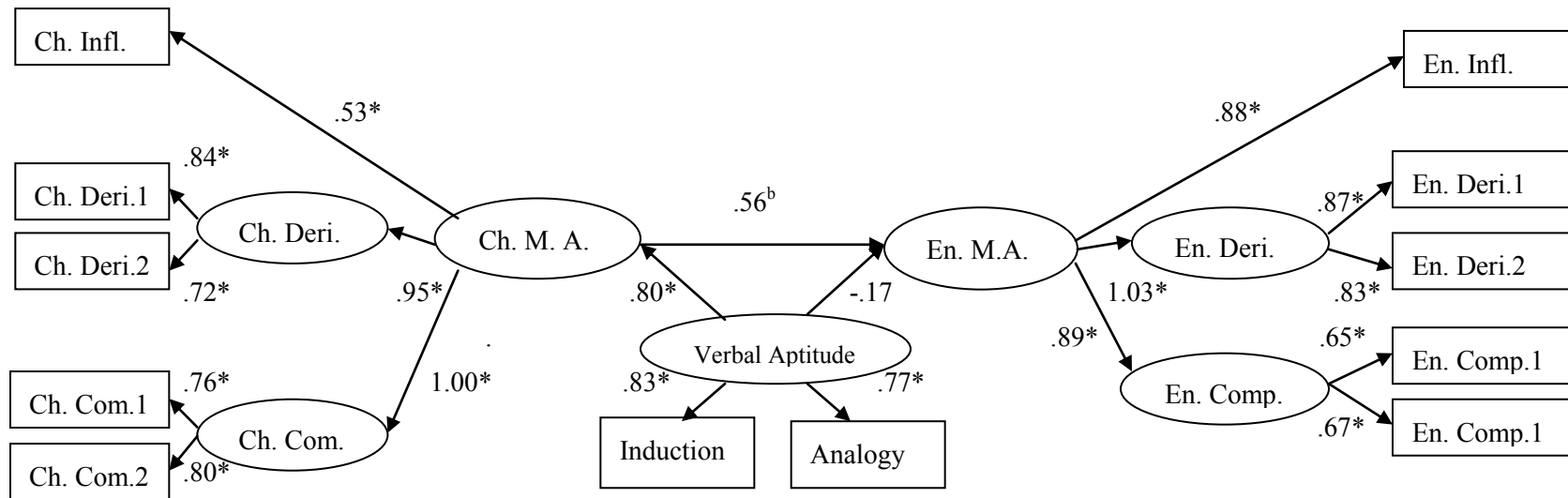


Figure 8. The Structure Model of the 9th Graders' Morphological Awareness.

Note. $X^2(48, N=92) = 58.3, p=.148, X^2/df$ ratio = 1.21, RMSEA = .048, CFI = .973, TLI = .981. * means significance at the level of .001 and ^a means significance at the level of .05. All values are in standardized forms.

In order to test the invariance (equality) across these three groups, a multi-group analysis of structural invariance was conducted. According to Byrne (2004), models with different parameters constrained were entered one by one, for finding out what measurements or latent variables were moderated by grade levels. The first step was to establish a baseline model, which could be served as the reference model for the following comparisons. Secondly, all the parameters in the models of any two groups from these three grades were constrained. A sharing set of X^2 , *d.f.* value, and goodness-of-fit indices was generated. Among them, the X^2 with its *d.f.* value was compared to the ones from the base-line model. An insignificant X^2 difference would suggest that students' performances on these parameters be invariant. On the contrary, if the difference was significant, it would be necessary to investigate which parameters caused the inequality between two graders. The results of the multi-group analysis were presented in Table 4.

Table 4

The Goodness-of-fit Statistics for Testing the Invariance of Transferring Effects between Grade Levels

Entry	Model description	Groups	X^2	<i>d.f.</i>	<i>p</i> - value	RMSEA	TLI	CFI	Rival model	ΔX^2	$\Delta d.f.$	Significance
1	Baseline model (Model 1)	7 th , 8 th , 9 th	195.0	144	.003	.035	.953	.971				
2	Factor loadings, factor variances, and covariances constrained equal	7 th , 8 th , 9 th	222.3	158	.001	.038	.946	.963	1	27.3	14	<i>p</i> <.05
3	Hypothesized model (Model 1A)	7 th , 8 th	136.7	96	.004	.047	.946	.967				
4	Factor loadings, factor variances, and covariances constrained equal	7 th , 8 th	155.9	108	.002	.048	.944	.961	1A	19.2	12	<i>ns</i>
5	Hypothesized Model (Model 1B)	8 th , 9 th	145.7	96	.001	.053	.929	.956				
6	Factor loadings, factor variances, and covariances constrained equal	8 th , 9 th	171.8	108	.000	.056	.919	.944	1B	26.1	12	<i>ns</i>
7	Hypothesized Model (Model 1C)	7 th , 9 th	107.5	96	.198	.025	.986	.990				
8	Factor loadings, variances, and covariances invariant	7 th , 9 th	131.8	108	.064	.028	.975	.980	1C	24.3	12	<i>p</i> <.05

Table 4 (Continued)

Entry	Model description	Groups	X^2	<i>d.f.</i>	<i>p</i> - value	RMSEA	TLI	CFI	Rival model	ΔX^2	$\Delta d.f.$	Significance
9	Factor loading from V.A. constrained equal (Model 2)	7 th , 9 th	110.7	97	.161	.027	.984	.988	2	3.2	1	<i>ns</i>
10	Model 2 with Factor loading from Ch. Inf. constrained equal	7 th , 9 th	114.7	98	.119	.030	.980	.985	2	7.2	2	<i>p</i> <.05
11	Model 2 with factor loading on Ch. Der. constrained equal (Model 3)	7 th , 9 th	114.8	99	.132	.029	.982	.986	2	7.3	3	<i>ns</i>
12	Model 3 with the coefficient on the path of Ch. Der. to Ch. M.A. constrained equal	7 th , 9 th	118.9	100	.096	.032	.978	.984	3	11.4	4	<i>p</i> <.05
13	Model 3 with factor loadings on Ch. Com. constrained equal (Model 4)	7 th , 9 th	116.1	100	.130	.029	.982	.986	3	8.6	4	<i>ns</i>
14	Model 4 with factor loadings on En. Inf. constrained equal (Model 5)	7 th , 9 th	117.0	101	.131	.029	.982	.986	4	9.5	5	<i>ns</i>

Table 4 (Continued)

Entry	Model description	Groups	X^2	<i>d.f.</i>	<i>p</i> - value	RMSEA	TLI	CFI	Rival model	ΔX^2	$\Delta d.f.$	Significance
15	Model 5 with factor loadings on En. Der. constrained equal (Model 6)	7 th , 9 th	117.6	102	.139	.028	.982	.986	5	10.1	6	<i>ns</i>
16	Model 6 with factor loadings on En. Com. constrained equal (Model 7)	7 th , 9 th	118.2	103	.146	.028	.983	.987	6	10.7	7	<i>ns</i>
17	Model 7 with the coefficient of the path from En. Com. to En. M.A. constrained equal	7 th , 9 th	124.9	104	.080	.033	.977	.982	7	17.4	8	<i>p</i> <.05
18	Model 7 with the coefficient from V.A. to Ch. M.A. constrained equal	7 th , 9 th	126.2	105	.078	.033	.977	.982	7	18.7	9	<i>p</i> <.05
19	Model 7 with the coefficient from V.A. to En. M.A. constrained equal	7 th , 9 th	128.2	106	.070	.033	.976	.981	7	20.7	10	<i>p</i> <.05
20	Model 7 with coefficient on the path from Ch. M.A. to En. M.A. constrained equal	7 th , 9 th	128.8	197	.074	.033	.977	.981	7	21.3	11	<i>p</i> <.05

The results showed that students from different grade levels indeed performed differently on the development of their M.A., but only between grade levels with two years apart. Entry 1 and 2 indicated the potential variances among three graders, and entry 7 and 8 validated such variances were originated from the 7th and 9th graders. Briefly speaking, these two groups showed different extent of the development on certain individual M.A. (i.e., Chinese Inflectional measurement, Chinese Derivational Awareness, the Awareness of English Compound Words) as well as the inter-relationships among the three hierarchical M.A. (i.e., Verbal Aptitude to Chinese M.A. and English M.A. respectively, Chinese M.A. to English M.A.). With the information from Table 1, the 9th graders statistically outperformed the 7th graders, in terms of the development of previously-mentioned M.A.

Moderation Effects

The number of years of English instruction and the size of the district could be potential factors impacting the development of Taiwanese students' English M.A. The students' reports of when they began their English instruction are presented as percentages in Figure 6, and with means and SD values in Table 5. The data was analyzed with a 3 (Current Grade Levels: 7th, 8th, and 9th) \times (Starting Grades of English Instruction: 1st, 2nd, 3rd, and 4th) one-way ANOVA. A major interaction effect was found between students' current grade levels and the grades they reported when they began their formal English instruction at primary school, $F[1, 286] = 25.931, p < .001$. A post hoc comparison indicated that for English instruction, the 9th graders ($M = 2.58, SD = .10$) started late as compared to the 8th graders ($M = 1.86, SD = .09$) and the 7th graders

($M = 1.68$, $SD = .09$), but no significant difference was found between the 8th graders and the 7th graders. That is, among the participants, the 7th and 8th graders reported that they began their formal English education earlier than the 9th graders, when these three groups were all at the primary school level. However, unequal variances were found while checking if students from the capital cities or other smaller cities also began their formal English education at different ages. Such a result regarding the starting age of students' formal English instruction should be attributed to the onset of educational policy, and not to regional disparity.

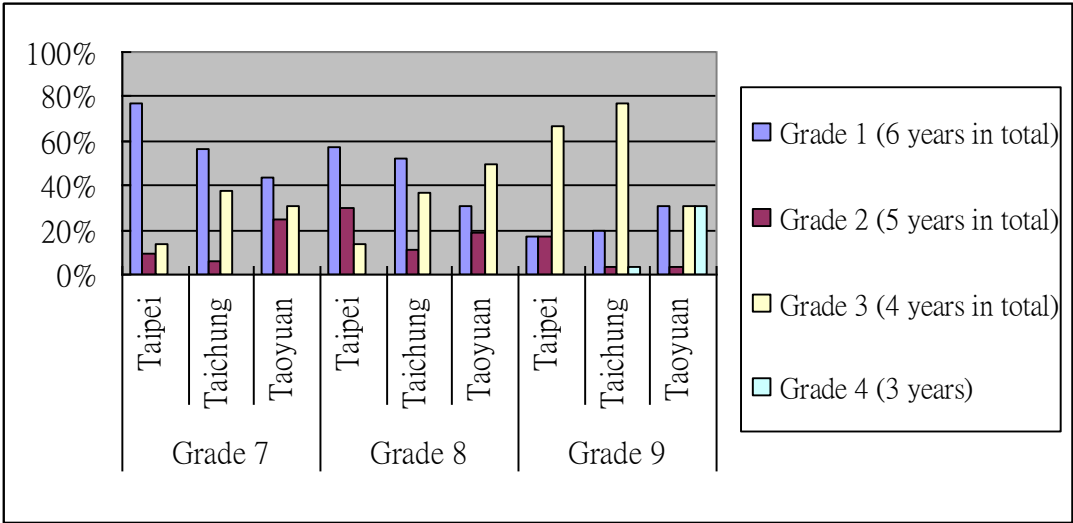


Figure 9.
The Actual Distribution of the Starting Grades and Their Corresponding Numbers of Learning Years by Different Grade Levels and Districts.

Table 5

The Means (SDs) of Students' Starting Grades and Starting Ages in English Learning

School Districts	M (SD) of Starting Grade	M (SD) of Starting Age
Taipei		
7 th graders	1.37 (.73)	6.63 (1.78)
8 th graders	1.57 (.73)	6.76 (1.69)
9 th graders	2.50 (.78)	6.43 (2.47)
Mean	1.77 (.88)	6.62 (1.97)
Taichung		
7 th graders	1.81 (.97)	6.56 (1.77)
8 th graders	1.85 (.95)	7.22 (1.28)
9 th graders	2.57 (.82)	7.57 (2.22)
Mean	2.08 (.97)	7.10 (1.85)
Taoyuang		
7 th graders	1.88 (.87)	6.91 (1.80)
8 th graders	2.19 (.90)	7.19 (1.62)
9 th graders	2.66 (1.23)	7.03 (2.38)
Mean	2.24 (1.05)	7.04 (1.94)

The structural model, as shown in Figure 2, was constructed for the purpose of explaining the cognitive development of Taiwanese students' morphological awareness. However, since English instruction is offered as a foreign language in Taiwan, the quantity and quality of English learning may differ according to students' social and economic status. Consequently, the school districts they attended and the length of English instruction were added as moderators into the structural model. Considering the inconsistent starting ages from formal or informal education, the length in years of the participants' English education were calculated in three ways: 1) the length of formal English instruction in middle school (M.S.), 2) the length of formal English instruction in elementary school (E.S.), and 3) the length of informal English education prior to the starting grade of their formal English instruction (P.E.) (see Table 4). Furthermore, gender and age may also moderate the development of students' Chinese and English M.A. respectively in this study. Since middle-school students at same grade levels were approximately same aged in Taiwan, the moderator MS replaced age in the model. As a result, totally five moderators were set up as parameters moderating the development of the Taiwanese Chinese M.A. and English M.A., as shown in Figure 10.

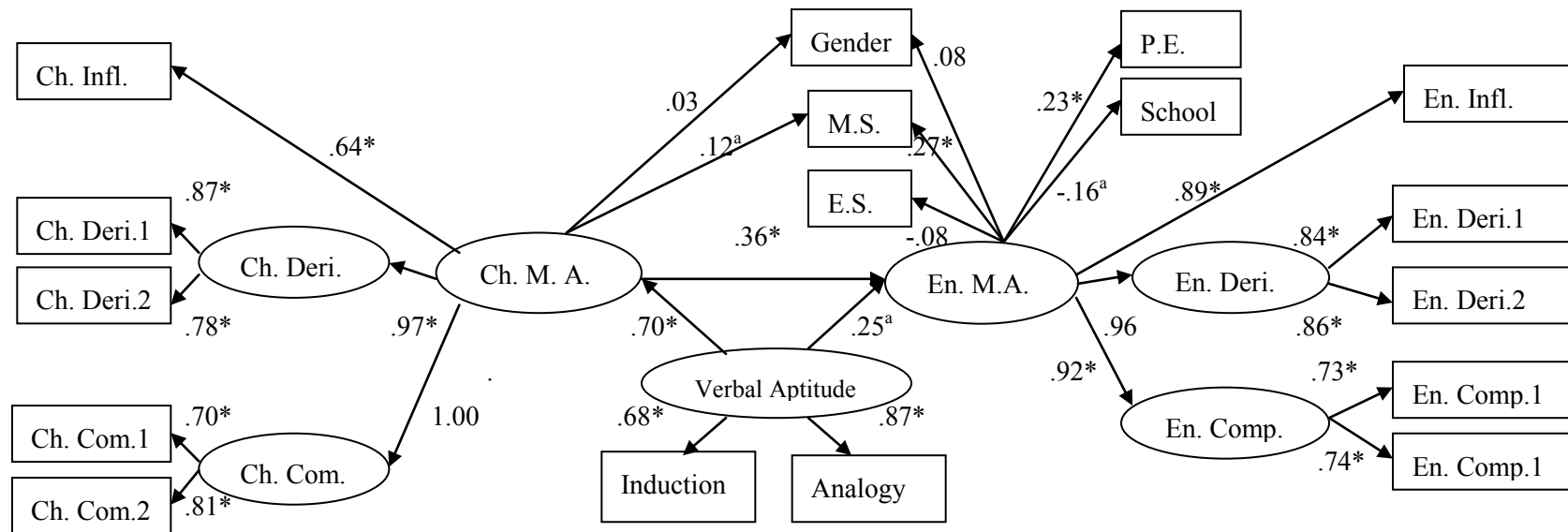


Figure 10. The Moderation Effects on the Structure Model of Morphological Awareness (Moderational Model).

Note. $X^2(111, N=287) = 223.1, p < .001, X^2/df \text{ ratio} = 2.010, RMSEA = .059, CFI = .941, TLI = .918, AIC = 341.140.$ * means significance at the level of .001, ^a means significance at the level of .05, and ^b means significance at the level of .01. All values are in standardized forms.

Table 6

The Goodness-of-fit Statistics for Testing the Moderating Effects on the Development of English M.A.

Entry	Model description	X^2	<i>d.f.</i>	<i>p</i> - value	RMSEA	TLI	CFI	ΔX^2	$\Delta d.f.$	Significance
1	Baseline model	208.8	111	.000	.055	.929	.948			
	Measurement Model for Ch. M.A.	22.4	13	.049	.050	.970	.986			
	Measurement Model for En. M.A.	84.2	33	.000	.074	.902	.941			
2	Factor loadings from gender to Ch. M.A. constrained 0	209.0	112	.000	.055	.930	.949	0.2	1	<i>ns</i>
3	Factor loadings from gender to En. M.A. constrained 0	210.0	112	.055	.062	.929	.948	1.2	1	<i>ns</i>
4	Factor loadings from school to En. M.A. constrained 0	215.2	112	.000	.063	.926	.946	6.4	1	<i>p</i> <.05
5	Factor loadings from M.S. to Ch. M.A. constrained 0	211.3	112	.000	.056	.928	.948	2.5	1	<i>ns</i>
6	Factor loadings from M.S. to En. M.A. constrained 0	221.5	112	.000	.058	.921	.942	12.7	1	<i>p</i> <.001
7	Factor loadings from E.S. to En. M.A. constrained 0	210.4	112	.000	.055	.929	.948	1.6	1	<i>ns</i>
8	Factor loadings from P.E. to En. M.A. constrained 0	222.3	112	.000	.059	.920	.942	13.5	1	<i>p</i> <.001

The analysis of moderating effects evaluated how students' background and regional disparity may influence their development of English M.A. These variables and their factor loadings were displayed in Figure 10. However, further comparisons of models where a parameter was constrained to 0 and where it was freed were needed for knowing the effectiveness of the parameter in the model. A significant X^2 difference would suggest the complex model where the parameter should be included into the model (Kline, 2005). According to the model-fit-indices, the Chinese M.A. and English M.A. measurement models which included moderating variables showed good and reasonable fit to the data, respectively. As shown in Table 6, the significant X^2 difference between the baseline model ($X^2 = 208.8$, $df = 111$) to the model with M.S. constrained ($X^2 = 221.5$, $df = 112$) and to the model P.E. constrained ($X^2 = 222.3$, $df = 112$) showed that freeing these two paths increased the model fit. In other words, the length of English instruction in middle school (M.S.) [$\lambda = .27$, $p < .001$] and prior to the 1st grade (P.E.) [$\lambda = .23$, $p < .001$] were found effectively contributive to students' development of English M.A. ($p < .001$). One other variable (i.e., school) was suspected as possible factors ($p < .05$). Yet, the results indicated that the length of English instruction in elementary school brought no impacts to development of English M.A.

While checking the changes on other parameters, the loadings or the coefficients in the moderation model remained consistent in both the base-line model (see Figure 2) and the moderational model (see Figure 10). By virtue of these stable path coefficients, the structural model provided a robust explanation for the development of Taiwanese students' morphological awareness.

CHAPTER V

DISCUSSION

The most important finding of this study was its confirmation that Taiwanese students' possession of a Chinese M.A. facilitates their pursuit of an English M.A., despite the significant differences in orthography between these two languages. Most previous studies discussed students' M.A. pursuits in Chinese and English by observing monolingual children's acquisition of morphological knowledge in their native language (Carlisle, 2000; Wu, Anderson, Li, Wu, Li, Zhang, Zheng, Zhu, Shu, & Jiang, 2009), or by comparing monolingual groups from each language simultaneously (Ku & Anderson, 2003; McBride-Chang & Robert, 2002). Other studies explored how linguistic features in different languages impact ESL students' English M.A. development (Koda, 2000; McBride-Chang, Cho, Liu, Wagner, Shu, Zhou, Cheuk, & Muse, 2005). The current study proposes a Chinese-to-English M.A. development model based on the previous findings regarding M.A. developments in native language acquisition and English as a second language acquisition. Though a different M.A. system is believed necessary when Chinese students endeavor to learn English (Wang, et al., 2003), this study suggests a different result – Taiwanese students' Chinese M.A. system is predictive of the pursuit of their English M.A. The results of overlapping M.A. systems suggest that teachers in Taiwan take advantage of what their students possess from their first language acquisition when scaffolding their students' English vocabulary.

Morphological Awareness Transfer

Generally speaking, the morphological awareness transfer from Chinese to English was observed among middle school students in Taiwan in this study. However, students at different grade levels, especially while comparing the 7th graders and the 9th graders, performed differently with regards to Chinese inflectional awareness, the degree of how Chinese Derivational Awareness contributed to Chinese M.A. and how English Awareness of Compound Words to English M.A. They also showed their transferring of knowledge from the Chinese M.A. to the English M.A. and from Verbal Aptitude to the Chinese M.A. and the English M.A. in different degrees.

Chinese inflectional awareness

Chinese speakers rely less on their inflectional awareness or inflectional clues in texts, as their overall Chinese M.A. matured. Either the low reliability of the task ($\alpha=.52$) or the non-inflected and tenseless nature of Chinese (Lin, 2003; 2006; Smith and Erbaugh, 2005) might be possible factors. However, the concern regarding low reliability should be minimal since the correlations between the inflectional task and other Chinese tasks were still within the average range ($.27 < r < .54$). In that sense, only the distinctive nature of Chinese inflectional morphology can explain the low internal consistency of the participants' performances on the given task.

First, the feature of the “non-inflected” in Chinese language may train Chinese speakers to decode or compose inflectionally- or derivationally-derived words differently from the speakers of Indo-European languages do. That is, when making inflectionally or derivationally conceptualized words, Chinese speakers directly attach

grammatical affixes and word-forming affixes to the stem morpheme, as they do when forming character strings, instead of posing potential modifications to the stem morphemes.

Second, it has been a controversial issue in the past regarding whether or not the Chinese use tenses (or related morphemes and concepts) as English speakers do. Li and Thompson (2003) claimed that the Chinese language is unmarked for tense, and only temporal adverbs (e.g., 昨天 [zuo2tian1] *yesterday*) and aspectual markers (e.g., 過 [guo4] (an experiential suffix)) are used in sentences to denote temporal references. On the contrary, more and more subsequent researchers have claimed that temporal references in Chinese are determined by sentential elements (e.g., verbal semantics or world knowledge) (Lin (2003; 2006) and discourse contexts (Wu et al., 2009). In other words, Chinese speakers do not necessarily need to spot specific inflectional morphemes in sentences; instead, they detect the inflectional information from these contexts. However, regardless of whether Chinese is marked for tense, inflectional awareness in Chinese might not be understood in the same sense as its counterpart in English.

The Morphological Awareness Transfer from Chinese to English

Positive correlations were found among the development of students' Verbal Aptitude, Chinese M.A., and English M.A. In other words, the study found a trend that the better a learner's L1, the better his L2 would be. Such a positive correlation indicates that the level of a learner's L1 may determine how mature his L2 was. The interdependence of the M.A. development in L1 and L2 seems like a natural learning process, in which Chinese learners of English facilitate their English M.A. development

by transferring L1 linguistic knowledge (Cummins, 1977, 1979). Language learners' progress on L2 can even be expedited after they reach a threshold level of proficiency in their L1 (Cummins, 1979). However, even the 9th graders in this study, who had better Chinese language ability, did not demonstrate drastic improvements as compared to the 7th graders.

Students with different levels of L1 ability, in fact, demonstrated transferring patterns intra-lingually and inter-lingually. They were found becoming more independent of Chinese inflectional awareness as their grade level increased, which was especially true in comparing the 7th and 9th graders. Their reliance on Chinese M.A., on the contrary, was augmented while developing the counterpart one in English. This meant that elder students could improve their English M.A. by continuously strengthening their Chinese M.A. Considering the previous findings regarding Chinese learners' decreasing engagement of their L1 during their English acquisition (Su, 2001), the study concludes that elder students become more adept at applying their already-developed cognitive learning strategies and knowledge (i.e., M.A.) but less prone to engage their L1 linguistic knowledge to avoid linguistic interferences.

Further examinations of each individual Chinese sub-awareness and their relationship to the English M.A. illustrate that only the model of the Chinese Awareness of Compound Words to the English M.A. showed a good fit to the data. The results support the assumption that Chinese speakers, who are native in a language that has abundant and complex compound words, not only develop a good sense of compounds words (i.e., a morpheme-detecting ability or a meaning-compounding ability) but also

are able to use such words as strategies for reading English words. As for the transfer of inflectional awareness, Jarvis and Pavlenko (2008) concluded that the transfer of bound morphemes usually occurred between languages which are lexically and morphologically related, based on previous research. Unsurprisingly, the non-inflectional feature and rare inflectional-conceptualized morphemes in Chinese were found not to be beneficial to the development of the English M.A.

As a higher-ordered verbal ability, Chinese students' verbal aptitude (i.e., induction and analogy) was assumed to dominate the development of their morphological awareness in L1 and L2, especially when their general M.A. in L1 is predictive of the one in L2. Yet the results of this study confirmed the association between verbal aptitude and the M.A. in L1 and L2, but only to a low extent. In further examinations of the grade level differences, a late benefit from the higher-ordered verbal ability to the English M.A. was also observed. A reasonable explanation would be that middle school students in Taiwan are still in the beginning stage of their M.A. development in L2, and thus in a state where they were still memorizing whatever they have learned from class, but seldom had the opportunity to engage their responsive or analogical thinking.

English Morpheme Detecting Ability

As previously mentioned, Chinese-speaking students applied strategies developed from how they read Chinese characters or words when they decoded English words, which was especially true on the words they learned in class. This result was explained by their high accuracy rate on real compound words, as well as the greater

number of translations on pseudo-compound words which were composed of high frequency morphemes. Furthermore, it was not surprising to see that students excessively reported unknown words as pseudo-words or as uncertain words, without attempting a translation, especially for the words or morphemes that were not in the curriculum. These limited intention or ability to detect morphemes within a word could be accounted for by EFL learners' over-relying on words they had already acquired, a lack of confidence for trying to understand new words, or a lack of relevant instructions regarding morpheme detecting and combining strategies.

Although a limited ability to detect morphemes was observed, the morphemes in a certain number of unfamiliar words (approximately 10%) were still detected, recognized, or even associated. Approximately 43% of the inaccurate translations showed students' ability to detect all morphemes, and 26% showed an ability to detect partial morphemes. Approximately 43% and 26% of the inaccurate translations showed students' ability to detect all of the morphemes and partial morphemes, respectively. The portion of mis-identifying morphemes to similar morphemes (14%) also indicated students' ability to detect the morphemes inside words, whereas in most cases the morphemes were simply mistakenly or carelessly identified. These results imply that some Chinese-speaking students indeed transfer the morpheme-detecting ability they developed in L1, and go forward to make smart guesses on unfamiliar English words. Given that instructions on detecting and reading morphemes are not common at the middle school level in Taiwan, identifying familiar morphemes in unfamiliar English words seemed to be a natural and intuitive response in the process of cross-linguistic

transfer. As a result, for Chinese-speaking students, providing systematic instruction on reading morphemes in English words should not absorb too much class time, but it can greatly help students to increase their vocabulary.

The pattern of mis-identifying morphemes to similar spelled or concept related morphemes was another interesting finding regarding EFL students' learning behaviors. Such skills might be attributed to the lack of proper orthographic instruction. For EFL students who do not have reading problems with their L1, the linguistic distance from their L1 background (Hamada and Koda, 2008; Koda, 2000; Wang, et al., 2003) or a lack of quality vocabulary instruction could account for their poor decoding behaviors in L2. Some explicit vocabulary instruction, like training on phonemes, was found useful for improving Chinese-speaking students' sensitivity to the phonological distinctions and orthographic rules in English (Cheung, 1999). For avoiding the recalling of words with associated concepts, teaching vocabulary in context will not only familiarize students with word usage, but also develop their strategies to make inferences regarding unknown words in the future (Beck and McKeown, 1991; Beck, McKeown & Kucan, 2002; McKeown, 1985; Nagy, Anderson & Herman, 1987; Sternberg, 1987; Stahl & Fairbanks, 1986).

Regional Differences in the Development of the English M.A.

The regional disparity of educational resources was reflected not only in the rate of high school students entering college, but also in the score distributions of the English General Scholastic Ability Test, which is the entrance exam for colleges. More high school graduates from urban areas enter into national universities than do those from

rural areas, and they have higher scores on English exams (Council for Economic Planning and Development, 2006). By comparing students' performances on English reading exams, Huang (2005) found that students who were in urban areas, whose parents had better educational backgrounds, or who spent more time on Chinese or English reading, had a better overall English reading ability.

The students who participated in this study, basically speaking, were the first group of the educational policy onset; English instruction was initiated prior to the 3rd grade. Due to the resource imbalance and policy difference experienced by the various regions, students of similar ages may receive different lengths of formal English instruction. From the survey results in this study, some students in Taipei were found to receive three more years of English in elementary school than some from Taoyuang and Taichung. However, does the earlier onset of English instruction really improve English ability? The answer is positive as far as the development of morphological awareness is concerned, but some exceptions are discussed in the following paragraph.

It is interesting to see that students who began their informal English instruction earlier or who were older at the middle school level possessed a high English M.A., but not those who began their formal English instruction earlier at the elementary school level. It makes sense that the more years a Chinese-speaking student receives English instruction, the higher the English M.A. she may have. Yet a positive correlation between the length of formal English instruction at the elementary school level and the development of the English M.A. was not clear. The current curriculum at the elementary school level might be the major factor. The curriculum in elementary school

is aimed at developing students' basic English communication ability, so it focuses on improving their listening and speaking skills. The enhancement of reading and writing skills become the curriculum focus only as late as at the middle school level (Department of Elementary Education, 2008). This kind of curriculum arrangement may also explain the late cross-linguistic M.A. transfer, which was mentioned previously.

CHAPTER VI

CONCLUSION

For the cross-linguistic influence, Oldin (1989) said that “transfer can occur in all linguistic subsystem” (p.23). The middle school students were found to be able to transfer their Chinese M.A., especially their morpheme-detecting abilities developed from reading Chinese compound words, to their English M.A. The older the students were, the more likely the cognitive learning strategies they developed from their L1 would be transferred to facilitate their L2 acquisition. Long term exposure to English indeed can function as a cornerstone in the development of the English M.A., but the curriculum also determines whether the English M.A. is scaffolded or not.

Since the present study showed that the Chinese M.A. is beneficial to the development of the English M.A., English teachers should take advantage of what their students bring into the classroom – their M.A. which has been developing in Chinese for a longer time. Previous research found morphological instruction beneficial to the development of the Chinese M.A. (Shu and Anderson, 1997) and the English M.A. (Carlisle, 2003; Nunes et. al., 2003). Based on the cross-linguistic transfer findings in this study, instructions regarding radicals within the Chinese characters offered at the primary school level are believed to build up students’ word decoding ability in Chinese, and then indirectly facilitate their word decoding in English. It will be more effective if middle school English teachers provide explicit morphemic and orthographic instruction, such as instructions on affixes and inferential strategies, for helping students to develop their English morpheme detecting and decoding abilities. This will affect students’

learning by transitioning their pre-developed morpheme-detecting ability in Chinese to their developing abilities in English.

An early starting age was found crucial to the development of the English M.A., but not the starting age of formal English education. Considering the current English curriculum that emphasizes students' listening and speaking abilities, teachers in primary school can prepare their students for the challenges of extensive vocabulary learning in middle and high school by increasing their sight vocabulary through story reading and conversations. Morphological awareness effects may not be observed among beginning readers, but these effects will later boost students' vocabulary and their reading development, reciprocally (Kuo and Anderson, 2006; Wu, et al., 2009).

Suggestions for Future Studies

This study provides an overall understanding of how the development of Taiwanese students' Chinese M.A. and English M.A. respectively as well the internal transfer from their Chinese M.A. to their English M.A. However, more research on Chinese inflectional concepts, such as temporal relations, is needed to fully understand how Chinese speakers encode relevant information in their speech. It can also be implemented to help those who learn Chinese as a foreign language. Further analyses of students' spelling performances on derivational words or compound words can shed some light on how they organize morphemes and combine morphemes into words in Chinese and English. Lastly, this study was only an exploratory study for the length of English instruction. There are still many factors to consider, such as curriculum or the

hours of English instruction, needed to be considered for the development of Taiwanese students' English acquisition.

REFERENCES

- Adjemian, C. (1983). The transferability of lexical properties. In S. Gass, & L. Selinker (Eds.), *Language transfer in language learning* (pp. 250-268). Rowley, MA: Newbury House.
- Akamatsu, N. (2003). The effects of first language orthographic features on second language reading in text. *Language Learning, 53*, 207-231.
- Beck, I. L., & McKeown, M. G. (1991). Conditions of vocabulary acquisition. In R. Barr, M. L. Kamin, P. B. Mosenthal, & P. D. Pearson (Eds.), *Handbook of reading research vol. II* (pp.789-814). New York: Longman.
- Beck, I. L., McKeown, M. G., & Kucan, L. (2002). *Bringing words to life: Robust vocabulary instruction*. New York: Guilford Press.
- Berko, J. (1958). The child's learning of English morphology. *Word, 14*, 150-177.
- Berman, R. (1981). Regularity vs. anomaly: The acquisition of Hebrew inflectional morphology. *Journal of Child Languages, 40*, 447-497.
- Broussard, Kathleen Marie (1999). Developmental and transfer influences in elementary bilingual writing. Ph.D. dissertation, Georgetown University, United States: District of Columbia. Retrieved April 8, 2009, from Dissertations & Theses: Full Text database. (Publication No. AAT 9955572).
- Brown, R. (1973). *A first language: The early stages*. Cambridge, MA: Harvard University Press.
- Byrne, B. (1996). The learnability of the alphabetic principle: Children's initial hypotheses about how print represents spoken language. *Applied Psycholinguistics, 17*, 401-426.
- Byrne, B. M. (2004). Testing for multigroup invariance using AMOS graphics: A road less traveled. *Structural Equation Modeling, 11*, 272-300.
- Carlisle, J. F. (1995). Morphological awareness and early reading achievement. In L. Feldman (Ed.), *Morphological aspects of language processing* (pp. 189-209). Mahwah, NJ: Lawrence Erlbaum Associates Inc.
- Carlisle, J. F. (2000). Awareness of the structure and meaning of morphologically complex words: impact on reading. *Reading and Writing: An Interdisciplinary Journal, 12*, 169-190.
- Carlisle, J.F., (2003). Morphology matters in learning to read: A commentary. *Reading Psychology, 24*, 291-332.

- Carstairs-McCarthy, A. (2002). *An introduction to English morphology*. Edinburgh, UK: Edinburgh University Press.
- Cazden, C. (1968). The acquisitions of nouns and verb inflections, *Child Development*, 49, 443-448.
- Chall, J.S. (1983). *Stages of reading development*. New York: Harcourt Brace.
- Cheung, H. (1999). Improving phonological awareness and word reading in a later learned alphabetic script. *Cognition*, 70, 1-26.
- Chialant, D. & Caramazza, A. (1995). Where is morphology and how is it processed? The case of written word recognition. In L. Feldman (Ed.), *Morphological aspects of language processing* (pp. 55-76). Hillsdale, NJ: Erlbaum Press.
- Clahsen, H. (1999). Lexical entries and rules of language: A multidisciplinary study of German inflection. *Behavioral and Brain Sciences*, 22, 991-1060.
- Corder, S. P. (1981). *Error analysis and interlanguage*. Oxford, UK: Oxford University Press.
- Chomsky, N. (1986). *Knowledge of language: its nature, origins and use*. New York: Praeger.
- Chomsky, N. (2006). *Language and mind*. New York: Cambridge University Press.
- Council for Economic Planning and Development. (2006). Decrease regional differences; balance the distraction of national resources. Retrieve December, 23, 2009, from www.cepd.gov.tw/dn.aspx?uid=183
- Cummins, J. (1977). Cognitive factors associated with attainment of intermediate levels of bilingual skills. *The Modern Language journal*, 31, 3-12.
- Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research*, 49, 222-251.
- DeFrancis, J. (1989). *Visible speech: The diverse oneness of writing systems*. Honolulu, HI: University of Hawaii Press.
- Department of Elementary Education. (2008). The curriculum and benchmarks for language learning (English) from grade 1 to grade 9. Retrieved December, 23, 2009, from http://www.edu.tw/eje/content.aspx?site_content_sn=15326
- Fabb, N. (1998). Compounding. In A. Spencer & A. M. Zwicky (Eds), *The handbook of morphology* (pp. 66-83). Oxford, UK: Blackwell.
- Faerch, C. & Kasper, G. (1987). Perspectives on language transfer. *Applied Linguistics*, 8, 111-136.

- Fan, K., Gao, J., & Ao, X. (1984). Pronunciation principles of Chinese characters and alphabetic writing scripts. *Chinese Character Reform*, 3, 23-27.
- Gass, S. & Selinker, L. (1992). *Language transfer in language learning*. Philadelphia: J. Benjamins Publishing Company.
- Hamada, M. & Koda, K. (2008). Influence of first language orthographic experience on second language decoding and word learning. *Language Learning* 58, 1-31.
- Ho, C., Wong, W., & Chan, W. (1999). The use of orthographic analogies in learning to read Chinese. *Journal of Child Psychology and Psychiatry* 40, 393-403.
- Hoff, E. (2009). *Language development*. (4th ed.). Belmont, CA: Wadsworth, Wadsworth/Cengage Learning.
- Huang, S.-L. (2005). *A comparative study on English reading comprehension of urban and rural junior high school students*. Unpublished master's thesis, University of National Kaohsiung Normal University, Kaohsiung, Taiwan.
- Jarvis, S. & Pavlenko, A. (2008). *Crosslinguistic influence in language and cognition*. New York: Routledge.
- Jiang, N. (2004). Morphological insensitivity in second language processing. *Applied Psycholinguistics* 25, 603-634.
- Johnson, J. & Newport, E. (1989). Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive Psychology*, 21, 60-99.
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford Press.
- Koda, K. (2000). Cross-linguistic variations in L2 morphological awareness. *Applied Psycholinguistics* 21, 297-320.
- Ku, Y., & Anderson, R. C. (2003). Development of morphological awareness in Chinese and English. *Reading and Writing: An Interdisciplinary Journal*, 16, 399-422.
- Ku, Y.-M. (2001). Development of morphological awareness in Chinese and English. Ph.D. dissertation, University of Illinois at Urbana-Champaign, United States -- Illinois. Retrieved April 8, 2009, from Dissertations & Theses: Full Text database. (Publication No. AAT 3017133).
- Kuczaj, S. (1977). The acquisition of regular and irregular past tense forms. *Journal of Verbal Learning and Verbal Behavior*, 16, 589-600.
- Kuczaj, S. (1978). Children's judgments of grammatical and ungrammatical irregular past-tense verbs. *Child Development*, 49, 318-326.

- Kuo, L., & Anderson, R. (2006). Morphological awareness and learning to read: a cross-language perspective. *Educational Psychologist* 41, 161-180.
- Landerl, K. (2000). Influences of orthographic consistency and reading instruction on the development of nonword reading skills, *European Journal of Psychology and Education*, 15, 239-257.
- Lardiere, D. (1998). Case and tense in the “fossilized” steady state. *Second Language Research*, 14, 1-26.
- Li, C. N., & Thompson, S. A. (2003). *Mandarin Chinese: A functional reference grammar*. Taiwan: The Crane Publishing Co. Ltd.
- Lin, J.-W. (2003). Temporal reference in Mandarin Chinese. *Journal of East Asian Linguistic*, 12, 259-311.
- Lin, J.-W. (2006). Time in a language without tense: The case of Chinese. *Journal of Semantics*, 23, 1-53.
- Liu, I.-M. (1999). Character and word recognition in Chinese. In J. Wang, A. W. Inhoff, & H.-C. Chen (Ed.), *Reading Chinese script: A cognitive analysis* (pp. 173-188). Mahwah, NJ: Lawrence Erlbaum Associates.
- Long, M. (1997, October). *Fossilization: Rigor mortis in living linguistic systems?* Paper presented at the meeting of Second Language Research Forum, East Lansing, MI.
- Lu, J.-Y., Wu, W.-D., & Chien, M.-C. (2001). *The junior high school students' scholastic aptitude test*. Taipei, Taiwan: Psychological Publishing Co. Ltd.
- Mahony, D., Singson, M., & Mann, V. (2000). Reading ability and sensitivity to morphological relations. *Reading and Writing: An Interdisciplinary Journal*, 12, 191-218.
- Marcus, G., Pinker, S., Ullman, M., Hollander, M., Rosen, T.J., & Xu, F. (1992). Overregularization in language acquisition. *Monographs of the Society for Research in Child Development*, 57, 1-182.
- Marslen-Wilson, W. D., & Tyler, L. K. (1997). Dissociating types of mental computation. *Nature*, 387, 592-594.
- Marslen-Wilson, W., & Tyler, L. K. (1998). Rules, representations, and the English past tense. *Trends in Cognitive Sciences*, 2, 428-435.
- McBride-Chang, C., Shu, H., Zhou, A., Wat, C. P., & Wagner, R. K. (2003). Morphological awareness uniquely predicts young children's Chinese character recognition. *Journal of Educational Psychology* 95, 743-751.

- McBride-Chang C., Cho, J.-R., Liu, H., Wagner, R. K., Shu, H., Zhou, A., Cheuk, C. S.-M., & Muse, A. (2005). Changing models across cultures: Associations of phonological awareness and morphological structure awareness with vocabulary and word recognition in second graders from Beijing, Hong Kong, Korea, and the United States. *Journal of Experimental Child Psychology* 92, 140-160.
- McBride-Chang, C. & Kail, R. V. (2002). Cross-cultural similarities in the predictors of reading acquisition. *Cross Development*, 73, 1392, 1497.
- McKeown, M. G. (1985). The acquisition of word meanings from context by children of high and low ability. *Reading Research Quarterly*, 20, 482-496.
- Muljani, D., Koda, K., & Moates, D. R. (1998). The development of word recognition in a second language. *Applied Psycholinguistics*, 19, 99-113.
- Nagy, W. E., Anderson, R. C., & Herman, P. A. (1987). Learning word meanings from context during normal reading. *American Educational Research Journal*, 24, 237-270.
- Nicoladis, E. (2002). What's the difference between "toilet paper" and "paper toilet"? French-English bilingual children's crosslinguistic transfer in compound nouns. *Journal of Child Language*, 29, 843-863.
- Oldin, T. (1989). *Language transfer: Cross-linguistic influence in language learning*. Cambridge, UK: Cambridge University Press.
- Paap, K. R., Chen, L., & Noel, R. W. (1987, November). *Word recognition: Is the sky falling on top-down processing?* Paper presented at the Twenty-eighth Annual Meeting of the Psychonomic Society, Seattle, WA.
- Packard, J. (2000). *The morphology of Chinese: A linguistics and cognitive approach*. New York: Cambridge University Press.
- Peters, A. (1997). Language typology, prosody, and the acquisition of grammatical morphemes. In D. Slobin (Ed.), *The crosslinguistic study of language acquisition: Expanding the contexts* (pp. 135-198). Mahwah, NJ: Erlbaum.
- Perfetti, C. A. (1991). Representations and awareness in the acquisition of reading competence. In L. Ribben & C. A. Perfetti (Eds.), *Learning to read: Basic research and its implications* (pp. 33-44). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Perfetti, C., & Tan, L. (1999). The constituency model of Chinese word identification. In J. Wang, A. W. Inhoff, & H.-C. Chen (Eds.), *Reading Chinese script: A cognitive analysis* (pp. 115-134). Mahwah, NJ: Lawrence Erlbaum Associates.

- Pinker, S., & Prince, A. (1988). On language and connectionism: Analysis of a parallel distributed processing model of language acquisition. *Cognition*, 28, 73-193.
- Pinker, S. (1999). *Words and rules: The ingredients of language*. New York: HarperCollins.
- Pinker, S., & Ullman, M. T. (2002). The past and future of the past tense. *Trends in Cognitive Sciences*, 6, 456-463.
- Schachter, J. (1992). A new account of language transfer. In S. Gass, & L. Selinker (Eds.), *Language transfer in language learning* (pp. 32-46). Amsterdam: John Benjamins Publishing Co.
- Shu, H. (2003). Chinese writing system and learning to read. *International Journal of Psychology*, 38, 274-285.
- Shu, H. & Anderson, R. C. (1997). Role of radical awareness in the character and word acquisition of Chinese children. *Reading Research Quarterly*, 32, 78-89.
- Shu, H., & Anderson, R. C. (1999). Learning to read Chinese: The development of metalinguistic awareness. In J. Wang, A. Inhoff, & H. C. Chen (Eds.), *Reading Chinese Script: A Cognitive Analysis*. Hillsdale, NJ: Erlbaum.
- Selinker, L. (1972). Interlanguage. *International Review of Applied Linguistics*, 10, 209-231.
- Seymour, P. H. (2006). Theoretical framework for beginning reading in different orthographies. In P. G. Aaron & R. M. Joshi (Eds.), *Handbook of orthography and literacy* (pp.441-462). Mahwah, NJ: Lawrence Erlbaum Associates.
- Seymour, P. H., Aro, M., Erskine, J. M. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology*, 94, 143-174.
- Smith, K. L (1980). Common errors in the compositions of students of Spanish as a second language. Ph.D. dissertation, The University of Texas at Austin, United States -- Texas. Retrieved April 8, 2009, from Dissertations & Theses: Full Text database. (Publication No. AAT 8100966).
- Smith, C., & Erbaugh, M. (2005). Temporal interpretation in Mandarin Chinese. *Linguistics*, 43, 713-756.
- Stahl, S. A. & Fairbanks, M. M. (1986). The effects of vocabulary instruction: A model-based meta-analysis. *Review of Educational Research*, 56, 72-110.
- Sternberg, R. J. (1987). Most vocabulary is learned from context. In M. G. McKeown & M.E. Curtis (Eds.), *The nature of vocabulary acquisition*. Hillsdale, NJ: Erlbaum.

- Stevenson, H. W., & Stigler, J. W. (1992). *The learning gap: Why our schools are failing, and what we can learn from Japanese and Chinese education*. New York: Summit Books.
- Su, I. (2001). Transfer of sentence processing strategies: A comparison of L2 learners of Chinese and English. *Applied Psycholinguistics*, 22, 83-112.
- Taft, M., Liu, Y., & Zhu, X. (1999). Morphemic processing in reading Chinese. In J. Wang, A. Inhoff, & H.-C. Chen (Eds.), *Reading Chinese script: A cognitive analysis* (pp. 91-113). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Taft, M., and Zhu, X. (1997a). Sub-morphemic processing in reading Chinese. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 23, 761-775.
- Taft, M., & Zhu, X. (1997b). Using masked priming to examine lexical storage of Chinese compounds. In H.-C. Chen (Ed.), *Cognitive processing of Chinese and related Asian languages* (pp. 233-242). Hong Kong: The Chinese University.
- Tyler, A., & Nagy, W. (1989). The acquisition of English derivational morphology. *Journal of Memory and Language*, 28, 649-667.
- Ullman, M. T., Bergida, R., & O'Craven, K. (1997). Distinct fMRI activation patterns for regular and irregular past tense. *Neuroimage*, 5, S549.
- Wang, M., Cheng, C., and Chen, S-W. (2006). Contribution of morphological awareness to Chinese-English biliteracy acquisition. *Journal of Educational Psychology*, 98, 542-553.
- Wang, M., Koda, K., & Perfetti, C. (2003). Alphabetic and nonalphabetic L1 effects in English word identification: A comparison of Korean and Chinese English L2 learners. *Cognition* 87, 129-149.
- Wu, J.-S. (2009). Tense as a discourse feature: Rethinking temporal location in Mandarin Chinese. *J East Asian Linguist*, 18, 145-165.
- Wu, J. T., & Liu, I. M. (1997). Phonological activation in pronouncing characters. In H.-C. Chen (Ed.), *The cognitive processing of Chinese and related Asian languages* (pp. 47-64). Hong-Kong: Chinese University Press.
- Wu, X., Anderson, R. C., Li, W., Wu, X., Li, H., Zhang, J., Zheng, Q., Zhu, J., Shu, H., & Jiang, W. (2009). Morphological awareness and Chinese children's literacy development: An intervention study. *Scientific Studies of Reading*, 13, 26-52.
- Yin, L., Anderson, R. & Zhu, J. (2007). Stages in Chinese children's reading of English words. *Journal of Educational Psychology* 99, 852-866.

- Zhang, X. (1990, November). *Language transfer in the writing of Spanish-speaking ESL learners: Toward a new concept*. Paper presented at the Fall Conference of the Three Rivers Association of Teachers of English to Speakers of Other Languages, Indiana, PA.
- Zhou, Y. (1978). To what degree are the “phonetics” of present-day Chinese characters still phonetics? *Zhongguo Yuwen*, 146, 172-177.
- Zhu, X. (1988). Analysis of the cueing function of the phonetic in modern Chinese. *Proceedings of the Symposium on Chinese Language and Character* (pp. 260-288). Beijing, China: Guang Ming Daily Press.

APPENDIX A
CHINESE INFLECTIONAL AWARENESS TASK

中文詞彙能力測驗

A. 填空 - 請根據句義，填入適當的字，讓句子讀起來更完整。

例：我曾經在西安看 過 兵馬俑。

1. 昨天督學到校參觀時，全校的學生都 _____ 早自習。
2. 你一次進這麼多貨，你真的覺得可以賣 _____ 掉嗎？
3. 他講 _____ 半天，都還是在講他當兵的事，我都快睡著了。
4. 買這麼多東西，是吃 _____ 完還吃 _____ 完這麼多的東西？
5. 趁著花季，昨天她 _____ 兩個人開車上陽明山賞櫻和野餐。
6. 每次太久沒回南部看外婆，她總想 _____ _____ _____ 我們的名字，媽媽還得提醒她。
7. 獵豹是世界上跑 _____ 快的動物，只可惜牠的持久力並不長。
8. 她實在是離 _____ 開五光十色並且便利的台北生活。
9. 鄰長 _____ 工作，基本上是協助里長發傳單和送資料。
10. 經理今天的心情似乎很好，因為我拿公文給他簽的時候，他正哼 _____ 歌。
11. 和從前比起來，現在立法委員都設有辦公室，希望能夠提供民眾 _____ 優質的服務。
12. 別看他平常很皮的樣子，他寫 _____ 書法 _____ ，倒是有模有樣安靜的很。
13. 你有讀 _____ 哈利波特嗎？我姑姑前兩天送我一本，很好看呢！

APPENDIX B

CHINESE DERIVATIONAL AWARENESS TASK

B. 填空 - 請根據句義，將括弧裡的字做適當的改變，讓句子讀起來更完整。

例：(飛) - 想要當上機師達成空中翱翔的感覺，首先必須要完成數百小時的 飛 行 訓練，再通過必要的證照考試。

1. (談) - 昨天老師來做家庭訪問，雖然我沒聽到老師和母親的 _____，但是他們有說有笑，似乎沒什麼需要擔心的。
2. (必) - 有的時候，神奇的發明 _____ 實用，但發明家的創意是值得讚賞的！
3. (目) - 在兒童或青少年時期，曾 _____ 或感受家庭暴力的人，通常比較會有情緒困擾的問題。
4. (凡) - 他對於美的事物有著 _____ 的鑒賞力，應該要歸功於他有個藝術家的母親。
5. (座) - 坐火車往南行，進入嘉南平原，處處可見一棟棟的農舍 _____ 在田野間。
6. (駁) - 政府官員提出數據 _____ 立法委員們對治安敗壞的批評。
7. (退) - 人類的大腦，如果長期缺乏刺激，就會 _____ 地很快，這就是為什麼很多老人退休後，還是需要出外多認識朋友，讓生活有寄託。
8. (滿意) - 從市場的反應來看，顧客對我們新推出的手機 _____ 很高。
9. (謀) - 歷史上有名的赤壁之戰，東吳與蜀國的聯軍憑藉著軍師諸葛孔明巧妙的佈陣與 _____，大破曹操的大軍。
10. (智) - _____ 對於未證實的事情，不會隨風起舞，一定會眼見為憑。
11. (信) - 你覺得他的說辭 _____ 嗎？你不覺得他剛剛跟我們講話的時候，連聲音都在發抖？
12. (服務) - 好的餐廳，除了食物要出色，裝璜要不落俗套，更重要的是 _____ 的素質也要在水準之上。

13. (統計) – _____ 是從數字中獲取資訊的科學，它直接影響了政府、社會、乃至日常生活等諸多層面。
14. (憂) – 他考上了基層公務員，薪水或許不多，但基本生活 _____。
15. (藥) – 一般人常常不懂得藥物的 _____，所以在買成藥前務必要向藥局內的藥師詢問清楚。
16. (觀察) – 雖然很多國際組織不承認台灣的國際地位，但台灣還是以 _____ 的身份參與世界衛生組織和氣候公約會。
17. (僵) – 要避免思想的 _____，就必須在最平常的生活或是習慣性的制約反應中找出新奇有趣之處。
18. (良心) – 或許不中聽，但這真的是我的 _____。
19. (隱密) – 越來越多的銀行開始注意保護其客戶資料的 _____。
20. (愧) – 對於公司這次的損失，我自認已經盡全力，_____ 於公司或是自己。
21. (規律) – 火山的噴發並沒有所謂的 _____，就連活火山，也可能是幾百年才噴發一次。
22. (摺) – 做紙鶴不難，照著我剛剛做出來的 _____，多練習幾次，你也會做出漂亮的天鵝。
23. (趣) – 他這個人常常會很不 _____ 地在公開場合講錯話。
24. (淡) – 當看過的世面越多，她也越能 _____ 地面對和處理事情，得失心不再那麼重。
25. (笑話) – 剛到美國的時候，王大明常因為不懂英語而 _____。
26. (賭) – 再這樣下去，再雄厚的 _____，也會被他敗光。

APPENDIX C

AWARENESS TASK OF CHINESE COMPOUNDS – MORPHEME COMBINATION

C. 組字 I – 請將以下劃底線的詞 / 短句，簡化成兩個字的詞。造出的新詞，請保留原意並使用相同的字。

例：和老師 面對面懇談 後，小明的父母比較能夠理解小明最近在課業上的表現失常的原因。→ 面談

(注意:此題僅填 面對面 或是 懇談 都不能完全代表原詞意，而 面壘 並無此用法，故此題正確答案為 面談。)

1. 全球電腦產業現在的狀況，實在是委靡不振。→ _____
2. 政府應該要撥專款來維持保護目前僅存的古蹟。→ _____
3. 這帖中藥的成份，是遵照依循古法所抓的，已經很多人見證它的有效。→ _____
4. 這次的友誼賽，是一個很好觀察揣摩資深球員球技的機會。→ _____
5. 二次大戰期間，納粹軍隊逼迫陷害猶太民族的事件，是許多得獎電影的題材。→ _____
6. 對於有些人來說，失戀時心裡痛苦的感覺常常會要花很久的時間才能平復。→ _____
7. 隨著年紀增長，青少年對於家庭的依賴附屬感會漸漸轉移到同儕團體上。→ _____
8. 有些大集團會利用壓低其商品的售價，讓對手的小公司生意不佳，最後用低價購買他們並將其併入集團。→ _____
9. 由於她的父親失業且背負債務，小雲選擇不繼續升學。→ _____
10. 不要再猶豫懷疑了，工欲善其事必先利其器，該買的書還是要買。→ _____
11. 因為工作的性質，模特兒時時刻刻對於他們的儀表姿態都相當注意。→ _____
12. 我們感動佩服於各位對我們基金會長期以來的資助者。→ _____
13. 別再一直辯論解釋了，家裡就兩個人，冰箱的東西不是你吃的就是我吃的。→ _____

14. 政府應該要嚴厲懲罰蓄意哄抬菜價，造成民生物價波動的商人。→ _____
15. 這次在床單清洗上的疏忽遺漏，造成了有些病人傷口的感染。→ _____
16. 成功的人總是能夠化危機為轉機，衝破艱險阻礙，樂觀地揚帆前進。→ _____
17. 人生苦短，我們要盡可能地歡樂渡過人生中的每一天。→ _____
18. 收集古董是一門學問，為避免被騙，最好要學會如何鑑定欣賞古玩。→ _____
19. 成吉思汗親自率領蒙古大軍，揮軍南下，在中國建立了元朝。→ _____
20. 經濟不景氣，政府也努力制定向企業籌措資金的相關政策。→ _____
21. 世界遺產中的吳哥窟，傾倒的石磚建築中紀錄了吳哥王朝的輝煌和頹落衰敗。
→ _____
22. 台灣對於中美洲和南非的邦交國，有時會提出經濟上的援助。→ _____
23. 到過花蓮的遊客，每個人都不由自主地讚美驚嘆太魯閣鬼斧神工的山景。→ _____
24. 雖然在 911 恐怖攻擊中，紐約雙子星大樓被完全炸毀，但其遺址目前還是吸引很多各國觀光客前往追思悼念。→ _____
25. 在春節年前，在傳統市場裡，喧嘩鼓噪的叫賣聲不絕於耳。→ _____
26. 就算在出版前經過多次的校訂，讀者總還是會找到一些打字上或是內容上的遺漏失誤。→ _____

APPENDIX D
AWARENESS TASK OF CHINESE COMPOUNDS – MORPHEME
COMPOUNDING

D. 組字 II - 請根據句中所提供的資訊，填出符合現代漢語語法的詞彙。

例：我們稱清晨時，太陽從東邊升起為“日出”；那我們稱傍晚時，太陽從西邊降下為日
落。

1. 我們稱數量集中的表示方法，為“密度”；那我們稱冷熱的表示方法，為 ___ 。
2. 我們稱一切符合規定行事，為“守法”；我們稱破壞規定行事甚至犯罪，為 ___ 。
3. 我們稱於公司行號工作服務為“任職”；那我們稱在學校作育英才為 ___ 。
4. 我們稱整天為“終日”；那我們形容一輩子為 ___ 。
5. 我們稱做事謹慎的人，為“細心”的人；那我們稱做事不留意的人，為 ___ 的人。
6. 我們稱站在同一方，為了相同目的而戰的士兵部隊，為“盟軍”；那我們稱原本是站在同一方，但卻改變作戰目的而背離倒戈的士兵部隊，為 ___ 。
7. 我們稱對人或事有固執的想法，為“偏見”；那我們稱在事物上有不一致或相異的想法，為 ___ 。
8. 我們形容自己不喜歡的人事物，為“礙眼”；那我們形容符合自己喜好的人事物，為 ___ 。
9. 我們形容一個人的眼睛無法辨識事物，叫做“視障”；那形容一個人的耳朵無法察覺外界的聲音，為 ___ 。
10. 我們稱在心理上，超越他人的想法，為“優越感”；那我們稱在心理上，一直覺得本身的行為表現不如於他人的想法，為 ___ 。
11. 我們稱能匯集大小溪水的河川，為“主流”；那我們稱旁系或是較小條的河川溪水為 ___ 。

12. 我們稱被聘用為“受雇”；那我們稱被除去聘用資格為 ___ ___。
13. 我們稱提高熱度，為“加溫”；那我們稱維持熱度，為 ___ ___。
14. 我們稱搭乘海上交通工具的費用，為“船資”；那我們稱搭乘陸上交通工具的費用，為 ___ ___。
15. 我們稱兩個人或一群人一起互相接觸或生活，為“共處”；那我們稱一個人自己生活，為 ___ ___。
16. 我們稱替別人捉刀寫信，為“代筆”；那我們稱本人自己構思寫信，為 ___ ___。
17. 我們稱懂得看人臉色，然後調整自己腳步做事的人為“識相”的人；那我們稱一眼就能看出物品品質好壞的人，我們形容他們為 ___ ___ 的人。
18. 我們稱到拍戲現場關心正在拍戲的朋友，為“探班”；那我們稱到醫院關心住院的朋友，為 ___ ___。
19. 我們稱為了增加慈善公益所得，而售出貨品的行為為“義賣”；那我們稱醫生對於病患提供免費諮詢或看病的行為為 ___ ___。
20. 我們稱到某地旅遊並且四處走走看看為“參觀”；那我們稱到某地旅遊並且和當地首長企業人士會晤談話為 ___ ___。
21. 我們稱請旅居於他國的台灣人搬離其居住地，為“撤僑”；那我們稱將派駐於某地的軍隊召回，為 ___ ___。
22. 我們稱一邊演奏一邊高歌，為“彈唱”；那我們在相聲中，一會兒講話一會兒高歌，為 ___ ___。
23. 我們稱房子的所有人，為“屋主”；那我們稱東西的所有人，為 ___ ___。

24. 我們稱一起學習的人，為“同學”；那我們稱一起當兵的伙伴，為 ____ ____ 。
25. 我們稱被壓迫摧殘的人，為“受害人”；那我們稱主動地以不法行為，壓迫摧殘他人的人，為 _____ _____ 。
26. 我們稱到一個公開場合，助陣支持的動作為“捧場”；那我們稱在公開場合中有人滋事，擾亂秩序，為 _____ _____ 。”

APPENDIX E

ENGLISH INFLECTIONAL AWARENESS TASK

英文詞彙能力測驗

A. 填空 – 根據句義，請將括弧內的字，做適當變化，填入空格。

1. (Nathan) - The book on the table belongs to Nathan. Whose book is it? It is _____.
2. (cry) – My little sister _____ a lot last night.
3. (short) – My younger brother is _____ than me.
4. (happy) – Nina is the _____ girl in her class.
5. (book) – I have to read 5 _____ for my test.
6. (taste) - This apple _____ terrible. It is too sour.
7. (work) - Scott is a businessman. He left home at 8:00 and arrived home at 11:00. He has _____ for 15 hours today.
8. (travel) - My parents like to _____ twice a year. They have been to most places in America and Asia.
9. (interest) – *Harry Potter* is an _____ book to read.
10. (child) - Our teacher has 1 son and 2 daughters. All of her _____ are older than us.
11. (want) – He _____ a toy car for his birthday gift.
12. (press) - Don't _____ the button, or the bell will ring.
13. (confuse) - I feel _____ when I read something I don't know, but my teacher always can answer the questions I have.
14. (tooth) – It is good to brush _____ every morning and night.

15. (cook) – Dad _____ dinner last night.

16. (see) – They _____ their math teacher in department stores yesterday.

APPENDIX F

ENGLISH DERIVATIONAL AWARENESS TASK – DERIVATION

B. 填空題 II - 請將括弧裡的字，做適當變化(加上幾個字母) 填入空格。

例：(write) – The writer of the book is very famous.

1. (**farm**) – My uncle is a _____ . *
2. (**friend**) – She has a _____ smile.
3. (**care**) – Be _____ when you walk across the street.
4. (**sun**) – It is _____ outside; let's play baseball.
5. (**danger**) – It is _____ to ride bicycles in the dark.
6. (**report**) – She wants to be a _____ .
7. (**tire**) – After studying all day, I feel _____ .
8. (**bake**) – They want to buy some bread from the _____ .
9. (**happy**) – They lose their game, so they are _____ .
10. (**teach**) – He was a very good _____ . *
11. (**rain**) – In Taiwan, May is in _____ season.
12. (**succeed**) – My father is a _____ businessman.
13. (**meet**) – Do you want to call back later? Mr. Black is at _____ .
14. (**real**) – It is late. I _____ need to go.
15. (**fun**) – It is a _____ movie; I laughed a lot.

APPENDIX G

ENGLISH DERIVATIONAL AWARENESS TASK - DECOMPOSITION

C. 填空題 III - 請將括弧裡的字，做適當變化(減幾個字母) 填入空格。

例：(visitor) – I like to visit my grandparents in Chinese New Year.

1. (driver) – Children are too young to _____ . *
2. (runner) – She can _____ very fast. *
3. (American) – My parents plan to go to _____ in August.
4. (surprised) – What a _____. Thank you so much for the birthday gift.
5. (fifth) – The boy counted from one to _____. *
6. (entrance) – Students _____ into the classrooms after their teacher.
7. (impolite) – He is a _____ person; he always smiles to everyone.
8. (noisy) – I cannot fall asleep because that _____ is too loud.
9. (safety) – It is a _____ place for you to stay.
10. (peaceful) – People seek for love and _____ .
11. (hanger) – You can _____ your clothes here.
12. (feeling) – Don't _____ sad. We can do it next time.
13. (disappear) – When my mom knows that I won the game, a smile _____ (s) on her face.
14. (discussion) – Let's _____ where we eat tonight.
15. (traditional) – Red envelopes are part of Chinese _____ in New Year's Eve.

APPENDIX H
AWARENESS TASK OF ENGLISH COMPOUNDS – MORPHEME
IDENTIFICATION

D. 圈選題 – 下面有 20 組字，如果你覺得第二個字是從第一個字衍生出來的，請圈 YES。
如果這兩個字沒有關係，請圈 NO。

Example :	eight	eighteen	<input checked="" type="checkbox"/> YES	<input type="checkbox"/> NO
	for	foreign	YES	<input checked="" type="checkbox"/> NO
1.	help	helpful		YES NO
2.	pen	penny		YES NO
3.	hand	handsome		YES NO
4.	card	postcard		YES NO
5.	too	tooth		YES NO
6.	after	afternoon		YES NO
7.	doll	dollar		YES NO
8.	know	knowledge		YES NO
9.	man	many		YES NO
10.	use	useful		YES NO
11.	cent	center		YES NO
12.	bed	bedroom		YES NO
13.	fact	factory		YES NO
14.	wind	windy		YES NO
15.	business	businessman		YES NO
16.	let	letter		YES NO
17.	stand	understand		YES NO
18.	class	classmate		YES NO
19.	work	homework		YES NO

20. come

become

YES NO

APPENDIX I

AWARENESS TASK OF ENGLISH COMPOUNDS – COMPOUND WORD

DECODING

E. 圈選題 & 翻譯題 – 以下的單字，有些是你學過的，有些是新的單字，有些是假字。

1. 如果你認識這個單字，請在單字旁圈 Yes, 然後寫下它的中文意思。如果你不確定這個單字的意思，沒關係，你可以猜猜看，寫下你覺得極有可能的中文意思。
2. 如果你覺得它應該是個英文單字(符合一般的英文造字原則)，只不過你不認識這個單字，沒關係，請圈 No.
3. 如果你覺得他是個假字，請圈 PS.

例 1a. afternoon	<input checked="" type="checkbox"/> Yes	下午	No	PS
例 1b. blackout	<input checked="" type="checkbox"/> Yes	黑掉?	No	PS
例 2. floodwater	Yes	?	<input checked="" type="checkbox"/> No	PS
例 3. usualnice	Yes		No	<input checked="" type="checkbox"/> PS
1. breakfast	Yes		No	PS
2. tooth brush	Yes		No	PS
3. colormark	Yes		No	PS
4. finally	Yes		No	PS
5. unangry	Yes		No	PS
6. writer song	Yes		No	PS
7. wantable	Yes		No	PS
8. housework	Yes		No	PS
9. disappear	Yes		No	PS
10. officing	Yes		No	PS
11. lakefish	Yes		No	PS
12. roomtea	Yes		No	PS
13. everyone	Yes		No	PS
14. married	Yes		No	PS

15. bell door	Yes _____	No	PS
16. waitress	Yes _____	No	PS
17. playground	Yes _____	No	PS
18. newspend	Yes _____	No	PS
19. centerless	Yes _____	No	PS
20. unfestival	Yes _____	No	PS
21. headache	Yes _____	No	PS
22. sidewalk	Yes _____	No	PS
23. brainhard	Yes _____	No	PS
24. non-regular	Yes _____	No	PS
25. raincoat	Yes _____	No	PS
26. visitor	Yes _____	No	PS
27. musician	Yes _____	No	PS
28. neckorder	Yes _____	No	PS
29. unwise	Yes _____	No	PS
30. healthier	Yes _____	No	PS
31. cell phone	Yes _____	No	PS
32. climbing	Yes _____	No	PS
33. antilaw	Yes _____	No	PS
34. hiker	Yes _____	No	PS
35. windy	Yes _____	No	PS
36. heartfelt	Yes _____	No	PS

- | | | | |
|---------------|-----------|----|----|
| 37. painting | Yes _____ | No | PS |
| 38. freshmade | Yes _____ | No | PS |
| 39. tellor | Yes _____ | No | PS |
| 40. bookshelf | Yes _____ | No | PS |

APPENDIX J

THE BACKGROUND SURVEY OF STUDENT'S ENGLISH LEARNING

英語學習的背景

學習英語時間的長短，是很重要的一個因素來決定你在英語上的表現

請問，

1A. 你從幾歲開始學英文？ _____ 歲 / _____ 年級

B. 是在哪裡開始你的英語學習呢？(圈選)

幼稚園 / 補習班 / 學校 / 其他(請說明) _____

2. 當你在讀小學的時候，學校是從幾年級開始上英語課的？

一年級 / 二年級 / 三年級

VITA

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