EFFECTS OF SEMANTIC TRANSPARENCY OF CHINESE DISYLLABIC COMPOUND WORDS ON CSL LEARNERS' INCIDENTAL VOCABULARY LEARNING THROUGH READING

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Effects of Semantic Transparency of Chinese Disyllabic Compound Words on CSL Learners' Incidental Vocabulary Learning through Reading

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_____ (Signed)

_____Tang Ming_____(Name of student)

Dedicated to my family

Abstract

This study investigated the effect of semantic transparency of Chinese disyllabic compound words on CSL learners' incidental vocabulary learning through sentence-level reading and passage-level reading. The accuracy of learners' lexical inferencing and CSL learners' use of inference strategy were compared between different types of words (transparent, semi-transparent, and opaque words), contexts (sentence and passage contexts), learners with different L1 backgrounds (with and without a Chinese character background in their L1s) and learners with different levels of Chinese morphological awareness (high and low levels).

This study was conducted among adult learners studying Chinese as a second language at universities in mainland China. In order to reveal the whole picture, the researcher applied multiple investigative techniques to collect both quantitative and qualitative data in two phases of the study. A total of 90 CSL learners participated in the first phase of the study by filling in a written questionnaire, which included questions about lexical inferencing and use of inference strategy in two types of reading (the sentence-level reading and the passage-level reading), a Chinese morphological awareness test and background information. In the second phase of the study, 29 learners who had participated in Phase 1 were

interviewed individually as a follow-up to further understand their lexical inferencing and use of inference strategy.

The results showed that compared with context strength, the semantic transparency of words played a more important role in CSL learners' incidental vocabulary learning, including both the accuracy of lexical inferencing and the inference strategy used. The context strategy, the word strategy, and the guessing strategy were the three main strategies applied by all learners most frequently in lexical inferencing. There was no significant difference in the accuracy of lexical inferencing between learners with and those without a Chinese character background in their L1s (i.e., Japanese/Korean students and non-Japanese/Korean students). However, Japanese/Korean students did apply the L1 strategy and the guessing strategy significantly more often than non-Japanese/Korean students. When inferring the meaning of an unknown word, Japanese students were more likely to think about the Japanese meanings of the composing characters in that word, and Korean students were more likely to conduct inferencing based on the Korean pronunciation of the word. The results of the study also indicated that both receptive and productive Chinese morphological awareness made positive contributions to incidental vocabulary learning. Learners with high Chinese morphological awareness applied the context strategy and other strategies significantly more often than those with low awareness.

In order to provide more practical suggestions to language educators, a supplementary study was conducted to investigate CSL instructors' teaching methods for lexical inferencing. A total of 15 students who participated in both phases of the study and six CSL instructors were involved in the supplementary study. Based on the results of the main study and the supplementary study, the researcher emphasized the need for developing appropriate reading materials for CSL learners at different levels and the importance of cultivating learners' skills of lexical inferencing as the pedagogical implications of the findings.

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CHAPTER ONE

INTRODUCTION

The importance of vocabulary knowledge in one's first and second language has been proved in many studies (Alderson, 2000; Anderson & Freebody, 1981; Haynes, 1993; Haynes & Bloch, 1993; Mezynski, 1983; McLeod & McLaughlin, 1986). However, due to finite classroom time, the number of words that can be introduced by direct instruction is limited (Durkin, 1979; Jenkins & Dixon, 1983). Therefore, scholars such as Laufer & Nation (1999) suggest that language teachers should focus on 2,000 high-frequency words in class by introducing related lexical knowledge; meanwhile, the teachers can ask student to enrich their vocabulary through extensive reading outside class. Since it is commonly accepted that a large portion of students' vocabulary in the first or second language will be learnt incidentally from extensive reading (Nagy, 1988; Huckin & Coady, 1999), incidental vocabulary learning as a research subject has attracted considerable interest (Bensoussan & Laufer, 1984; Bernhardt, 1991; Hulstijn, 1992; Chern, 1993; Ellis, Tanaka, & Yamazaki, 1994; Graessar, Singer & Trabasso, 1994; Chun & Plass, 1996; Hulstijn, Hollander, & Greidanus, 1996; Koda, 1996; Laufer, 1997; Parry, 1997;

Ellis & He, 1999; Tekmen & Daloglu, 2006; Song & Fox, 2008; Shahrokni, 2009).

Statement of the Research Problem

It is common for a reader to encounter unknown words in L1 or L2 reading. If an unknown word does not influence comprehension of the text, a reader might skip it and continue his/her reading. If it does affect reading, he/she would try to infer its meaning. For a word that he/she is not able to infer the meaning but really wants to know, he/she might seek the assistance from other people or dictionaries. Compared with L1 readers, we can imagine that L2 readers would encounter many unknown words when reading regular publications written in their second language. Frequent pauses in reading to look up unknown words make reading a boring and time-consuming task, and lead to a lack of interest. Although we cannot deny the role of dictionaries in word learning through reading, looking up words in dictionaries is one type of intentional learning, which is not the focus of the present study. On the other hand, if a reader keeps skipping unknown words, learning new vocabulary by the end of reading would be impossible. Therefore, one precondition of incidental word learning is that learners could infer the meanings of unknown words correctly in reading. And lexical inferencing in reading is an important skill for enlarging vocabulary size of language learners.

Unfortunately, not all unknown words can be inferred easily. While some words can be inferred correctly in the first time of exposure to learners, others might never be inferred correctly even when embedded in a helpful context after many exposures. Individual words are different from each other in various aspects: length, structure, part of speech, or conveyed concepts. Among these properties, semantic transparency is one main factor that can influence the accuracy of lexical inferencing (Anglin, 1993; Nagy et al., 1987; Shu et al., 1993). Many studies have tried exploring the effects of word semantic transparency on word learning in both L1 and L2 (Sandra, 1990; Libben et al., 2003; Gao, 2004; Miwa et al., 2012). However, most of these present target words in sentence context, especially studies taking L2 learners as subjects. A likely reason for this observation might be the fact that most L2 learners are much weaker than L1 learners in reading ability. Therefore, it might be difficult to collect data in passage-level reading. As we know, sentence context is often used to facilitate vocabulary acquisition in class teaching. Passage context, however, might be the main channel from which learners acquire new words outside class.

In everyday life, a learner is more likely to read passages of text rather than single sentences. Unfortunately, due to the lack of studies exploring the role of word semantic transparency in incidental

vocabulary learning in L2 passage-level reading, we do not know what difficulties L2 learners usually encounter in such kind of reading. As a consequence, we do not know what help and in what form language educators should assist learners to overcome these difficulties. Therefore, it is necessary to conduct research in passage-level reading in the area of second language learning.

Statement of Purpose

In order to fill the gap mentioned above, the researcher proposes to investigate the effects of semantic transparency of Chinese disyllabic compound words on CSL (Chinese as a second language) learners' incidental vocabulary learning through reading passage-level texts; The researcher also intends to provide suggestions for language educators that will improve CSL learners' incident vocabulary learning based on the outcomes of the study.

This study has five aims. The first is to examine the role of word semantic transparency in CSL learners' incidental vocabulary learning through passage-level reading. Since most Chinese words are disyllabic compound words (Chen et al., 2009), these are the target words used in the study. When we are conducting research on incidental vocabulary learning through reading, we are expected to present target words in a reading context in front of learners. Given the importance of context in incidental learning, the researcher also

explores the influence of context strength on the role of semantic transparency in incidental vocabulary learning. Therefore, this study actually investigates the role of word semantic transparency with two different context strengths (weak or strong). The researcher hopes to better understand the interactions between semantic transparency and context strength during incidental word learning.

The second aim is to study CSL learners' inference strategies with changes in word semantic transparency and context strength because it has been shown that multiple strategies are applied by learners to figure out the meaning of target words (Paribakht & Wesche, 1999; Bengeleil & Paribakht, 2004). Among these strategies, contextual cues and word characteristics are the two main information sources from which learners seek assistance to complete lexical inferencing (Baumann et al., 2002; Huckin & Bloch, 1993; Nagy, Anderson, & Herman, 1987; Nagy & Scott, 2000). Therefore, besides identifying inference strategies utilized by learners, the study further explores learners' usage of contextual cues and word characteristics under various conditions of word semantic transparency and context strength.

The third aim is focused on L1's effects on incidental vocabulary learning, which is another gap in the literature. Japanese and Korean learners have learnt Chinese characters from their native languages or

in their domestic education systems before studying Chinese. Their performance should be different from learners from other countries without such Chinese character background in their L1s. The study compares Japanese and Korean learners' lexical inferencing and use of inference strategies with other learners to check if there are any differences between two groups and what these differences might be.

The fourth aim is to explore the relationship between learners' morphological awareness and incidental vocabulary learning. Since most Chinese words are transparent (Li, 2011), i.e., one can infer the meaning of a word if the meanings of individual composing characters in the word are known, learners' Chinese morphological awareness should influence learners' lexical inferencing and in turn the outcome of incidental word learning to some degree. How does morphological awareness affect learners' incidental learning? To answer this question, the study compares learners with high morphological awareness and learners with low morphological awareness in the performance of lexical inferencing and usage of inference strategies.

In the last aim, the researcher intends to provide relevant suggestions based on the outcomes of this study to CSL educators to facilitate CSL learners' vocabulary acquisition through outside classroom reading.

To conclude, the following research questions are addressed in the study.

Research Question 1 What effects does the semantic transparency of Chinese disyllabic compound words exert on CSL learners' incidental vocabulary learning through reading? What are the effects of interaction between the semantic transparency and the strength of contextual support of the target words on CSL learners' incidental vocabulary learning through reading?

Research Question 2 What strategies do CSL learners utilize in sentence-level texts and passage-level texts to infer the meanings of target words with semantic transparency at different levels? Do CSL learners rely more on semantic transparency or more on contextual cues when trying to figure out the meanings of target words?

Research Question 3 What are the differences in the learning outcomes and inference strategies between CSL learners with a background of Chinese characters in their L1s and those without such a background when learning target words through reading with semantic transparency at different levels incidentally?

Research Question 4 What are the differences in the learning outcomes and inference strategies between CSL learners with strong morphological awareness and those with weak morphological awareness when learning target words through reading with semantic transparency at different levels incidentally?

Overview of the Theoretical Framework

The theoretical framework of this study is composed of five different parts: 1) incidental vocabulary learning, 2) semantic transparency, 3) context of reading, 4) lexical inferencing, and 5) morphological awareness. These theories and related studies are reviewed in detail in Chapter Two. According to the theories and results in the previous related studies, the researcher proposes the following assumptions:

1. All CSL learners would be able to more or less learn some words incidentally through passage-level reading. There are many factors that could affect the effectiveness of incidental vocabulary learning. Therefore, in order to test the concerned factors' effects on vocabulary learning, the researcher has to control the other factors as much as possible.

2. Target words can be grouped as transparent, semi-transparent, or opaque words according to the semantic relationship between the words' and their composing morphemes' meanings. In general, words with high transparency would be easier to learn than those with low transparency.
3. A word presented in a context with more directive contextual cues would be easier to infer correctly than the one in a context with less directive contextual cues.
4. Learners must infer a word's meaning correctly before they can learn it incidentally. Learners may apply various strategies to infer the word. Contextual cues and word characteristics are two main information sources for lexical inferencing.
5. Learners with a Chinese character background in their L1s probably perform differently in lexical inferencing from those without Chinese character background in their L1s.
6. Since analyzing words' characteristics is one of major inference strategies used by learners, Chinese morphological awareness would play an important role in CSL learners' incidental vocabulary learning through reading. Learners with high morphological awareness are likely to perform better in lexical inferencing than those with low morphological awareness.

Design of the Study

This study recruited learners who were studying Chinese as a second language in China as research subjects. Because most CSL learners in China take Chinese courses at authorized universities, it is relatively easier for the researcher to gain access to these learners compared to other countries or regions. Furthermore, CSL learners in China universities attend more class hours every week than those in other countries. For example, all participants in this study have to take 20 Chinese classes every week. Therefore, the researcher could recruit more qualified subjects out of this group with sufficient ability to read and understand the main points of passages in the study. Additionally, these learners live in a Chinese environment, so they are more likely to learn vocabulary incidentally than those who do not reside in such a language environment.

In this study, a total of 90 CSL learners were recruited in mainland China in order to investigate the effects of semantic transparency of Chinese disyllabic compound words on incidental vocabulary learning in passage-level reading through a questionnaire and a semi-structured interview.

Since incidental vocabulary learning is a long-term accumulation process, it would be too time-consuming if we wanted to test learners' ultimate attainment. Due to the restrictions of time and funding, it is

not realistic to conduct a longitudinal study. However, if a reader encounters a word only for a few times through reading, it is impossible for him/her to acquire the full vocabulary knowledge of that word, which includes spelling, pronunciation, semantics, collocation, and pragmatics (Read, 1993). When a reader is reading, his/her main purpose is to understand the meaning of text. Thus, knowing the meanings of individual words that compose the text becomes important compared with other word knowledge. On the other hand, if an unknown word is not critical for comprehending the text, the reader might skip it and continue reading, and then he/she would not learn that word. Therefore, inferring the meaning of a word correctly is the precondition of learning the word. Thus, this study takes the accuracy of learners' lexical inferencing as the performance measurement of their incidental vocabulary learning.

A questionnaire was first distributed to 90 CSL learners to collect data on lexical inferencing and inference strategy usage in sentence-level and passage-level reading, Chinese morphological awareness, and background information. Since there are more directive contextual cues in passage-level reading, all participants were required to conduct lexical inferencing and indicate the use of inference strategies in the sentence-level reading first and then do the same in the passage-level reading. Once they had finished all

questions in the sentence-level reading, they were not allowed to revise or correct the answers. One week later, 29 learners who had finished the questionnaire satisfactorily were invited to participate in an individual face-to-face interview to elicit more detailed information on lexical inferencing and inference strategy usage based on their responses to the questionnaire.

To analyze the data, the 90 participants' lexical inferencing were first graded to calculate the accuracy rates of all target words. These accuracy rates were compared between words of different transparency levels and different context strengths to examine the effects of semantic transparency and context strength on incidental vocabulary learning.

Second, the inference strategies were compared among different types of target words and two levels of context strength (sentence and passage) to investigate the effects of semantic transparency and context strength on learners' usage of inference strategies.

All 90 participants were then divided into two groups according to their native language, i.e., the group with a Chinese character background in their L1s (Japanese/Korean learners) and the group without such a background (non-Japanese/Korean learners). The two groups' performance in lexical inferencing and usage of inference

strategies were compared to investigate the effects of L1 on learners' incidental vocabulary learning.

All 90 participants were separated into two groups according to their scores in the Chinese morphological awareness test, i.e., a group with high Chinese morphological awareness and a group with low awareness. Their performance in lexical inferencing and use of inference strategies were compared to investigate the effects of Chinese morphological awareness on learners' incidental vocabulary learning.

Finally, the qualitative data collected from interviews were coded and analyzed to provide detailed information mainly about the learners' usage of inference strategies.

In order to be able to provide practical suggestions to language educators, a supplementary study was conducted to investigate the current teaching methods which were used to teach the words encountered incidentally in class. A total of 15 learners among 29 people who attended the semi-structured interview were asked to introduce the teaching methods that their language instructors' used (including both the previous and current instructors) when encountering unknown words in class. On the other hand, six Chinese instructors who were the Chinese teachers of the 90 participants at the time of survey were asked to introduce their teaching methods in

incidental vocabulary learning as well. Based on the results of the questionnaire survey, interviews, and learners and instructors' introductions, the researcher proposes several suggestions that are intended to help language educators and facilitate CSL learners' incidental vocabulary learning through reading.

Significance of the Study

This study makes significant contributions to the area of L2 acquisition, benefiting related researchers, language educators, and learners. Although there are studies about the effects of word semantic transparency on incidental vocabulary learning, most are focused on incidental vocabulary learning in sentence-level reading in the area of L2 acquisition. Incidental vocabulary learning in passage-level reading has not been studied extensively. As a result, we do not know much about the problems or difficulties that L2 learners experience when they infer unknown words in passages and what strategies they tend to use to aid comprehension. Therefore it is important to conduct related research in passage-level reading as used in this study to fill this gap, as passage-level reading is more common than sentence-level reading in real life.

The present study not only contributes to a thorough understanding of L2 learners' incidental vocabulary learning in

reading, but also makes a significant addition to the related pedagogy. Despite the importance of lexical inferencing for incidental vocabulary learning, inference skills are seldom taught in L2 classes. The findings of this study yield suggestions for language educators based on empirical research. For example, this study investigates the effects of word semantic transparency and context strength on learners' incidental vocabulary learning, and explores how contextual cues and word characteristics help learners infer unknown words. This knowledge will help language educators improve their instruction on lexical inferencing. Through this study, language teachers will better know the importance of developing and cultivating students' lexical inferencing skills, for instance, skills in word analysis and identification of useful contextual cues in reading. The findings of the present study will also help language educators develop appropriate reading materials for CSL learners which will enable learners improve their skill in lexical inferencing in reading and reduce interruptions due to unknown words. Students will be able to maintain their interest in the selected text and so learn unknown words from reading more effectively.

Definitions of Key Terms

Incidental vocabulary/word learning **–** a reader learns about words unintentionally from written or oral context. Since learning through reading is the concern of the present study, "incidental learning" in this study refers to learning from written context.

Intentional vocabulary/word learning **–** a learner acquires about words intentionally with or without written or oral context.

Semantic transparency **–** the semantic relationship between a compound word and its composing morphemes (Zwitserlood, 1994). Depending on the difficulty of inferring the meaning of the entire word from the meanings of its components, a word could be categorized as a transparent, semi-transparent, or opaque word.

Context strength **–** the richness of information in a context that facilitates the learning of an unknown word.

Contextual cues **–** the information in a context that facilitates lexical inferencing.

Sentence-level reading **–** a reading text that consists of only one sentence.

Passage-level reading **–** a reading text that consists of at least three sentences.

Lexical inferencing **–** guessing the meaning of an unknown word by employing all available linguistic cues, the reader's general world knowledge, linguistic knowledge, and his/her awareness of context (Haastrup, 1991).

Inference strategies **–** information sources from which learners seek assistance to infer the meaning of an unknown word.

Morpheme **–** the smallest grammatical unit in a language. It is a combination of meaning and pronunciation. Morphemes are the important components of words.

Morphological awareness **–** the ability to "reflect on, analyze, and manipulate the morphemic elements in words" (Carlisle, 2010).

Receptive morphological awareness **–** the ability to decompose a word into morphemes and identify the correct meaning of a polysemous morpheme in different words.

Productive morphological awareness – the ability to construct words using morphemes.

Limitations of the Study

As with many other studies, this study has some limitations.

First, the participants came from three different universities. Although these three universities are located in the same city and their textbooks and curricula are similar, there might still be some differences in the Chinese language learning experience of the participants.

Second, there was one-week time gap between the questionnaire survey and face-to-face interviews. As a result, some interviewees needed to recall their inference processes during the interview. Hence what they stated during interview might not be completely the same as what they experienced in lexical inferencing.

Third, due to the difficulties of finding professional translators for some languages, not all participants could select their native languages to fill out the written questionnaire. Some of them had to use the official languages in their home countries to answer questions. Therefore, they might not be able to express themselves as precisely

as those who used their native languages. Fortunately, only 11 out of 90 participants fell into this category and all indicated that they were proficient in their selected official languages.

CHAPTER TWO

LITERATURE REVIEW

Incidental Vocabulary Learning

When a person is reading a book or an essay, the main goal is typically to comprehend the book/essay, and learning words is just a by-product of the reading. Therefore, we call such learning incidental word learning. Since the word learning in this manner is incidental, the effectiveness of such learning is inevitably affected by many factors. For example, empirical studies show that topic familiarity, students' interest level (Parry, 1993, 1997), readers' background knowledge (Bernhardt, 1991; Graessar, Singer & Trabasso, 1994; Nagy, Anderson & Herman, 1987), language and reading proficiency (Bensoussan & Laufer, 1984; Chern, 1993; Koda, 1996; Laufer, 1997; Tekmen & Daloglu, 2006) all can contribute to effective incidental vocabulary learning. Text quality such as context difficulty and context strength can affect the effectiveness of learning. A reader is more likely to acquire more words from a text that is at an appropriate difficulty level (Krashen, 1989; Sternberg et al., 1983) and with rich information (Chung, 1995; Ghabanchi &Ayoubi, 2012; Hulstijn, Hollander, & Greidanus, 1996; Ko, 1995; Xu, 2010). Furthermore, the

properties of words would affect the outcome of incidental learning as well (Jenkins & Dixon, 1983; Nagy et al., 1987; Rieder, 2004).

Contribution of Incidental Learning to Learners' Vocabulary Size

Due to the many factors that influence a reader's word learning from context and low pick-up rates that have been found in multiple empirical studies (Horst et al., 1998), some scholars questioned if the contribution of incidental learning to learners' vocabulary was exaggerated. For example, Laufer & Shmueli (1997) pointed out that it is unrealistic to expect incidental learning through L2 learning, because it is hard to acquire a word that does not attract a reader's attention and then this word has little opportunity to be processed deeply in his/her mind. Webb (2008) further proposed that incidental learning is the main approach to ensure vocabulary growth in L1 while intentional learning should be the main approach to gain vocabulary growth in L2, although L2 learners may take incidental learning as an alternative approach to enlarge their vocabulary size.

While these empirical studies yield interesting findings, most contained methodological weaknesses that have resulted in wrong conclusions being made, i.e., no incidental learning occurred (Schmitt, 2008). First, it is inaccurate to compare the outcome per unit time of intentional learning with that of incidental learning. It is

commonsense that if a learner spends an equal amount of time in intentional learning and incidental learning, he/she will learn more words in intentional learning.

Incidental learning is a long-term process. A reader, who consistently performs general reading for years should be able to learn a much larger number of words through incidental learning than someone who does not. It seems that Laufer & Shmueli (1997) did not consider the time factor when they concluded that L2 learners rarely acquire words from incidental learning since they only compared intentional-learning groups and incidental-learning groups after short-term interventions (around 10 - 55 minutes). In fact, proving the superiority of intentional learning over incidental learning one cannot deny the role of incidental learning in learners' vocabulary growth especially in the long term. Second, small amounts of reading cannot reveal the long-term effectiveness of incidental learning (Schmitt, 2008).

In many related studies, subjects were only asked to read a few short essays and then their pick-up rates in unannounced tests were evaluated. Such experimental designs utilized short-term methods to test the long-term effectiveness of incidental learning thus it was more likely to get low pick-up rate by the nature of the methods. Third, improper contexts might hinder word learning. Not all contexts

facilitate word learning (Beck, 1983). If the contexts provided in the related studies did not have enough cues that help readers infer word meaning, the pick-up rate would be low. Finally, rough measurements cannot test the gain of partial vocabulary knowledge (Herman et al., 1987). In intentional learning, a learner is well equipped to learn more knowledge of given words. In incidental learning, however, only partial knowledge of a word may be reflected in the individual context. The learner's main purpose is not to learn new words, but to comprehend the main points of the text. Therefore, he/she may only gain partial knowledge of the words from the context. This kind of partial knowledge is usually the meaning of word (Ehri & Roberts, 1979; Webb, 2008). If the tests are not sensitive enough, it will be hard to test such gains which are different from those in intentional learning.

In sum, the effectiveness of intentional learning is superior over that of incidental learning per unit time. But in real life, it is impossible to spend all class time just introducing words to students. So the main approach for enlarging vocabulary size will be incidental learning through reading outside class. However, incidental learning is a long-term project that takes years to show results. No one should expect to enlarge vocabulary size from incidental learning in a short period. So an individual's perseverance with reading is an important

factor in achieving any significant learning outcome from incidental learning. A person who loves or has enough time for reading usually has a larger vocabulary size than the one who seldom reads.

Effects of Word-related Factors on Incidental Vocabulary Learning

Words in a text are not of equal difficulty to a reader as some words might be easier to learn than others. Researchers have investigated the effects of word-related factors on incidental vocabulary learning from various perspectives. These factors include word importance (Rieder, 2004), word length (Nagy et al., 1987), frequency of occurrence (Tekmen & Daloglu, 2006), conceptual difficulty (Jenkins & Dixon, 1983; Graves, 1984; Nagy et al., 1987), part of speech (Gentner, 1982; Laufer, 1990; Lin, 2010; Nagy et al., 1987; Nation, 1990; Quealy, 1969), word concreteness (Begg, 1973; Steinberg & Sciarini, 2006), and semantic transparency (Anglin, 1993; N agy et al., 1987; Shu et al., 1993; Gan, 2008).

Among these factors, semantic transparency is the main word property investigated in this study.

Semantic Transparency

Definition of Semantic Transparency

Zwitserlood (1994) defined semantic transparency as "the semantic relationship between a compound and its component morphemes" (p. 342). When the meaning of a word is clearly related to the meaning of its component morphemes, this word is semantically transparent, for example, *blueberry*. If the meaning of a word cannot be related to the semantics of its constituent morphemes, it is semantically opaque, such as *cocktail*. Some scholars also interpreted semantic transparency as the compositionality of compound word. If the meaning of a compound word can be understood from the meaning of its components, the word was compositional. Otherwise, it is non-decomposable (Reddy, et al., 2011). In recent years, some scholars proposed another definition from the perspective of distributional semantics, assuming that the transparent words would share the same contexts with their components (Marelli, et al., 2015). Although this approach gained some support in empirical studies, it judges word semantic transparency from an indirect way and increases the difficulty of applying this approach into the field of language teaching and learning. In practice, language teachers and learners seldom think about semantic transparency of a word from the distributional approach. Therefore, this study characterized semantic transparency following Zwitserlood's approach.

English Morphemes vs. Chinese Morphemes

In both English and Chinese, there are three types of words: inflectional words, derivational words, and compound words. These words are formed through combination of various types of morphemes, including free morphemes (root words), inflectional morphemes (inflectional affix), derivational morphemes (derivational affix), and bound roots (Table 2.1) (Katamba 1993; Koda 2000; Ku & Anderson 2003; McBride-Chang et al. 2005).

Table 2.1 Types of Morphemes and Examples in Chinese and English (Cited from Ku & Anderson 2003)

Morpheme Type	Chinese	English
Root Word	山/shan1/ (mountain) 狗/gou3/ (dog)	Book Hand
Bound Root	房/fang2/ (house) 桌/zhuo1/ (desk)	Anti- (against, opposite) -logy (study)
Inflectional Affix	-了/le/ verbal aspect -们/men/ plural	-ed (past tense) -s (plural)
Derivational Affix	无-/wu2/ (not) -化/hua4/ verbalizing	-er (agentive) -ly (adverb)

Inflectional morphemes usually serve a grammatical function and they do not change the word's syntactic category, such as the tense or number markers (e.g., *talk-talked, book-books*). Derivational morphemes can either alter words' syntactic category (e.g., *teach-teacher*) or change the meaning of words (e.g., *possible-impossible*). Besides inflectional words and derivational words, there are other kinds of words called compound words. A compound word is composed of two or more free morphemes or bound roots. Free morphemes are those morphemes that can form words independently (e.g., *mountain, book*). Bound roots, however, must combine with other affixes or roots to form words (e.g., *anti-, -logy*). In English, many morphemes are inflectional and derivational morphemes. In contrast, most morphemes in Chinese are used to form compound words while the amounts of inflectional and derivational morphemes are very limited. As a result, most Chinese words are compound words, and analyzing the structure of a Chinese word is based on the meanings of individual morphemes instead of their morphologies. Therefore, semantic analysis is more important than morphological analysis in the processing of Chinese compound words. This is why the present study focuses on Chinese words' semantic transparency instead of their morphological structure.

Morphological Transparency vs. Semantic Transparency

From existing studies about the relation between the meaning of a word and those of its constituents, one can find two terms that describe such a relation, i.e., morphological transparency and semantic transparency. Semantic transparency has been used to refer to the transparency of compound words, while morphological transparency has been used to refer to the transparency of derivational words or derivational and compound words together. For example, Nagy et al. (1987) proposed a four-degree scale to measure the morphological transparency of the target words, including 1) unanalyzable, for example, *force*; 2) has a suffix which indicates part of speech, for example, *destination*; 3) can be broken into recognizable parts that contribute at least something to the meaning of the whole, for example, *outskirts, earshot*; 4) meaning of the whole is a compositional function of the meanings of the parts, and meanings of the parts are likely to be familiar to the reader, for example, *nonliving, unsteered*. One can see that the second degree is related to derivational words, and the last two degrees are related to compound words.

Generally, studies that explored the effects of English word transparency on incidental vocabulary learning often selected derivational or derivational and compound words as target words, while studies on Chinese word transparency were likely to select

compound words. Therefore, one finds "morphological transparency" used in studies on English words and "semantic transparency" used in studies on Chinese character words. Since the present study is focused on Chinese compound words, "semantic transparency" was selected as a term to refer the semantic relationship between a word and its constituents.

Evaluation of Word Semantic Transparency in Previous Studies

To investigate the effect of semantic transparency on word learning, the first important task is to establish a list of reasonable criteria to evaluate the semantic transparency of a given word accurately.

There are three main approaches currently used to evaluate semantic transparency: the expert approach, the public approach, and the learner approach. The expert approach refers to the rating of semantic transparency graded by those who are knowledgeable in the target language, including linguists, language instructors, graduate students majoring in linguistics, and the researchers themselves. These experts usually take dictionaries as their reference when grading the semantic transparency of the words. For example, Li (2011) applied the dictionary approach to a collection of two-syllable and three-syllable words in modern Chinese. She looked up the

definitions of individual words and their composing morphemes in the *Dictionary of Modern Chinese Words*. She then graded the semantic transparency of the words by examining the relationship between the meanings of morphemes and those of the words.

Fu (1981) also utilized the dictionary approach to investigate the relationship between the meaning of a word and that of its morphemes. Fu developed a frame with high operability to decompose the definition of a word according to this relationship. The definition of a word in *Dictionary of Modern Chinese Words* usually included four parts:

1) the definitions of composing morphemes; 2) implicit content of the word definition, which refers to the necessary parts of the definition of the word cannot be expressed by its morphemes; 3) supplemental content of the word definition, which refers to the optional parts of the definition of the word that are added to make the whole definition smoothly and clearly; 4) additional content of the word definition, which refers to the optional parts of the definition of the word that are added to provide additional knowledge to dictionary users.

Fu gave the following example (Z=the definition of the word; C=the definition of the composing morpheme; a=implicit content of the

word definition; b=supplemental context of the word definition; s=additional content of the word definition):

合　唱　　由若干人　分几个声部 共同 演唱 一首 多声部歌曲，

Z (C1+C2) =　　b　　+　　a　　+　　C1　+ C2　+　b　　+　　a

如男生合唱，女声合唱，混声合唱等。

+ s

Chorus (singing together)　A group of singers　in several parts singing together a multipart song,　such as the male chorus, female chorus, mixed chorus and so on.

(Translated from Fu (1981))

Fu then categorized the relationship between the definition of a word and that of its morphemes into five types:

1) *The definition of a word is expressed directly and completely by the definition of the composing morphemes. The formats of this type of words include Z=C1+C2, Z=C1=C2.*
2) *The definition of a word is expressed directly and partially by the definition of the composing morphemes. The format of this type of words is Z=C1+C2+a.*

3) *The definition of a word is expressed indirectly by the definition of the composing morphemes. The format is Z=the extended meaning or metaphorical meaning of C1+C2.*
4) *One of composing morphemes in a word completely loses its original meaning in the definition of the word.*
5) *The definition of a word cannot be expressed at all by the definition of the composing morphemes.*

(Translated from Fu (1981))

Since the dictionary approach is based on definitions listed in dictionaries, it is relatively easy to implement. However, dictionaries usually list many definitions for every character or word. In this case, most words would be graded as transparent if they are evaluated in the dictionary approach. However, it is unrealistic to expect ordinary native speakers to know all meanings of every polysemous character. For this reason, some words that are transparent according to the dictionary approach may not be so transparent for the ordinary learners.

In fact, in most empirical studies, researchers employ the public approach to evaluate semantic transparency. The public approach emphasizes that evaluating a word's semantic transparency needs to be based on the understanding of the average people on a word and its

components. The common procedure in this approach is that researchers select words first according to their own research purposes and criteria and then ask a number of native speakers to grade the semantic transparency of the words. Usually, there are three grading methods. One is to ask native speakers to grade the semantic transparency of each individual composing morpheme and then use the average score of all composing morphemes for the entire word (Wang & Peng, 1999). The limitation of this method is that the morphemes that make a greater or lesser contribution to the meaning of the word are likely to artificially increase or decrease the score of the word's semantic transparency.

The second grading method is to ask native speakers to just grade the semantic transparency of the whole word (Wong & Rotello, 2010). The limitation of this method is that it may be harder for the graders to evaluate the semantic transparency of a whole word than that of each individual morpheme. Therefore, it is important to provide detailed examples to make sure that the graders understand the researchers' criteria beforehand. The third grading method is to ask native speakers to write the definition of a given word and then count the frequencies of constituents that were used in the definition. The higher frequency of the constituents in the definition would suggest the higher transparency of the word (Sandra, 1990). This method

overcomes the limitation of the second method; however, it demands longer time from the graders thus the rate of grading completion in this method may be lower than the other two.

The third approach is the learner approach that emphasizes evaluating semantic transparency from the perspective of learners. If a learner is familiar with a word, that word for him/her is transparent. Otherwise, it is an opaque word. For example, Shu & Zhang (1993) applied this approach to the selection of target words (disyllabic words) when they explored Chinese third and fifth graders' word learning by reading. In the study, they set up categories to reflect various semantic transparencies of target words as follows:

1) *A word with one morpheme that was familiar to the subjects or has a familiar radical that would help the subjects to infer the meaning of the word.*
2) *A word with composing morphemes that have helpful radicals, but the subjects might not be familiar with the radicals.*
3) *A word composed by two familiar morphemes, but either the meaning of the morphemes or the radicals in the morphemes have no contribution to the word meaning.*
4) *An opaque word was the word that was composed by two unfamiliar simple characters without radicals for the subjects.*

(Translated from Shu & Zhang, 1993)

From the grouping criteria, it can be seen that whether a learner is familiar with the constituents (characters in Chinese) in a word is an important variable. This variable would influence the semantic transparency of a given word from the perspective of the learner. The learner approach evaluates the semantic transparency according to learners' previous knowledge. The semantic transparency of the target words selected by this approach would be more consistent with the semantic transparency in learners' minds compared to other approaches. However, it is difficult to know every subject's prior knowledge in an experiment since prior knowledge varies with each individual.

Factors that would Influence Learners' Understanding of Word Semantics

Effects of Word Structure

In the area of Chinese linguistics, scholars usually categorize Chinese compound words as combined compound words, modifying compound words, verb complement compound words, verb-object-type compound words, or predicate compound words. For example, 丢弃 (throw away, 丢 means throw away, and 弃 also means throw

away) is a combined compound word; 喜讯 (good news, 喜 means happy or good, and 讯 means news) is a modifying compound word. Would this characteristic of Chinese words affect the understanding of word semantics? From the current literature, we cannot find convincing studies that confirm the role of Chinese word structure in understanding word semantics. In fact, we can find many examples that showed the conflicting effects of word structure on the understanding of word meaning. For instance, 朋友(friend)，开关(switch)， and 领袖(leader), are all combined compound words. While the first one is a transparent word and easier to understand, the second one, 开关, is composed of two verbs, 开(turn on) and 关(turn off), but the word means a switch. Compared with 朋友，开关 is a bit harder to understand. The last one, 领袖(leader), is composed of 领(collar) and 袖(sleeve). Since this word has an extended meaning, it is almost impossible for a L2 learner to infer its meaning correctly based on its components. A few other examples, such as 扫地(sweep)，枕头(pillow)， and 贴心(thoughtful), are all verb-object-type compound words. The first one, 扫地, is a transparent word, composed of 扫(sweep) and 地(floor). The second one, 枕头, is composed of 枕(rest one's head on) and 头(head). Here the meanings

of word components indicate the action of resting one's head on something, but the meaning of the word is pillow. We could see that the semantic relation between the word and its constituents is not as obvious as that in 扫地. As to the third one, 贴心, the semantic relation between this word and its composing characters, 贴 (paste) and 心(heart), goes beyond the superficial meanings so that it is difficult to infer the word's meaning based on the hints provided by composing characters. From these examples, we could see that word structure is not a critical determinant of learning word semantics since even words having the same structure can vary in the degree of transparency.

Additionally, because Chinese words are composed of ideographic characters, the structure of a Chinese compound word is often analyzed according to the meanings of individual morphemes rather than morphologies. For example, if we want to analyze the structure of a transparent word 父母(parents), we need to know the meanings of 父(father) and 母(mother) first, and then we can treat it as a combined compound word. If a language learner doesn't know the meanings of composing morphemes, he/she will not be able to analyze the word structure.

On the other hand, some scholars consider semantic transparency as an indicator of the degree of lexicalization. A lower degree of transparency often suggests a higher degree of lexicalization, and a smaller possibility of analyzing the structure of that word (Li & Li, 2008). For instance, the semantic relationship between a transparent word 悲哀(sad) , and 悲 (sad) or 哀(sad) is very clear, i.e., 悲哀=悲=哀. And then we know it is a combined compound word. However, we cannot figure out any semantic relationship between an opaque word 东西(stuff), and 东(east) or 西(west). As a result, we are unable to analyze the structure of 东西. Therefore, it can be implied that word structure is not an important factor to affect the outcome of word inferencing. Consequently, the researcher did not categorize the words from the perspective of word structure when selecting target words for this study.

Effects of Orthography

Chinese is an ideographic language, the orthography of many characters contain iconic components that would facilitate understanding of their meanings. For example, a radical indicating the meaning of a character would provide big help to the readers for inferring the meaning of the character (Zhang et al., 1990). For

instance, there is 氵 (water radical) in the character 河 (river). From the water radical, a language learner would know part of the meaning of the character. However, such assistance from orthography might only work for those words with high transparency. For example, in a highly transparent word 闲谈(chat), 谈 has 讠 (speak radical), which is directly related to the word meaning, "chat". Meanwhile, such a radical cannot provide clear hints to a word with low transparency. In the word, 周折(difficulty), 折 also has a popular radical 扌(hand radical), but it is not directly related to the word meaning, "difficulty". So a language learner might not be able to infer the meaning of the word from the radical. In fact, even in a transparent word, orthography might not be always helpful. For example, 补救(remedy), is a transparent word. Its component 补 has 衤(clothe radical) since the original meaning of this character is to mend clothes. But a common L2 learner would not know the semantic development of 补, thus it is unlikely for him/her to relate clothe radical with the action of mend. Therefore, we could see that seeking assistance from the meanings of radicals to infer the semantics of unknown words is not reliable, although sometimes this method could provide useful hints.

Previous Studies on the Role of Semantic Transparency in Word Recognition and Word Learning

As one of properties of a word, semantic transparency might play an important role in vocabulary learning. Clark & Berman (1984) described semantic transparency as one of the four word acquisitional principles on which children rely to derive new word forms. Jenkins & Dixon (1983) also thought that learners could learn new words through the morphological analysis of individual words.

The effect of semantic transparency on processing compound words is another research topic receiving significant attention. Multiple empirical studies using the lexical decision paradigm (Diependaele et al., 2011; Libben et al., 2003; Sandra, 1990; Zwitserlood, 1994) proved that more semantic priming effects were found for transparent words than for opaque words. However, there are also some studies in which semantic transparency did not play any significant role in compound processing (Frisson, Niswander-Klement & Pollatsek, 2008; Pollatsek & Hyönä, 2005).

In contrast, many empirical studies proved the positive role of semantic transparency in processing Chinese disyllabic compound word recognition or processing. (Gao, 2004; Liu, 2004; Miwa, Libben & Baayen, 2012; Wang & Peng, 2000; Zhang, Peng & Zhang, 1991).

In the area of word learning through reading, studies on the influence of semantic transparency of English words on learning outcome contradicted each other. For example, the study of Nagy et al. (1987) found that morphological transparency had no significant effect on American children's incidental learning from the context. McCutchen & Logan (2011) suggested that students inferred the meaning of morphologically accessible words more accurately than less accessible words.

Many similar studies on Chinese character words, however, confirmed the positive role of semantic transparency. Xu & Li (2001) gave a multiple-choice test to Chinese children and required them to select the correct interpretation of target words. The results showed that the meanings of transparent unknown words were easier for children to learn. Moreover, children's ability of understanding transparent unknown words and opaque familiar words predicted their ability in reading comprehension. Shu, Zhang, & Anderson (1993) studied the natural learning of word meanings from the context among Chinese children in the 3rd and 5th grades, and found that morphological transparency only influenced word learning for children in the 5th grade. The researchers believed that this was related to the fact that children in the 3rd grade have not developed enough morphological awareness, the ability to carry out morphological

analysis or the ability to infer word meaning from both word structure and the context. Later, Shu, Anderson & Zhang (1995) conducted a similar experiment among American and Chinese children in the 3rd and 5th grades and, like before, found morphological transparency only influenced word learning for Chinese children in the 5th grade while there was no such influence among American children in either grade.

Gan (2008) examined the effects of semantic transparency on word learning among CSL learners. Each subject was shown 30 sentences. Every sentence contained one target word that was underscored and the subject was asked to select a correct synonym of the target word among four choices. The results proved that semantic transparency influenced CSL learners' word learning significantly. Learners who had a Chinese character background in L1 (like Japanese and Korean learners) performed better than those without such a background (like European and American learners). Guo (2004) examined the lexical inference ability of non-Japanese/Korean CSL learners who had studied Chinese for one year. The results showed that semantic transparency and lexical structure affected word inferencing. Transparent words were easier to infer than opaque words and modified compound words were easier to infer than verb-object compound words.

The process of word learning is complicated. Ideally, if one wants to examine the effect of semantic transparency on word recognition and learning, it would be better to control the effects of other factors. However, this is often unrealistic to do so, as there is always interaction between semantic transparency and other factors. Several studies have investigated the role of interaction between semantic transparency and other factors, such as word frequency and contextual cues, in incidental vocabulary learning. Baluch (1993) conducted a study on a lexical decision task in Persian for this purpose. It was found that the subjects recognized opaque words that were of high frequency as fast as transparent words but they recognized low-frequency transparent words faster than opaque ones of low frequency. In Gao & Gao's (2005) study on Chinese disyllabic words, the subjects did a word decision task for a collection of high-frequency transparent words, high-frequency opaque words, low-frequency transparent words, low-frequency opaque words, and pseudo-words. Their results confirmed that an interaction effect did exist between word frequency and semantic transparency. Semantic transparency played a more important role in recognizing low-frequency words than that in recognizing high-frequency words. Gan (2008) conducted two experiments to study the same problem. The first experiment demonstrated the significant role of semantic transparency in CSL

learners' word learning as mentioned earlier. In the second experiment, Gan showed the subjects the same target words with strong contextual support, weak contextual support, and no context to examine the interaction effect between semantic transparency and contextual cues. The results indicated that the effects of context were significantly positive in learning opaque words but not in learning transparent words. The results of the study by Zhang & Zeng (2010) also supported the interaction effect between semantic transparency and sentence context on the learning of word meaning. When there was no context or weak contextual support, the subjects who were CSL learners learned transparent words better than they learned opaque words. Where there was strong contextual support, there was no significant difference in learners' performance between transparent and opaque words.

Context Types and Contextual Cues

Incidental learning emphasizes that learners acquire words unintentionally from a context. Therefore, context is an important factor influencing the outcome of incidental vocabulary learning (Li et al., 2000; Stanovich & West, 1981; Zhang, 2008). Obviously, the effect of each context on word learning can be different. While some contexts facilitate word learning, others may not.

A context can be categorized differently according to its properties. Beck et al. (1983) emphasized the importance of distinguishing the pedagogical context from the natural context. Pedagogical context is specially designed for target words, so one can expect it to provide enough cues for learners to understand unknown words. The main function of the natural context is not to convey the meanings of individual words, but to express ideas or thoughts. Therefore, the natural context does not always facilitate word learning. Beck et al. (1983) stated that the effectiveness of the natural context is a continuum. Misdirective context and directive context are two ends of the continuum. Nondirective context and general context are in the middle. They also tested the effects of these four different types of contexts on the selection of missing words or synonyms in a passage. The results showed that the subjects could identify almost all target words in the directive context while their performance in the misdirective context were the worst.

Herman et al. (1987) classified text features into three categories: 1) features associated with macrostuctures referring to the aspects of global coherence which include titles, top sentences and the overall organization of information; 2) features associated with microstructures referring to logical and temporal relations expressed in the text; 3) features associated with the explanations of concepts

and relations between them in the text. They distributed several different versions of similar texts to 309 English native speakers in grade eight and found that those subjects reading versions with the third category of features learned about word meanings significantly better than those reading other versions.

Beck and Herman concentrated on text contexts but ignored the role of readers' backgrounds and previous knowledge in word learning. Engelbar & Theuerlouf (1999) argued that the context should be divided into two types, i.e., verbal context and nonverbal context. Verbal context includes grammatical context which consists of morphology, syntax, and phonetics, and semantic context that refers to word association. Unlike verbal context that provides linguistic environment of an unknown word, nonverbal context provides content-oriented environment, including situative context, descriptive context, subject context, and global context. The last two contexts refer to readers' knowledge about the materials in which an unknown word is embedded. Dubin and Olshtain (1993) listed five factors that influence readers' word inference, including the reader's overall knowledge on or beyond the text, semantic information at the sentence/paragraph level or beyond the paragraph level, and syntactic relationships.

Sternberg & Powell (1983) considered factors related to the reader in the case of learning words from context. However, they did not count readers' knowledge as one type of context, but a mediating variable that would affect readers' word learning. They proposed that readers need to decode external context and internal context so that they could infer the meanings of unknown words. They defined internal context as the morphemes within a word, such as prefixes, suffixes, and stems. They further defined any other information in texts that could help infer the meaning of unknown words as external context, such as information regarding the unknown words' time, location, worth, physical properties, and function. In fact, both internal and external contexts provide contextual cues that influence readers' understanding of an unknown word. Besides contexts, other factors are counted as mediating variables by Sternberg & Powell, like the number of occurrences of an unknown word, the density of other unknown words in context, and readers' prior knowledge, would also influence the likelihood that the meaning of the unknown word is inferred correctly (Sternberg & Powell, 1983).

Comparing all these past categories of context, it is clear that Beck and Herman concentrated on text context without considering other factors that would probably affect word learning from context. The main difference among the approaches of Engelbar & Theuerlouf,

Dubin & Olshtain, and Sternberg & Powell is whether readers' prior knowledge should be counted as one type of context. I personally think that it is more reasonable to count it as a mediating variable. This is based on the fact that, readers' prior knowledge did not come from the text where the unknown word is embedded, but came from readers' individual past experiences. Additionally, Sternberg & Powell's also takes an unknown word as the center. The cues within the word are counted as internal factors, and those outside of the word as external factors. Such a category is suitable for a study on word learning centering on unknown words. Therefore, the present study has adapted Sternberg & Powell's theory with some minor revisions. The context in this study refers to the external context in the framework proposed by Sternberg & Powell, while word semantic transparency is the internal context explored in this study. The mediating variables are considered the controlled variables in the study.

The Role of Context in Word Learning

The role of context in word learning can be positive or negative. An incomplete sentence context can either facilitate a subsequent lexical decision or impede it, depending on the likelihood that a test word was a completion of the sentence (Brusnighan & Folk, 2012;

Fisehler & Bloom, 1979). Such facilitation or inhibition is also found in natural passage-level contexts (Beck et al., 1983). Therefore, there are significant arguments regarding whether teachers should present unknown words in context or not. Supporters believe that it is more natural for readers to learn new words from context as the context would help learners understand words' polysemous versatility (Beheydt, 1987). Presenting a new word in context starts the elaboration processing of the word and readers would be more likely to memorize the word when it is presented with context than that without context (Laufer & Shmueli, 1997). Opponents of this view argue that individual words are often ignored if they are not critical for understanding the main points of texts. If a misdirective context has many distractions, less context would be better than more for word learning (Laufer & Shmueli, 1997).

The results of many empirical studies on intentional word learning reflect such debate, including learning L1 words (Dempster, 1987; Nist & Olejuik, 1995; Nash & Snowling, 2006) and L2 words (Pickering, 1982; Laufer & Shmueli, 1997; Webb, 2007; Zaid, 2009; Baleghizadeh & Shahry, 2011; Bolger & Zapata, 2011). The following are possible reasons for the mixed results of these studies. First, the contexts used in these studies were of different types. Second, the context approaches claimed in some of these studies were

not just the context approach. It was often combined with other learning approaches such as bilingual word lists. This fact led to difficulties in evaluating the accuracy of context effects. Finally, it may be unfair to compare non-context intentional learning with incidental learning from context in a short-term study as some studies did, since it usually takes longer to appreciate the learning achievement from incidental learning. Nevertheless, one could conclude from previous studies that context might not be the most effective teaching or learning method in explicit word learning, but it does facilitate word learning when combined with other methods.

Studies on the Effects of Context on Incidental Word earning

The importance of context for incidental learning is self-evident. Without context, there would be no incidental learning. Therefore, when one talks about the role of context in incidental learning, one should focus on the effects of context properties on incidental learning. According to previous studies, there are six main context variables that might influence incidental word learning. They include the strength, the length, the frequency, the difficulty level, the genre, and the position of context.

Context Variables

• *Context Strength*

Context strength refers to the richness of information provided by context that help learners acquire unknown words. A short and directive context could be more useful than a long but nondirective context (Engelbart & Theuerkauf, 1999). Many studies affirmed the positive role of informative context in word learning (Baleghizadeh & Shahry, 2011; McGregor, Sheng & Ball, 2007; Nash & Snowling, 2006; Steele & Watkins, 2010; Zaid, 2009). For example, Webb (2008) examined the effects of context strength on L2 learners' word learning. The informative context group performed much better than the less informative context group. However, some studies found that informative contexts did not facilitate word learning as most people expected (Diakidoy, 1998), since readers are able to collect enough information from the contexts, and they pay less attention to unknown words. Therefore, these studies proposed that slightly less helpful contexts or a mix of context types facilitate word learning more than supportive contexts (Mondria & Wit-De Boer, 1991).

• *Context Length*

How long should the context be to facilitate word learning most effectively? Engalbar & Theuerlouf (1999) thought that learners would not need a longer context if one sentence could provide

sufficient information. Dempster (1987) found that learners' performance in word leaning from a single sentence context was not significantly different from a three-sentence context. Longer context does not necessarily provide more useful contextual cues. Occasionally cues in some contexts might impede deriving the true meaning of an unknown word and so prevent the effective use of context (Sternberg et al., 1983).

• *Context Frequency*

Context frequency refers to the frequency that a reader encounters an unknown word in different contexts. Currently we do not know how many times a learner needs to encounter an unknown L2 word before grasping it. The frequency suggested by scholars ranged from six (Rott, 1999) to more than 20 encounters (Waring & Takaki, 2003) since the necessary number of encounters is affected by the richness of contextual information and the properties of the target word.

• *Context Difficulty*

The difficulty level of context is determined by the density of unknown words, the complexity of grammar, and the familiarity of concepts conveyed (Hu & Nation, 2000; Stahl, 2003; Chegeni & Tabatabaei, 2014). If the context is too difficult for a reader, it would

be unlikely for him/her to concentrate on individual words. Therefore, most scholars in carrying out incidental learning studies tend to select the context with an appropriate level of difficulty.

• *Context Genre*

Some studies explored the effects of context genre on incidental word learning. The key question in this aspect was the discrepancy among narratives or expositions. The results of these studies were not consistent. According to a meta-analytic analysis of 12 studies on incidental learning conducted by Huang et al. (2012), the subjects in the studies that used both expository and narrative texts learned more words than those who only read expository texts. The subjects who only read narrative texts gained the least vocabulary. However, due to the small sample sizes in these studies (one study using narrative text, ten studies using expository text, and one using both), the conclusion of the meta-analytic analysis based on these studies is not very convincing.

• *Context Position*

Context position refers to the position of contextual cues that would facilitate the learning of an unknown word. Context position can be categorized as either near context or far context according to

the distance from the word, or as the preceding context or the following context according to its order relative to the target word encountered by readers. For example, Cain et al. (2003) investigated the ability to learn word meanings from context between two groups of 7-8 year-old children. One group of children had normal reading skills and the other group had weak skills. Both groups had to read two versions of stories, one with near context and the other with far context. Near contexts offered helpful information immediately after the unknown word, and far contexts offered such information several sentences away from the word. Results revealed that far contexts made significant contribution in distinguishing skilled readers from weak readers. Potter et al. (1998) found subjects made quicker or more accurate selections on the target words with the preceding contexts than those words with the following contexts or delayed contexts. Chern (1993) explored Chinese ESL readers' word-solving strategies and found that the use of forward cues made a greater contribution to distinguishing better readers from weaker readers.

Since the present study is mainly concerned with the effects of context strength on incidental learning, the researcher tried to control other context variables in the experiments.

Lexical Inference

As mentioned above, it is not realistic to expect students to acquire all lexical knowledge of a word at one time. In most previous studies about incidental vocabulary learning, learning a word's meaning is considered equivalent to learning the word. However, since only part of a word's meaning can be revealed in a natural text, even an alert reader is only able to learn just a portion of the word's meaning through reading incidentally (Herman et al., 1987).

Inferring a word's meaning is a necessary precondition for learning the word through reading. Usually, if the meaning of an unknown word is not important to the comprehension of the text, most readers tend to ignore the word, in which case it is impossible for them to learn the word (Paribakht & Wesche, 1999). Rieder (2004) proposed a term, "the degree of focus on a word," to describe the possibility for a word to be inferred during reading. Three variables that determine the degree of focus on a word are the saliency of a word's form or content in the text, a learner's individual interest in that word, and the learner's particular reading goal. A reader would put more effort in figuring out the meanings of unknown words with higher degrees of focus than others. When encountering an unknown word in reading, the most frequent method a reader might apply is inferencing (Bengeleil & Paribakht, 2004; De Bot et al., 1997; Oxford & Scarcella, 1994) [1]. Appropriate use of lexical inferencing strategies would also

compensate for a reader's shortcomings in receptive vocabulary and thus assist him/her in the proficiency of the second language reading (Parel, 2004).

On the other hand, whether a reader could infer the meaning of unknown words successfully depends on his/her strategies, available knowledge resources through the text, and his/her background knowledge. For example, Paribakht & Wesche (1999) conducted an introspective study of lexical inference and found that knowledge sources used by ESL university students in inference include sentence-level grammar, word morphology, punctuation, world knowledge, discourse and text, homonymy, word associations, and cognates. Meanwhile, the characteristics of tasks, texts, and words also influence subjects' inferencing behavior. Bengeleil & Paribakht (2004) investigated EFL learners' lexical inferencing and grouped their knowledge sources as linguistic sources and non-linguistic sources. Linguistic sources included intralingual sources (target-word level, sentence level, and discourse-level sources) and interlingual sources (lexical knowledge and word collocation). Non-linguistic sources included knowledge of topic and subject. Qian (2005) conducted a case study by interviewing a Japanese CSL learner's lexical inference and found as well that the knowledge sources used for word inference by the CSL learner include intralanguage

knowledge (Chinese morphological, syntactic, and contextual knowledge), interlanguage knowledge (knowledge from L1 or other languages), and other nonlinguistic knowledge.

Although there are various sources of knowledge that could be used to infer the meaning of an unknown word, many scholars think that contextual cues and lexical characteristics are the two main types of information that facilitate the process of figuring out the meaning of an unknown word (Baumann et al., 2002; Bensoussan & Laufer, 1984; Graves, 2006; Huckin & Bloch, 1993； Nagy, Anderson, & Herman, 1987; Nagy & Scott, 2000; Sternberg, 1987; Wysocki & Jenkins, 1987).

While L1 readers might be able to comprehend texts from both the top-down and bottom-up processing approaches, L2 readers tend to rely more on word-based information or local contextual cues in reading. For example, Fischer (1994) examined the lexical inference strategies of German advanced ESL learners and found that these learners largely used word information and seldom used contextual cues. De Bot et al. (1997) found that ESL learners at the intermediate level relied heavily on morphosyntactic information in lexical inference. About 50 percent of subjects' inferencing attempts were related to the morphosyntactic information of words in their study. Haynes (1993) found that EFL learners with both high and low

English proficiency from all language backgrounds in the study (Spanish, Japanese, Arabic/French (Tunisian), and Arabic) utilized word analysis as one of approaches when inferring the meanings of unknown words.

Besides word-based cues, L2 learners use contextual cues to infer words as well. The think-aloud study conducted by Huckin & Bloch (1993) revealed that when L2 learners encountered an unknown word in reading, they usually rely on both word-based and context-based knowledge. According to this study, L2 learners first study the word in general to see if they recognize any part of the word, and then infer the possible meaning of the word based on the meaning of its parts. And finally, they use context-based strategies to evaluate the guessing. However, when L2 learners use contextual cues, they prefer to use local contextual cues than the cues beyond the sentence in which unknown words are embedded in (Bengeleil & Paribakht, 2004). Haynes (1993) also showed that L2 readers performed better in local guessing than global guessing.

Jenkins & Dixon (1983) proposed four ways to learn word meanings, including through a dictionary or oral instruction, through example, through verbal, oral or written contexts, and through morphological analysis. The first two ways are related to intentional learning, the third one is related to incidental learning, and the last one

is related to both. However, both contextual cues and morphological analysis have limitations. As mentioned earlier, contexts sometimes inhibit the understanding of a word. In many occasions, cues in a natural context are not enough to help readers infer the meaning of a word (Schatz & Baldwin, 1986). On the other hand, many meanings of words are not consistent with their lexical structure. Contextual cues may help learn the meaning of an unknown word by providing a similar word that is more familiar to the reader. Thus, Jenkins & Dixon (1983) concluded that combining morphological analysis and sentence context would help gain more vocabulary growth than either one of them alone. Nagy & Anderson (1984) also hypothesized that readers' ability to combine cues from morphology and context would affect much incidental learning from context. Nassaji's study (2003) provided evidence to support this hypothesis. The results of his introspective and retrospective think-aloud protocols indicated that inference accuracy was related more to morphological knowledge than other knowledge sources, and verifying ("Examining the appropriateness of the inferred meaning by checking it against the wider context") as a strategy that led to the highest success rate of inferencing. Unfortunately, the results of a few other empirical studies did not support this hypothesis (Fischer, 1994; Nagy et al., 1987). I think the possible reason for the inconsistency could be due to limited

experiment designs in these studies. For example, if the text in an experiment is too difficult or the morphology of target words are too salient, the subjects would tend to solely or mostly rely on morphological cues to infer word meaning.

On the contrary, if the morphology of a word goes beyond a reader's capability of analysis, he/she may only rely on contextual cues to infer word meaning. For studies such as Nagy et al. (1987) that focus on children's word learning, it is necessary to consider the nature of children when interpreting the results of the studies. For example, if the concepts conveyed by target words were too hard for children to understand, children would not be able to infer the words' meaning even if the words were transparent. Additionally, certain reader-related factors could also affect the results. For example, Mori (2002) explored JFL (Japanese as a foreign language) learners' ability to integrate information from both contextual cues and word cues. It was found that 55 percent of students could combine word cues and contextual cues and around 45 relied mostly on either word cues or contextual cues when inferring word meaning. The same study also revealed that an individual's belief in the efficiency of combination of cues significantly affected their ability to integrate information from various knowledge sources.

Since it is harder to analyze the morphology of Chinese character compound words, CSL or JSL learners are more likely to combine word cues and contextual cues together when inferring the meaning of unknown words. Mori & Nagy (1999) found that American students studying Japanese as a second language rely on information from both word and context to infer the meanings of unknown Japanese Kanji words (words composed by Chinese characters). Mori (2003) asked JFL learners at the intermediate level to interpret the meanings of compound words under three different conditions, i.e. 1) words-only, 2) sentence context only with target words omitted, and 3) words plus sentence context. The results indicated that American JFL learners gained more information from the combination of morphological cues and contextual cues, and they were more confident in context-based inference than words-in-isolation inference. Additionally, contextual cues provided more syntactic information, while word cues provided more semantic information. Jiang & Fang (2012) conducted a similar experiment among CSL learners and got similar results, i.e., combining contextual cues and word morphology cues provided more information to interpret new words than either contextual cues or word morphology cues only. The types of information provided by contextual cues and word morphology were also similar to Mori's study.

In sum, when readers infer the meanings of unknown words, they try to gain information from various knowledge sources. Among these sources, word-based and context-based sources are the two main types of sources used frequently in incidental learning. Compared with L1 learners, L2 learners rely more on word-based cues and local context-based cues in word inferencing. Finally, the combination of word-based cues and context-based cues provides more information about unknown words than either one of them alone.

Morphological Awareness

Morphological awareness refers to the abilities "to reflect on, analyze, and manipulate the morphemic elements in words" (Carlisle, 2010). It includes two major aspects. One is the ability to decompose a word into morphemes or identify the correct meaning of a polysemous morpheme in different words, which is called receptive morphological awareness. The other is the ability to construct words with morphemes, which is called productive morphological awareness.

Chinese Morphological Awareness

Due to discrepancies among languages, the main content of morphological awareness in each language is different. Let's take English and Chinese as examples. As mentioned previously, since

most words in English are inflectional words or derivational words, the morphological awareness of English in the existing studies mainly refers to the abilities to analyze and manipulate inflectional and derivational morphemes. The relevant studies usually assessed participants' receptive morphology awareness ability by using word segmentation tasks i.e., parsing a word into meaningful units, for example, *unkind = un + kind*. Productive morphology awareness ability is usually measured by changing word stems into appropriate derived or inflected forms to fit sentence context, like *predict → prediction* (Hayashi & Murphy, 2011). In contrast, Chinese language has few inflectional or derivational words, and more than 65 percent of Chinese words are two-morpheme disyllabic compounds (Chen et al, 2009). Therefore, most researchers pay more attention to learners' Chinese morphological awareness on two-morpheme disyllabic compound words. Since it is clear that two-morpheme disyllabic compound words have two meaning units, instead of word segmentation tasks, discriminate morphemes tasks are often used to assess participants' receptive morphology awareness ability. These tasks usually require participants to judge if the common morpheme has the same meaning in several different words (Ku & Anderson, 2003). Furthermore, the morphemes in these compounds are highly productive as they can appear in many other words as well. On

average, one morpheme could be a part of 17 compound words (Chen, et al. 2009). Accordingly, there are many homonyms and homographic morphemes in Chinese and to understand the language, a learner needs to be able to discriminate between them. Finally, besides the relation between two morphemes within a disyllabic compound word, a learner also needs to be able to analyze the internal structure of Chinese characters, since most characters are pictophonetic. Such a character is composed by one semantic radical that suggests the meaning of the character and one phonetic radical that indicates the pronunciation. Semantic radicals play an important role in discriminating among homophone characters (Shu & Anderson, 1997). Hence, some scholars think that morphological awareness in Chinese should include the ability to analyze structure (word structure and internal character structure), and that to discriminate between homo-morphemes and homographic morphemes (Li, et al. 2002). Other scholars argue that the semantic radical and phonetic radical of a pictophonetic character is not the combination of meaning and pronunciation, but the components of a character. A morpheme, however, is the smallest combination of meaning and pronunciation. Therefore, awareness of internal character structure (termed as radical awareness) should not be included in Chinese morphological awareness (Hao & Zhang, 2006).

Morphological Awareness vs. Phonological Awareness

Which is more important, morphological awareness or phonological awareness? Most scholars agree that morphological awareness plays an important role in vocabulary growth and reading (Li, et al., 2009; McBride-Chang, et al., 2003; McBride-Chang, et al., 2008; Nagy & Anderson, 1984; Sternberg, 1987; White, Power & White, 1989， Wysocki & Jenkins, 1987) in either alphabetic languages such as English or non-alphabetic languages such as Chinese (Carlisle, 1995; Carlisle, 2000; Carlisle & Nomanbhoy, 1993; Casalis & Louis-Alexandre, 2000; Deacon, & Kirby, 2004; Dong, et al., 2013; Mahony, Singson, & Mann, 2000; Li, Anderson, Nagy, & Zhang, 2002; Li, et al., 2011; Liu, et al., 2013; Ravid & Bar-On, 2005; Shu & Anderson, 1997; Shu, Anderson, & Zhang, 1995; Wu, Shu, & Liu, 2005). Nagy et al. (2003) stated that morphological awareness might help readers in understanding the nature of the writing system, spelling, reading, writing, decontextualizing languages, and learning oral vocabulary. Wysocki & Jenkins (1987) trained fourth, sixth, and eighth graders with one of two word sets randomly and post-tested them on the words relating morphologically to both sets of training words in weak and strong contexts. The results showed that the meanings of target words that were related to the training words are

more likely to be derived. And the strength of context affected the accuracy of inferring the word meaning. The results suggested that learners' morphological awareness did make a contribution to incidental vocabulary learning. However, as to whether phonological awareness or morphological awareness is more important for reading in alphabetic languages, scholars cannot reach agreement (Carlisle & Nomanbhoy, 1993; Byrne, 1996; Singson, Mahony & Mann, 2000; Deacon & Kirby, 2004).

Most related studies on the Chinese language, however, support the point that morphological awareness makes a greater contribution to reading Chinese compared to phonological awareness (Tong & McBride-Chang, 2010; Tong et al., 2009; Zhang et al., 2012). For example, McBride-Chang et al. (2003) conducted a study on the relationship between morphological awareness and Chinese character recognition among 100 children in kindergarten and another 100 children in Grade 2 in Hong Kong. This study revealed that for Chinese character recognition, morphological awareness is uniquely important. Li et al. (2002) examined the role of metalinguistic awareness in Chinese children's reading and also concluded that morphological awareness is more important in learning how to read Chinese.

Morphological Awareness and L1 or L2 Learning

The development of morphological awareness in children of various language backgrounds shows diverse characteristics. Ku & Anderson (2003) compared the development of morphological awareness in students in second, fourth and sixth grades from Taiwan and the United States. Besides the strong relation between morphological awareness and reading ability, the results also reflected the interesting relationship between morphological awareness and native languages. It was found that Chinese students acquire derivational morphology after compound morphology, which relates to the fact that most Chinese words are compound words. McBride-Chang (2005a) collected data from four different areas: Beijing, Hong Kong, Korea, and the United States, to study the relations among phonological awareness, morphological awareness, vocabulary knowledge, and word recognition. The results proved again that metalinguistic awareness plays a different role in each language. Both phonological awareness and morphological awareness were found to make contributions to second graders' vocabulary knowledge. But in word recognition, phonological awareness seemed more important in English reading, morphological awareness seemed more important in Chinese reading, while both phonological awareness and morphological awareness were critical in Korean reading.

Morphological awareness also influences second language learning in multiple ways. First, learners' morphological awareness in one language can facilitate learning another language. For example, Deacon et al. (2007) conducted a longitudinal study among English-speaking children who were enrolled in a French immersion class from the first grade to the third grade. They found that in the first grade when children just started the program, their English morphological awareness played an important role in both English and French reading and their French morphological awareness was only associated with their French reading. Second, when learners have been exposed to L2 long enough, their L2 morphological awareness would start to influence their L1 reading. Deacon's study revealed the fact that after the subjects had been exposed to French for a period of time, their French awareness became significantly related to both English and French reading (Deacon et al., 2007). This study provided evidence about morphological awareness transfer between two different alphabetical languages. Wang et al. (2006) showed the evidence about morphological awareness transfer between an alphabetical language and a non-alphabetical language. The researchers found that bilingual children's English (L2) morphological awareness of compound structures contributed to their Chinese (L1) character reading and reading comprehension. Another

study by Wang and colleagues took English-Korean bilingual children as subjects. The results again supported that morphological awareness in one language would facilitate word reading in another language (Wang et al., 2009).

There are fewer related studies regarding morphological awareness in the area of learning Chinese as a second language. Most focus on the role of Chinese (L2) morphological awareness in character and word learning. For example, Hao & Zhang (2006) found that Chinese morphological awareness of CSL learners was a unique predictor of Chinese character learning. Guo (2004) distributed an unlearnt word list to non-Japanese/Korean CSL learners at the intermediate level and asked them to write down Pinyin and the possible meaning of each word. The results showed that even if learners know the pronunciation of a word, they might still not know the meaning of the word. In contrast, if they know the correct word meaning, they usually also know the correct pronunciation. Such results confirmed that in the field of learning Chinese as a second language, morphological awareness is more important than phonological awareness in learning Chinese compound words.

In sum, due to its language characteristics, current studies on English morphological awareness are mainly about derivational morphemes, while the studies on Chinese morphological awareness

are mainly about compound morphemes. All studies agree that morphological awareness makes aids reading. But there is an argument about whether phonological awareness or morphological awareness is more important in alphabetic languages. Most studies on Chinese morphological awareness, in contrast, agree that morphological awareness is more important than phonological awareness in Chinese reading. Unfortunately, few studies explore the role of morphological awareness in incidental learning from the context.

Summary and Gaps

In sum, only a few publications have investigated the effect of words' semantic transparency on incidental vocabulary learning. Major studies related to the effect of semantic/morphological transparency on incidental word learning are listed in Table 2.2. The characteristics and gaps in the related fields are identified as follows.

Generally, due to language characteristics, related studies about alphabetical languages mainly explore the role of morphological transparency of derivational and compound words in word learning. Since derivational words have obvious morphological forms and the meanings of the words are closely related to their morphological forms, researchers use the term "morphological transparency" to refer

to both morphological and semantic transparency of target words. In contrast, related studies in Chinese language mainly focus on compound words. The meaning of a compound word is not reflected by their morphological forms, but by the logical and semantic relations between the composing morphemes and the word. Therefore, in studies on Chinese language, researchers often use the term "semantic transparency" to refer the relationship between the meaning of the whole word and that of its components.

Second, the past results in the studies of alphabetical languages about the role of morphological transparency in word learning conflicted with each other. Some studies confirmed the significant effect of morphological transparency, while others rejected it. The possible reason for the mixed results might be that most researchers selected both derivational words whose transparency is reflected in morphology and compound words whose transparency is reflected in semantics in their studies. To overcome this problem, researchers who are interested in word transparency in alphabetical languages may need to consider conducting separate studies on derivational words or compound words alone. In contrast, related studies on Chinese character words showed relatively consistent results, i.e., semantic transparency has a positive effect on word recognition and learning through reading.

The main reason for this phenomenon might be related to the characteristics of Chinese writing system. Unlike most alphabetical languages, Chinese is an ideographic language. Although both morphological awareness and phonological awareness can affect Chinese learning, morphological awareness is more important in Chinese learning while phonological awareness is more crucial in the learning of an alphabetic language (Ku & Anderson, 2001). Furthermore, if it is accepted that Chinese morphological awareness is more critical in learning Chinese as a native language, one would expect that Chinese morphological awareness would also influence CSL learners to some extent. Unfortunately, studies about the role of Chinese morphological awareness in incidental learning for CSL learners are also limited.

Third, previous studies on semantic transparency mainly explored the effect of words' semantic transparency on word recognition or lexical access from the perspective of cognitive linguistics. Subjects were often required to complete lexical decision tasks in which they were shown just single words or single sentences with words at various transparency levels. Although there are a few studies about the role of semantic transparency in L1 readers' incidental vocabulary learning from passage level readings, we do not know how L2 readers

would recognize and learn words at various transparency levels in the passage reading from the literature.

Finally, CSL learners come from all over the world with various L1 backgrounds. Some L1 languages were influenced by the Chinese language in history and used or are using Chinese characters in their writing systems, such as Korean and Japanese languages. Some L1 languages never experienced such influence, such as Western languages including English, French, and Spanish. When CSL learners of different L1 backgrounds read the same Chinese text, their outcome in terms of incidental vocabulary learning might be different due to the influence of L1. However, we could not find many studies that make such comparisons between learners with a Chinese character background in their L1s and those without such a background.

Table 2.2 Previous Studies on the Effects of Words' Semantic /Morphological Transparency on Incidental Vocabulary Learning

Articles	Subjects	Target Words	Evaluation Methods of Semantic Transparency	Word Presentations	Testing Methods	Results
Gan (2008)	CSL adult learners	Compound words	Public approach	In sentence context or no context	Multiple-choice test	1. Significant effects 2. Context facilitated learning opaque words significantly
Guo (2004)	CSL adult learners	Compound words	Expert approach (Researcher)	No context	Write down the meaning of words in L1 or any language that is familiar for the subjects	Significant effects
Jiang & Fang (2012)	CSL adult learners	Compound words	Public approach	In sentence context or no context	Write down the meaning of words in L1 or in	1. Students would gain more information by combining morphological cues

					English	and contextual cues. 2. Students performed better in word inferencing in context only condition than in word only condition. 3. Context provides more syntactic information while morphology provides more semantic information to students.
McCutchen & Logan (2011)	English native speaking children in 5th and 8th grades	Derivational words and unanalyzable words	Expert approach (Researcher)	In sentence context	Multiple-choice test	Significant effects
Mori (2002)	English native speaking	Compound words	Expert approach	In sentence context or no context	Write down the meaning of words in	55% of the students can combine word cues and contextual cues. 45% of

	adults who are learning Japanese as a foreign language				L1	them overrelied on either word cues or contextual cues when inferring the words' meaning.
Mori (2003)	English native speaking adults who are learning Japanese as a foreign language	Compound words	Expert approach	In sentence context or no context	Write down the meaning of words in L1	1. Combination of morphological cues and context cues provided more information 2. Students are more confident in their context-based inference than words-in-isolation inference. 3. Contextual cues provided more syntactic information while word cues provided more semantic cues.
Mori & Nagy (1999)	English native speaking	Compound words	Expert approach	In sentence context or no context	Multiple-choice test	Students are more likely to combine both word cues and contextual cues in word

	adults who are learning Japanese as a foreign language					meaning inferencing when both kinds of cues are available.
Nagy, Anderson & Herman (1987)	English native speaking children in 3rd, 5th, and 7th grades	Derivational words, compound words, and unanalyzable words	Expert approach (Researcher)	In passage-level context	Multiple-choice test	No significant effects
Shu, Anderson & Zhang (1995)	English native speaking children (US) in 3rd and 5th grades Chinese native speaking children (China) in	Derivational words, compound words, and unanalyzable words Compound words and single-character words	Learner Approach	In passage-level context	Multiple-choice test	No significant effects on American students Significant effects on Chinese 5th graders

	3rd and 5th grades					
Shu, Zhang & Anderson (1993)	Chinese native speaking children in 3rd and 5th grades	Compound words	Learner Approach	In passage-level context	Multiple-choice test	Significant effects on fifth graders' word learning
Xu & Li (2001)	Chinese native speaking children in 2nd, 4th, and 6th grades	Compound words	Public Approach	No context	Multiple-choice test	1. Significant effects 2. Transparent unknown words made great contribution to comprehending passage-level texts
Zhang & Zeng (2010)	CSL adult learners	Compound words	Public Approach	In sentence context or no context	Multiple-choice test	1. Significant effects 2. Significant interaction between semantic transparency and context

CHAPTER THREE

METHODOLOGY

The present study investigated the role of semantic transparency of Chinese disyllabic compound words in CSL learners' incidental vocabulary learning through passage-level reading. The researcher used both quantitative and qualitative methods to collect and analyze data. The study mainly relied on quantitative data to answer the research questions, while qualitative data provided more information for better understanding of the quantitative data. This chapter presents the methodology applied to conduct the study. This chapter has two sections, the first introduces the pilot study, including the methodology and the problems found in the pilot study. The second section presents the methodology applied in the main study.

Pilot Study

Overview

The main purpose of the pilot study was to evaluate the design of the questionnaire, interview guidelines, and all steps of the entire procedure. The findings of the pilot study helped the researcher estimate the time for completing the questionnaire and interviews, detect potential problems in

the design, revise the questionnaire to prevent misunderstanding, and check if the difficulty level of the reading materials were appropriate for most participants. The pilot study had three phases. In Phase 1, the participants took a pretest of the words, a Chinese morphological awareness test, and provided their background information. In Phase 2, they read passages with target words embedded and inferred the meanings of the words. In Phase 3, eight learners who participated in the first two phases of the pilot study were interviewed with the researcher noting their lexical inferencing and use of inference strategy.

Participants and Settings in the Pilot Study

Participants of Phases 1 & 2

The pilot study was conducted in November 2013 in one of the universities that also later participated in the main study. However, all students who participated in the pilot study did not take part in the main study. A total of 42 CSL learners enrolled in intermediate-level Chinese classes were recruited, but only 22 students finished the first two phrases of the pilot study. These 22 students were 19 to 31 years old. There were a total of 14 males and 8 females. Most had a high school diploma and a bachelor's degree, and two had a master's degree. Half had majored in the disciplines of Chinese language, Chinese literature, or Chinese language and literature. Among all participants, six came from Japan, six from

South Korea, and one from each of the following countries: Australia, France, Germany, Indonesia, Italy, Kazakhstan, and United Kingdom. Therefore, there were 12 participants with a Chinese character background and 10 without in their L1s.

Participants of Phase 3

All 22 students agreed to attend the third phase of the study. Finally, 8 out of 22 students were selected to participate in individual face-to-face interviews with the researcher, on the basis of their nationalities and their responses to the questionnaires in Phases 1 & 2. Four out of eight students had a Chinese character background in their L1s and four did not have such a background. Four had high Chinese morphological awareness and four others had low Chinese morphological awareness. There were four males and four females.

Development of Experimental Materials for the Pilot Study

The pilot study combined the following two protocols to select target words and develop reading materials.

Protocol 1

The main steps of Protocol 1 were similar to those of Protocol 1 in the main study, which was described in detail in the section of main study in

this chapter. The main differences in Protocol 1 between the pilot and the main study were:

1) Only one language instructor and one advanced CSL learner were invited to screen candidate words, and no common Japanese/Korean native speakers participated in Step 3 of the pilot study.
2) In Step 4 of the pilot study, only one language instructor was invited to check if the difficulty level of the reading materials was appropriate. No other Chinese native speakers helped the researcher check if the reading materials looked natural to native speakers.

Protocol 2

The main steps of Protocol 2 were similar to those of Protocol 2 in the main study, which was described in detail in the section of main study in this chapter. The main differences in Protocol 2 between the pilot and the main study were:

1) Only one language instructor and one advanced CSL learner were invited to screen candidate words, and no common Japanese/Korean native speakers participated in Step 2 of the pilot study.
2) In Step 4 of the pilot study, only one language instructor was invited to check if the difficulty level of the reading materials was appropriate. No other Chinese native speakers helped the researcher check if the reading materials looked natural to native speakers.

Additionally, different from the two versions of reading materials in the main study, which had both sentence-level and passage-level readings, the two versions of reading materials developed in the pilot study were both passage-level readings, one with strong contextual support to the target words and the other with weak contextual support. Each passage had three to eight sentences according to their syntactic structure and about 20 to 160 characters.

Instruments in the pilot study

Pretest-The pretest was designed to check if the participants had prior knowledge about the meanings of the target words. In the pretest, the participants were presented with three choices for each word including A) I do not know the meaning of this word; B) I probably know the meaning of this word, and I guess its meaning is_____; and C) I know this word, and its meaning is_____. The participants were required to write down the meanings of the words provided without any context in any one of the following languages, including Chinese, English, Korean, Japanese, Russian, French, German or Spanish, whichever they felt most comfortable.

Morphological Awareness Test – The test had two parts. The first part had ten pairs of words. Each pair of words had one common composing

morpheme underlined. The participants were required to compare the meanings of the underlined morphemes between two words in each pair and decide if their meanings were identical or not. The second part of the test asked the participants to create as many Chinese words as they could with each given character.

Background Questionnaire – Participants were asked to provide information about their age, gender, nationality, education level, native language, period of time that they had studied Chinese, and contact information.

Reading Materials for the Weak Context Group – The reading materials included several passages. Each passage included three to eight sentences in which one or a few target words were embedded.

Reading Materials for the Strong Context Group – The researcher added extra contextual cues to the passages in the reading materials for the weak context group, which were designed to facilitate comprehension of the unknown words. The main methods to enhance the strength of contextual support included: 1) providing examples; 2) providing details; 3) describing situations; 4) adding simple synonyms or antonyms; 5) providing possible reasons or results; or 6) adding conjunctions to clarify

the relations between sentences. On the other hand, to enlarge the difference in the strength of contextual support between the weak context group and the strong context group, the following actions were also taken to reduce the strength of contextual support in the weak context reading, which included 1) reducing examples; 2) cutting details; 3) reducing description; 4) reducing simple synonyms or antonyms; 5) reducing possible reasons or results; or 6) reducing the conjunctions for clarifying relations between sentences. Finally, to balance the lengths of the reading passages, the researcher deleted unrelated or unimportant words or sentences in the materials for the strong context group.

Posttest on Target Words – After reading each passage, participants were required to infer and write down the meanings of the underlined and bolded target words in the passage in any one of the following languages, including Chinese, English, Korean, Japanese, Russian, French, German, or Spanish, whichever they felt most comfortable. Then the participants completed a multiple-choice test on their inference strategies for the same target word. They could select multiple choices from the following potential strategies, i.e., A) from the context of the sentences; B) from the characters in the word; C) my native language has the same word; D) I just guess; and E) Others _____.

Interview Guideline – During the interviews, participants were asked to go over the reading materials they had read and tell the researcher how they could infer the meanings of the target words, and what cues from the contexts or words helped them.

Target Words

A total of 21 Chinese mainland research students of various majors studying at the Hong Kong Polytechnic University graded in five-point Likert Scale the semantic transparency of candidate words selected in the pilot study. On average, words graded below or equal to 2.3 were counted as opaque words, words graded above 2.3 and below or equal to 3.6 were counted as semi-transparent words, and words above 3.6 and below or equal to 5 were transparent words.

An advanced CSL learner was invited to review the list of target words to check if she knew any words in the list. Any words she knew were removed from the list. The participants' instructor also reviewed the list. The words confirmed by the instructor that have been learnt by most participants were removed from the list. Then the researcher distributed the pretest to the participants. If more than 50 percent of the participants wrote down the correct meaning of a word, that word would also be deleted from the list. Eleven target words were retained for the pilot study,

including four transparent words, three semi-transparent words, and four opaque words.

Procedure

Initially, the researcher distributed to all participants the pretest, morphological awareness test, and background questionnaire. One week later, the researcher distributed the appropriate reading materials together with the posttest to the two groups of participants. The weak context group read materials with weak contextual support while the strong context group read those with strong contextual support. At the end, the researcher interviewed individually a subset of participants from each group.

Problems in the Pilot Study and Corrections in the Main Study

There were multiple problems identified in the pilot study, which were addressed in the main study accordingly as described below.

1) There was no gap in terms of semantic transparency score between word types with different transparency. As a result, some target words used in the pilot study were not typical words in the related group. Therefore, when selecting target words for the main study, the researcher set up a 0.5-point gap between transparent and semi-transparent words, and also between semi-transparent and opaque

words, so that the difference in semantic transparency between the target words of different types was enlarged. Consequently, the final target words would be able to represent their respective groups better.

2) Since no common Japanese/Korean native speakers reviewed the target word list in the pilot study, there were a few isomorph synonyms in the Chinese and Japanese languages or in the Chinese and Korean languages that were included in the list of the target words in the pilot study. Consequently, most Japanese or Korean learners indicated that they had known these words in the pilot study. To solve this problem, the researcher invited Japanese/Korean native speakers to screen the word list and removed the words they knew from the list in the main study.
3) The reading materials were not reviewed by other Chinese native speakers except the researcher. To ensure the reading materials looked more natural to native speakers, four Chinese native speakers at a range of education levels (one with a high school diploma, one with a bachelor's degree, one with a master's degree, and one with a PhD degree) were invited to review and revise the reading materials in the main study.
4) The pilot study compared two versions of passage-level reading. Although the strength of contextual support to the target words between these two versions were different (weak vs. strong), the

difference in context strength between the two versions was still not significant. Therefore, the researcher changed the design of comparison between the weak passage context and the strong passage context to the design of comparison between sentence context and passage context in the main study.

5) The pilot study had three phases. There was one-week break between the first two phases that were designed to collect quantitative data from the participants. Because of this time gap, only 22 out of 42 learners completed the first two phases of the study. To solve this problem, the researcher divided the main study into two phases instead of three to achieve a higher response rate in the main study.
6) In the pilot study, the participants were divided into two groups: one group reading the materials with weak contextual support to the target words and the other reading those with strong contextual support. This design can be easily challenged since the participants' background in language abilities, previous knowledge and personal experience could be different for the two groups that may artificially induce variation. Accordingly, the researcher improved the research design by requiring the same group of participants to read two versions of reading materials (sentence vs. passage context) in the main study so that the variables related to the participants were controlled.
7) One of the choices about use of lexical strategy in the pilot study, "my

native language has the same word", may mislead participants to think about the word in their L1s expressing the same concept as the target word. Actually, the researcher designed this choice to explore the influence from languages that used or use Chinese characters in their writing systems. Therefore, the researcher revised this choice into "my native language has the same or similar Chinese character word" to prevent misunderstanding.

8) The second part of the morphological awareness test in the pilot study asked the participants to create as many Chinese words as they could with the given Chinese character. This requirement prolonged the test time and probably induced undesired results since students who were willing to spend more time in this part might gain higher scores. Therefore, the researcher changed the requirement to "creating four words at most with each given character" in the main study.

Main Study

Overview

This study had two phases and one supplementary study. In Phase 1, quantitative data were collected from participants through a written questionnaire, which included a lexical inference test, a survey on lexical inference strategy use, a morphological awareness test, and demographic questions. Full knowledge of a word includes its pronunciation, spelling,

semantics, collocation, and pragmatics. It is impossible for a person to acquire the deep vocabulary knowledge of a word from reading if a reader encounters the word a few times. For this reason, if a participant could infer the correct meaning of an unknown word from the written context, he/she would be considered as having successfully learnt about the word. In Phase 2, qualitative data were collected from the randomly selected participants through face-to-face follow-up interviews focusing on the lexical inferencing strategy used. In the supplementary study, half of the participants of Phase 2 were asked to describe their previous and current Chinese instructors' teaching methods when encountering unknown words incidentally in class. The participants' current Chinese instructors were also asked to describe their teaching methods for words outside the syllabus encountered in class.

Participants and Settings

A total of 105 CSL learners were recruited in Phase 1 of this study, and at the end there were 90 valid questionnaires to be analyzed. From these 90 participants, 29 learners were selected to take part in Phase 2 of the study. 15 learners out of those who participated in both phases of the study and six of their Chinese instructors joined the supplementary study. The participants came from six classes at the intermediate level at three universities in China, two classes from each university. A total of 49

participants were from Japan or South Korea with Chinese character background in their L1s, and 41 of them were from other countries without a Chinese character background in their L1s.

The three universities, J University, S University, and W University, are all located in a metropolitan city in the northwestern part of China. All three are public universities with government permission to admit international students. These three universities were selected mainly because of their prestige and large numbers of enrolled international students. The more important factor is that their CSL programs are similar to each other, including curriculum, textbooks, and graduation requirements. Therefore, the researcher expects that the levels in Chinese are similar for most students in the three universities.

Participants of Phase 1

All 90 participants of Phase 1 agreed to participate in the study. They were all adult learners at or above 18 years of age and taking Chinese courses at intermediate level at Chinese universities. Before enrolling in their current classes, all learners had to gain their instructors' recommendation and take the exams offered by the universities to identify their Chinese proficiency level. There were a total of 36 males and 54 females. Most had a high school diploma or bachelor's degree. Two participants had a master's degree and three participants had other degrees.

Half had majored in disciplines related to Chinese language and literature, including Chinese language, Chinese literature, or both. Among all participants, 37 students came from South Korea, 12 from Japan, and 41 from other countries, including Austria, Belgium, Czech, France, Georgia, Germany, Israel, Italy, Kazakhstan, Kyrgyzstan, Lithuania, Mongolia, Russia, Turkey, United Kingdom, and Uzbekistan. This means that there were 49 participants with a Chinese character background and 41 without such a background in their L1s. All of them had taken Chinese courses for at least 800 hours and have learned around 2700 Chinese words. Their Chinese language instructors considered them to be at the intermediate level in terms of Chinese proficiency. CSL learners at the intermediate level were targeted as the subjects in this study mainly because learners at this level have developed Chinese morphological awareness to some degree (Hao & Zhang, 2006; Zhang, 2006) and they have gained necessary word and grammatical knowledge so that they were able to comprehend passage-level readings in this study.

Participants of Phase 2

A total of 29 students were selected from all 90 students who participated in the first phase of the study to take part in Phase 2 of the study. The following criteria were used to select participants for Phase 2:

1) Roughly one fourth to one third of students out of the 90 participants need to be interviewed.
2) Half of the interviewees should have a Chinese character background in their L1s and the other half should have no such a background.
3) Half should obtain high scores [2] in the morphology awareness test that was included in the written questionnaire in Phase 1. The other half should obtain low scores from the test.
4) The interviewees should be selected from all three universities involved.

Besides the above criteria, all interviewees should also meet the following two conditions:

1) They agreed to participate in Phase 2 of the study.
2) They completed the questionnaire distributed in Phase 1 and their answers to the questionnaire were valid.

The researcher interviewed these participants individually. The average interview time was 25 minutes. When a participant was not able to attend the scheduled interview, the researcher would contact the next candidate with similar characteristics in terms of selection criteria.

At the end, there were 15 participants with a Chinese character background in their L1s, and 14 without such a background. Among the participants with a Chinese character background in their L1s, nine obtained high scores in the Chinese morphological awareness test, and six

obtained low scores. Among those who without such a background, eight had obtained high scores in the morphological awareness test, and six obtained low scores. Considering that there were 38 students from J University, 23 from S University, and 29 from W University in Phase 1, the researcher interviewed 15 participants from J University, seven from S University, and seven from W University.

Participants of the Supplementary Study

A total of 15 students out of the 29 interviewees in Phase 2 were asked to describe their previous and current Chinese instructors' teaching methods when encountering unknown words in class. Among these 15 students, eight had a Chinese background in their L1s, and seven did not have such a background. In terms of the morphology awareness test, seven obtained high scores, and eight obtained low scores. A total of seven were from J University, seven from W University, and one from S University. There were 6 male students and 9 female students.

Six Chinese instructors who were teaching the participants in this study also participated in the supplementary study, introducing their own teaching methods when encountering unknown words in class. Two were from J University, two from S University, and two from W University. All had over 10 years teaching experience in the area of teaching Chinese as a second language.

Development of Experimental Materials

This study combined the following two protocols to select target words and develop reading materials.

Protocol 1 (Figure 3.1):

Step 1: Select reading materials

The researcher selected reading materials at the appropriate difficulty level (intermediate level) from CSL textbooks, exercise books, and reading materials designed for Hanyu Shuiping Kaoshi (HSK- Chinese Proficiency Test). The selection criteria were: (1) all reading materials should be related to common topics and concepts that could be easily understood by any person who had finished formal education from Grade 1 to Grade 9; (2) all reading materials should be at the appropriate language level so that most participants would understand the main points.

Step 2: Select words from selected reading materials

The researcher selected target words with different transparency levels (i.e., transparent words, semitransparent words, and opaque words) from the reading materials with reference to the definitions provided by the *Dictionary of Contemporary Chinese (the 6th Edition).*

Step 3: Screen words

• *By The Syllabus of the Graded Vocabulary for the HSK*

The goal in this step was to select words that would be unknown for most participants, since they were expected to infer the meaning of unknown words through reading. Because most CSL learners in China should have learnt A-level words and some B-level words in *The Syllabus of the Graded Vocabulary for HSK (The Syllabus)*, the words that were identified as A-level or B-level words in *The Syllabus* were removed from the candidate list. Because the goal of this study was to investigate the role of word semantic transparency in lexical inferencing, a participant needs to be able to recognize the composing characters of the unknown words, since for a learner a transparent word with unknown composing characters would be an opaque word. In order to guarantee most composing characters of the target words were recognized by most participates, words that were composed of C-level or D-level characters according to *The Syllabus* were also removed from the list.

• *By Chinese native speakers*

A total of 20 undergraduates or graduate students at the Hong Kong Polytechnic University were invited to grade the semantic transparency of words selected in the previous step. All of them are Chinese native speakers who grew up in mainland China. Since most Chinese words

have multiple meanings, these words were highlighted and embedded into single sentences for the native speakers to grade. The meanings of the words in these sentences are as same as those in the questionnaire for the main study. After reading the sentences, the graders evaluated the semantic transparency of the highlighted words using a 5-point Likert Scale, in which 1 point meant "completely opaque" and 5 meant "completely transparent". The mean scores provided by all 20 graders were used as the final score of semantic transparency for each word. Since word semantic transparency is a kind of continuum, there are always words that even linguistics experts feel hard to categorize in term of semantic transparency. To make sure that each selected word is a true representation of the corresponding category, the researcher set up the score ranges to group the words. The words with scores from 4 to 5 were counted as transparent words, those with scores from 2.5 to 3.5 were semi-transparent words, and those with scores from 1 to 2 were opaque words. There was a 0.5-point gap between neighboring ranges and the words with scores in the gaps were deleted from the list, so that the selected words were clearly and consistently defined in terms of semantic transparency among graders.

- *By language instructors*

The researcher checked with the language instructors of the participants whether their students had learnt the selected words and

whether they were familiar with the composing characters of these words. Six instructors from three universities (two from each university) participated in this step. Any words identified by the instructors as known to most of their students were removed from the list. The words with composing characters unfamiliar to participants identified by the instructors were also removed from the list.

• *By advanced CSL learners*

The researcher also invited two advanced CSL learners, one from Germany and the other from South Korea, to check if there were any words that they had known. The rationale behind this measure was that if advanced CSL learners did not know these words, most intermediate CSL learners would not know them either. Any words known by the advanced learners were also taken away from the list.

• *By common Japanese/Korean native speakers*

There are a large number of Japanese words and Korean words that were borrowed from the Chinese language. In order to eliminate the influence of L1 with a Chinese character background, one Japanese native speaker with a master's degree and two Korean native speakers, one with a PhD degree and the other with a bachelor's degree, were invited to screen the candidate words. The Japanese native speaker had never taken any class to learn the Chinese language. The Korean native speakers just took a short-term class learning some Chinese characters when they were

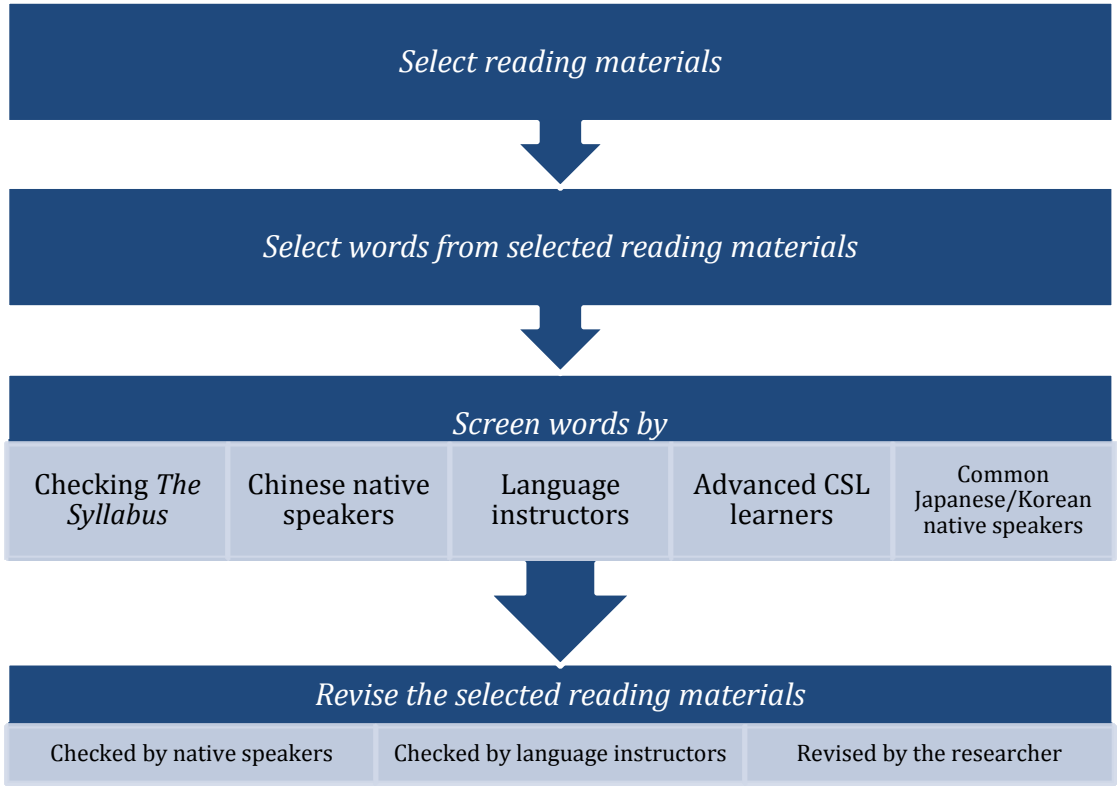
in middle school. Considering that most Korean people take similar classes in middle school since it is part of the national curriculum for middle school students, these two Korean native speakers were identified as representing common Korean people who had never studied Chinese as a second or foreign language. Words identified as known by them were removed from the list as well. At the end, the final target words were selected according to the combination of information provided by the researcher, the dictionary, *The Syllabus*, Chinese native speakers, language instructors, advance CSL learners, and common Japanese/Korean native speakers.

Step 4: Revise the selected reading materials

The researcher revised the selected reading materials with the target words embedded in two different versions, one for single-sentence level reading and the other for passage-level reading. To ensure that the reading materials sounded natural to native speakers, four Chinese native speakers at different education levels, one with a high school diploma, one with a bachelor's degree, one with a master's degree, and one with a PhD degree, were invited to read the sentences and passages and identify any part that sounds unnatural based on their own knowledge. The researcher then revised the unnatural parts till all native speakers found them acceptable. Then the six instructors from the three universities were

invited to check if the difficulty level of the reading materials was appropriate. Reading materials identified as too easy or too difficult for most of their students by the instructors were removed.

Figure 3.1 Protocol 1 for Developing Experimental Materials



Protocol 2 (Figure 3.2):

Step 1: Select words

With reference to *The Dictionary of Contemporary Chinese (the 6th Edition)*, the researcher selected three groups of disyllabic compound words, i.e., transparent words, semitransparent words and opaque words from CSL textbooks, exercise books, and reading materials for HSK at the advanced level, from which it is very likely to find appropriate unknown words for the intermediate-level participants in this study.

Step 2: Screen words

With reference to *The Syllabus*, the researcher removed any selected words at A or B level from the list. Then the researcher invited the 20 Chinese native speakers to grade the semantic transparency of the selected words. After that, the researcher checked with the six language instructors of the participants whether most of their students had learnt these words and whether students were familiar with the composing characters or not. Similar to Protocol 1, the same advanced CSL learners (one from Germany and the other from South Korea), the same Japanese native speaker, and the same two Korean native speakers were also invited to check if there were any word in the list that they had already known. Words identified as known by the instructors, advance learners or common Japanese/Korean native speakers were removed from the word

list. The words with composing characters unfamiliar to most participants as identified by the instructors were also removed from the list. At the end of this process, the final target words were selected according to the combination of information provided by the researcher, the dictionary, *The Syllabus*, the Chinese native speakers, the language instructors, the advanced learners, and the common Japanese/Korean native speakers.

Step 3: Develop reading materials

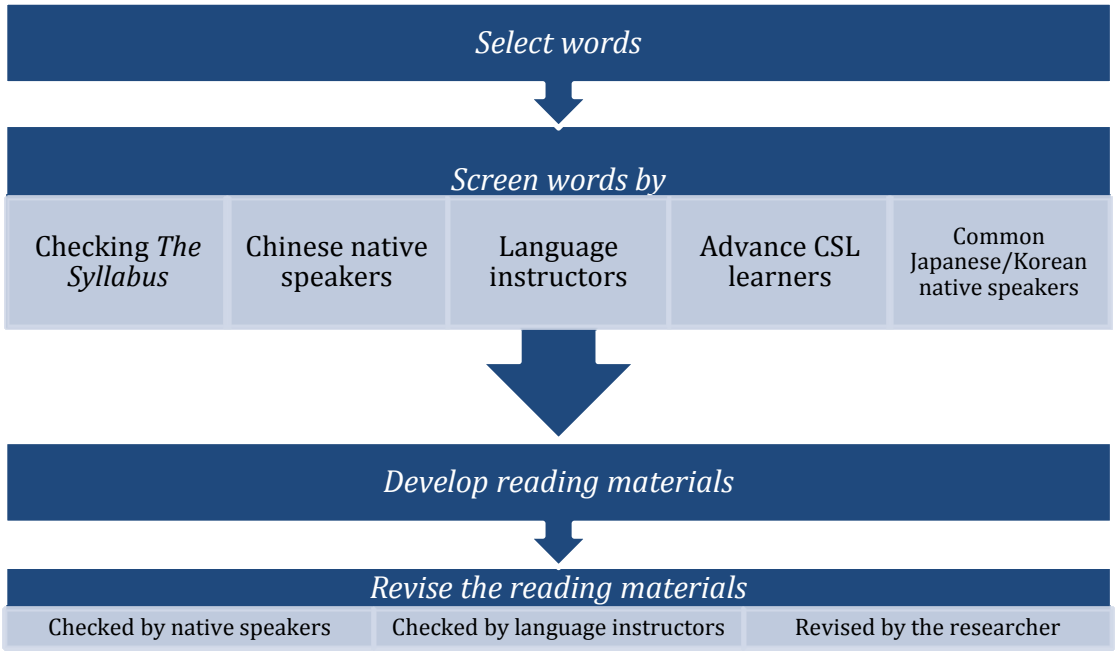
The researcher developed reading materials with the target words in two different versions, one for single-sentence level reading and the other for passage-level reading.

Step 4: Revise the reading materials

The reading materials in Protocol 2 were mainly developed by the researcher. To make sure that these sentences and passages sounded natural to Chinese native speakers, the same four Chinese native speakers who checked the reading materials in Protocol 1 were also invited to check the reading materials developed in Protocol 2. The researcher revised the unnatural parts according to their feedback and asked them to check the readings again until all native speakers thought that the readings were completely natural to them. Then the researcher invited the language instructors of the participants to check if the difficulty level of the reading

materials was appropriate. Those reading materials identified as too easy or too difficult for most students by the instructors were removed.

Figure 3.2 Protocol 2 for Developing Experimental Materials



In sum, in order to select appropriate target words, this study combined three different approaches mentioned in the previous part, i.e., the dictionary approach, expert approach, and public approach, when evaluating the semantic transparency of the target words [3]. The researcher also applied multiple screening steps to ensure that the composing characters of the target words were known but the target words themselves were unknown to most participants. Finally, various parties, including native speakers, language instructors, and the researcher, were involved in revising the reading materials to ensure that the reading materials were natural and with the appropriate level of difficulty.

Word Variables Control

After completing all the previous steps, a total of 17 target words were selected, including six transparent words, six semi-transparent words, and five opaque words. As mentioned above, the words with transparency scores from 4 to 5 were counted as transparent words, the words with scores from 2.5 to 3.5 were counted as semi-transparent words, and the words with scores from 1 to 2 were opaque words. These words were disyllabic compound words without any prefix and suffix. For clarity in the study, a Chinese disyllabic compound word is defined as a language unit composed by two compound one-character morphemes with different syllables. All were content words and there were no reduplicated words

(叠词) in the list. The composing characters of these words were either A or B level characters in *The Syllabus of the Graded Vocabulary for HSK* to guarantee that most participants had already learnt these characters. All concepts conveyed by the target words were common concepts in everyday life. Since all participants were exposed to the same set of target words, most word variables like word length, conceptual difficulty, part of speech, exposure frequency, and word concreteness were set equal for all participants. Every participant was exposed to the target words twice, one in the sentence-level reading and the other in the passage-level reading. All target words were embedded in text, underlined and bolded, so that the participants would not ignore them when reading.

Table 3.1 Target Words in the Main Study

Word	SST	CC Level	Word Level	Part of Speech
认同	4.25	AA	Not in *The Syllabus*	v
设想	4.3	AA	C	v
丢弃	5	AB	Not in *The Syllabus*	v
喜讯	4.7	AB	D	n
败坏	4.45	BA	D	v
补救	4.7	BB	D	v

正经	2.6	AA	C	adj.
自如	2.95	AA	Not in *The Syllabus*	adj.
划算	2.7	AA	Not in *The Syllabus*	v
周折	2.63	AB	D	n
知趣	2.95	AB	Not in *The Syllabus*	v
谈吐	2.95	AB	Not in *The Syllabus*	n
墨水	1.65	BA	Not in *The Syllabus*	n
名堂	1.65	AA	Not in *The Syllabus*	n
抱负	1.95	AA	D	n
从容	1.75	AA	C	adj.
检点	1.95	AA	Not in *The Syllabus*	v

Note: SST= Score of semantic transparency

CC Level=Composing characters level in The Syllabus

Word Level=Word level in The Syllabus

Context Variables Control

The passage context used in the study could not be too short or it would be similar to a sentence context in text length. Almost all the previous related studies on L2 presented target words in isolation or in a

sentence context. This type of context does not reflect the real situation, since few readers only read a single sentence in normal reading. We would not know how L2 learners acquire a word in normal reading if we just investigate readers' incidental word learning in a sentence context. On the other hand, texts for reading should not be too long for CSL learners at the intermediate level who were subjects in the study, since long context might induce cognitive overload that may prohibit them from learning new words. Considering these factors, the researcher developed reading materials in the form of short passages. Each passage had three to eight sentences based on their syntactic structure with about 20 to 160 characters. The researcher also developed the corresponding sentence contexts so that the incidental vocabulary learning through the two types of contexts (sentence and passage contexts) could be fairly compared in the study.

• *Context variables control between groups of the participants*

All contexts were about common topics in daily lives. The participants were expected to have enough knowledge on these topics. And all participants read the same reading materials including both the single-sentence level and passage-level readings.

• *Context variables control between the sentence-level readings and passage-level readings*

One of the goals in this study is to explore effects of the strength of contextual support in reading on CSL learners' incidental vocabulary learning by comparing sentence-level reading with passage-level reading. Because the main differences between these two types of reading are context length and the strength of contextual support for the target words, other context variables should be controlled.

The fact is that all the sentence-level readings are parts of the passage-level readings. This means that every passage included one or two sentences from the sentence-level readings. Therefore, the main points and the context genre of the two types of reading are the same. As mentioned above, the word exposure frequency was controlled to be identical for the same word in the two types of reading. All participants met the target words twice through reading: one in the sentence-level reading and the other in the passage-level reading. So the variable of context frequency for the two types of reading was also equal.

Obviously, the length and the strength of the context are different between the two types of reading. To avoid the negative effects of overloading on word learning, the researcher controlled the length of the passages in the study to be under 200 characters per passage-level reading which is similar to the length of reading comprehension of HSK for

intermediate-level learners [4]. Compared with the sentence-level reading, the passage-level reading provided extra contextual cues to all target words. All these contextual cues were positive ones that were helpful to learners to infer the meaning of target words. Due to the variable context length and strength of context, some contextual variables, such as context position and context difficulty, might be different in the two types of readings, but the differences were minimized. All extra contextual cues in the passage-level reading were near contextual ones, i.e., either in the same sentence as the target words or in the sentence immediately preceding or following it. There were no grammar structures in the passages that were more complicated than those in the sentences.

• *Context variables control between different types of target words*

In the sentence-level reading, each sentence had one target word embedded. In the passage-level reading, some passages only had one target word embedded while others had two target words embedded.

Instruments

This study applied a written questionnaire and semi-structured interviews as the main investigative techniques. Besides appropriateness for the research purpose, these two methods were chosen because of their reliability, validity, and feasibility. First, a written questionnaire was

chosen since the study needed to collect data from a large number of students to obtain convincing results. It is also relatively easy to elicit and statistically analyze the data from an organized questionnaire (Cohen, 1998). However, the responses to a questionnaire are usually simple and limited by the topics listed in the questionnaire (Cohen, 1998). If only relying on data from a questionnaire, it is hard to obtain a whole picture of the situation. Therefore, the researcher applied follow-up interviews as a supplementary method to overcome the drawbacks of using a written questionnaire alone.

Conducting semi-structured interviews is helpful to getting detailed and accurate information from participants. Besides questions listed in the interview guide, the researcher could ask further questions based on interviewees' feedback and gain deep information through interaction with interviewees. However, the number of participants for semi-structured interviews is often limited. The representation of results based on semi-structured interviews can be easily challenged. Therefore, the combination of these two complimentary methods, i.e., a written questionnaire and semi-structured interviews, would make good use of each of their advantages and minimize each's disadvantages.

Questionnaire

A written questionnaire with three parts was used to investigate

students' incidental vocabulary learning through reading, strategies used when inferring the meanings of target words, morphological awareness, and background information. The questionnaire was written in both Chinese and English to ensure most participants could understand all questions.

- *Part 1 Section 1- Sentence-level reading*

This section included 17 single sentences. Each sentence had one target word embedded that was underlined and bolded. The participants were asked to read the sentences and wrote down the meanings of the target words in any of the following languages they felt most comfortable, which included English, Korean, Japanese, Russian, French, German, Spanish, Italian, Vietnamese, Thai, Malay, Indonesian, Mongolian, Turkish, or Chinese. These language choices were selected mainly according to the demographic information of the participant pool and the researcher's accessibility to relevant translators so that all participants could use their native languages or one of official languages in their countries to answer the questions to ensure the accuracy of answers. Chinese was provided as one of choices because the researcher found from the pilot study that some students felt more comfortable explaining Chinese words in Chinese. Therefore, although Chinese was neither native nor official language for all participants, it was still listed as a

choice to encourage the participants to answer questions. The researcher asked the participants to write down the meanings of the target words instead of giving them multiple choices, mainly because the former method is more sensitive in testing small gains in word learning compared with the latter method. Those given choices could either enhance the subject's performance by providing helpful hints, or artificially bring down the performance by providing misleading hints. After writing down the meaning of a target word, the students needed to do a multiple-choice test on their inference strategies for the same target word. They could select multiple choices from the following potential strategies, i.e. ,A) from the context of the sentence or passage; B) from the characters in the word; C) my native language has the same or similar Chinese character word; D) I just guess; and E) Others_____(Please specify). Since the strength of contextual support and word semantic transparency were the two main variables in this study, the researcher listed these two as the first two choices. Considering half of the participants were from Japan or South Korea where Chinese characters are used in ancient or modern times, the researcher listed this to explore the effect of the participants' L1s on performance. Since the selected words were unknown for most participants, the researcher could foresee that some participants could not be able to infer the meanings of some words even after combining contextual cues, word cues, and/or knowledge from their L1s. That was

the main reason why Choice D was included in the list. Although word characteristics and contextual cues are the two main strategies people use to infer the word meaning, there are still many knowledge sources that could help them guess (Wesche, 1999; Bengeleil & Paribakht, 2004). Therefore, the researcher put an open-ended choice as "others", so that the participants would not be limited by the choices provided in the questionnaire.

- *Part 1 Section 2 - Passage-level reading*

The second section of Part 1 was passage-level reading. There were a total of 12 passages in this section. The length of each passage was approximately 20 to 160 characters and each consisted of three or more sentences. Note that the sentence here was not defined by punctuation but by its syntactic structure. If a set of words grouped together became meaningful with a complete sentence-level syntactic structure, it would be defined as a sentence in this study. Some passages had one target word embedded and others had two. The 17 target words were exactly the same as those in the first section. Compared with the sentence-level readings, the passage-level readings had more extra contextual cues, which was designed to facilitate the comprehension of unknown words. The main methods to enhance the strength of contextual support were the same as those in the pilot study. The second section also had multiple-choice

items to elicit information on students' lexical inferencing strategy use.

• *Part 2-Morphological Awareness Test*

The third part of the written questionnaire was the test to check the Chinese morphological awareness of the participants. The test had two parts. There were 10 pairs of words in the first part. Each pair of words had one common composing morpheme underlined. The participants needed to compare the meanings of the underlined morphemes between two words in each pair and decide if their meanings were identical or not. All words in this part were selected from A-level words listed in *The Syllabus of the Graded Vocabulary for HSK*. This part was designed to test the participants' receptive knowledge of Chinese morphemes and homographic awareness. The second part of the test required students to create Chinese words using the given morphemes in order to test the learners' productive knowledge in Chinese morphemes. Due to the limited testing time, they only needed to create four words with each morpheme. All provided morphemes in this part were randomly selected from the list of A- and B-level morphemes of strong word-forming ability in *The Syllabus of the Graded Vocabulary for HSK*. This list was created by Sun (2011).

• *Part 3-Background information*

The third part of the questionnaire was designed to collect participants' background information, including age, gender, nationality, education level, native language, and period of time that the student had studied Chinese as well as their contact information.

Interview Guidelines

A total of 29 students who returned a valid questionnaire were invited to participate in individual face-to-face semi-structured interviews with the researcher. The purposes of the interviews were to: (1) seek detailed information about students' lexical inferencing strategy use, and what exact cues from context or words in the texts helped them infer the meanings of target words; (2) seek the information on students' feedback about the questionnaire; and (3) clarify any ambiguities on their responses to the questionnaire. The interviews were conducted in either Chinese or English depending on the preference of the interviewees. During the interviews, the students were first asked if they could understand the main points of the reading materials and which level of reading, sentence-level or passage-level reading provided more assistance for them to infer the word meaning. Then they were required to go over the first part of the written questionnaire and tell the researcher how they could infer the meaning of the target words and what cues from the contexts or words helped them. Although every interviewee was asked all questions listed in

the interview guidelines, each interview was still individualized due to the various responses to either the questionnaire or the questions asked in the interviews. The researcher asked a few new questions to some students since they provided some unexpected information in their interviews. The researcher also asked an optional question to 15 participants about their instructors' teaching methods on unknown words encountered incidentally in class.

Procedure

Phase 1 of the Study

Before receiving the written questionnaire, all students were instructed on how to fill out the questionnaire correctly. The main points of the instruction were (1) they could finish the lexical inferencing part in any provided language they felt most comfortable; (2) they should finish the questionnaire independently, i.e., without discussing with other people and seeking assistance from dictionaries; (3) they should not go back to revise the answers, especially for the first section of part one, i.e., the sentence-level readings; and (4) their answers would only be used for this study, and would not affect their grades in the course.

The data collection activities were conducted during two consecutive normal class periods of reading, each lasting for 50 minutes, and there were 10 minutes break between them. The students took anywhere from

25 minutes to one hour with a median of about 45 minutes to complete the questionnaire. If a student finished the questionnaire ahead of time, he/she would receive another exercise assigned by his/her instructor. After all students finished the questionnaire, the instructor would start to give a normal lecture.

Phase 2 of the Study

The researcher interviewed 29 students from all learners who participated in Phase 1 individually. To ensure accurate data, all interviews were audio-recorded.

Variables (Table 3.2)

The dependent variables in this study were those quantities related to the CSL learners' incidental vocabulary learning, which included the accuracy of word meaning inference and the inference strategies applied by the learners.

The independent variables were the semantic transparency of target words (transparent, semi-transparent, or opaque words), the strength of contextual support of target words (weak contextual support refers to the sentence-level reading and strong contextual support refers to the passage-level reading), L1 background (L1s with a Chinese character

background and L1s without a Chinese character background), and the Chinese morphological awareness (strong or week).

Table 3.2 Research Variables Involved In the Study

<table>
<tr><td colspan="3">Variable Type</td><td>Source of Data Collection</td></tr>
<tr><td rowspan="4">Independent Variables</td><td rowspan="3">Semantic transparency of target words</td><td>Transparent words</td><td rowspan="3">1. Dictionaries
2. The Syllabus of the Graded Vocabulary for HSK
3. CSL textbooks, exercise books, and reading materials for HSK
4. Grades given by native speakers</td></tr>
<tr><td>Semi-transparent words</td></tr>
<tr><td>Opaque words</td></tr>
<tr><td rowspan="2">Strength of contextual support to target words</td><td>Strong contextual support</td><td>Passage-level reading materials developed or revised by the researcher</td></tr>
<tr><td>Weak contextual support</td><td>Sentence-level reading materials developed or revised by the researcher</td></tr>
</table>

	L1 background	With a Chinese character background (eg. Japanese, Korean learners)	Background section in the questionnaire
		Without a Chinese character background	
	Chinese morphological awareness	Strong morphological awareness	Morphological awareness test
		Weak morphological awareness	
Dependent Variables	Performance of L2 incidental vocabulary learning	Accuracy of word meaning inference	Part 1 of the questionnaire
		Strategies applied to the inference of word meaning	Part 1 of the questionnaire
			Interview

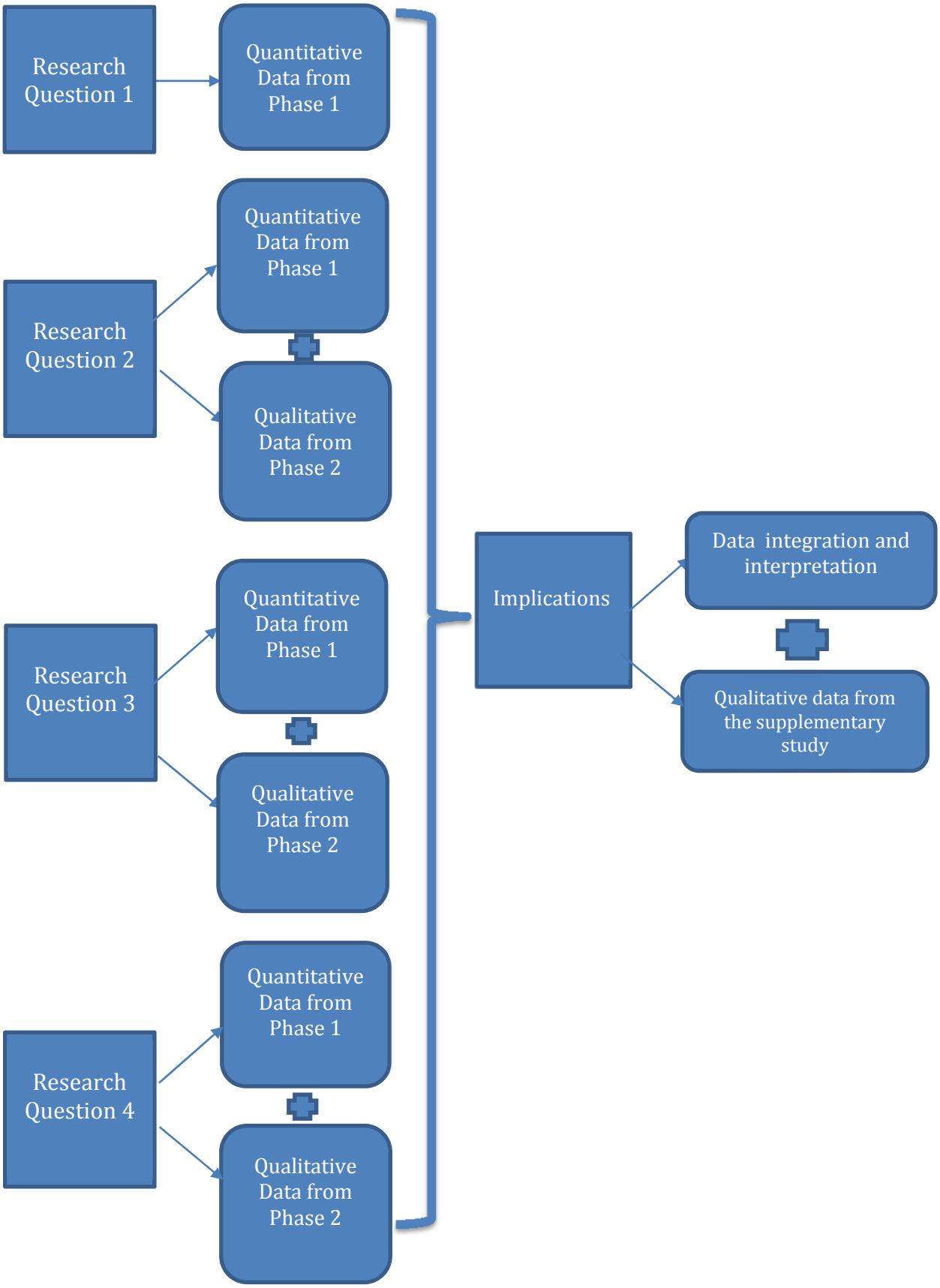
Data Analysis Procedures

The present study collected quantitative data from the written questionnaires and qualitative data from follow-up interviews. Accordingly, both quantitative and qualitative analysis were applied to address the research questions. As Figure 3.3 indicates, Research Question 1 was addressed mainly by the quantitative data collected from the questionnaire. Both quantitative and qualitative data from the two phases of the study were applied to answer Research Question 2, 3, and 4. Pedagogical implications were proposed based on the integration and interpretation of all data and the qualitative data from the supplementary study.

The researcher and one experienced Chinese instructor graded the students' answers. When two graders' opinions did not agree with each other, they discussed and decided the final grade together.

Excel 2013 and IBM SPSS Statistics 20 were used to analyze the data quantitatively. The calculations were run by Excel and the correlation, t-test, one-way ANOVA, and two-way ANOVA were run by SPSS.

Figure 3.3 Data Analysis Procedures



CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents the results from the quantitative and qualitative analyses of the data collected in the questionnaires and the interviews.

This chapter has two parts: Part 1 reports the results from the quantitative analysis of the written questionnaires and Part 2 presents the results from the quantitative and qualitative analyses of the interviews. In each part, the results are organized according to the research questions to be addressed. Therefore, there are four sections in the first part to answer four respective research questions. Similarly there are three sections in the second part to address Research Questions 2, 3, and 4. The results of the supplementary study are reported in the section on implications in Chapter 5.

PART 1: Questionnaire Results

Research Question 1 *What effects does the semantic transparency of Chinese disyllabic compound words exert on CSL learners' incidental vocabulary learning through reading? What are the effects of interaction between the semantic transparency and the strength of contextual support of the target words on CSL learners' incidental vocabulary learning*

through reading?

The first section of this part presents results from the quantitative analysis of the questionnaires to address the first research question. Cronbach's alpha was first performed to test the internal reliability of the data collected from the first part of the questionnaire. The value of Cronbach's alpha is .859, which is acceptable. The accuracy values of the three types of target words were then calculated and compared between different context conditions. To examine the statistical significance of the effects of semantic transparency and context, correlation, one-way ANOVA, paired samples t-test, and two-way ANOVA were carried out.

Effects of Semantic Transparency

The calculation was carried out in a function of Excel to compare the accuracy values of three different types of the target words in two different contexts and the results were displayed in Figure 4.1.

Figure 4.1 Comparison in the Accuracy of Target Words between Two Context Conditions

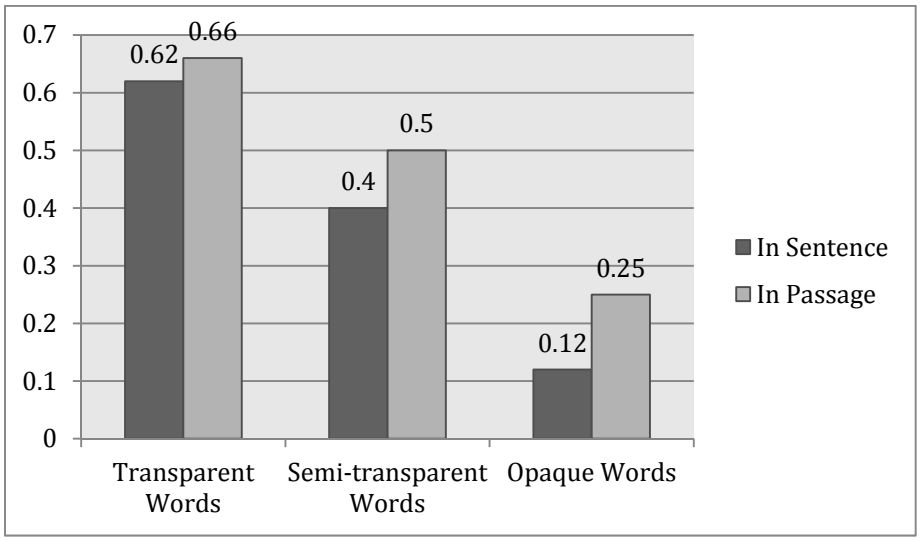


Figure 4.1 displays the accuracy values of target words in the sentence-level and passage-level readings. It can be seen in Figure 4.1 that in the sentence context the accuracy of transparent words was the highest (0.62), followed by that of semi-transparent words (0.4), and the lowest was the accuracy value of opaque words (0.12).

Similar to the sentence-level reading, the accuracy in the passage-level reading also went down with decreasing semantic transparency. The highest accuracy value was still the accuracy of transparent words (0.66), the lowest one was that of opaque words (0.25), and the middle one was that of semi-transparent words (0.5). The differences between the accuracy values of different types of words in the sentence-level reading

were greater than those in the passage-level reading. In the sentence-level reading, the gap between transparent words and semi-transparent words was 0.22 while the gap between the same two groups of words in the passage-level reading was 0.16. The gap between semi-transparent words and opaque words was 0.28 in sentence-level reading while this gap in the passage-level reading was 0.25. Such results indicated that the strength of context played a role in lexical inferencing.

Additionally, compared with the sentence-level reading, the accuracy values of transparent, semi-transparent and opaque words increased from 0.62, 0.4 and 0.12 to 0.66, 0.5 and 0.25 in the passage-level reading, respectively. The results showed that the strength of the contextual support did assist participants when inferring the meaning of the target words. Such assistance was more helpful when the semantic transparency of the words decreased. This can be confirmed by the observation in Figure 4.1 that the accuracy value of opaque words increased by 0.13, that of semi-transparent words increased by 0.1, and that of transparent words only rose by 0.04 in the passage-level reading compared to the sentence-level reading.

To examine the relationship between the accuracy values and the words' semantic transparency, the correlation coefficient was calculated using IBM SPSS Statistics 20 as shown in Table 4.1. Strong association was found between accuracy values and words' semantic transparency.

The accuracy in the sentence context was positively related to the words' semantic transparency at the significant level of 0.01 (r=.795). The accuracy in the passage context was strongly associated with the words' semantic transparency as well (r=.753, p<.01). These positive results indicated that it was more likely for participants to correctly infer the meanings of transparent words than semi-transparent or opaque words. Therefore, the positive role of a word's semantic transparency in incidental vocabulary learning through reading was confirmed.

Table 4.1 Correlation between the Accuracy of the Target Words and the Score of the Words' Semantic Transparency

Variables	*1*	*2*	*3*
1. Semantic Transparency Score	-		
2. Accuracy in the sentence context	.795**	-	
3. Accuracy in the passage context	.753**	.934**	-

Variables	*1*	*2*	*3*
M	3.13	.394	.484
SD	1.19	.25	.22
Range	1-5	0-1	0-1

*p< .05. **p< .01.

Note: Semantic Transparency Score: 1=Completely opaque, 5=Completely transparent.

To further explore the differences between various types of the target words, two sets of independent samples t-tests, one in the sentence-level reading and the other in the passage-level reading, were performed to compare the accuracy values among transparent, semi-transparent, and opaque words in the same context condition. The results are presented in Tables 4.2 and 4.3.

Table 4.2 Results of Independent Samples t-test with Semantic Transparency as Independent Variable for Accuracy Values of the Target Words in Sentence-level Reading

AV	*n*	*Mean*	*SD*	*t-Value*	*df*	*p*
Opaque Words	5	.1178	.1025	−2.713	9	.024
Semi-transparent Words	6	.4009	.2123			
Opaque Words	5	.1178	.1025	−7.118	9	.000
Transparent Words	6	.6167	.1253			
Semi-transparent Words	6	.4009	.2123	−2.143	10	.058
Transparent Words	6	.6167	.1253			

Note: AV=Accuracy values

As summarized in Table 4.2, significant differences were found between opaque words and semi-transparent words for the accuracy values of lexical inferencing in sentence-level reading with t_9=-2.713, p=.024, and as well as between opaque words and transparent words, t_9=-7.118, p=.000. However, there was no significant difference between semi-transparent words and transparent words, t_{10}=-2.143, p=.058.

Table 4.3 Results of Independent Samples T-test with Semantic Transparency as Independent Variable for Accuracy of the Target Words in Passage-level Reading

AV	*n*	*Mean*	*SD*	*t-Value*	*df*	*p*
Opaque Words	5	.2467	.1256	−2.880	9	.018
Semi-transparent Words	6	.5000	.1593			
Opaque Words	5	.2467	.1256	−5.232	9	.001
Transparent Words	6	.664815	.1368818			
Semi-transparent Words	6	.5000	.1593	−1.922	10	.083
Transparent Words	6	.6648	.1369			

Note: AV=Accuracy values

Another set of t-test was carried out to compare the accuracy values of different types of target words in the passage-level reading and the results

are presented in Table 4.3. As indicated in Table 4.3, significant results were found between opaque words and semi-transparent words for the accuracy values of lexical inferencing in the passage-level reading with t_9=-2.880 and p=.018, as well as between opaque words and transparent words with t_9=-5.232 and p=.001. Similar to the results in the sentence-level reading, there was no significant difference between semi-transparent words and transparent words.

Effects of Context

To examine the effects of context, paired samples t-tests were performed to compare the accuracy values of the target words between two context conditions. The results were summarized in Table 4.4.

Table 4.4 Results of Paired Samples t-test for Comparing Accuracy of the Target Words between Sentence-level and Passage-level Readings

	Mean	*t*	*df*	*p*
Pair 1				
SC	.3938	−4.026	16	.001
PC	.4837			
Pair 2				
SC	.6167	−2.107	5	.089
PC	.6648			

Pair 3				
SC	.4009	−3.215	5	.024
PC	.5000			
Pair 4				
SC	.1178	−2.136	4	.1
PC	.2467			

Note: SC=Sentence context. PC=Passage context

Pair 1=Accuracy values of all target words in the sentence context & those of all target words in the passage context; Pair 2=Accuracy values of transparent words in the sentence context & those of transparent words in the passage context; Pair 3=Accuracy values of semi-transparent words in the sentence context & those of semi-transparent words in the passage context; Pair 4=Accuracy values of opaque words in the sentence context & those of opaque words in the passage context.

As presented in Table 4.4, the mean of accuracy values for all target words in the passage context was higher than that in the sentence context. The difference in the accuracy values of all target words between the sentence context and the passage context was statistically significant: t_{16}=-4.026, p=.001. Namely, the accuracy values of most target words increased after the students read them in the passage context. However, not all types of words' accuracy values increased significantly. The accuracy values of semi-transparent words increased significantly in the passage context: t_5=-3.215, p=.024. However, the accuracy values of

transparent words (t_5=-2.107, p=.089) and opaque words (t_4=-2.136, p=.1), did not change significantly. These results indicated that the strength of context influenced students' incidental learning more on semi-transparent words, but the effects of context on the learning of transparent and opaque words were limited.

From the above results, we can see that both semantic transparency and context influence the students' lexical inferencing. However, which one plays a more important role?

To address this question, two-way ANOVA was applied with semantic transparency (three levels: transparent, semi-transparent, and opaque) and the strength of contextual support (two levels: sentence context and passage context) as two independent variables. The results are displayed in Table 4.5.

Table 4.5 Results of Two-Way ANOVA with the Semantic Transparency of Target Words and the Strength of Contextual Support as Independent Variables for the Accuracy of Target Words

	df	*SS*	*MS*	*F*	*p*
Transparency	2	1.149	.575	25.555	.000
Context	1	.071	.071	3.178	.085
Transparency* Context	2	.009	.005	.206	.815
Error	28	.630	.022		
Total	34	8.401			

Corrected Total	33	1.857

The results revealed that semantic transparency had significant effects on the accuracy values of the target words: $F_{(2, 28)}=25.555$, p=.000. Meanwhile, no significant effects from context were found according to the ANOVA results: $F_{(1, 28)}=3.178$, p=.085.

The Differences among Individual Words

Table 4.6 lists the accuracy values of all 17 target words in two context conditions and the learning rates of the words that are defined as the accuracy values of the words in the passage context minus those of the words in the sentence context. To visualize the learning rates of the individual words, Figure 4.2 was created in Excel. As presented in Table 4.6 and Figure 4.2, the learning rates of individual words vary significantly. Some words' accuracy values rose very fast when strong contexts were provided. For example, in the category of transparent words, the accuracy value of "设想" increased 14 percent when the word was presented in a passage. In the category of semi-transparent words, the accuracy values of "知趣", "正经", and "周折" increased 21, 14, and 12 percent respectively. And in the category of opaque words, the accuracy values of "墨水", "检点", and "从容" increased 33, 17, and 12 percent

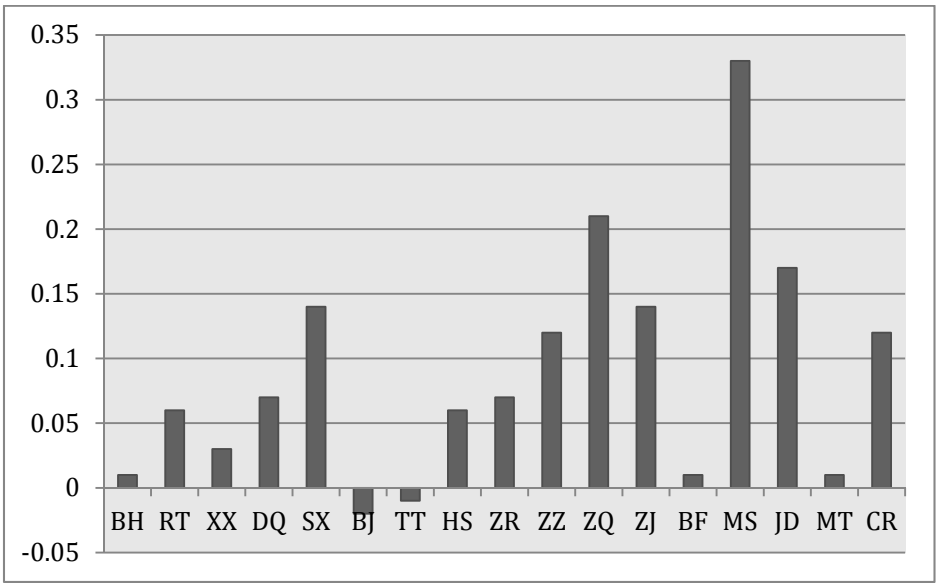
respectively. The learning rates of these words were more than 10 percent. Some words' accuracy values did not change much with the strength of contextual support, such as "败坏"(1%), "喜讯"(3%), "抱负"(1%), and "名堂"(1%). Some words' accuracy values, in contrast, even decreased a little in a strong context. For instance, the accuracy value of "补救" decreased by 2 percent and the accuracy value of "谈吐" decreased by 1 percent when the words were presented in passages.

Table 4.6 Accuracy of All Target Words in the Sentence-Level and Passage-Level Reading

Transparent Words					Semi-transparent Words					Opaque Words				
Word	ST	SC	PC	LC	Word	ST	SC	PC	LC	Word	ST	SC	PC	LC
败坏	4.45	0.62	0.63	0.01	谈吐	2.95	0.74	0.73	-0.01	抱负	1.95	0.28	0.28	0.01
认同	4.25	0.73	0.79	0.06	划算	2.7	0.28	0.33	0.06	墨水	1.65	0.08	0.41	0.33
喜讯	4.7	0.38	0.41	0.03	自如	2.95	0.56	0.63	0.07	检点	1.95	0.02	0.19	0.17
丢弃	5	0.69	0.76	0.07	周折	2.63	0.28	0.39	0.12	名堂	1.65	0.06	0.07	0.01
设想	4.3	0.59	0.73	0.14	知趣	2.95	0.17	0.38	0.21	从容	1.75	0.16	0.28	0.12
补救	4.7	0.68	0.67	-0.02	正经	2.6	0.38	0.53	0.14					
Average		0.62	0.66	0.04			0.40	0.50	0.10			0.12	0.25	0.13

Note: ST=Score of semantic transparency; SC=Accuracy values in the sentence context; PC=Accuracy values in the passage context; LC=Learning rates (PC-SC).

Figure 4.2 Learning Rates of the Target Words



Note: BH=败坏; RT=认同; XX=喜讯; DQ=丢弃; SX=设想; BJ=补救; TT=谈吐; HS=划算; ZR=自如; ZZ=周折; ZQ=知趣; ZJ=正经; BF=抱负; MS=墨水; JD=检点; MT=名堂; CR=从容.

Research Question 2 *What strategies do CSL learners utilize in sentence-level texts and passage-level texts to infer the meanings of target words with semantic transparency at different levels? Do CSL learners rely more on semantic transparency or more on contextual cues when trying to figure out the meanings of target words?*

To answer Research Question 2, Excel was first used to calculate the usage rate of individual strategies in lexical inferencing, and the results are displayed in Table 4.7.

In general, "from the context of the sentence or passage", "I just

guess", and "from the characters in the word" were the three main strategies applied by the students when inferring the meanings of the words (Table 4.7). To visualize the usage of these strategies, Figures 4.3, 4.4, 4.5, and 4.6 were created in Excel.

Table 4.7 Usage Rates of Strategies for Lexical Inferencing

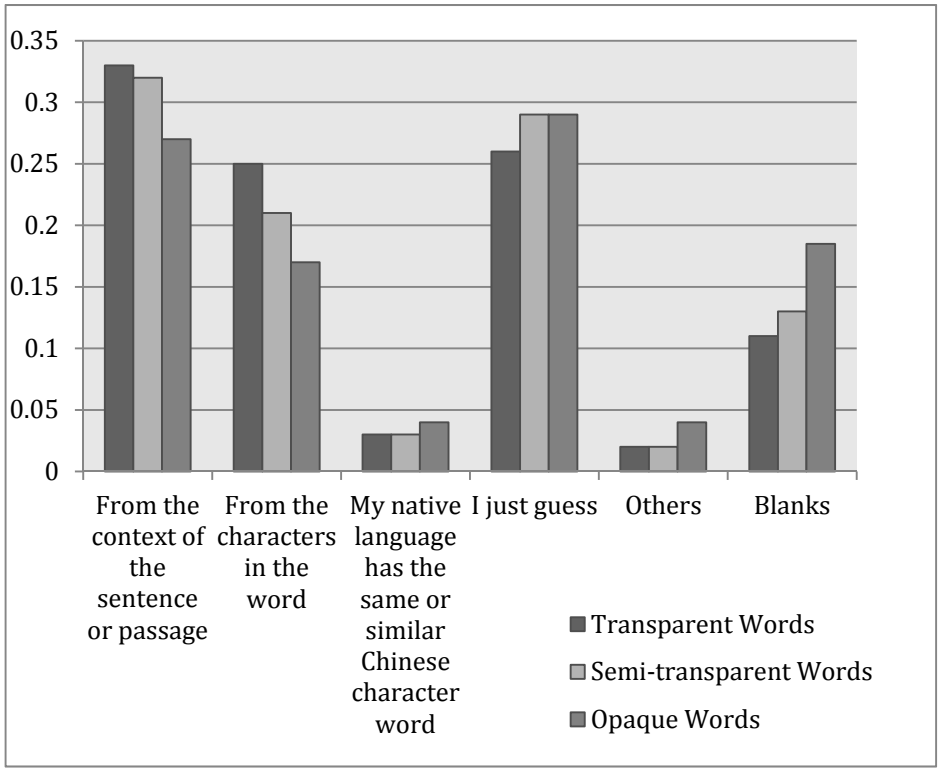
Strategy	Transparent Words			Semi-transparent Words			Opaque Words		
	In SC	In PC	In Both	In SC	In PC	In Both	In SC	In PC	In Both
From the context of the sentence or passage	0.29	0.37	0.33	0.27	0.38	0.32	0.19	0.35	0.27
From the characters in the word	0.27	0.23	0.25	0.23	0.19	0.21	0.17	0.17	0.17
My native language has the same or similar Chinese character word	0.03	0.03	0.03	0.03	0.03	0.03	0.05	0.04	0.045
I just guess	0.27	0.24	0.26	0.31	0.28	0.29	0.32	0.26	0.29
Others	0.02	0.01	0.02	0.02	0.01	0.02	0.05	0.03	0.04
Blanks	0.11	0.11	0.11	0.15	0.11	0.13	0.22	0.15	0.185

Note: SC=Sentence context; PC=Passage context.

Blanks=The participants did not indicate any strategies applied in the questionnaire for the words that they were unable to infer.

Figure 4.3 indicates the comparison in students' inferencing strategy usage when they inferred various types of words. From Figure 4.3, we can see that with a decrease in the semantic transparency of the target words, the participants used less cues from the context of sentences and passages (a usage rate of .33 for transparent words, .32 for semi-transparent words and .27 for opaque words) and less cues from the characters of the words (a usage rate of .25 for transparent words, .21 for semi-transparent words, and .17 for opaque words) to infer the meanings of the words. When the students encountered the words with lower semantic transparency, they were more likely to "just guess" the meaning of the words (a usage rate of .26 for transparent words, .29 for semi-transparent words, and .29 for opaque words). In this case, they were also more likely to leave blanks for the inference questions (.11 for transparent words, .13 for semi-transparent words, and .185 for opaque words).

Figure 4.3 Comparison in Strategy Usage across Different Words' Semantic Transparency Levels



One-way ANOVAs were performed to test if the above changes were statistically significant. The results showed that (Table 4.8) in the sentence context, two strategies, "from the context of the sentence or passage" ($F_{2, 14}$ =6.929, p=.008), and "from the characters in the word" ($F_{2, 14}$ =6.646, p=.009) had significant relations with the semantic transparency of the target words. With a decrease in transparency, the learners tended to apply other strategies ($F_{2, 14}$ =5.634, p=.016) and left blanks more often ($F_{2, 14}$ =3.915, p=.045) in the answer sheets.

Table 4.8 Results of One-way ANOVA for Comparing Strategy Usage in the Sentence Context across Different Words' Semantic Transparency Levels

Strategy		*Mean*	*SD*		*df*	*F*	*p*
SA	Opaque	.1872	.0294	Between groups	2	6.929	.008
	Semi-transparent	.2651	.0648	Within groups	14		
	Transparent	.2932	.0402				
SB	Opaque	.1671	.0409	Between groups	2	6.646	.009
	Semi-transparent	.2270	.0403	Within groups	14		
	Transparent	.2700	.0559				
SC	Opaque	.0515	.0356	Between groups	2	1.259	.314
	Semi-transparent	.0314	.0134	Within groups	14		
	Transparent	.0346	.0134				

SD	Opaque	.3178	.0563	Between groups	2	1.406	.278
	Semi-transparent	.3101	.0560	Within groups	14		
	Transparent	.2736	.0264				
SE	Opaque	.0514	.0229	Between groups	2	5.634	.016
	Semi-transparent	.0203	.0184	Within groups	14		
	Transparent	.0226	.0056				
Blanks	Opaque	.2250	.0685	Between groups	2	3.915	.045
	Semi-transparent	.1461	.0702	Within groups	14		
	Transparent	.1060	.0733				

Note: SA=Strategy A: from the context of the sentence or passage; SB=Strategy B: from the characters in the word; SC=Strategy C: my native language has the same or similar Chinese character words; SD=Strategy D: I just guess; SE=Strategy E: others.

To further explore the differences, a set of independent samples t-tests was carried out and the significant results were summarized in Table 4.9. As presented in Table 4.9, the strategy, "from the context of the sentence or passage" (t_9=-2.468, p=.036), and the strategy, "from the characters in the word" (t_9=-2.434, p=.038), were used significantly more frequently when inferring semi-transparent words than when inferring opaque words in the sentence context. The strategies, "from the context of the sentence or passage" (t_9=-4.891, p=.001) and "from the characters in the word" (t_9=-3.410, p=.008) were applied significantly more frequently when inferring transparent words than when inferring opaque words. Compared with transparent words, the students left blanks more often in the questions related to opaque words when filling out the questionnaire (t_9=2.757, p=.022). They also applied other strategies more frequently to infer the meanings of opaque words, compared with transparent or semi-transparent words. There were no significant differences found when comparing the strategy usage between inferring transparent and semi-transparent words. These results suggest that the effects of context on the inferencing of opaque words were limited.

Table 4.9 Significant Results of t-tests for Comparing Strategy Usage in the Sentence Context across Different Words' Semantic Transparency Levels

Strategy Usage		*Mean*	*SD*	*t-Value*	*df*	*p*
SA	Opaque Words Semi-transparent Words	.1872 .2651	.0294 .0648	-2.468	9	.036
SB	Opaque Words Semi-transparent Words	.1671 .2269	.0409 .0403	−2.434	9	.038
SE	Opaque Words Semi-transparent Words	.0514 .0203	.0229 .0184	2.503	9	.034
SA	Opaque Words Transparent Words	.1872 .2932	.0294 .0402	−4.891	9	.001
SB	Opaque Words Transparent Words	.1671 .2700	.0409 .0559	−3.410	9	.008

SE	Opaque Words	.0514	.0229	2.738	4.406	.047
	Transparent Words	.0226	.0056			
Blank	Opaque Words	.2250	.0685	2.757	9	.022
	Transparent Words	.1060	.0733			

Note: SA=Strategy A: from the context of the sentence or passage; SB=Strategy B: from the characters in the word. SE=Strategy E: others.

Additionally, one-way ANOVA was performed to compare strategy usage in the passage context when inferring the meaning of the words with semantic transparency at different levels. No significant results were found.

To further explore the differences, a set of independent samples t-tests were carried out and those significant results are summarized in Table 4.10. It can be seen that there were not many significant differences found on use of strategy. The students' use of inference strategy did not differ from opaque words to semi-transparent words, or from semi-transparent words to transparent words. But significant results were found when comparing transparent words and opaque words. The results revealed that the strategy, "from the characters in the word", was used significantly more often when inferring the meanings of transparent words than when

inferring opaque words (t_9=-3.392, p=.008). Other strategies were used more often when inferring opaque words (t_9=2.274, p=.049).

Table 4.10 Significant Results of t-tests for Comparing Strategy Usage in the Passage Context across Different Words' Semantic Transparency Levels

Strategy Usage		*Mean*	*SD*	*t-Value*	*df*	*p*
SB	Opaque Words	.1726	.0204	−3.392	9	.008
	Transparent Words	.2289	.0319			
SE	Opaque Words	.0316	.0184	2.274	9	.049
	Transparent Words	.0134	.0067			

Note: SB=Strategy B: from the characters in the word. SE=Strategy E: others.

Effects of Context

The comparison in use of strategy between different contexts were also conducted to examine the effects of context on use of strategy. Figures 4.4, 4.5, and 4.6 present the strategies used for inferring transparent words, semi-transparent words, and opaque words in two contexts with different strengths. As the figures indicate, with an increase in the context strength

from sentences to passages, the students relied more on contextual cues to infer the meanings of the target words, left fewer blanks to the related questions, and used the guessing strategy less often. Additionally, since more information was provided in the passages, students were less likely to seek assistance from other information sources.

Figure 4.4 Comparison in Strategy Usage for Inferring Transparent Words between Two Contexts with Different Strength

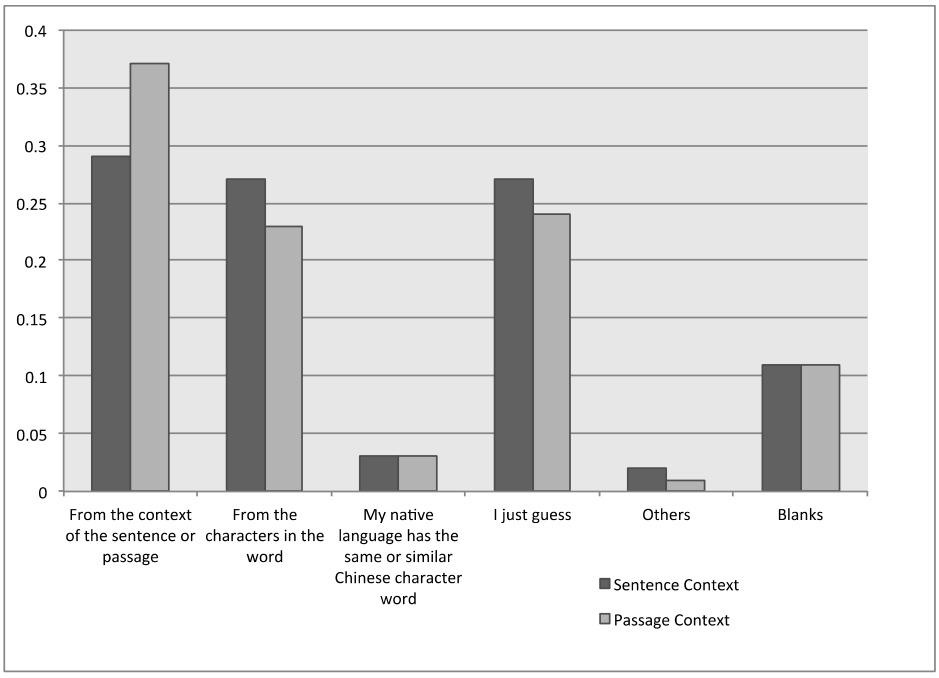


Figure 4.5 Comparison in Strategy Usage for Inferring Semi-Transparent Words between Two Contexts with Different Strength

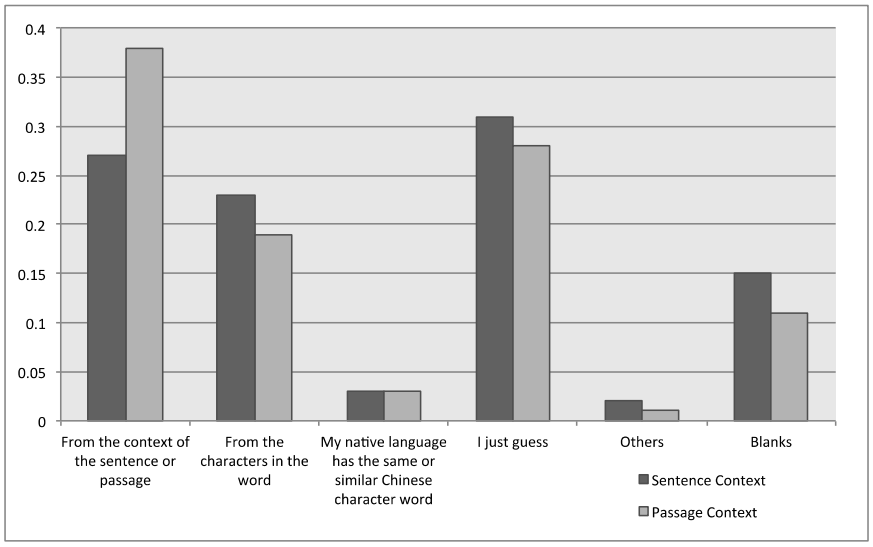
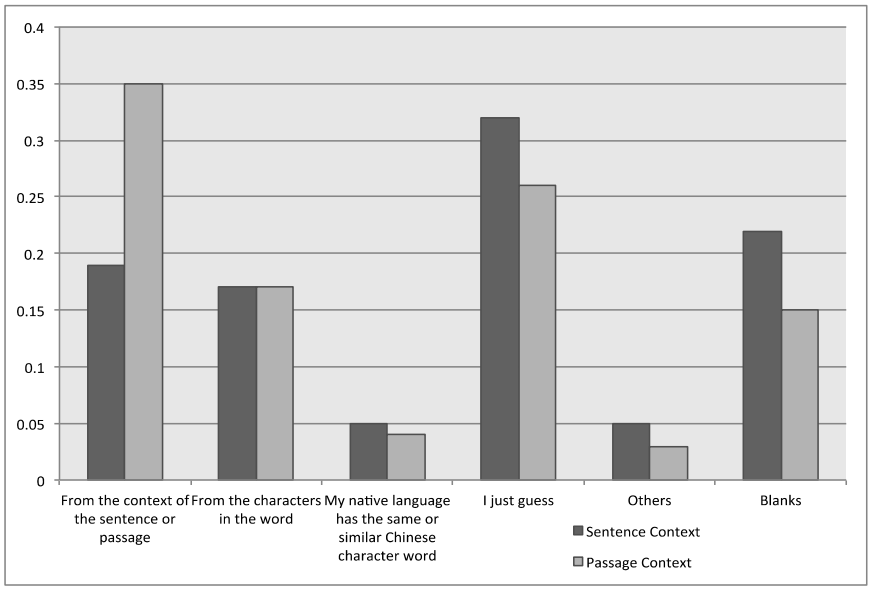


Figure 4.6 Comparison in Strategy Usage for Inferring Opaque Words between Two Contexts with Different Strength



A number of t-tests were carried out to examine if the above differences were statistically significant as shown in Table 4.11. In general, students relied more on contextual cues ($t_{21.416}$ =-6.975, p=.000) to infer the meanings of words in the passage context than in the sentence context and they tended to just guess the meaning in the sentence context ($t_{26.115}$ =2.802, p=.009). When inferring the meanings of transparent words, they were more likely to seek information from the context in passages (t_{10} =-4.240, p=.002) while from other sources (t_{10} =2.582, p=.027) in sentences. When inferring the meanings of semi-transparent words, the context strategy was also applied significantly more often in passages than in sentences ($t_{6.531}$ =-4.052, p=.006). When inferring the meanings of opaque words, contextual cues also played a significant role in passages as well (t_{8} =-9.391, p=.000).

Table 4.11 The Significant Results of Independent Samples T-test with Context as an Independent Variable for the Strategy Usage of Lexical Inferencing

Strategy Usage		*Mean*	*SD*	*t-Value*	*df*	*p*
SA	Sentence Context	.2521	.0636	-6.925	21.416	.000
	Passage Context	.3679	.0266			

SD	Sentence Context	.2995	.0489	2.802	26.115	.009
	Passage Context	.2608	.0292			
SA-T	Sentence Context	.2932	.0402	-4.240	10	.002
	Passage Context	.3726	.0221			
SE-T	Sentence Context	.0226	.0057	2.582	10	.027
	Passage Context	.0134	.0067			
SA-S	Sentence Context	.2651	.0648	-4.052	6.531	.006
	Passage Context	.3804	.0257			
SA-O	Sentence Context	.1872	.0294	-9.391	8	.000
	Passage Context	.3472	.0243			

Note: SA=Strategy A: from the context of the sentence or passage; SD=Strategy D: I just guess; SA-T: Strategy A used to infer the meanings of transparent words: from the context of the sentence or passage; SE-T: Strategy E used to infer the meanings of transparent words: I just guess.

SA-S: Strategy A used to infer the meanings of semi-transparent words: from the context of the sentence or passage; SA-O: Strategy A used to infer the meanings of opaque words: from the context of the sentence or passage; SD-O: Strategy D used to infer the meanings of opaque words: I just guess.

Based on the above results, the researcher understood that both semantic transparency and context can influence what strategy the learners' used. But the researcher still wanted to know which one induced the main effects. For this purpose, two-way ANOVA with the strength of contextual support and the semantic transparency of target words as the independent variables was performed and the results are presented in Table 4.12. It was found that both semantic transparency ($F_{2, 28}$ =9.145, p=.001) and context ($F_{1, 28}$ =81.211, p=.000) affected the frequency of using contextual cues significantly. These two independent variables (transparency: $F_{2, 28}$=8.785, p=.001; context: $F_{1, 28}$=5.453, p=.027) also significantly influenced the use of the strategy, "others". Additionally, semantic transparency ($F_{2, 28}$=9.814, p=.001) had a significant effect on the usage of word cues and the choice of a blank answer in lexical inferencing ($F_{2, 28}$=4.472, p=.021), while context did not have a significant effect on these strategies.

Table 4.12 Results of Two-Way ANOVA with the Semantic Transparency of Target Words and the Strength of Contextual Support as Independent Variables for Individual Strategy Usage

Strategy		*df*	*SS*	*MS*	*F*	*p*
SA	Transparency	2	.027	.013	9.145	.001
	Context	1	.118	.118	81.311	.000
	Transparency* Context	2	.009	.004	3.058	.063
	Error	28	.041	.001		
	Total	34	3.457			
	Corrected Total	33	.190			
SB	Transparency	2	.035	.017	9.814	.001
	Context	1	.005	.005	2.676	.113
	Transparency* Context	2	.003	.002	.969	.392
	Error	28	.049	.002		
	Total	34	1.619			
	Corrected Total	33	.093			

SC	Transparency	2	.001	.001	1.620	.216
	Context	1	.001	.001	1.711	.202
	Transparency* Context	2	.000	.000	.270	.765
	Error	28	.011	.000		
	Total	34	.053			
	Corrected Total	33	.013			
SD	Transparency	2	.008	.004	2.723	.083
	Context	1	.013	.013	8.789	.006
	Transparency* Context	2	.001	.001	.406	.670
	Error	28	.042	.002		
	Total	34	2.733			
	Corrected Total	33	.065			
SE	Transparency	2	.004	.002	8.785	.001
	Context	1	.001	.001	5.453	.027

	Transparency* Context	2	.000	.000	.449	.643
	Error	28	.007	.000		
	Total	34	.032			
	Corrected Total	33	.012			
Blank	Transparency	2	.037	.018	4.472	.021
	Context	1	.010	.010	2.309	.140
	Transparency* Context	2	.008	.004	1.006	.378
	Error	28	.115	.004		
	Total	34	.830			
	Corrected Total	33	.169			

Note: SA=Strategy A: from the context of the sentence or passage; SB=Strategy B: from the characters in the word; SC=Strategy C: my native language has the same or similar Chinese character words; SD=Strategy D: I just guess; SE=Strategy E: others.

Research Question 3 *What are the differences in the learning outcomes and inference strategies between CSL learners with a background of Chinese characters in L1 and those without such a background when learning target words through reading with semantic transparency at different levels incidentally?*

Differences between Two Groups on Learning Outcomes

Figures 4.7 and 4.8 show the comparisons in the accuracy values of target word inference in both sentence context and passage context between Japanese/Korean and non-Japanese/Korean students. From the figures, we can see that in both contexts, the students with a Chinese character background in their L1s gained slightly higher accuracy when inferring the meanings of transparent words. Interestingly, those without a Chinese character background in their L1s achieved slightly higher accuracy when inferring the meanings of semi-transparent words or opaque words.

Figure 4.7 Comparison in the Accuracy of Target Words in the Sentence Context between Japanese/Korean and Non-Japanese/Korean

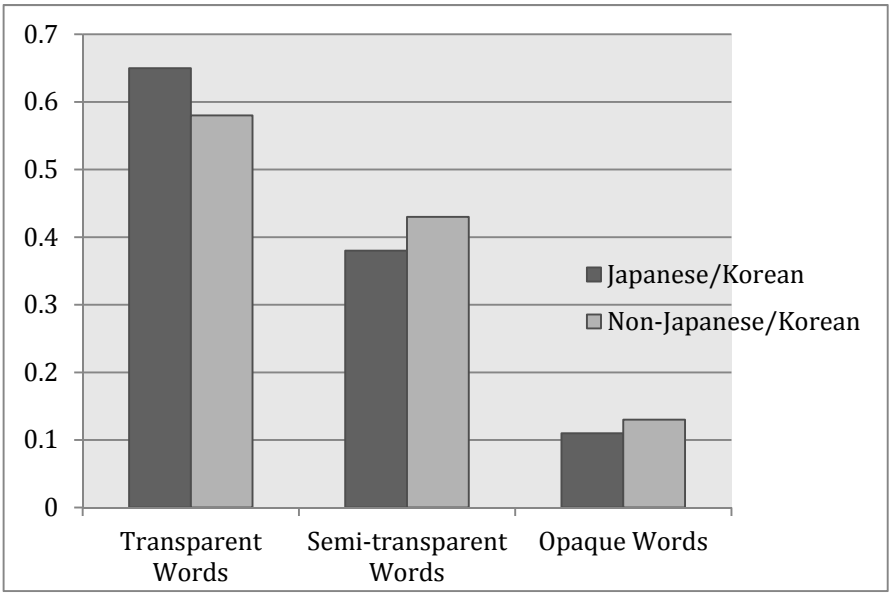
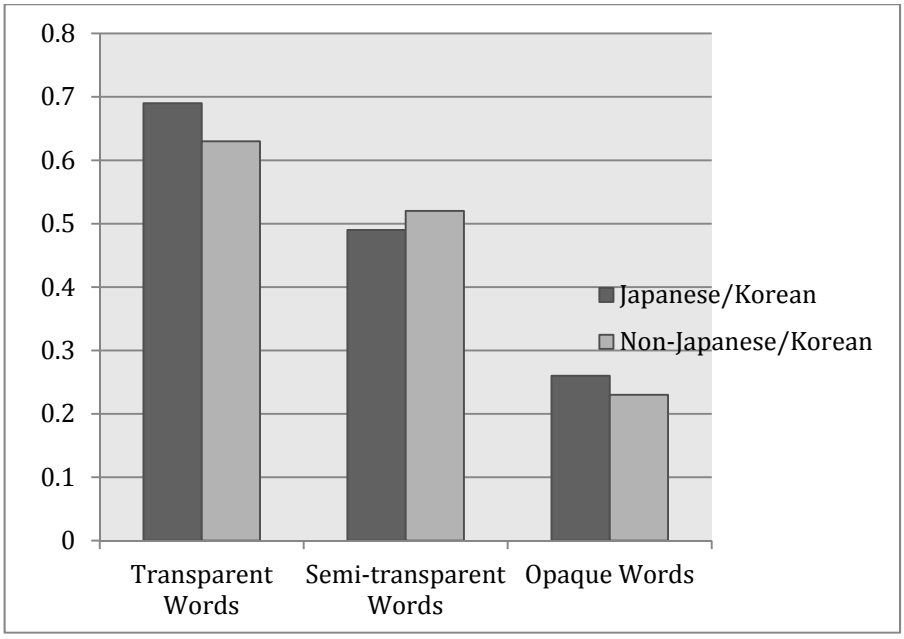


Figure 4.8 Comparison in the Accuracy of Target Words in the Passage Context between Japanese/Korean and Non-Japanese/Korean



Independent samples t-tests were performed to compare the accuracy values of lexical inferencing between Japanese/Korean students and non-Japanese/Korean students. The results (Table 4.13) indicate that the accuracy values of transparent, semi-transparent, and opaque words were not significantly different between two groups of learners in either the sentence context or passage context. Even when comparing the accuracy values of individual words, there were only 3 out of a total of 17 words that showed significant difference between the two groups. For example, in the sentence context, only the accuracy value of "从容" was significantly different between the two groups. Non-Japanese/Korean

students gained higher accuracy in this word than did Japanese/Korean students ($t_{77.778}$=-2.243, p=.028). On the other hand, in the passage context, Japanese/Korean students gained significantly higher accuracy in "补救" ($t_{78.216}$=2.015, p=.047) and "墨水" ($t_{87.557}$=2.401, p=.018) than did other students.

Table 4.13 Results of Independent Samples t-test with L1 as Independent Variable on the Accuracy of Lexical Inferencing

Accuracy		*Mean*	*SD*	*t-Value*	*df*	*p*
CR1	Japanese/Korean	.092	.2637	-2.243	77.778	.028
	Non-Japanese/Korean	.232	.3182			
BJ2	Japanese/Korean	.755	.4098	2.015	78.216	.047
	Non-Japanese/Korean	.561	.4898			
MS2	Japanese/Korean	.520	.4996	2.401	87.557	.018
	Non-Japanese/Korean	.280	.4479			
T-SC	Japanese/Korean	.651	.2445	1.521	88	.132
	Non-Japanese/Korean	.575	.2265			

S-SC	Japanese/Korean	.381	.2224	-.926	88	.357
	Non-Japanese/Korean	.425	.2250			
O-SC	Japanese/Korean	.108	.1552	-.648	88	.518
	Non-Japanese/Korean	.129	.1521			
T-PC	Japanese/Korean	.693	.2502	1.184	88	.239
	Non-Japanese/Korean	.630	.2596			
S-PC	Japanese/Korean	.481	.2659	-.788	88	.433
	Non-Japanese/Korean	.522	.2205			
O-PC	Japanese/Korean	.259	.2159	.681	87.458	.498
	Non-Japanese/Korean	.232	.1665			

Note: CR1=The word, "从容", presented in the sentence context; BJ2=The word, "补救", presented in the passage context; MS2=The word, "墨水" presented in the passage context; T-SC=The accuracy value of transparent words in the sentence context; S-SC=The accuracy value of semi-transparent words in the sentence context; O-SC=The accuracy value of opaque words in the sentence context; T-PC=The accuracy value of transparent words in the passage context; S-PC=The

accuracy value of semi-transparent words in the passage context; O-PC=The accuracy value of opaque words in the passage context.

Differences between Two groups in Inference Strategies

A set of independent samples t-tests was carried out to compare the use of inference strategies between Japanese/Korean students and non-Japanese/Korean students. To visualize the comparisons, Figures 4.9, 4.10, and 4.11 were created. The results (Table 4.14) reveal that in the sentence context, Japanese/Korean students were more likely to rely on their native languages ($t_{65.383}$=3.268, p=.002) and the guessing strategy (t_{88}=2.859, p=.005) to infer the words. Other students without a Chinese character background in their L1s applied the context strategy more often to infer the meanings of the words ($t_{85.546}$=-2.070, p=.041). In the passage context, the significant differences in the uses of the native language strategy and the guessing strategy were also found between the two groups. Japanese/Korean students still tended to seek useful information from their native languages ($t_{58.027}$=3.179, p=.002) and continue guessing the meanings of the target words (t_{88}=2.226, p=.029) even when context strength increased. Generally, Japanese/Korean students applied the L1 strategy ($t_{63.131}$=3.48, p=.001) and the guessing strategy (t_{88}=2.724, p=.008) significantly more often than other students in both contexts.

From the perspective of semantic transparency, there were some

significant differences as well between the two groups. When inferring transparent (L1 strategy: $t_{56.522}$=2.978, p=.004; guess strategy: t_{88}=2.14, p=.035), semi-transparent (L1 strategy: $t_{61.246}$=2.593, p=.012; guessing strategy: t_{88}=2.423, p=.017), and opaque words (L1 strategy: $t_{64.225}$=3.643, p=.001; guessing strategy: t_{88}=2.855, p=.005), Japanese/Korean students applied the L1 strategy and the guessing strategy significantly more than non-Japanese/Korean students. On the other hand, non-Japanese/Korean students only applied the context strategy significantly more often when inferring semi-transparent words. The results suggested that due to the long-time influence of the Chinese language on the Japanese/Korean languages, Japanese/Korean students tended to seek assistance from their native languages first and ignored other inference strategies when encountering unknown words. This became a negative L1 transfer. Due to the excessive reliance on native languages, these students were not confident about the meanings inferred by themselves since they knew that the meanings of the Chinese words were often different from those of the same or similar Chinese character words in Japanese or Korean. This explains the finding that more Japanese/Korean students select the guessing strategy in the written questionnaire.

Table 4.14 Significant Results of t-test with L1 as Independent Variable for the Usage of Inference Strategies

Strategy		*Mean*	*SD*	*t-Value*	*df*	*p*
SA-SC	Japanese/Korean	.2131	.2056	-2.070	85.546	.041
	Non-Japanese/Korean	.2897	.1442			
SC-SC	Japanese/Korean	.0549	.0921	3.268	65.383	.002
	Non-Japanese/Korean	.0079	.0370			
SD-SC	Japanese/Korean	.3727	.2452	2.859	88	.005
	Non-Japanese/Korean	.2355	.2023			
SC-PC	Japanese/Korean	.0403	.0767	3.179	58.027	.002
	Non-Japanese/Korean	.0036	.0230			
SD-PC	Japanese/Korean	.3360	.2751	2.226	88	.029
	Non-Japanese/Korean	.2065	.2748			
SC-BC	Japanese/Korean	.0478	.0783	3.480	63.131	.001
	Non-Japanese/Korean	.0058	.0291			

SD-BC	Japanese/Korean	.3545	.2415	2.724	88	.008
	Non-Japanese/Korean	.2196	.2247			
SC-T	Japanese/Korean	.0445	.0882	2.978	56.522	.004
	Non-Japanese/Korean	.0053	.0243			
SD-T	Japanese/Korean	.3300	.2685	2.140	88	.035
	Non-Japanese/Korean	.2142	.2394			
SA-S	Japanese/Korean	.2721	.2319	-2.071	88	.041
	Non-Japanese/Korean	.3668	.1956			
SC-S	Japanese/Korean	.0367	.0784	2.593	61.246	.012
	Non-Japanese/Korean	.0057	.0271			
SD-S	Japanese/Korean	.3704	.2608	2.423	88	.017
	Non-Japanese/Korean	.2403	.2451			
SC-O	Japanese/Korean	.0631	.1010	3.643	64.225	.001
	Non-Japanese/Korean	.0061	.0390			

SD-O	Japanese/Korean	.3631	.2507	2.855	88	.005
	Non-Japanese/Korean	.2145	.2397			

Note: SA-SC=Strategy A used in the sentence context: from the context of the sentence or passage; SC-SC=Strategy C used in the sentence context: my native language has the same or similar Chinese character word; SD-SC= Strategy D used in the sentence context: I just guess; SC-PC=Strategy C used in the passage context: my native language has the same or similar Chinese character word; SD-PC= Strategy D used in the passage context: I just guess; SC-BC= Strategy C used in both contexts: my native language has the same or similar Chinese character word; SD-BC= Strategy D used in both contexts: I just guess; SC-T=Strategy C used in inferring the transparent words: my native language has the same or similar Chinese character words; SD-T= Strategy D used in inferring transparent words: I just guess; SA-S= Strategy A used in inferring semi-transparent words: from the context of the sentence or passage; SC-S= Strategy C used in inferring semi-transparent words: my native language has the same or similar Chinese character words; SD-S= Strategy D used in inferring semi-transparent words: I just guess; SC-O= Strategy C used in inferring opaque words: my native language has the same or similar Chinese character words; SD-O= Strategy D used in inferring opaque words: I just guess.

Figure 4.9 Comparison in Inference Strategies Applied between Different L1 Groups When Inferring Transparent Words

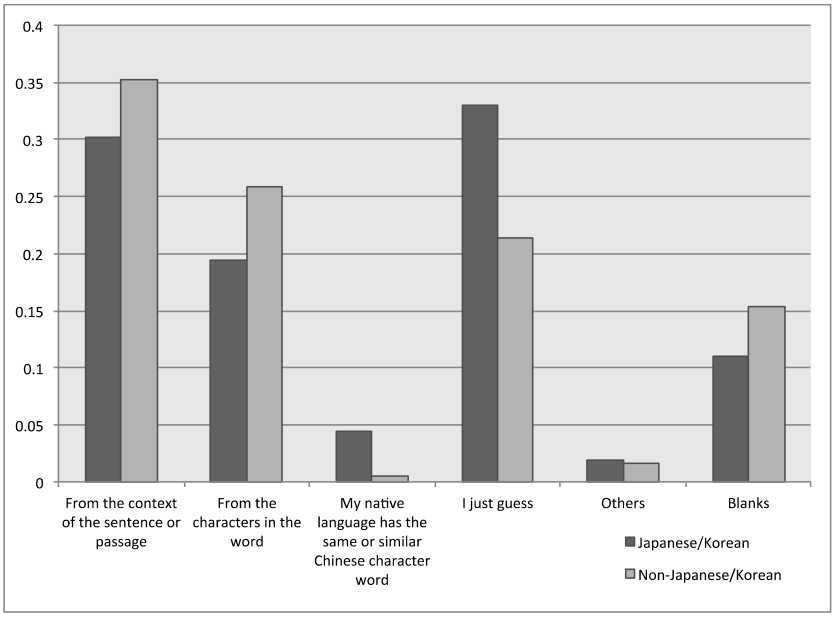


Figure 4.10 Comparison in Inference Strategies Applied between Different L1 Groups When Inferring Semi-transparent Words

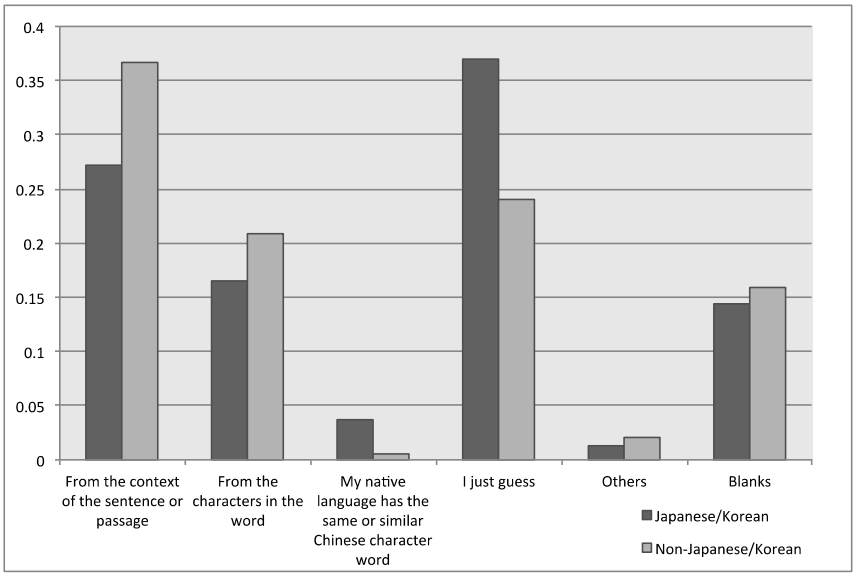
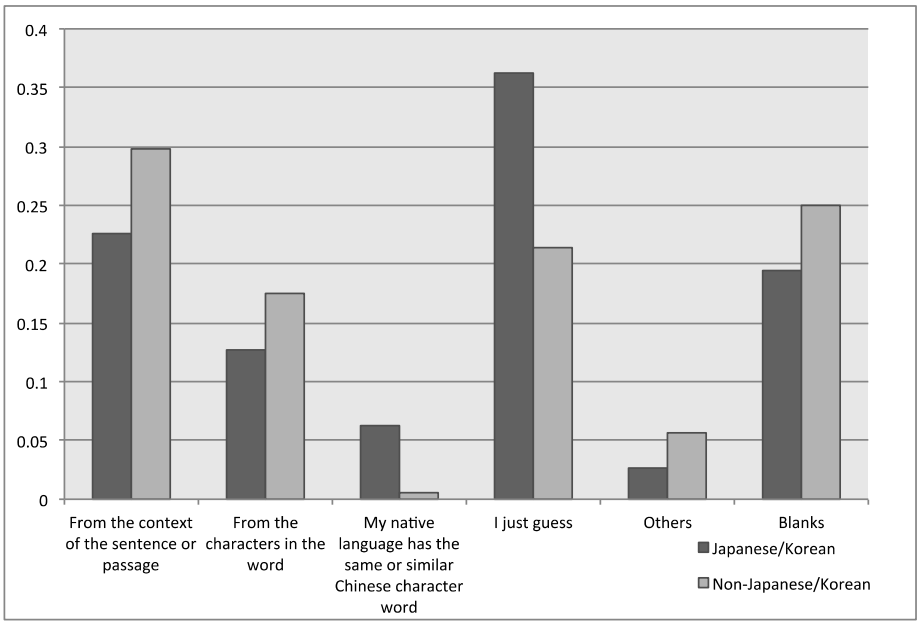


Figure 4.11 Comparison in Inference Strategies Applied between Different L1 Groups When Inferring Opaque Words



Research Question 4 *What are the differences in the learning outcomes and inference strategies between CSL learners with strong morphological awareness and those with weak morphological awareness when learning target words through reading with semantic transparency at different levels incidentally?*

This section presents the results of quantitative analysis of the questionnaire to address the fourth research question. The Cronbach's Alpha was first calculated to test the internal reliability of the data collected from the morphological awareness test of the questionnaire. The

participants were then median-split according to their scores in the receptive morphological awareness section, the productive morphological awareness section, and total scores of these two sections. Hence, we had three sets of two groups, including high and low receptive morphological awareness groups, high and low productive morphological awareness groups, and high and low morphological awareness groups. Finally, three sets of independent samples t-tests were performed to compare the accuracy of the target words and the use of inference strategies between high and low score groups in terms of receptive morphological awareness, productive morphological awareness, and general morphological awareness.

First, the reliability for the scores of the morphological awareness test collected from the second part of the questionnaire was quantified by Cronbach's alpha, which was .764. Therefore the data of morphological awareness is reliable.

Differences in Learning Outcomes between The Two Groups

Table 4.15, 4.16, and 4.17 summarized the results of independent samples t-tests, comparing the accuracy of the target words between the low-ability groups and high-ability groups in the receptive morphology awareness, productive morphology awareness, and morphology awareness. Significant results were found regarding the accuracy of all

words in two contexts between the group with low ability and that with high ability in receptive morphology awareness. The high ability group gained significantly higher accuracy of transparent, semi-transparent, and opaque words in both the sentence and passage contexts (Table 4.15).

Table 4.15 Results of t-test with Receptive Morphological Awareness as Independent Variable for the Accuracy of the Target Words

Accuracy	*Receptive MA*	*Mean*	*SD*	*t-Value*	*df*	*p*
T-SC	Low	.5701	.2300	-2.952	88	.004
	High	.7253	.2251			
S-SC	Low	.3651	.2129	-2.385	88	.019
	High	.4846	.2288			
O-SC	Low	.0714	.0974	-3.805	31.359	.001
	High	.2259	.2011			
T-PC	Low	.6111	.2588	-3.206	88	.002
	High	.7901	.1993			
S-PC	Low	.4616	.2389	-2.317	88	.023
	High	.5895	.2423			
O-PC	Low	.2127	.1737	-2.381	40.606	.022
	High	.3259	.2194			

T-B	Low	.5906	.2331	-3.242	88	.002
	High	.7577	.2008			
S-B	Low	.4134	.2018	-2.594	88	.011
	High	.5370	.2197			
O-B	Low	.1421	.1137	-3.452	34.497	.001
	High	.2759	.1873			

Note: T-SC=transparent words in the sentence context; S-SC=semi-transparent words in the sentence context; O-SC=opaque words in the sentence context; T-PC= transparent words in the passage context; S-PC=semi-transparent words in the passage context; O-PC=opaque words in the passage context; T-B=transparent words in both contexts; S-B=semi-transparent words in both contexts; O-B=opaque words in both contexts.

When comparing the groups with high and low ability in productive morphology awareness, the same significant differences were found in the accuracy of all target words in both two contexts. As indicated in Table 4.16, the students with high ability of productive morphology awareness gained higher accuracy when inferring transparent, semi-transparent, and opaque words in the sentence or passage context. These differences were so significant that most p values were less than .001.

Table 4.16 Results of t-test with Productive Morphological Awareness as Independent Variable for the Accuracy of the Target Words

Accuracy	*Productive MA*	*Mean*	*SD*	*t-Value*	*df*	*p*
T-SC	Low	.5337	.2209	−3.691	88	.000
	High	.7074	.2252			
S-SC	Low	.3014	.1681	−4.906	76.951	.000
	High	.5097	.2273			
O-SC	Low	.0617	.1012	−3.820	65.598	.000
	High	.1791	.1767			
T-PC	Low	.5603	.2616	−4.478	88	.000
	High	.7791	.1932			
S-PC	Low	.4184	.2194	−3.493		
	High	.5891	.2442		88	.001
O-PC	Low	.1936	.1524	−2.765	74.108	.007
	High	.3047	.2193			
T-B	Low	.5470	.2313	−4.318	88	.000
	High	.7432	.1965			
S-B	Low	.3599	.1610	−4.599	76.061	.000
	High	.5494	.2220			

O-B	Low	.1277	.1062	−3.752	68.830	.000
	High	.2419	.1718			

Note: T-SC=transparent words in the sentence context; S-SC=semi-transparent words in the sentence context; O-SC=opaque words in the sentence context; T-PC= transparent words in the passage context; S-PC=semi-transparent words in the passage context; O-PC=opaque words in the passage context; T-B=transparent words in both contexts; S-B=semi-transparent words in both contexts; O-B=opaque words in both contexts.

Finally, when comparing the two groups in the general morphology awareness (receptive morphological awareness plus productive morphological awareness), which was the same as above, the group with high ability in morphology awareness inferred the meanings of transparent, semi-transparent, and opaque words with higher accuracy than did the low-ability group. Most differences were significant at a significance level of .001.

Table 4.17 Results of t-test with Morphological Awareness as Independent Variable for the Accuracy of the Target Words

Accuracy	*MA*	*Mean*	*SD*	*t-Value*	*df*	*p*
T-SC	Low	.5148	.2036	−4.466	88	.000

	High	.7185	.2284			
S-SC	Low	.3037	.1571	−4.565	76	.000
	High	.4981	.2387			
O-SC	Low	.0533	.1014	−4.376	71.870	.000
	High	.1822	.1696			
T-PC	Low	.5519	.2489	−4.666	88	.000
	High	.7778	.2087			
S-PC	Low	.3796	.1959	−5.309	88	.000
	High	.6204	.2327			
O-PC	Low	.1978	.1588	−2.452	80.949	.016
	High	.2956	.2153			
T-B	Low	.5333	.2135	−4.835	88	.000
	High	.7481	.2079			
S-B	Low	.3417	.1507	−5.587	79.116	.000
	High	.5593	.2135			
O-B	Low	.1256	.1053	−3.799	73.392	.000
	High	.2389	.1702			

Note: T-SC=transparent words in the sentence context; S-SC=semi-transparent words in the sentence context; O-SC=opaque words in the sentence context; T-PC= transparent words in the passage context; S-

PC=semi-transparent words in the passage context; O-PC=opaque words in the passage context; T-B=transparent words in both contexts; S-B=semi-transparent words in both contexts; O-B=opaque words in both contexts.

Differences in the Usage of Inference Strategies between Two Groups

To compare the usage of inference strategies between the groups with high ability and low ability in morphology awareness, an independent samples t-test was carried out and those significant results were presented in Table 4.18. As shown in the table, the high-ability group used the context strategy (t_{88}=-2.18, p=.032) and other information sources ($t_{77.522}$=-2.383, p=.020) significantly more often than the low-ability group in the sentence context. In the passage context, students with a high ability in morphological awareness used the context strategy more often (t_{88}=-2.692, p=.009) while those with low ability were more likely to just guess the meanings of unknown words ($t_{76.369}$=2.467, p=.016). Generally, in both contexts, the high-ability group applied the context strategy (t_{88}=-2.698, p=.008) and the other strategy ($t_{69.282}$=-2.407, p=.019) more often while the low-ability group applied the guessing strategy more often ($t_{75.037}$=2.184, p=.032).

The use of inference strategies in the two groups was also different when inferring unknown words of different transparency levels. The high-ability group used the context strategy (t_{88}=-2.608, p=.011) more often to

infer transparent words while the low-ability group tended to just guess word meaning ($t_{68.792}$=3.051, p=.003). The high-ability group also significantly relied more on the context strategy to infer semi-transparent (t_{88}=-2.626, p=.010) or opaque words (t_{88}=-2.561, p=.012). In addition to the context strategy, the high-ability group also sought assistance from other information sources actively to infer the meanings of semi-transparent words ($t_{57.388}$=-2.84, p=.006).

Table 4.18 Significant Results of t-test with Morphological Awareness as Independent Variable for the Usage of Inference Strategies

Strategy	*MA*	*Mean*	*SD*	*t-Value*	*df*	*p*
SA-SC	Low	.2067	.1740	-2.18	88	.032
	High	.2893	.1851			
SE-SC	Low	.0143	.0466	-2.383	77.522	.020
	High	.0437	.0685			
SA-PC	Low	.2863	.2658	-2.692	88	.009
	High	.4352	.2587			
SD-PC	Low	.3480	.3223	2.467	76.369	.016
	High	.2059	.2134			

SA-B	Low	.2478	.2024	-2.698	88	.008
	High	.3616	.1981			
SD-B	Low	.3477	.2824	2.184	75.037	.032
	High	.2384	.1814			
SE-B	Low	.0113	.0322	-2.407	69.282	.019
	High	.0348	.0573			
SA-T	Low	.2596	.2425	-2.608	88	.011
	High	.3907	.2346			
SD-T	Low	.3574	.3083	3.051	68.792	.003
	High	.1970	.1713			
SA-S	Low	.2562	.2203	-2.626	88	.010
	High	.3742	.2058			
SE-S	Low	.0055	.0181	-2.84	57.388	.006
	High	.0264	.0460			
SA-O	Low	.2073	.1775	-2.561	88	.012
	High	.3109	.2053			

Note: SA-SC=Strategy A used in the sentence context: from the context of the sentence or passage; SE-SC= Strategy E used in the sentence context: others; SA-PC=Strategy A used in the passage context: from the context of the sentence or passage; SD-PC=Strategy D used in the passage context: I just guess; SA-B= Strategy A used in both contexts: from the

context of the sentence or passage; SD-B= Strategy D used in both contexts: I just guess; SE-B=Strategy E used in both context: others; SA-T=Strategy A used in inferring transparent words: from the context of the sentence or passage; SD-T=Strategy D used in inferring transparent words: I just guess; SA-S= Strategy A used in inferring semi-transparent words: from the context of the sentence or passage; SE-S= Strategy E used in inferring semi-transparent words: others; SA-O=Strategy A used in inferring opaque words: from the context of the sentence or passage.

Discussion

This section discusses the main findings in the first phase of this study by comparing it with other related studies on a range of topics, which include the effects of word semantic transparency and its interaction with context strength on CSL learners' incidental vocabulary learning, the usage pattern of CSL learners' lexical inference strategy on various types of words in different levels of readings and the influences of learners' L1 and Chinese morphological awareness on their incidental vocabulary learning through reading.

First, a statistically strong association was found between the accuracy of lexical inferencing and word semantic transparency. It indicates that transparent words are more likely to be acquired through reading than are opaque words. This result is consistent with the results of previous studies in the area of learning Chinese as the first or second language. Different from some studies that focused on word semantic

transparency (Gan, 2008; Xu & Li, 2011; Zhang & Zeng, 2010), this study compared target words across three levels in transparency (transparent, semi-transparent, and opaque) instead of two levels (transparent and opaque). Significant differences were found in accuracy between transparent and opaque words, as well as between semi-transparent and opaque words in two-level readings (sentence and passage). There were no significantly differences between semi-transparent and transparent words in either the sentence-level or passage-level readings. These findings proved the importance of word cues in lexical inferencing. Even fewer cues were better than no cues.

Second, it was found that the effect of word semantic transparency was influenced by context strength. For example, the accuracy values of most target words in the passage context were higher than those in the sentence context. Furthermore, the accuracy values of semi-transparent words increased significantly from the sentence context to the passage context while the accuracy values of transparent and opaque words did not change significantly. These results are different from the results in both Gan's study (2008) and Zhang & Zeng's study (2010). Gan (2008) found that the context strength influenced the learning outcome of opaque words positively but not so for transparent words. Zhang & Zeng (2010) found no significant difference in learners' performance between transparent and opaque words in the condition of strong contextual

support. It needs to be pointed out that while both studies changed the strength of contextual support within the sentence context, the context strength in this study changed from the sentence context to the passage context. This factor might contribute to the difference in the results.

Different from the previous studies that usually used one-way ANOVA or t-test to analyze the interaction between semantic transparency and context strength, this study applied two-way ANOVA to compare the effects of semantic transparency and the strength of contextual support on learners' incidental vocabulary learning. The results revealed the unique role of semantic transparency in incidental vocabulary learning directly based on the statistically significant evidence, while the effects of context strength were found insignificant.

Furthermore, the accuracy of a few words with relatively high transparency decreased with strong context. This interesting finding was also different from the results of previous studies which usually indicated that the learners' performance improved when the strength of context increased. The subjects in these studies were either native speakers or L2 learners learning words in the sentence context. The results in this study, i.e., the decrease in accuracy of certain target words in the strong context, demonstrated that context could sometimes mislead readers and impede understanding. Although all of our contextual cues were directive and helpful cues, the participants of this study still could extract wrong cues

and make incorrect inference due to these second language readers' limited reading ability. On the other hand, it seemed that extensive context could overload learners and prevent effective learning. The decrease in the accuracy of some words with high transparency in the passage-level reading in this study confirmed the negative effect of long context on learners' incidental vocabulary learning. However, the positive effect of context could not be denied since the accuracy of most target words increased in passage-level reading compared to sentence-level reading. Therefore, passage-level reading could be a good choice for language educators when developing reading materials for their students. The results of this study also showed that the learning rates of individual target words were different from each other. Thus, when developing reading materials for CSL learners, language educators need to select appropriate supporting contextual cues that match the characteristics of individual words.

Third, this study confirmed again that word cues and contextual cues were two major information sources from which CSL learners seek assistance when inferring the meanings of unknown words in reading. From the perspective of semantic transparency, we can see that learners applied the word strategy significantly more often when inferring transparent words and semi-transparent words than when inferring opaque words in the sentence context. Learners applied the word strategy

significantly more often when inferring transparent words than when inferring opaque words in the passage context. In the sentence context, the learners applied the context strategy more often when inferring semi-transparent than when inferring opaque words.

Also in the sentence context, the learners applied other strategies more often when inferring opaque words than when inferring other words. Similarly, in the passage context, they applied other strategies more often when inferring opaque words than when inferring transparent words. From the perspective of context, we could see that with an increase in the strength of context, the learners relied significantly more on contextual cues. When reading passages, the learners performed more confidently and relied less on other sources to infer the meanings of unknown words. This can be easily understood, since if a learner could gain adequate information from the context, there would be no need to seek other information sources that requires more efforts to infer the meanings of unknown words.

The results of the two-way ANOVA indicated that both semantic transparency and context strength influenced the learners' use of the context strategy, the guessing strategy and other strategies significantly. Only word semantic transparency affected the learners' use of word strategy and blank strategy significantly. Therefore, in general, the effects of semantic transparency on learners' use of inference strategy were more

significant than those of context strength. This finding is consistent with the finding for the first research question, i.e., semantic transparency affected learners' accuracy of lexical inferencing more significantly than context strength did.

In addition, this study found an interesting phenomenon, i.e., with a decrease in semantic transparency, learners applied not only the word strategy less often, but also the context strategy less often. It seemed that the difficulty level of target words could affect the use of other types of strategies besides the word strategy. This result also suggests that even after providing helpful context, it is still sometimes difficult for learners to infer the meanings of the words with a low transparency score. In this study, the highest value of inferencing is .79, and the lowest one is .02. This finding revealed a fact, that is, it is impossible to acquire all unknown words from incidental learning. Learners would sometimes have to seek assistance from dictionaries so that they could acquire the meanings of the opaque words with intentional learning.

Fourth, contrary to the researcher's expectations, Japanese/Korean students did not perform better than non-Japanese/Korean students in incidental vocabulary learning through reading. This study did not find any significant difference in the accuracy of lexical inferencing in both contexts between the Japanese/Korean group and the non-Japanese/Korean group. The result suggests that although

Japanese/Korean students do have some advantages in learning the Chinese language compared with students from other countries, such as Chinese character recognition and character writing, their performance in lexical inferencing through reading is not superior over non-Japanese/Korean students.

Additionally, Japanese/Korean students applied the L1 strategy and the guessing strategy significantly more often than did other students. This pattern in strategy usage was consistent regardless of changes in either word semantic transparency or context strength. Significantly applying the guessing strategy more often indicated that Japanese/Korean students were not confident about their inference since they relied on their L1s excessively. Due to the overuse of the L1 strategy, the inference strategies applied by Japanese/Korean students were not as diverse as those applied by non-Japanese/Korean students. Overusing the L1 strategy might have also influenced Japanese/Korean students' performance and contributed to the lower accuracy rate of lexical inferencing than what was expected by the researcher. Therefore, we could consider the overuse of L1 strategy as one example of L1 negative transfer.

Fifth, this study found a significant relationship between learners' Chinese morphological awareness and their accuracy of lexical inferencing. The results confirmed Nagy's statement (Nagy et al., 2003)

again, i.e., morphological awareness is helpful for language learning in multiple ways. One new contribution made by this study is that the researcher not only investigated the relationship between morphological awareness and lexical inferencing, but also further explored the specific relationship between the accuracy of lexical inferencing and the different aspects of morphological awareness, including both receptive morphological awareness and productive awareness. In the area of second-language teaching and learning, the related studies on the relations between language learning and different aspects of morphological awareness are limited although a few are available. For example, Hayashi & Murphy (2011) found that L2 learners' productive morphological awareness played a more important role in language learning than did receptive awareness. This study, however, found most participants with high receptive, productive, or general morphological awareness abilities gained significantly higher accuracy for all types of target words in both levels of reading at the significant level of .001. That is, for the accuracy of lexical inferencing, receptive morphological awareness and productive morphological awareness were equally important. The possible explanation for this difference is that Hayashi & Murphy focused on the relationship between the individual aspects of morphological awareness and vocabulary size. Compared with lexical inferencing in this study, the size of vocabulary in their study required learners to have higher

productive ability.

Learners with high ability in Chinese morphological awareness possessed better skill in using contextual cues and they applied the context strategy more often to infer the meanings of unknown words in both levels of reading according to our study. The result showed that the high-ability group used other information sources significantly more often in the sentence context than the low-ability group. The low-ability group, on the other hand, relied more often on the guessing strategy in both contexts.

From the perspective of semantic transparency, we could see that the high-ability group applied the context strategy significantly more often when inferring the meanings of words in all three different transparency levels. Even for transparent words, the high-ability group still tended to conduct lexical inferencing by combining the word strategy and the context strategy.

PART 2: Interview Results

This section reports the results of interview data, which were analyzed both quantitatively and qualitatively. The interview was designed as a supplementary method to compensate for the drawbacks of a written questionnaire and provide more detailed and accurate information to examine the strategy usage in order to answer Research Questions 2, 3,

and 4. A total of 29 students participated in the interviews. (Table 4.19), Six students were from Japan, nine from South Korea, three from Kyrgyzstan, two each from Kazakhstan, France, and Italy, and one each from Russia, Georgia, Austria, the United Kingdom, and Israel. Of these, 17 interviewees belonged to the high-ability group of Chinese morphological awareness and 12 were in the low-ability group. In terms of host institution, 15 were from J University, seven from S University and seven from W University. It is also worth noting that 14 majored in Chinese language or literature, 13 had other majors, and two did not indicate their majors. The researcher asked interviewees questions and their answers were audiotaped, transcribed, and coded.

Table 4.19 Demographic Data of the Interviewees

Name	Nationality	University	MA	Gender	Age	Education	Major
TZ	Japan	S	High	F	-	B	-
XCGZ	Japan	W	Low	F	32	A	-
MAYZ	Japan	J	High	M	57	B	N
CXY	South Korea	S	High	F	20	A	Y
LXR	South Korea	W	High	F	23	B	Y
QMY	South Korea	W	High	F	21	B	Y
LJY	South	J	Low	M	22	B	Y

	Korea						
JYJ	South Korea	W	Low	F	23	-	N
CYZ	South Korea	W	High	M	36	B	N
JZL	South Korea	J	Low	F	22	B	N
JHS	South Korea	J	Low	F	21	A	Y
YJXY	Japan	J	High	F	33	B	N
AN	Kyrgyzstan	W	High	F	19	A	Y
BD	Kyrgyzstan	J	Low	M	20	E	Y
XL	Kazakhstan	S	High	M	26	B	N
LF	Kazakhstan	S	High	M	22	B	Y
KT	Russia	S	High	F	24	B	Y
ML	Georgia	J	Low	F	21	B	N
OXR	France	S	High	M	22	C	N
ZFG	France	S	High	M	29	C	N
LJH	Austria	J	High	M	27	A	Y
ZYW	UK	J	Low	M	23	B	N
XDE	Israel	W	High	M	24	A	N
CH	Kyrgyzstan	J	Low	M	17	A	Y
AL	Italy	J	Low	F	23	B	Y
FD	Italy	J	Low	M	23	B	Y
CGQSL	Japan	J	High	M	21	B	N
JTJN	Japan	J	High	F	20	A	Y
JGL	South Korea	J	Low	M	26	A	N

Note: MA=Morphological Awareness.

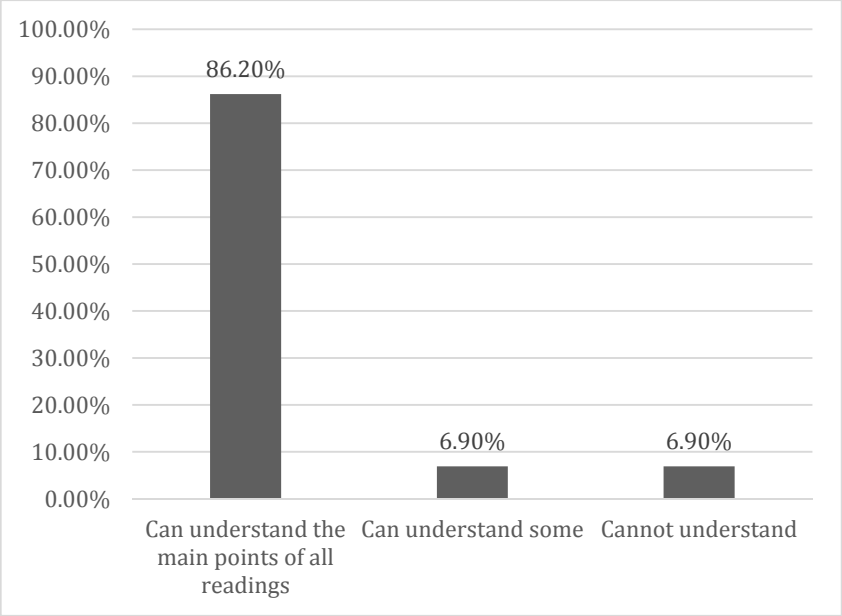
Education A=High School Diploma; Education B=Bachelor Degree; Education C=Master's Degree; Education D=PhD Degree; Education E=Others.
Major N = A major not related to Chinese language or literature; Major Y =A major related to Chinese language or literature.

About Context

Difficulty Level of the Readings

Although the difficulty level of the readings in the questionnaire had been checked by instructors and tested in the pilot study, the researcher still asked the students if they could understand the main points of the sentences or passages in the questionnaire to ensure that the readings provided were at the appropriate difficulty level. Their answers were coded as three types: *can understand the main points of all sentences and passages*, *can understand some*, and *cannot understand*. The results (Figure 4. 12) indicated that 86.2 percent of the interviewees could understand the main points of all readings, 6.9 percent could understand some, and only 6.9 percent could not understand the main points of the readings. These results proved again that the difficulty level of the readings in the questionnaire was appropriate.

Figure 4.12 Interviewees' Feedback on the Difficulty Level of the Readings

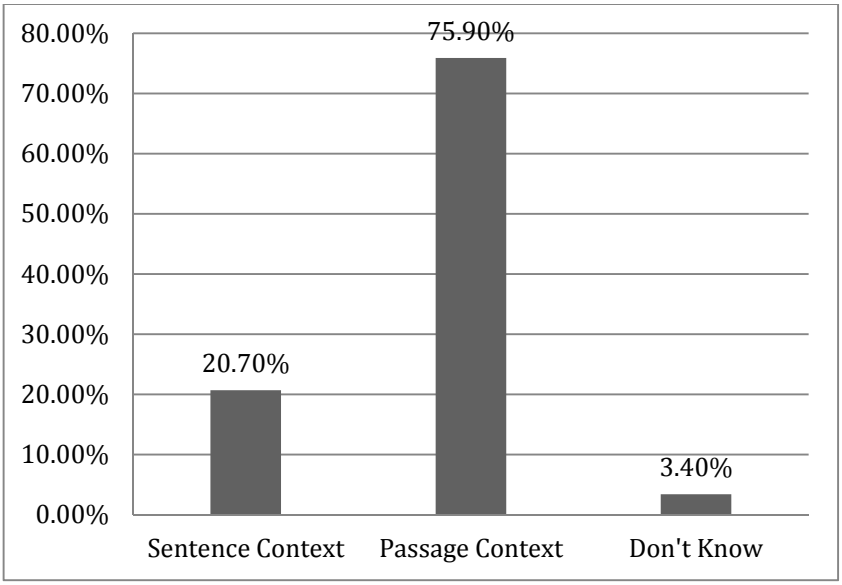


Sentence Context vs. Passage Context

Although too much information might become a burden for L2 learners, passage context in general should be more helpful than sentence context for learners to infer the meaning of unknown words as the former provides more information about the words. This is confirmed by the observation that 75.9 percent of interviewees thought that the passage context helped them more in lexical inferencing. In contrast, 20.7 percent of interviewees thought that the sentence context was more helpful.

Another 3.4 percent could not tell which one was more helpful (Figure 4.13). This observation could be partially attributed to the fact that there was no misleading context in the sentences and passages in this study.

Figure 4.13 Interviewees' Feedback about Which Type of Context Is More Helpful



The most common reason stated by interviewees who chose the passage context as the more helpful was that the passages provided more information. The response from FD, who was one such interviewee, is shown below.

C1. (Translated from Chinese)

I: Could you let me know what kind of context help you more on inferring the meanings of unknown words? Sentences or passages?

FD: I think that passages with more sentences could help me more.

I: But do you think there might be too much information in a passage? And sometimes, it might be difficult to deal with it because of too much information. Do you have such kind of feeling?

FD: No. I don't think so. If there is only one short sentence, I might not be able to know the word's meaning. I cannot guess the meaning of that word at all. But if there are a few sentences, at least to me, inferring becomes easier.

For CH, a student from Kyrgyzstan, the passage context helped him and he was able to write more about the unknown words.

C2. (Translated from Chinese)

CH: I think passages are more helpful.

I: Why?

CH: I am not sure if my answers to the questionnaire are correct or not. But when I read the passages, I could write down more on the paper about the words.

On the other hand, KT, a female student from Russia, thought that sometimes single sentences were more helpful than passages, because extra sentences did not provide extra useful information.

C3.

I: In general, do you think sentences help you know the meanings of the words or the passage help you know the meaning?

KT: Sometimes, a sentence helps. But not all the time.

I: There are more sentences in passages. Do you think more sentences would help you more?

KT: No.

I: Why? You think more sentences may put more burden on you in reading?

KT: Not more burden in reading. Just if it is not clear in one sentence about how the word would be used, it will not be clear in extra sentences either.

Although other students said the sentence context was more helpful, their performance of lexical inferencing in the passage context was better than that in the sentence context. For example, LJH, a student from Austria, thought passages were not helpful because of difficulty.

C4. (Translated from Chinese)

LJH: I think the sentence context is more helpful for me. I can analyze the grammar function of unknown words in a sentence and feel easier to guess the meanings of the words. But it is difficult to do so in a passage. For me, reading passages is more difficult than sentences.

From this conversation, we know that LJH was used to inferring the word meaning by conducting grammar analysis. When there was too much information provided by reading, he felt it was more difficult since he treated more information as something that prevented him from finishing tasks. However, his performance in lexical inferencing was better in passage readings compared to that in sentence readings, although he felt it was more difficult in reading passages.

Role of New Hints in the Passage Context: Positive and Negative

The length of the passage context is much longer than that of the sentence context. Consequently the passage context provides more helpful hints to the learners. After analyzing the interview transcripts, it was found that the interviewees treated new hints in six different ways. As listed in Table 4.20, the interviewees were able to point out 24.55 percent

of new hints in the passage context helped them in lexical inferencing. Usually there are two ways that the new hints provide help. One is that a new hint provides the direct definition of the target words. For example, some participants inferred the correct meaning of "正经" (serious and formal) based on the new hint "严肃正式" (serious and formal), in the passage context. The other is that a new hint could activate leaners' previous knowledge in their mind as demonstrated in the following example.

C5. . (Translated from Chinese)

[Questions:

Sentence Context- *求职者面试时，态度一定要**从容**。*

When attending a job interview, the candidate must be calm.

Passage Context- *人们常常会根据你的**谈吐**、态度来判断你的能力、社会地位、受教育的程度。所以，求职者面试时，除了注意说话的方式和用词外，态度一定要**从容**。不要紧张。*

People usually judge your abilities, social status, and education level based on your conversation style and attitude. Therefore, when attending the job interview, the candidate must be calm besides

paying attention to the way of speaking and the selection of right words in the conversation. Do not be nervous.]

I: In the sentence context, you think "从容" means important. In the passage context, you think it means relax. Why did you change?

ZFG: Since there is "do not be nervous" in the passage. It caused me to remember a word I learned before, "从容不迫".

In the example, the new cue facilitated the learner to think about the idiom learned in the past and made correct inferencing.

About 8.18 percent of the new hints provided the interviewees with more confidence or helped them improve their inference. However, the interviewees were only able to state that the whole passages helped them but could not point out which new hints really assisted them. Two possible reasons could contribute to this finding. First, due to their limited Chinese language skills, some learners were only able to catch the main points of the passages but were not able to understand the detailed information. Second, in some passages the hints were not a word or a phrase, but a few sentences describing the situation, possible reasons, or consequence that were difficult to point out, especially for the words that were hard to explain directly. For example, in the passage for the target

word, “知趣” (know one’s place; get the message), the hints were the description of a situation in which a young guy was paying court to a girl. It was hard for the participants to tell which part of the passage helped them in such a passage so they thought the whole passage was helpful.

Another 8.18 percent of new hints made the interviewees feel they had made the wrong inference in the sentence context, so they rejected their former answers. However, these interviewees still could not infer the correct meanings of target words in the passage context. For example, when a learner was reading the sentence with the target word, “划算” (cost-effective), she noticed “从 200 立方公里的海水中捞到 1 公斤黄金” (gain 1 kg gold from 200 km^3 of seawater) from the sentence and thought the word means “many” because 200km^3 and 1 kg sounds like a large amount. Then after reading the passage, she noticed the new hint, 投入大大超过产出” (Investment is significantly more than output), and realized her former inferencing was not correct. So she inferred the meaning of the word as “difficult” since she thought it is difficult to make money if the investment is more than the output. Although she did not infer the target word correctly, the new hint in the passage was obviously helpful since she got closer to the correct answer after learning about it.

Additionally, about 26.14 percent of new hints did not play any role in lexical inferencing in the passage context. According to conversations

with some interviewees, this could be explained by the possibility that the information provided by the sentence context was sufficient for some interviewees to infer the words' meaning so that they did not pay extra attention to the new hints when they read the passages. This usually occurred when the target words were transparent words. For example, many participants had inferred the meaning of "败坏" (damage) in the sentence context correctly. Then the new hint in the passage, "破坏" (damage), seemed no use for them.

Another 29.77 percent of new hints did not play any role because the readers did not understand them or because they were not good at extracting useful contextual cues from Chinese texts, although the words or phrases in the new hints were easier than the target words they supported. For instance, "不要紧张 (do not be nervous)" was used a cue to explain "从容" (leisurely, calm), and "严肃正式 (serious and formal)" was used as a cue to explain "正经".

Finally, although all new hints in the passages were positive, there were still 3.18 percent of new hints that misled the interviewees to conduct inferencing incorrectly. After analysis, the researcher found that the main reason for this was not the cues themselves but the learners' misunderstanding. For example, CXY, a female South Korean student,

first inferred "周折" as "difficulties" as the correct answer, but she became confused after reading the passage.

C6. (Translated from Chinese)

[Questions:

Sentence Context-*经历了这么多的**周折**，老张终于和家人团聚了。*

After experiencing so many twists and turns, finally, Old Zhang got together with his family.

Passage Context-*经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。*

After experiencing so many twists and turns and difficulties, finally, Old Zhang got together with his family. Now, he had no more dreams and would not think the lofty ambition he ever had any longer. He just wanted to live a stable life.]

I: In the sentence context, you inferred "周折" as difficulties. However, in the passage context, you did not write anything. I am

wondering why you can guess the meaning of this word in the sentence but leave it as a blank in the passage. Obviously, you have more information to help you in the passage. Right?

CXY: Since we only have one sentence in Section 1, I can guess it without hesitation. But in the passage, we have a lot of information. And then I am not sure if it still means difficulties or it should mean other bad things.

I: Did you notice "不顺" in the passage? Do you know the meaning of this word?

CXY: It means things do not go smoothly or difficulties.

I: So do you think the meaning of "周折" might be close to the meaning of "不顺"?

CXY: But I think if it already has "不顺" (difficulties), it does not need another "difficulties". No need to repeat the same thing.

In the above example, the student understood the meaning of the hint, "不顺", but still made a wrong decision. Her general knowledge about repetition affected her lexical inferencing. At the same time, we could see that she did not completely understand the function of Chinese conjunction, "和" that could connect two words with similar meanings in

the Chinese language. This small misunderstanding resulted in the wrong inferencing and this would never occur to L1 readers.

Table 4.20 Usage of New Hints of the Interviewees in the Passage Context

Usage of New Hints in Passage Context	Percentage (%)
Be able to point out the exact new hints that help lexical inferencing	24.55
New hints do make interviewees feel more confident or improve their lexical inferencing, but interviewees cannot point out the exact new hints that helped them	8.18
New hints make interviewees deny their former wrong inference, but the new hints could not help interviewees improve inferencing	8.18
New hints do not cause interviewees to make any change in their inferencing, since they are very confident with their inference in the sentence context	26.14
New hints cannot cause interviewees to make any change or improvement during their inferencing, since they cannot understand new hints correctly	29.77
New hints mislead interviewees	3.18

Advantages of the Passage Context

On the other hand, if we analyzed the data from the perspective of context, we can see that there was interaction between contextual cues and longer context (passages). As mentioned in the previous part, extra hints in the longer contexts conveys richer information. Longer contexts sometimes also facilitate the comprehension of the cues. For example, some hints ignored in the sentence context were used for lexical inferencing in the passage context. For example,

C7. (Translated from Chinese)

[Questions:

Sentence Context-*求职者都想收到被录用的**喜讯**。*

All job seekers want to receive the good news about offer.

Passage Context-*如果求职者想收到被录用的**喜讯**，就不要轻视外表在求职中的作用。求职者除了要准备简历以外，还应该准备好面试的行头。因为合适的服装会给人留下好的印象，有助于求职的成功。*

If a candidate wants to receive the good news about an offer, he/she should not ignore the importance of appearance. Besides the resume,

the job seeker should prepare clothes for the interview, since a set of appropriate interview clothes will impress interviewers and help in successful job hunting.]

I: How about this one, "喜讯"? I remember that you cannot infer the meaning of this word in the sentence context. Why did you infer its meaning as news or notice in the passage context?
JHS: I know from "被录用的", which means "be accepted" or "be hired". That is a good thing. So I think "喜讯" may mean the news.

In the above example, the learner could not infer the meaning of "喜讯" (good news) from the sentence context, although the cue "被录用的" (be admitted, be hired) was also in the sentence. However, after reading the passage, she may notice or understand the same cue and infer the partially correct meaning of the word. Another example is "划算" (cost-effective).

C8. (Translated from Chinese)

[Questions:
*Sentence Context-从 200 立方公里的海水中只能捞到 1 公斤黄金，很不**划算**。*

People can only gain 1-kg gold from 200-km³ seawater. It is not cost-effective.

*Passage Context-很多数据证实海水中含有黄金，所以有人就设想从海水里提取黄金。可是，要实现这个假想很困难。因为，从 200 立方公里的海水中只能捞到 1 公斤黄金，投入大大超过产出，很不**划算**。*

A lot of data prove that there is gold in seawater. Therefore, some people propose to extract gold from seawater. However, it is difficult to realize this idea, since people can only gain 1-kg gold from 200-km³ seawater, i.e. the investment is significantly more than the output. It is not cost-effective.]

I: Well, this word, "划算", you think it means uneconomical. But in the sentence context, you think it means forecast. Why did you make such a change?

JTJN: According to the context.

I: Which part of the context makes you think it means uneconomical?

JTJN: "only can gain 1 kg gold from 200 km³ seawater". It is said "only".

I: But this part is also in the previous sentence context where it also has "only".

JTJN: Really? Yes. You are right. But I did not notice it in the sentence context.

In this example, the learner also ignored the same cue in the sentence. The large information of the passage helped her understand the main points more clearly and then she was able to notice the detailed information and catch the small hint ignored in the sentence context.

Disadvantages of the Passage Context

Although all contextual cues in both the sentence and passage contexts were directive cues, the learners were still more likely to be misled in the passage context, especially when two target words were embedded in one passage.

C9. (Translated from Chinese)

[Questions:

Sentence Context-*人们常常会根据你的**谈吐**来判断你的社会地位。*

People usually judge your social status based on your way of speaking.

Passage Context-*人们常常会根据你的**谈吐**、态度来判断你的能力、社会地位、受教育的程度。所以，求职者面试时，除了注意说话的方式和用词外，态度一定要**从容**。不要紧张。*

People usually judge your abilities, social status, and education level based on your conversation style and attitude. Therefore, when attending the job interview, the candidate must be calm besides paying attention to the way of speaking and the selection of right words in the conversation. Do not be nervous.]

I: You changed the meaning of "谈吐". In the sentence context, you guessed this word as the way of speaking. But later you changed it as "bearing". Why did you make such a change?

XDE: This is because there is "attitude" in the passage. I think the concept about the way of speaking does not include the concept of attitude, so I selected a word that has more general reference and could include "attitude".

In this example, when the learner read the sentence that only had one target word, “谈吐” (the way of speaking, style of conversation), it was easier for him to catch the useful and correct cues in the single sentence. However, in the passage with two target words embedded, extracting correct cues became more difficult. This learner extracted the wrong cue, “attitude”, when he tried to infer the meaning of “谈吐” in the passage and made wrong inferencing since this cue was to support another target word, “从容” (leisurely, calm), instead of “谈吐”.

In summary, if there are no misleading cues, it seems that the passage context is more helpful for lexical inferencing than the sentence context. In this study, most cues in both contexts played positive roles in the learners’ word inferring. Some cues played negative or no roles in the learners’ word learning mainly because of the learners’ limited Chinese language skills that lead to misunderstanding the meaning of the cues or extracting wrong cues.

Research Question 2 *What strategies do CSL learners utilize in sentence-level texts and passage-level texts to infer the meanings of target words with semantic transparency at different levels? Do CSL learners rely more on semantic transparency or more on contextual cues when trying to figure out the meanings of target words?*

Through the questionnaire, the researcher had collected data about the usage of four main strategies, i.e., the context strategy, the character strategy, the L1 strategy, and the guessing strategy. Although the questionnaire provided a blank space in which the participants could fill in any other strategies they applied, most participants just checked the blank but did not provide detailed information. Therefore, investigating any other strategies that the learners utilized in lexical inferencing became one of the objectives of the interviews. The researcher asked the interviewees how they inferred the meanings of the target words and also asked them to explain what hints in the words or contexts helped them.

According to the answers, there were two types of other strategies applied by the learners, including the previous knowledge strategy and the grammar analysis strategy (Table 4.21) besides the four main strategies mentioned in the questionnaire. The previous knowledge strategy (86%) was applied much more frequently than the grammar analysis strategy (14%). Previous knowledge strategy could be further classified into four subtypes. Among them, “world knowledge” (49%) and “encountered the words before” (35%) were the top two strategies applied frequently, followed by “personal experience” (2%) and “Chinese culture knowledge” (2%). Sometimes, the learners also performed grammar analysis to infer the meanings of unknown words. They analyzed the grammar functions of unknown words, including word collocation (6%) and part of speech

(4%), to infer the words' meaning. Other times the learners made inferences according to sentence patterns (1%) and punctuations (1%).

Table 4.21 Types of Other Strategies Utilized by the Participants

Type of Strategies	Subtype of Strategies	Percentage
Previous Knowledge 88%	World knowledge	49%
	Encountered the words before	35%
	Personal experience	2%
	Chinese culture knowledge	2%
Grammar Analysis 12%	Word collocation	6%
	Part of speech	4%
	Punctuations	1%
	Sentence Patterns	1%

Previous Knowledge

•*World Knowledge*

This study defined world knowledge as learners' knowledge on the themes or topics of the reading texts (Paribakht & Wesche, 1999). Besides the four main strategies investigated in the questionnaire, world knowledge was the most frequently used strategy among the learners. When the learners cannot get enough information from words or contexts, they tended to make a judgment based on common sense. For example, when inferring an opaque word, "从容" (leisurely, calm), presented in a

short sentence, CXY, a female Korean student, inferred the word according to her world knowledge.

C10. (Translated from Chinese)

[Questions:

Sentence Context- *求职者面试时，态度一定要**从容**。*

When attending a job interview, the candidate must be calm.

Passage Context- *人们常常会根据你的**谈吐**、态度来判断你的能力、社会地位、受教育的程度。所以，求职者面试时，除了注意说话的方式和用词外，态度一定要**从容**。不要紧张。*

People usually judge your abilities, social status, and education level based on your conversation style and attitude. Therefore, when attending the job interview, the candidate must be calm besides paying attention to the way of speaking and the selection of right words in the conversation. Do not be nervous.]

I: Why do you think "从容" means calm, unhurried?

CXY: Since the sentence mentions job interview, I think usually when people attend job interview, he should be calm. So I wrote calm.

Of course, world knowledge cannot guarantee that the inferred meaning was always correct, although sometimes the inferred meaning did sound reasonable. For example, a learner thought every job seeker was eager to receive the offer, so he inferred "喜讯" as "job offer" instead of "good news". His answer did make sense, but it was not correct.

•*Encountered the words before*

Some learners reported that they have encountered some target words before. In this study, encountering the words before means that the learners have been exposed to the target words in class or out of class by seeing or hearing. The researcher used the term "encounter" instead of "learn" because most interviewees reported that they had been exposed to some words, but forgot the meaning or recalled the wrong meaning. The sentences or passages in the questionnaire reminded them once more about the words. Therefore, in fact they did not really learn the words before filling in the questionnaire.

C11. (Translated from Chinese)

I: You said you learned this word before?

CXY: At the beginning, when I saw this word, I did not know its

meaning. But after I read the sentence, I remember that this is a word I learned before.

Another reason that the researcher used "encounter" is that many interviewees wrote the wrong meanings of the words although they reported that they had learnt these words. JHS, a student from South Korea, thought she knew the meaning of a word, and then wrote the incorrect meaning without checking the context.

C12. (Translated from Chinese)

[Questions:

Sentence Context-*经历了这么多的**周折**，老张终于和家人团聚了。*

After experiencing so many twists and turns, finally, Old Zhang got together with his family.

Passage Context-*经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。*

After experiencing so many twists and turns and difficulties, finally, Old Zhang got together with his family. Now, he had no more dreams and would not think the lofty ambition he ever had any longer. He just wanted to live a stable life.]

I: Why do you think "周折" means close (relationship)?

JHS: I learned this word before, so I wrote the meaning directly, and I don't know why.

I: You learned it before?

JHS: Yes.

I: Did you check this meaning in the sentence? Did you check whether the sentence still makes sense if "周折" means close (relationship)?

JHS: I did not read the sentence since I think I already know the meaning of the word.

Obviously, this student mixed up "周折" with another word she may have learned before, and thought that she had learned the target word. Because of this kind of false confidence, she did not even read the sentence.

Some other students had encountered a multi-meaning word before and learned some meanings of that word but not the exact meaning in this

particular context. For example, ZFG, a male French student, inferred the meaning of "名堂" (a trick that was difficult to discover, or figure out) according to his previous knowledge.

C13. (Translated from Chinese)

[Questions:

Sentence Context-*有的孩子的哭闹就有**名堂**。*

There are tricks when some kids are crying.

Passage Context-*教育孩子有时候需要采用"忽视"的方法，虽然一些父母可能会不**认同**这个观点，觉得这样做不好。例如，有的孩子的哭闹就有**名堂**——我一哭闹，你就得百事依我。所以父母面对孩子的无理哭闹，必要时可以不理他，当孩子觉得这样的哭闹无效时，就再不会无理哭闹了。*

Sometimes, parents need to ignore their children when educating them, although some parents may not agree with this, thinking it is not a good idea. For example, there are tricks when some kids are crying. They may think, "if I cried, you would agree with all my requests". So when children cry without a valid reason, parents can

ignore it when necessary. If children realize such crying does not work, they will never do it again.]

I: You think the meaning of "名堂" is reason and you said you learned this word before.

ZFG: Yes. I knew this word has many different meanings, right? After I read the sentence, I think here it should mean "reason". If a child is crying, there should be some reasons.

ZFG combined his previous knowledge and context together to infer the meaning of the word. His inference sounds reasonable, but the result is still not correct.

•*Personal Experience*

Some learners conducted lexical inferencing based on their own experience. When the context did not provide enough information about the situation, the learners were more likely to put the event into a certain situation they were familiar with. For example,

C14. (Translated from Chinese)

[Questions:

Sentence Context-*小伙子**知趣**地离开了。*

The young guy got the message and left in time.

Passage Context-*中国布朗族的小伙子如果看中哪个姑娘，便采来鲜花相送。姑娘有意，便把花插在自己的头巾上，小伙子就开始和姑娘交往。如果姑娘把花**丢弃**不要，就表示拒绝，小伙子就会**知趣**地离开。*

Blang is a minority in China. If a young Blang man falls in love with a girl, he will pick flowers and present them to the girl. If the girl also loves the guy, she will wear the flowers on her scarf and then they will begin to date. If the girl throws away the flowers, it means she refuses him. The young guy would get the message and leave in time.]

I: You think "知趣" means happy. Why do you think this young man left happily?

XCGZ: Probably he is happy because he will leave.

I: But it is possible that he left sadly.

XCGZ: When people leave here, some of them might be happy, some might be unhappy.

When XCGZ read the single sentence “他知趣地离开了(He got the message correctly and left in time without being embarrassed.)”, she could not get any information about the guy’s leaving time, place, reason, or situation. So she naturally thought about the situation familiar to herself, i.e., when her friends finished studying in China and went back to their own countries, some of them were happy and others not. Another Korean student, JGL, explained “周折” (difficulties) as “weekend discount” according to his personal experience.

C15. (Translated from Chinese)

[Questions:

Sentence Context-*经历了这么多的**周折**，老张终于和家人团聚了。*

After experiencing so many twists and turns, finally, Old Zhang got together with his family.

Passage Context-*经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。*

After experiencing so many twists and turns and difficulties, finally, Old Zhang got together with his family. Now, he had no more dreams and would not think the lofty ambition he ever had any longer. He just wanted to live a stable life.]

I: Why do you think "周折" means weekend discount?

JGL: When I go out during weekends, I often see many stores offer discounts in weekends.

In Example C15, the learner relied on individual characters in the word to infer the word's meaning. The combination of these individual characters with his personal experience caused him to infer wrongly.

•*Chinese Culture Knowledge*

Sometimes, culture knowledge can help learners understand words' meaning more clearly and then make a correct inference.

C16. (Translated from Chinese)

[Questions:

Sentence Context-*求职者都想收到被录用的**喜讯**。*

All job seekers want to receive the good news about offer.

Passage Context-*如果求职者想收到被录用的**喜讯**，就不要轻视外表在求职中的作用。求职者除了要准备简历以外，还应该准备好面试的行头。因为合适的服装会给人留下好的印象，有助于求职的成功。*

If a candidate wants to receive the good news about an offer, he/she should not ignore the importance of appearance. Besides the resume, the job seeker should prepare clothes for the interview, since a set of appropriate interview clothes will impress interviewers and help in successful job hunting.]

I: Why do you think "喜讯" means good news?

CXY: This "喜". Usually, you could see many double "喜" in Chinese people's weddings. So I think the word definitely means good news.

Although "喜" (happy or good) is an A-level character in *The Syllabus*, many participants learned this character from "喜欢 (like)". Thus, many were not able to tell the difference between its word meaning and morpheme meaning, thinking that the meaning of "喜" was also "like" instead of "happy or good". CXY remembered double "喜" as used in

weddings. She thought weddings were considered a good thing and then inferred the character as meaning "good". This is a good example showing the advantage of the culture strategy.

Cultural knowledge could be gained through various ways, including in-class teaching, books, movies, and personal experience, etc. OXR, a male French student, stated that a movie helped him find the correct meaning.

C17. (Translated from Chinese)

[Questions:

Sentence Context-*如果姑娘把花**丢弃**，就表示拒绝。*

If the girl throws away the flowers, it means she refuses him.

Passage Context-*中国布朗族的小伙子如果看中哪个姑娘，便采来鲜花相送。姑娘有意，便把花插在自己的头巾上，小伙子就开始和姑娘交往。如果姑娘把花**丢弃**不要，就表示拒绝，小伙子就会**知趣**地离开。*

Blang is a minority in China. If a young Blang man falls in love with a girl, he will pick flowers and present them to the girl. If the girl also loves the guy, she will wear the flowers on her scarf and then

they will begin to date. If the girl throws away the flowers, it means she refuses him. The young guy would get the message and leave in time.]

I: You think "丢弃" means "throw away". How do you know this?

OXR: I watched a movie about minority people in China. In a wedding, they usually hold flowers. They throw the flowers away after the wedding. Additionally, "丢" means "throw away". So this word means throw away, right?

In this case, the learner already knew the meaning of one character in the word, and his cultural knowledge confirmed his guessing. In this study, culture knowledge was not frequently applied (only 2%), which could be attributed to the fact that the topics of the texts used were not about culture. Nevertheless, it seemed that cultural knowledge was helpful for improving the inferencing accuracy.

Grammar Analysis

When learners applied the grammar analysis strategy, they were more likely to analyze the words grammatically. Four subtypes of the grammar analysis strategy were found from the interview data. Three of them were related to the words. It was understandable since these learners were

required to do lexical inferencing tasks.

•*Word Collocation*

When analyzing the words grammatically, the learners were more likely to analyze them from the perspective of word collocation. If an unknown word was a verb, they usually inferred its meaning according to its objective or subject. JYJ, a female Korean student, inferred the meaning of "认同" (approve, agree) according to its objective "观点" (opinion, point) and subject "父母" (parents).

C18. (Translated from Chinese)

[Questions:

Sentence Context-*一些父母可能会不**认同**这个观点。*

Some parents may not agree with this point.

Passage Context-*教育孩子有时候需要采用"忽视"的方法，虽然一些父母可能会不**认同**这个观点，觉得这样做不好。例如，有的孩子的哭闹就有**名堂**——我一哭闹，你就得百事依我。所以父母面对孩子的无理哭闹，必要时可以不理他，当孩子觉得这样的哭闹无效时，就再不会无理哭闹了。*

Sometimes, parents need to ignore their children when educating them, although some parents may not agree with this, thinking it is not a good idea. For example, there are tricks when some kids are crying. They may think, "if I cried, you would agree with all my requests". So when children cry without a valid reason, parents can ignore it when necessary. If children realize such crying does not work, they will never do it again.]

I: You think "认同" means agree, why?

JYJ: Because of the followed word, "观点", "agree someone's points", sounds reasonable. Additionally, the previous word is "父母". Parents agree this point.

Another example came from KT, a Russian student.

C19.

[Questions:

Sentence Context- *假冒产品**败坏**了商场的声誉。*

Counterfeit products damage the reputation of shopping centers.

Passage Context- *假冒产品对社会的危害极大，既**<u>败坏</u>**了商场的声誉，破坏了产品在人们心中的形象，又使购买者遭受了经济损失。应该坚决予以抵制。*

Counterfeit products have done serious harm to society. They damage the reputation of shopping centers, tarnish the image of genuine products in people's heart, and make buyers suffer from economical loss. We should resolutely resist these products.]

I: You said "败坏" means "damage the reputation". How did you infer the meaning?

KT: From the context and from the meaning of the separate characters. First one means 失败，失败 has the character of 败. 坏 means bad. When you put the two characters together, then you know the meaning of the word. The word following that also helps, "声誉", which means reputation.

In Example C19, KT inferred the word's meaning first based on the meanings of the separate characters, and then confirmed her inference according to the objective following the word.

If an unknown word is a noun, some learners would infer its meaning

based on the verb preceding it. Let's look at an example from ZFG, a French student.

C20. (Translated from Chinese)

[Questions:

Sentence Context-*经历了这么多的**周折**，老张终于和家人团聚了。*

After experiencing so many twists and turns, finally, Old Zhang got together with his family.

Passage Context-*经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。*

After experiencing so many twists and turns and difficulties, finally, Old Zhang got together with his family. Now, he had no more dreams and would not think the lofty ambition he ever had any longer. He just wanted to live a stable life.]

I: Why do you infer "周折" as difficulties?

ZFG: Because of the previous word, "经历". It is said here,

experience so many balabala, and finally get together with families. Since "经历" has the meaning of passing through, or experience, pass through what? Should pass through some difficulties. So I think "周折" must mean "difficulties".

In Example C20, the target word, "周折" (difficulties), is not easy to be inferred since it is a semi-transparent word. This learner inferred its meaning correctly based on the corresponding verb, which demonstrated the effectiveness of the word collocation strategy.

•*Part of Speech*

Although only knowing the part of speech of a word might not help a learner to infer that word's meaning correctly, it can definitely provide some hints to facilitate inferencing. The learners in this study sometimes judged a word's part of speech for the purpose of lexical inferencing.

C21. (Translated from Chinese)

[Questions:

Sentence Context-*近视的人需要配戴眼镜**<u>补救</u>**视力。*

People with myopia need to wear glasses to correct eyesight.

Passage Context-*长时间近距离看东西会造成眼球变形，形成近视。一个人如果近视就会看不清远处的物体。这时，就需要配戴眼镜进行**补救**，以弥补眼球变形所造成的视力缺陷。*

Seeing things close for a long time causes distortion of the eye and results in myopia. A person with myopia is unable to clearly see an object far away. In this case, the person needs to wear glasses correct the problem, compensating for the visual impairment induced by the distortion of the eyeballs.]

ZFG: Here in the passage, I think the meaning of "补救" is the same as that in the sentence. But it should be a noun, not a verb.

I: Oh. Which part of the sentences makes you think "补救" should be a noun?

ZFG: Because of "进行". "进行补救". I think it is not a verb. It's a noun.

It's interesting that some students did not use this strategy in the sentence-level reading but did so when encountering the same sentence in the passage-level reading. For example, LJH, a male student from Austria, analyzed the target word's part of speech in the passage and corrected his

wrong inferencing in the sentence-level reading.

C22. (Translated from Chinese)

[Questions:

Sentence Context- *求职者面试时，态度一定要**从容**。*

When attending a job interview, the candidate must be calm.

Passage Context- *人们常常会根据你的**谈吐**、态度来判断你的能力、社会地位、受教育的程度。所以，求职者面试时，除了注意说话的方式和用词外，态度一定要**从容**。不要紧张。*

People usually judge your abilities, social status, and education level based on your conversation style and attitude. Therefore, when attending the job interview, the candidate must be calm besides paying attention to the way of speaking and the selection of right words in the conversation. Do not be nervous.]

I: Now you think "从容" means "confident". You changed your mind since you thought "从容" means "infer" before. What made you change?

LJH: Because of "态度". It is said "态度一定要从容". I think "从容"

should be an adjective, not a verb.

In Example C22, the learner also read the same part, "态度一定要从容" (the attitude must be calm), in the sentence context. But he did not analyze the target word's part of speech and he guessed the word's meaning completely according to the meanings of the composing characters. However, in the passage context, more information helped his reading, which inspired him to conduct the grammar analysis in the passage context and made a more reasonable inference.

•*Punctuation*

Similar to part of speech, punctuations in a context could provide hints for lexical inferencing although the hint may not be sufficient for all learners. XDE, a male student from Israel, noticed punctuation when inferring "墨水".

C23. (Translated from Chinese)

[Questions:

Sentence Context-*他一肚子**墨水**呢！*

His belly is full of ink (The metaphoric meaning is that he knows a lot).

Passage Context- *你知道王文吗？这个问题还是去问问他吧，他一肚子**墨水**，知道的很多呢！*

Do you know Wang Wen? Go to ask him about this question. His belly is full of ink, knowing a lot!]

I: You think "墨水" is dirty liquid?

XDE: Yes. It is said "一肚子墨水". I thought it might be related to medicine. But later I think it is not related to medicine. Since if it is related to medicine, "呢" and an exclamation mark should not be used. If you write with brush, you use "墨水". There should not be ink in his belly. So I guess it must be a metaphor.

In this example, the learner thought that the text was talking about medicine initially. Later, the exclamation mark that is usually used to express personal emotion helped the learner to reject his first wrong guess.

Another example came from JHS, a female Korean student. She used her knowledge about the dash symbol to infer the meaning of "名堂".

C24. (Translated from Chinese)

[Questions:

Sentence Context-*有的孩子的哭闹就有**名堂**。*

There are tricks when some kids are crying.

Passage Context-*教育孩子有时候需要采用"忽视"的方法，虽然一些父母可能会不**认同**这个观点，觉得这样做不好。例如，有的孩子的哭闹就有**名堂**——我一哭闹，你就得百事依我。所以父母面对孩子的无理哭闹，必要时可以不理他，当孩子觉得这样的哭闹无效时，就再不会无理哭闹了。*

Sometimes, parents need to ignore their children when educating them, although some parents may not agree with this, thinking it is not a good idea. For example, there are tricks when some kids are crying. They may think, "if I cried, you would agree with all my requests". So when children cry without a valid reason, parents can ignore it when necessary. If children realize such crying does not work, they will never do it again.]

I: Now after reading the passage, you corrected the meaning of "名

堂" from "good place" to "meaning". Why did you change?

JHS: Because of this dash. It connects the two parts. I know a dash indicates explanation. So I think "名堂" means "meaning".

I: You mean the crying of children has another meaning? What kind of meaning?

JHS: I don't know. I just think children's crying has a special meaning, not just crying.

As an opaque word, "名堂" was so difficult that most participants could not guess its meaning. JHS gained partial credit by seeking the information from the punctuation.

•*Sentence Patterns*

Some students sought information from sentence patterns. For example, JZL, a female Korean student, thought Ba sentence helped her when inferring the meaning of "丢弃" (throw away).

C25. (Translated from Chinese)

[Questions:

Sentence Context-*如果姑娘把花**丢弃**，就表示拒绝。*

If the girl throws away the flowers, it means she refuses him.

Passage Context-*中国布朗族的小伙子如果看中哪个姑娘，便采来鲜花相送。姑娘有意，便把花插在自己的头巾上，小伙子就开始和姑娘交往。如果姑娘把花**丢弃**不要，就表示拒绝，小伙子就会**知趣**地离开。*

Blang is a minority in China. If a young Blang man falls in love with a girl, he will pick flowers and present them to the girl. If the girl also loves the guy, she will wear the flowers on her scarf and then they will begin to date. If the girl throws away the flowers, it means she refuses him. The young guy would get the message and leave in time.]

I: Well, you think "丢弃" means "fall down".

JZL: Since I know the meaning of "丢", throw away. "弃" means "give up". So I guess it means "fall down".

I: But fall down means the girl lose the flower accidentally, not purposefully.

JZL: Yes. This sentence is a Ba sentence. After realizing this is a Ba sentence, I guess she did not throw away the flower, but let the flower fall down accidentally.

From the conversation, we could see that JZL knew that certain sentence patterns could express a special meaning and she applied this to her lexical inferencing. Although she recalled it incorrectly since the Ba sentence actually emphasized that the girl threw away the flower in purpose, seeking information from the sentence pattern was still a good strategy that could provide useful cues to learners.

Character Strategy

Besides the subtypes of other strategies, the researcher identified some detailed information about CSL learners' usage of two main inference strategies: the character strategy and the context strategy. As one of the main inference strategies used by the learners, seeking information from characters have several advantages.

C26.

I: I found that you like to seek information from characters. Why? Because you don't understand the context?

KT: No, I understand. Just because it is much easier. If you don't have so much time to read, you just see if there are some characters you are familiar with. I think it works.

First, as KT said, seeking assistance from characters is direct and time-saving. If you know the correct meaning of the composing morpheme, you are more likely to infer the correct meaning of the whole word. For example,

C27. (Translated from Chinese)

[Questions:

Sentence Context- *假冒产品**<u>败坏</u>**了商场的声誉。*

Counterfeit products damage the reputation of shopping centers.

Passage Context- *假冒产品对社会的危害极大，既**<u>败坏</u>**了商场的声誉，破坏了产品在人们心中的形象，又使购买者遭受了经济损失。应该坚决予以抵制。*

Counterfeit products have done serious harm to society. They damage the reputation of shopping centers, tarnish the image of genuine products in people's heart, and make buyers suffer from economical loss. We should resolutely resist these products.]

I: You think "败坏" means "damage". Could you tell me the reason?

XL: I looked at the characters. "坏" means bad. Another word "失败"

also has "败". So I guess this word's meaning should be "bad, damage".

Sometimes, even when learners just know the meaning of one character, they could still infer the correct meaning of the whole word.

C28. (Translated from Chinese)

[Questions:

Sentence Context-*经历了这么多的**周折**，老张终于和家人团聚了。*

After experiencing so many twists and turns, finally, Old Zhang got together with his family.

Passage Context-*经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。*

After experiencing so many twists and turns and difficulties, finally, Old Zhang got together with his family. Now, he had no more dreams and would not think the lofty ambition he ever had any longer. He just wanted to live a stable life.]

I: Why do you think "周折" means "曲折" (tortuous, difficulty)?

CXY: I am not very sure. I learned "曲折" last year. Both words have "折". I feel the meanings of these two words should be close.

Being part of a character, a radical usually indicates the meaning of the character. Some learners inferred the meaning of the whole word based on the meanings of radicals in the composing characters.

C29. (Translated from Chinese)

[Questions:

Sentence Context-*人们常常会根据你的**谈吐**来判断你的社会地位。*

People usually judge your social status based on your way of speaking.

Passage Context-*人们常常会根据你的**谈吐**、态度来判断你的能力、社会地位、受教育的程度。所以，求职者面试时，除了注意说话的方式和用词外，态度一定要**从容**。不要紧张。*

People usually judge your abilities, social status, and education level based on your conversation style and attitude. Therefore, when attending the job interview, the candidate must be calm besides paying attention to the way of speaking and the selection of right words in the conversation. Do not be nervous.]

I: Why do you think "谈吐" means "accent"?

LJH: I read the sentence and I felt it means accent. Since it has a mouth radical, it should have some relation with mouth.

Although seeking information from characters in unknown words has such advantages in lexical inferencing, it is not a reliable strategy especially for words with low transparency. For example,

C30. (Translated from Chinese)

[Questions:

Sentence Context-*经历了这么多的**周折**，老张终于和家人团聚了。*

After experiencing so many twists and turns, finally, Old Zhang got together with his family.

Passage Context-*经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。*

After experiencing so many twists and turns and difficulties, finally, Old Zhang got together with his family. Now, he had no more dreams and would not think the lofty ambition he ever had any longer. He just wanted to live a stable life.]

I: You think "周折" means "weekly discount"?

ZYW: Yes. Since "周" means "week", and "折" means "discount", so every week has a discount.

A Chinese morpheme frequently has multiple meanings. The precondition to using the character strategy in lexical inferencing is that a learner should know the correct meaning of the composing morphemes in the specified word. Otherwise the inferred meaning may not make any sense. In Example C30, ZYW inferred the meaning of "周折" as "weekly discount", which was far off its actual meaning, i.e., difficulties, because the meanings of the composing morphemes were incorrect in this particular word. Here is another example:

C31.

[Questions:

Sentence Context- *求职者面试时，态度一定要**从容**。*

When attending a job interview, the candidate must be calm.

Passage Context- *人们常常会根据你的**谈吐**、态度来判断你的能力、社会地位、受教育的程度。所以，求职者面试时，除了注意说话的方式和用词外，态度一定要**从容**。不要紧张。*

People usually judge your abilities, social status, and education level based on your conversation style and attitude. Therefore, when attending the job interview, the candidate must be calm besides paying attention to the way of speaking and the selection of right words in the conversation. Do not be nervous.]

I: How about this one? You think "从容" means face expression.

KT: Like you get it from his face. Face expression.

Obviously, KT relied completely on the characters when inferring the meaning of "从容" (leisurely, calm). She explained the word by putting

the meanings of the two characters together as “from his face” and then thought the meaning of the word should be “face expression”. However, this strategy only works well when inferring words with high transparency. It may fail when applied to opaque words. In this example, the correct meaning of the word was “calm”, which was far different from the learner’s inference.

Context Strategy

Context is another main strategy used by the learners. A context usually provides background information to learners so that sometimes the learners could infer the meanings of unknown words even they are not familiar with the composing characters.

C32. (Translated from Chinese)

LF: Most words here for me are unknown words. If you just show me the words, I definitely have no idea about their meaning. But if you put them into sentences, I can understand the meaning according to the main points of the sentences, even though I have never seen these words before.

Context can not only help the learners guess the meanings of unknown

words, but also remind them to recall the previous knowledge they had learnt before.

C33. (Translated from Chinese)

[Questions:

Sentence Context-*他现在已经没有什么**抱负**。*

Now he had no more ambition.

Passage Context-*经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。*

After experiencing so many twists and turns and difficulties, finally, Old Zhang got together with his family. Now, he had no more dreams and would not think the lofty ambition he ever had any longer. He just wanted to live a stable life.]

I: How did you infer this word "抱负"?

CXY: When I looked at this word first, I don't know its meaning. But after reading the sentence, I remembered that I have learnt it before and then I wrote down the meaning.

Especially if a word has multiple meanings, it is impossible to identify the exact meaning without context.

C34. (Translated from Chinese)

[Questions:

Sentence Context-*有的孩子的哭闹就有**名堂**。*

There are tricks when some kids are crying.

Passage Context-*教育孩子有时候需要采用"忽视"的方法，虽然一些父母可能会不**认同**这个观点，觉得这样做不好。例如，有的孩子的哭闹就有**名堂**——我一哭闹，你就得百事依我。所以父母面对孩子的无理哭闹，必要时可以不理他，当孩子觉得这样的哭闹无效时，就再不会无理哭闹了。*

Sometimes, parents need to ignore their children when educating them, although some parents may not agree with this, thinking it is not a good idea. For example, there are tricks when some kids are crying. They may think, "if I cried, you would agree with all my requests". So when children cry without a valid reason, parents can

ignore it when necessary. If children realize such crying does not work, they will never do it again.]

I: You think "名堂" means "reason" and you said you have learnt this word before.

ZFG: Yes. But I remember "名堂" has many different meanings. Am I right?

I: Yes, you are right. So what made you decide its meaning to be "reason"?

ZFG: I know it has a few meanings. I selected this meaning mainly because I looked at the context. I think if a child is crying, there should be some a reason for it. A child will not cry without any reasons.

However, in many cases, even though the inferred meaning sounds reasonable in the context, it is still incorrect. Therefore, completely relying on context is not safe either. For example, some participants inferred "谈吐" (the way of speaking, style of conversation) as "opinion" because the sentence would mean "people make judgment according to your opinion" if they replaced "谈吐" with "opinion". The logic sounds perfect but not correct since the correct definition of "谈吐" is "the way of speaking".

Combination of the Character Strategy and the Context Strategy

In this study, many learners applied more than one strategy to infer the meanings of unknown words. They usually combined the character strategy and the context strategy.

C35. (Translated from Chinese)

[Questions:

Sentence Context- *假冒产品**败坏**了商场的声誉。*

Counterfeit products damage the reputation of shopping centers.

Passage Context- *假冒产品对社会的危害极大，既**败坏**了商场的声誉，破坏了产品在人们心中的形象，又使购买者遭受了经济损失。应该坚决予以抵制。*

Counterfeit products have done serious harm to society. They damage the reputation of shopping centers, tarnish the image of genuine products in people's heart, and make buyers suffer from economical loss. We should resolutely resist these products.]

I: You think "败坏" means "bad"?

JZL: Yes. This word has "坏", so I think the meaning of the whole

word is not good. And then I noticed that it has counterfeits in the sentence. So I guess the word means "bad".

In Example C35, the learner only knew the meaning of one composing character, but she extracted the correct contextual cue, "counterfeits". The contextual cue compensated for the learner's lack of knowledge of characters and helped her infer the word's meaning.

Although combining the character and the context strategies would improve the accuracy of inferencing, a learner could still make a wrong guess if he/she could not apply each individual strategy correctly.

C36. (Translated from Chinese)

[Questions:

Sentence Context-*经历了这么多的**周折**，老张终于和家人团聚了。*

After experiencing so many twists and turns, finally, Old Zhang got together with his family.

Passage Context-*经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。*

After experiencing so many twists and turns and difficulties, finally, Old Zhang got together with his family. Now, he had no more dreams and would not think the lofty ambition he ever had any longer. He just wanted to live a stable life.]

I: You think "周折" means "time", why?

OXR: According to the sentence, after a period of time, he finally got together with his family. Because "周" means "week", that means a period of time. I didn't know that "周折" refers to how many days, but it should mean a period of time.

In Example C36, the learner combined the two main strategies; however, his guess was not correct since he extracted the wrong meaning for the morpheme, "周", which has multiple meanings.

Combination of Multiple Strategies

When a learner infers unknown words in reading, he/she could use various strategies at one time according to the example below or other

similar ones.

C37. (Translated from Chinese)

[Questions:

Sentence Context-*人们一生说的话，总计起来，**正经**的话很少。*

If we calculate, there are very few serious conversations spoken in people's whole lives.

Passage Context-*爱说话是人的本性。人们一生说的话，总计起来，大约还是闲话多，废话多，**正经**的话少，因为说严肃正式的话太累。人们不论多么忙，总爱闲谈。*

Loving to talk is human nature. If we calculate, most conversations in people's whole lives are nonsense or rubbish, and there are very few serious conversations, since it is tiring to speak seriously and formally. However, people always like to chat no matter how busy they are.]

I: Why do you think "正经" means "honest"?

FD: Partially because of the word, and partially because of the sentence. Since "正经" has two characters. "正" means "formal", I

guess the meaning of "经" is similar to the meaning of "正". And the sentence is talking about the content of people's talking in the whole life, so I think this word is to describe the context of people's talking. It should mean "honest".

I: So you think usually people seldom talk honestly?

FD: Yes. Most time people's talking is superficial.

In Example C37, the learner examined the composing characters of the word first and then checked the context, and finally conducted the inference based on the information from the characters and the context as well as his world knowledge. Unfortunately, he did not notice the direct contextual cue, "严肃正式 (serious and formal)", and his guess was not correct.

C38. (Translated from Chinese)

[Questions:

Sentence Context-*人们常常会根据你的**谈吐**来判断你的社会地位。*

People usually judge your social status based on your way of speaking.

Passage Context-*人们常常会根据你的**谈吐**、态度来判断你的能力、社会地位、受教育的程度。所以，求职者面试时，除了注意说话的方式和用词外，态度一定要**从容**。不要紧张。*

People usually judge your abilities, social status, and education level based on your conversation style and attitude. Therefore, when attending the job interview, the candidate must be calm besides paying attention to the way of speaking and the selection of right words in the conversation. Do not be nervous.]

I: You said "谈吐" means the way of speaking. How did you infer it?

CGQSL: I read the sentence first. It said that people judge your social status according to the way of your speaking. Because it said "你的谈吐", I know "谈吐" should be a noun. And I also looked at the characters. "谈" means speak.

In Example C38, the learner first read the sentence, analyzed the word's part of speech, considered the meaning of the composing character and finally inferred the word's meaning correctly.

In sum, we could understand CSL learners' use of inference strategies in details by analyzing the interview data. First, this study found that besides the strategies listed in the questionnaire, the learners also applied the previous knowledge strategy (including *world knowledge, encountered the words before, personal experience,* and *Chinese culture knowledge*) and the grammar analysis strategy (including *word collocation, part of speech, punctuations,* and *sentence patterns*). The previous knowledge strategy was used much more frequently than the grammar analysis strategy.

Second, it is found that every strategy had its advantages and disadvantages. Most interviewees did not rely on one single strategy but instead they combined multiple strategies to infer meanings of words. Conducting lexical inferencing based on the combination of multiple strategies might not improve the accuracy of inference, but most interviewees showed more confidence in the words if they inferred the words' meanings based on multiple information sources.

Research Question 3 *What are the differences in the learning outcomes and inference strategies between CSL learners with a background of Chinese characters in L1 and those without such a background when learning target words through reading with semantic transparency at different levels incidentally?*

The 29 interviewees were divided into two groups by their nationalities. A total of 15 Japanese or Korean students formed the group with a Chinese character background in their L1s while 14 students from other countries belonged to the group without a Chinese character background in their L1s. The two groups' frequencies of using other inference strategies were calculated and listed in Table 4.22. It can be seen that the frequencies of use of other strategies between the two groups were quite similar. There was only one large difference between the two groups in "encountered the words before". The group with a Chinese character background in L1 used this strategy 21 times while the group without such a background applied this strategy 13 times. However, the results of t-tests in SPSS showed that there was no significant difference on the use of each subtype of strategies between two groups.

Table 4.22 Comparison between Japanese/Korean and Non-Japanese/Korean on the Frequency of Other Strategies Used

Type of Strategies	Subtype of Strategies	Japanese/Korean	Non-Japanese/Korean
Previous Knowledge	World knowledge	**23**	**25**
	Encountered the words before	**21**	**13**
	Personal	**2**	**0**

	experience		
	Chinese culture knowledge	**1**	**1**
	Total	**47**	**39**
Grammar Analysis	Word collocation	**2**	**4**
	Part of speech	**2**	**2**
	Punctuations	**0**	**1**
	Sentence Patterns	**1**	**0**
	Total	**5**	**7**

Does Your Native Language Help You Learn Chinese?

Most students in the group without a Chinese character background in their L1s thought that their native language did not provide any help in learning Chinese. The only exception was one student, ML, from Georgia.

C39. (Translated from Chinese)

I: Does your native language, Georgian language, help you learn Chinese?

ML: Sometimes. Sometimes, the meanings are the same. For example, some Georgian idioms are similar to Chinese idioms.

And ML did infer the meaning of "墨水" with help from her native language, although it was not correct.

C40. (Translated from Chinese)

[Questions:

Sentence Context-*他一肚子**墨水**呢！*

His belly is full of ink (The metaphoric meaning is that he knows a lot).

Passage Context- *你知道王文吗？这个问题还是去问问他吧，他一肚子**墨水**，知道的很多呢！*

Do you know Wang Wen? Go to ask him about this question. His belly is full of ink, knowing a lot!]

I: You think "墨水" means "speak a lot". Could you explain this a bit more?

ML: Since in my country, we often say there is a lot of water in his mouth, which means that he speaks a lot. Here it said there is water in his belly. So I think it also means that he speaks a lot.

Although ML's native language is completely different from Chinese in writing system, she could still figure out the similarities in the meanings of idioms between the two languages and tried to infer the meaning of the target word. Although her guess was not correct, at least she realized that "墨水" in the sentence was a word with figurative meaning, which did help her inference generate better results than other students.

In contrast, most Japanese or Korean interviewees thought that their native languages provided significant help for them in learning Chinese.

C41. (Translated from Chinese)

I: You native language is Japanese. Do you think Japanese language helps you learn Chinese?

CGQSL: Yes, a very big help. We also use Chinese characters.

I: Do you think your native language also has some negative influence in your Chinese learning?

CGQSL: No, not at all.

Korean students also were of the same opinion.

C42. (Translated from Chinese)

I: Do you think your native language, Korean language, helps you learn Chinese?

JGL: Yes, it helps me a lot.

I: What kinds of help?

JGL: The help mainly focuses on learning Chinese character words. We also know some Chinese characters.

From Example C41 and C42, we could know that the positive influence of the Japanese and Korean languages on Chinese learning mainly comes from the use of Chinese characters in their writing systems. As mentioned earlier, the main difference in the use of other strategies between Japanese/Korean students and non-Japanese/Korean students was the usage of "encountered the words before". Japanese/Korean students applied this strategy more often than other students, which could be due to this reason. Since Japanese/Korean students are more familiar with Chinese characters, they are more likely to understand those words whose composing characters are identical or similar to the target words that they encountered in class or out of class. Or they are more likely to think about the words in their L1s whose composing characters are identical or similar to the target words in this study.

Influence of the Japanese Language

•*Positive Influence*

Since there are a large amount of Chinese characters used in modern Japanese language, Japanese students have a greater advantage in lexical inferencing compared to those students who have no Chinese character background in their L1s. Even though the researcher tried to control this advantage by deleting the Chinese words that also exist in the Japanese language and with the same written form, it seems that Japanese students could still infer the meanings of unknown words based on the meanings of the composing characters that are also used in the Japanese language.

C43. (Translated from Chinese)

[Questions:

Sentence Context- *假冒产品**败坏**了商场的声誉。*

Counterfeit products damage the reputation of shopping centers.

Passage Context- *假冒产品对社会的危害极大，既**败坏**了商场的声誉，破坏了产品在人们心中的形象，又使购买者遭受了经济损失。应该坚决予以抵制。*

Counterfeit products have done serious harm to society. They damage the reputation of shopping centers, tarnish the image of genuine products in people's heart, and make buyers suffer from economical loss. We should resolutely resist these products.]

I: Could you let me know how you inferred the meaning of this word, "败坏"?

MA: I read the sentence and looked at the characters. This character is the same as the character in Japanese.

I: You mean the second one, "坏"? Your native language has the same "坏"?

MA: Yes. So I guess the meaning of the word is "damage".

I: Does your native language have the first character, "败"?

MA: Yes. We have. Completely the same.

I: Does the Japanese language have the word, "败坏"?

MA: I think no. We have these two characters, but we don't have this word with these two characters together.

Like in Example C43, although there is no "败坏" in Japanese, Japanese people use the two characters, "败" and "坏", in their own language with

the same meanings. Therefore, it was easy for the Japanese learner to infer this word.

Although some Chinese characters in the Japanese language are in the traditional form that are different from the simplified form adopted in mainland China, some Japanese students can still recognize these Chinese characters in the simplified form.

C44. (Translated from Chinese)

[Questions:

Sentence Context-*近视的人需要配戴眼镜**补救**视力。*

People with myopia need to wear glasses to correct eyesight.

Passage Context-*长时间近距离看东西会造成眼球变形，形成近视。一个人如果近视就会看不清远处的物体。这时，就需要配戴眼镜进行**补救**，以弥补眼球变形所造成的视力缺陷。*

Seeing things close for a long time causes distortion of the eye and results in myopia. A person with myopia is unable to clearly see an object far away. In this case, the person needs to wear glasses correct the problem, compensating for the visual impairment induced by the distortion of the eyeballs.]

I: You guess this word, "补救", means "supplement". Why?

YJXY: I looked at the word first. It has the character, "补".

I: I know the same character is also used in your native language, but it's in the traditional form. Since this character in the traditional form is used in the Japanese language, is it easy for you to recognize the same character in the simplified form?

YJXY: Yes. At least for this character, I know the traditional form (補) and this one (补) is a simplified one.

The difference between the traditional and simplified forms of Chinese characters seems to have no influence on the Japanese participants negatively in terms of taking advantage of these characters during inferencing.

•*Negative Influence*

Relying on L1 excessively is the main negative influence of the Japanese language found in this study.

C45. (Translated from Chinese)

[Questions:

Sentence Context-*经历了这么多的**周折**，老张终于和家人团聚了。*

After experiencing so many twists and turns, finally, Old Zhang got together with his family.

Passage Context-*经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。*

After experiencing so many twists and turns and difficulties, finally, Old Zhang got together with his family. Now, he had no more dreams and would not think the lofty ambition he ever had any longer. He just wanted to live a stable life.]

MAYZ: I think "周" in Japanese it means "week". This character, "折", also exists in Japanese, and it means "break". Put them together, "week break", it does not make sense. Ur, I cannot infer the meaning of this word.

In this example, the learner only relied on his native language to infer the word's meaning and forgot that the meanings of Chinese characters in

Chinese and Japanese are not always the same, although they might look identical.

Influence of the Korean language

•*Positive Influence*:

Many words in the Korean language originated from Chinese words. However, ordinary Korean people do not realize that many words they used are Chinese words, since the writing systems of these two languages are completely different. Nevertheless, the pronunciations of these words in Korean are similar to those in Chinese. Therefore, when Korean students inferred the meanings of unknown words, the pronunciations of the words can often remind them about the words with the similar pronunciations in their L1.

C46. (Translated from Chinese)

[Questions:

Sentence Context-*一些父母可能会不**认同**这个观点。*

Some parents may not agree with this point.

Passage Context-*教育孩子有时候需要采用"忽视"的方法，虽然一些父母可能会不**认同**这个观点，觉得这样做不好。例如，有的孩子的哭闹就有**名堂**——我一哭闹，你就得百事依我。所以父母面对孩子的无理哭闹，必要时可以不理他，当孩子觉得这样的哭闹无效时，就再不会无理哭闹了。*

Sometimes, parents need to ignore their children when educating them, although some parents may not agree with this, thinking it is not a good idea. For example, there are tricks when some kids are crying. They may think, "if I cried, you would agree with all my requests". So when children cry without a valid reason, parents can ignore it when necessary. If children realize such crying does not work, they will never do it again.]

I: You think "认同" means 同感, why?

JHS: I looked at the characters. 同 is the character that is also in the word 同样, 认 is also in the word 认识.

I: But you also said that there is a similar Chinese character word in your native language.

JHS: Yes. In Korean, we say shangtong. The meaning of shangtong is similar to the meaning of "认同", and the pronunciation is similar.

I: Well. You said the pronunciation is similar. Is the writing form of this word in Korean also the same as that in Chinese?

JHS: No. We don't use Chinese characters in the Korean language.

Before the invention of Korean written language, Korean people used Chinese characters as their written language. Therefore, there are many Korean words that were originated from the Chinese language. Even though the modern Korean language no longer uses Chinese words explicitly in writing, the pronunciations of those words borrowed from Chinese are still similar to those in Chinese. This is the reason that some Korean learners inferred the word meaning with assistance from pronunciation according to the interview.

Another special thing is that secondary schools in South Korea offer a Chinese character class to all students as an elective course.

C47. (Translated from Chinese)

I: Did you take any Chinese character class in the secondary school?

JZL: I took the Chinese character class as an elective course when I was in the middle school. This was not a required course. Students could choose to take it or not. Young Korean people do not like to learn Chinese characters. In the past, Korean people wrote words in

Chinese characters. But later, we did not use Chinese characters. My parents might be able to guess the meanings of some difficult Chinese words, for example, the formal written words, since they know the meanings of more Chinese characters.

Although the Chinese character course is an elective course, it continues for a few years in South Korean secondary schools.

C48. (Translated from Chinese)

I: Did you take any Chinese character course when you were in the secondary school?

CYZ: Yes, I did.

I: Did all students in your secondary school take that course?

CYZ: Yes.

I: How many Chinese characters did you guys learn when you graduated from the secondary school?

CYZ: I don't know the exact number. But I learned Chinese characters for three years in my middle school and two years in my high school.

Therefore, a common Korean high school student learns around 1,800 Chinese characters by graduation (Luo, 2001). This is an important advantage for Korean students in learning Chinese, when compared with other students, except those from Japan of course.

•*Negative Influence*

On the other hand, Korean learners' advantage could also bring negative effects, especially for words with pronunciation similar to the target words.

C49. (Translated from Chinese)

[Questions:

Sentence Context-*他现在已经没有什么**抱负**。*

Now he had no more ambition.

Passage Context-*经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。*

After experiencing so many twists and turns and difficulties, finally, Old Zhang got together with his family. Now, he had no more

dreams and would not think the lofty ambition he ever had any longer. He just wanted to live a stable life.]

I: Why did you guess "抱负" means "revenge"?

CYZ: I think the pronunciation is similar.

I: I think you are talking about another word. Does the Korean language have the Chinese character word, "抱负"?

CYZ: I don't know. The meaning I wrote here might be wrong. But the pronunciation of some Korean words are really very similar to the pronunciation of the related Chinese words, for example, sun, art museum. The pronunciation are very close to the related Chinese words.

In Example C49, the learner inferred the word according to its pronunciation, and gave the meaning of the target word (抱负, ambition)'s homophone (报复, revenge) as the answer. The meanings of the two words are completely different. From the above exchange, we can see that the learner knew that the pronunciation of Korean words and the corresponding Chinese words are similar and he might have taken this advantage frequently in learning Chinese. Unfortunately, this time he made a mistake.

C50. (Translated from Chinese)

[Questions:

Sentence Context-*有的孩子的哭闹就有**名堂**。*

There are tricks when some kids are crying.

Passage Context-*教育孩子有时候需要采用"忽视"的方法，虽然一些父母可能会不**认同**这个观点，觉得这样做不好。例如，有的孩子的哭闹就有**名堂**——我一哭闹，你就得百事依我。所以父母面对孩子的无理哭闹，必要时可以不理他，当孩子觉得这样的哭闹无效时，就再不会无理哭闹了。*

Sometimes, parents need to ignore their children when educating them, although some parents may not agree with this, thinking it is not a good idea. For example, there are tricks when some kids are crying. They may think, "if I cried, you would agree with all my requests". So when children cry without a valid reason, parents can ignore it when necessary. If children realize such crying does not work, they will never do it again.]

I: You think "名堂" means "good place". I know the Korean language has the same word with the meaning of "good place". But do you think this meaning makes sense in this sentence?

JZL: No, it does not make sense, since the sentence is talking about children's crying.

I: Then why did you still answer "good place" here?

JZL: Because I didn't know the correct meaning, I just wrote down the meaning in the Korean language without considering much.

Although most words in Korean are written in the Korean form, there are still a few words written in Chinese characters used in Korean today, one of which is "名堂" (a trick that was difficult to discover, or figure out). However, the meaning of "名堂" in Korean (good place) is completely different from its meaning in Chinese. Since this word is also written in Chinese characters in Korean, Korean participants naturally tended to answer with its meaning in Korean. Even when they realized that the word's meaning in Korean did not match at in the context, they still did not spend much time reconsidering it.

The researcher also found that some negative influences of Korean were not related to the similarities between two languages, but to

language habits. In this case, learners with other native languages are also likely to make similar mistakes.

C51. (Translated from Chinese)

[Questions:

*Sentence Context-从 200 立方公里的海水中只能捞到 1 公斤黄金，很不**划算**。*

People can only gain 1-kg gold from 200-km³ seawater. It is not cost-effective.

*Passage Context-很多数据证实海水中含有黄金，所以有人就设想从海水里提取黄金。可是，要实现这个假想很困难。因为，从 200 立方公里的海水中只能捞到 1 公斤黄金，投入大大超过产出，很不**划算**。*

A lot of data prove that there is gold in seawater. Therefore, some people propose to extract gold from seawater. However, it is difficult to realize this idea, since people can only gain 1-kg gold from 200-km³ seawater, i.e. the investment is significantly more than the output. It is not cost-effective.]

I: After reading the passage, you think "划算"means "变成这样" (become this). This meaning is different from the one you inferred in Section 1. Why did you change?

JZL: Because I think when we read in Chinese, we tend to translate what we read into our native language, thinking about what we read in spoken Korean. And I also think that the part with this word is not the main content of the whole passage.

I: So you mean in your native language, after stating a fact, you usually say "变成这样"?

JZL: Yes.

In Example C51, the learner noticed that the phrase, "很不划算", was at the end of the context, following the statement of a fact. So she inferred it as "变成这样" (become this), according to Korean language habits, i.e. speaking out a phrase whose function is similar to "that's it" in oral English to end the statement.

Learners' Role

When a student is learning a second language, his/her native language can influence L2 learning positively or negatively. However, if he/she

combines the L1 strategy with other strategies, he/she could avoid the negative transfer of L1.

C52. (Translated from Chinese)

[Questions:

Sentence Context-*他一肚子**墨水**呢！*

His belly is full of ink (The metaphoric meaning is that he knows a lot).

Passage Context- *你知道王文吗？这个问题还是去问问他吧，他一肚子**墨水**，知道的很多呢！*

Do you know Wang Wen? Go to ask him about this question. His belly is full of ink, knowing a lot!]

I: Well, you did not write the meaning of "墨水", but you said there is a similar Chinese character word in your native language (Japanese).

MAYZ: In Japanese, "墨水" means the ink for Chinese painting. But in this sentence, it obviously has a different meaning. I cannot guess its meaning in this sentence.

C53. (Translated from Chinese)

[Questions:

Sentence Context-*有的孩子的哭闹就有**名堂**。*

There are tricks when some kids are crying.

Passage Context-*教育孩子有时候需要采用"忽视"的方法，虽然一些父母可能会不**认同**这个观点，觉得这样做不好。例如，有的孩子的哭闹就有**名堂**——我一哭闹，你就得百事依我。所以父母面对孩子的无理哭闹，必要时可以不理他，当孩子觉得这样的哭闹无效时，就再不会无理哭闹了。*

Sometimes, parents need to ignore their children when educating them, although some parents may not agree with this, thinking it is not a good idea. For example, there are tricks when some kids are crying. They may think, "if I cried, you would agree with all my requests". So when children cry without a valid reason, parents can ignore it when necessary. If children realize such crying does not work, they will never do it again.]

I: Why did you think "名堂" means "reason"?

CXY: I don't know this word. But after reading the sentence, I think there should be some reasons that resulted in the child's crying.

I: Sounds reasonable. But I think Korean people also use "名堂", right?

CXY: Yes. We have the same word.

I: Then why didn't you write down the Korean meaning of this word?

CXY: Because I am sure the Korean meaning is not correct here. In Korean, this word means "good place". There are no relations between "good place" and the main point of this sentence.

In the above two examples, both MAYZ (Japanese student) and CXY (Korean student) realized that the target words' meanings in their native languages were not suitable in the particular context and they avoided the negative transfer using the context strategy.

In sum, after analyzing the interview data, the researcher could reveal CSL learners' inference strategy usage thoroughly from the perspective of learners' native languages. Through interview, the researcher made the following findings.

First, for the usage of other strategies, the interviewees with a Chinese character background in their L1s only applied the strategy, "encountered

the words before", obviously more often than those without such a background. However, this difference was not statistically significant.

Second, most interviewees with a Chinese character background in their L1s agreed that their native languages provided great help in learning Chinese while most interviewees without a Chinese character background in their L1s denied the positive role of their L1s on Chinese learning.

Third, the effects of Japanese or Korean on Chinese learning could be positive or negative. The influence of Japanese on Chinese learning mainly comes from the same Chinese characters used in the Japanese language, while the influence of Korean can come from either the same Chinese characters used in the Korean language or the Korean words with pronunciation similar to Chinese words.

Finally, if learners combine the L1 strategy with other strategies instead of relying on the L1 strategy alone, they might be able to avoid the negative transfer of L1.

Research Question 4 *What are the differences in the learning outcomes and inference strategies between CSL learners with strong morphological awareness and those with weak morphological awareness when learning target words through readings with semantic transparency at different levels incidentally?*

The 29 interviewees were divided into two groups according to morphological awareness ability, resulting in 17 students in the high-ability group and 12 students in the low-ability group. The two groups' frequencies of using other inference strategies were calculated and listed in Table 4.23. According to Table 4.23, the frequencies in the use of most other strategies between two groups were very close. However, the difference in the use of world knowledge between two groups was relative large. The high-ability group applied this strategy 30 times while the low-ability group only used it 18 times. The interviewees in the high-ability group had also encountered certain target words before more frequently than those in the low-ability group. However, there were no significant results found after comparing the usage of each subtype of strategies between the two groups with t-test in SPSS.

Table 4.23 Comparison in the Frequency of Other Strategies Usage between Interviewees with High Morphological Awareness Ability and Those with Low Morphological Awareness Ability

Type of Strategies	Subtype of Strategies	Low Ability	High Ability
Previous Knowledge	World knowledge	**18**	**30**
	Encountered the words before	**13**	**21**

	Personal experience	**2**	**0**
	Chinese culture knowledge	**0**	**2**
	Total	**33**	**53**
Grammar Analysis	Word collocation	**3**	**3**
	Part of speech	**1**	**3**
	Punctuations	**0**	**1**
	Sentence Patterns	**1**	**0**
	Total	**5**	**7**

Discussion

The interview data provided us more detailed information about CSL learners' lexical inference strategy usage than the questionnaire alone. This section discusses the main findings from the interviews in the second phase of the study. Although the interviews revealed the same patterns in CSL learners' inference strategy usage as the questionnaire, the second phase of the study uncovered some new aspects. It is noted that the study only had 29 out of 90 participants as interviewees in Phase 2. However, the researcher believes that the interview data is able to provide an important supplement to the results of Phase 1 because the interviewees were selected according to strict criteria and the samples were thus highly representative of all participants.

First, similar to the quantitative data, the interview data confirmed the positive role of the passage context on CSL learners' incidental vocabulary learning. The results of Phase 1 indicated that the learners' accuracy of lexical inferencing significantly improved from the sentence context to the passage context. Consistently, the feedback from participants in Phase 2 showed that the passages provided more help to most interviewees than the sentences when inferring the meanings of unknown words. However, the researcher found that a considerable portion of helpful contextual cues in the passage context were not used effectively by the interviewees, which might be one of reasons that the accuracy of lexical inferencing was relatively low (the average accuracy of transparent words, semi-transparent words and opaque words in both contexts were .64, .45, and .185, respectively). The findings suggest that it is necessary to cultivate CSL learners' ability to extract useful contextual cues so that they could improve their learning rate of new words through reading and finally enlarge their vocabulary size. On the other hand, the findings also prove the importance of using reading materials with an appropriate difficulty level for incidental vocabulary learning. The reading materials used in this study were identified by the language instructors as at the appropriate difficulty level for the participants, but there were still 32.95 percent of new hints in the passages that were not used by the learners because of the learners'

limited Chinese language ability. We can imagine how low the learning rate of unknown words would be if we provide the learners a reading text at a higher difficulty level. Similar to the findings of Mori (2003), the researcher found through the interviews that the contextual cues generated more inferences based on the syntactic analysis than did the word cues, while the word cues generated more guesses associated with the semantic analysis than did the contextual cues.

However, generally, the interviewees in this study made most of their guesses based on semantic analysis. The main difference between this study and Moris is still on the context type. Mori's participants were exposed to unknown words in a single sentence context while the participants in this study had to read both the sentence context and passage context. Reading longer text reduced the possibility that learners would be able to conduct a syntactic analysis. Although the researcher found that the learners were more likely to conduct grammar analysis in the passage context, their analysis did occur within one sentence in a passage. When CSL learners read a passage, it is obviously easier for them to remember the meaning of a passage instead of its grammar structure. Therefore, it is not surprising that they conducted most of their inferences based on semantic analysis.

Second, by individual interviews with 29 learners, this study provides more information on other strategies applied by the learners. Together

with the strategies listed in the questionnaire of Phase 1 in this study, the information sources used by the participants in this study are consistent with those identified by the previous studies conducted by Qian (2005) and Paribakht & Wesche (1999). In addition, all three studies indicated that the distance between the target language and the learners' L1s determined their usage of the L1 strategy. In this study, the learners with a Chinese character background in their L1s applied the L1 strategy significantly more than those without such a background. In Paribakht & Wesche's study, French ESL learners used L1 strategy more than other learners since there are many cognates in both English and French, while Qian did not found any L1 knowledge used by Korean and Chinese ESL learners in his study. The main difference between this study and the one conducted by Paribakht & Wesche is the usage of homonymy. In Paribakht & Wesche's study, ESL learners with various L1 background were likely to infer the meanings of unknown words according to the phonetic similarity between two words, while in this study only Korean learners utilized this technique to guess the meaning of Chinese words.

This could be attributed to the fact that Chinese is an ideograph. Therefore, although there are many Chinese characters sharing the same pronunciation, most learners prefer to infer the meanings of the words based on their written forms except Korean students. Korean students inferred the meanings of the words based on both the written forms and

pronunciation mainly because the pronunciations of some Korean words are similar to their Chinese cognates. For this reason, this study considered using homonymy as Korean students' use of the L1 strategy.

Additionally, this study confirmed again that although L2 learners' information sources for lexical inferencing were diverse, the main information sources were still from the context, word, L1 and previous knowledge. Most learners would apply not just one strategy during inferencing, but combine multiple strategies. Therefore, language instructors should help their students develop their inferencing skills from multiple aspects.

Similar to the results of the quantitative study, the results of the qualitative study indicated again that the learners with a Chinese character background in their L1s (Japanese/Korean students) applied the L1 strategy much more often than those without such a background in their L1s (Non-Japanese/Korean students). Furthermore, almost all Japanese/Korean interviewees agreed that their L1s provide big help on Chinese learning, while only one non-Japanese/Korean interviewee thought her L1 sometimes helped her learn Chinese. However, since the similarities between Chinese and Japanese/Korean are mainly in Chinese characters and word usage, the researcher found that the help provided by the Japanese or Korean languages on Chinese learning was limited on the character or word levels too. For Japanese learners, the help mainly came

from the same or similar character written forms; while for Korean learners, the help mainly came from the similar pronunciations of words and the relatively large number of Chinese characters learnt in their secondary education.

Another interesting finding is that the Japanese and Korean languages provide help on Chinese learning on the one hand, but they can also influence it negatively. For example, the meaning of a Chinese word might be different from that of a Japanese word despite consisting of the same characters. A Chinese word does not necessarily mean the same thing as a Korean word even though their pronunciations are similar. It has been found that the Japanese/Korean interviewees relied on the L1 strategy too much. Consequently, their L1s limited their ability to infer words' meanings using other types of strategies.

Furthermore, there was no significant difference between Japanese/Korean interviewees and non-Japanese/Korean interviewees in the usage of the previous knowledge strategy and grammar analysis strategy. The quantitative data indicated that there was no significant difference between the two groups of learners in using the word strategy either. In the sentence context, non-Japanese/Korean learners applied the context strategy even significantly more than Japanese/Korean students did. These results suggest that Japanese and Korean learners' advantages on characters or words do not make them better in using other types of

strategies, for example, the context strategy. For this reason, when reading passage-level texts, those learners' L1 advantages would be reduced greatly. Consistent with this reasoning, the accuracy of Japanese/Korean learners' lexical inferencing was not significantly different from that of non-Japanese/Korean learners. This finding is different from the results of Gan's study (2008). In Gan's study, the accuracy of Japanese/Korean students was higher than that of the students from other countries. The researcher thinks that the main reason for the different results in the two studies is still the use of different context types. Gan asked the participants to read single-sentence texts, in which level Japanese/Korean students were more likely to take advantage of their native languages to infer the meanings of unknown words. In contrast, the passages in this study diluted the character/word-level advantage of Japanese/Korean students due to their L1s. Additionally, Gan just invited the language instructor of the participants to check if the participants had learned the target words. She did not invite Japanese or Korean native speakers to check the word list as the researcher did in this study. So it was possible that there were some Japanese or Korean isomorph synonyms in Gan's word list that resulted in the high accuracy of lexical inferencing for those Japanese/Korean students. Therefore, language instructors cannot take it for granted that Japanese/Korean learners' abilities of comprehending passage-level readings are better than other

learners just because they have learned more Chinese characters from their native languages. In fact, they may need special instruction because of the double-edged sword effect of their L1s.

Last, through the interviews, this study found that the interviewees with high Chinese morphological awareness ability applied the world knowledge strategy more often than those who were of low ability. However, likely because of the small percentage of use of other strategies among the interviewees, this study did not find any statistically significant difference in the use of other strategies between the high-ability and the low-ability groups.

CHAPTER FIVE

CONCLUSIONS & IMPLICATIONS

Summary of the Findings

The present study investigated the effects of semantic transparency of Chinese disyllabic compound words on incidental vocabulary learning through two types of readings, i.e., sentence-level reading and passage-level reading, in which the subjects were adult learners studying Chinese as a second language at universities in mainland China. In Phase 1, quantitative data were collected from 90 CSL learners through a written questionnaire including questions about lexical inferencing, inference strategy usage, Chinese morphological awareness test, and background information. In Phase 2, qualitative data were collected through individual interviews with 29 learners who had participated in Phase 1 of the study. The main purpose of interviews was to collect more detailed information about the learners' lexical inferencing and use of inference strategy. The researcher also asked other related questions based on individual interviewees' feedback.

In this chapter, the findings of the whole study is summarized first by combining the results from the two phases of the study to answer every research question sequentially. Then the conclusion of the whole study is

presented. After that, several suggestions are proposed for language educators according to the conclusions and the results of the supplementary study. Finally, the limitations of the study are discussed and the direction of future research is pointed out.

Research Question 1

What effects does the semantic transparency of Chinese disyllabic compound words exert on CSL learners' incidental vocabulary learning through reading? What are the effects of interaction between the semantic transparency and the strength of contextual support of the target words on CSL learners' incidental vocabulary learning through reading?

The results of the questionnaire showed the strong relationship between word semantic transparency and the accuracy of lexical inferencing. Generally, words with high transparency could be more easily acquired than those with low transparency, although the t-test results revealed that there were significant differences in accuracy between transparent and opaque words, or between semi-transparent and opaque words, while no significant difference was shown between semi-transparent and transparent words.

The results of the questionnaire also indicated that context strength was able to influence the accuracy of lexical inferencing to some degree. The context strength mainly played a positive role in inferring semi-

transparent words. Compared with the sentence context, learners' accuracy of inferring semi-transparent words significantly improved in the passage context. In contrast, the improvement in the accuracy of inferring transparent or opaque words was not statistically significant from the sentence context to the passage context.

The qualitative data from the second phase of the study proved that most interviewees thought that the passage-level reading provided them with more help to infer the meanings of target words, mainly because the passages provided more contextual cues. However, not all contextual cues were used effectively by the interviewees due to their limited Chinese language ability.

Research Question 2

What strategies do CSL learners utilize in sentence-level texts and the passage-level texts to infer the meanings of target words with semantic transparency at different levels? Do CSL learners rely more on semantic transparency or more on contextual cues when trying to figure out the meanings of target words?

The results of the questionnaire revealed that whenever the word semantic transparency or context strength was changed, the context strategy, the word strategy, and the guessing strategy were three main strategies used by CSL learners. Under this condition, CSL learners

changed their inference strategy when inferring words with different transparency levels in two types of contexts. As indicated by the quantitative data, they tended to rely on the word strategy to infer the meanings of transparent words in both the sentence and passage contexts. They used the word and context strategies to infer the meanings of semi-transparent words in the sentence context. They also applied other strategies more often to infer the meanings of opaque words in both the sentence and passage contexts. From the interview data, this study identified two main other strategies used by the interviewees, i.e., the strategy of using the previous knowledge and the strategy of analyzing grammar. The types of previous knowledge applied by the interviewees included world knowledge, words encountered before, personal experience, and Chinese cultural knowledge. The types of grammar analysis used were word collocation, part of speech, punctuation, and sentence pattern. Furthermore, with an increase in context strength, they relied more on contextual cues, less on guessing or other strategies to conduct lexical inferencing.

The results of the questionnaire also revealed that the semantic transparency of the target words was the most important factor that affect learners' use of the context, word, guessing, blank, and other strategies while the context strength only influenced their use of the context, guessing, and other strategies significantly. Furthermore, with a decrease

in word semantic transparency, learners' use of two main inference strategies including the context strategy and word strategy also decreased.

Both quantitative and qualitative data showed that the context strategy and word strategy were the two main strategies used by CSL learners when inferring the meanings of unknown words through reading. Both strategies had advantages and disadvantages. Overusing any one of them could result in incorrect inference. Actually, the data from both the questionnaire and interview indicated that most participants applied two or more strategies at the same time.

Research Question 3

What are the differences in the learning outcomes and inference strategies between CSL learners with a background of Chinese characters in L1 and those without such a background when learning target words through reading with semantic transparency at different levels incidentally?

This study compared the accuracy of lexical inferencing between learners with a Chinese character background in their L1s (Japanese/Korean students) and those without such a background (non-Japanese/Korean students), and found that no significant difference existed between the two groups. The same comparison was also conducted between the two groups on the use of inference strategies. The

results indicated that the context, word, and guessing strategies were the three main strategies used by both groups. Additionally, the questionnaires revealed that Japanese/Korean students applied the L1 strategy and the guessing strategy significantly more often than non-Japanese/Korean students.

The results of the interview study provided more detailed information about Japanese/Korean students' use of the L1 strategy. First, most Japanese/Korean interviewees agreed that their native languages provided great help for them to learn Chinese while most non-Japanese/Korean interviewees thought their native languages did not provide any help for them to learn Chinese. Second, when Japanese students sought assistance from their L1, they often took advantages of a large number of Chinese characters also used in Japanese. When the meanings of these characters were identical in Chinese and Japanese, the positive transfer of L1 led to the correct guess. However, when the meanings of the characters were different in these two languages, the negative transfer of L1 would occur. Unlike Japanese students, Korean learners usually applied the L1 strategy from the perspective of pronunciation.

Due to the requirement of taking a Chinese-character course in Korean secondary school, when a Korean student graduates from a high school, he/she has learned about 1,800 Chinese characters in his/her Chinese character course. This course is different from foreign language

courses usually offered in a school, since it only teaches students the meanings and pronunciations of individual Chinese characters used in the Korean language. Students would not learn anything related to grammar or other communication abilities about the Chinese language. Since most Korean interviewees had taken this kind of Chinese character class in their own country, they knew how to pronounce these words in the Korean language when they saw the target words with familiar composing characters. Usually, the pronunciation of a Chinese character in Korean is very close to that in Chinese, but unfortunately, not exactly the same. Therefore, Korean learners were most likely to identify the cognates of target words in their native language based on similar pronunciation. However, this method is not reliable since there are many words sharing the same pronunciation in both languages. When the learners could not identify the Korean cognates correctly, a negative transfer would occur. Therefore, for both Japanese and Korean learners, overusing the L1 strategy is a kind of negative transfer from L1, which would result in wrong inference.

In short, the most important reason for Japanese/Korean students' use of the L1 strategy is that both languages had used or still currently use a large number of Chinese characters in their writing systems. There are also many cognates in Chinese, Japanese, and Korean. Therefore, the inter-language transfers usually happen at the character or word level. The

interview results showed that Japanese/Korean interviewees applied the subtype of other strategies, i.e., the strategy of the word encountered before, more frequently than non-Japanese/Korean interviewees, although the difference between two groups was insignificant.

Research Question 4

What are the differences in the learning outcomes and inference strategies between CSL learners with strong morphological awareness and those with weak morphological awareness when learning target words through reading with semantic transparency at different levels incidentally?

The results of the questionnaire confirmed the significant relationship between learners' Chinese morphological awareness and the accuracy of lexical inferencing. Both receptive morphological awareness and productive morphological awareness played positive roles in learners' lexical inferencing. The group with high Chinese receptive or productive morphological awareness achieved significantly higher accuracy of lexical inferencing than the group with low awareness.

The high-awareness group always applied the context strategy more frequently than the low-awareness group for the target words at all three transparency levels in both the sentence context and passage context. Even when inferring the meanings of transparent words in the sentence

context, the high-awareness group used the context strategy more often than the low-awareness group. The low-awareness group, in contrast, used the guessing strategy more often than the high-awareness group in both types of contexts. These results suggest the positive correlation between morphological awareness and the skills of using inference strategies. Such skills can be reflected by the usage of other strategies as well. For instance, the results of Phase 1 study revealed that the high-awareness group utilized other strategies more frequently with statistical significance when inferring the meaning of target words in the sentence context. This observation showed that the high-ability group had stronger ability to seek new information sources when contextual cues were limited in sentences. The later interview data further indicated that the high-awareness group applied most subtypes of other strategies more often than the low-awareness group, although the difference in any of these subtypes between two groups was not significant.

Conclusions

Given that most relevant studies investigated this topic through sentence-level reading, this study fills a gap in the literature by exploring the role of word semantic transparency on CSL learners' incidental vocabulary learning through passage-level reading. The researcher presented the target words in both the sentence context and the passage

context so that we could further understand learners' incidental learning by comparison between the two levels of readings.

In order to reveal the real picture, this study employed several scientific methods to develop instruments, which included selecting more representative target words and developing appropriate reading materials. The researcher evaluated the semantic transparency of the target words based on the combination of three main approaches (the expert, dictionary, and public approaches) used in previous studies. Furthermore, the candidate words had to pass through five screening steps to be selected, involving the use of the HSK syllabus, Chinese native speakers, language instructors, advance CSL learners, and common Japanese/Korean native speakers. The researcher also developed the reading materials according to strict criteria. All reading texts were revised several times after examination by Chinese native speakers, language instructors, and the researcher herself. Due to these efforts, the results of the study should be highly reliable.

Because of the systematic design, this study has made multiple unique findings. First, this study confirmed a finding in the previous studies, i.e., words with high transparency can be more easily acquired by illustrating the strong association between the accuracy of lexical inferencing and word semantic transparency. Different from other studies in the CSL field, which only presented target words in two transparency levels, this study

selected words with three transparency levels, i.e., transparent, semi-transparent, and opaque. This improvement enabled more precise analysis in results and broader coverage of target words because there is a large number of words for which the transparency level falls between transparent words and opaque words. For example, this study found that there were significant differences in the accuracy of lexical inferencing between transparent and opaque words as well as between semi-transparent and opaque words while no significant difference was found between transparent and semi-transparent words. This result proved the importance of semantic transparency for incidental vocabulary learning considering that it is difficult for a L2 learner to acquire a word with low transparency incidentally through reading.

Huckin & Coady (1999) pointed out that many factors could affect the outcome of incidental vocabulary learning. Some other scholars (Gan, 2008; Zhang & Zeng, 2010) studied the interactions between semantic transparency and context strength on incidental vocabulary learning, and concluded that the effect of semantic transparency on incidental word learning can be influenced by context strength. However, these studies did not explore whether semantic transparency or context strength played a more critical role in learners' incidental learning. This study applied two-way ANOVA in order to examine the effects of semantic transparency and context strength on the accuracy of learners' lexical

inferencing. It was found that semantic transparency affected learner's incidental vocabulary learning through reading more significantly, compared with context strength. This finding could provide practical guide to pedagogical applications.

Most previous studies concerning the effect of semantic transparency on incidental vocabulary learning seldom explored learners' use of inference strategies. Similarly, most previous studies focusing on the usage of inference strategies seldom examined the relationship between word semantic transparency and the use of inference strategies. This study filled this gap by exploring the variation in learners' inference strategy with the transparency level of the target words. Most strategies identified by this study are consistent with previous studies. The context strategy, the word strategy, and the guessing strategy remained the three major strategies used by CSL learners regardless of context strength, word semantic transparency, learners' L1 background, or learners' abilities of Chinese morphological awareness. The L1 strategy was used by the learners with a Chinese character background in their L1s occasionally. Sometimes, other strategies including previous knowledge and grammar analysis were used as well by the learners with various L1 backgrounds, including those with or without a Chinese character background.

Although the context strategy, the word strategy, and the guessing strategy remained the three major strategies used by CSL learners, the

percentage of the use of each strategy varied with the level of word semantic transparency and context strength. The results of two-way ANOVA showed that semantic transparency affected learners' use of context, word, other, and blank strategies while context strength only influenced the use of context and other strategies. Obviously, compared with context strength, semantic transparency has more significant effects on what inference strategies CSL learners used. Learners were more likely to apply the word strategy when inferring transparent words but to combine both the word and context strategies when inferring semi-transparent words. Other strategies were used more frequently to infer the meanings of opaque words. Another evidence suggesting the dominant role of semantic transparency on the use of inference strategies is that the percentage values of using the context strategy and the word strategy both decreased with a decrease in words' transparency. Learners did not use the context strategy more often when there was less information provided by the words themselves. This did not occur when the strength of context changed. Although the percentage of learners using context strategy increased with an increase in context strength, the percentage of learners using the word strategy did not change significantly.

In addition, compared with other languages, the language distances between Chinese and Japanese/Korean are closer. For this reason, people tend to think it is easier for Japanese or Korean students to learn Chinese

than those from other countries. According to the language instructors interviewed by the researcher in this study, Japanese/Korean students possessed stronger Chinese reading and writing abilities, but most did not like to speak in class while students from other countries were more likely to speak out and express themselves in front of class. If the language instructors were correct, the performance of Japanese/Korean students in this study would have been better than that of non-Japanese/Korean students. However, the results of the study indicated that there was no significant difference in the accuracy of lexical inferencing between Japanese/Korean and non-Japanese/Korean students. This suggests that the advantages of Japanese/Korean students in the passage-level reading were not as significant as the language instructors thought.

Although the researcher had invited Japanese/Korean native speakers to remove words with the same writing forms in their L1s from the list of target words for this study, Japanese/Korean learners still used the L1 strategy and the guessing strategy significantly more often than others. When Japanese learners saw the words with familiar composing characters, they tended to think about the Japanese meanings of the characters first. Similarly, Korean learners sometimes would infer the meanings of unknown words based on their Korean pronunciations. Perhaps because the positive transfer and negative transfer of L1s canceled out each other, the accuracy of lexical inferencing of

Japanese/Korean students and that of non-Japanese/Korean students were almost equal. The interview data also suggested that Japanese/Korean students' L1 advantages were not demonstrated at the passage level, but mainly at the character or word level. Therefore, when inferring the meanings of unknown words in the passage-level texts, Japanese/Korean students did not gain higher accuracy than other students.

Most previous studies focusing on the relationship between morphological awareness and language learning seldom explored the effect of individual morphological awareness on incidental vocabulary learning. This study, however, investigated the role of learners' Chinese morphological awareness in incidental vocabulary learning from the perspectives of receptive morphological awareness and productive morphological awareness. It was shown that both receptive and productive morphological awareness provided significant help to learners' incidental vocabulary learning.

Finally, this study further examined the usage of inference strategies by CSL learners with different Chinese morphological awareness, which was also a gap in the related previous studies. The results indicated that learners with high Chinese morphological awareness applied the context strategy and other strategies significantly more frequently than those who with low Chinese morphological awareness during lexical inferring. It can be inferred from the results that the learners with high Chinese

morphological awareness might have stronger reading comprehension ability. This ability helped them understand contexts more thoroughly so that they were able to use contextual cues more effectively to conduct lexical inferencing than learners with low Chinese morphological awareness.

Implications

In order to provide practical suggestions to language educators, the researcher conducted a supplementary study to investigate CSL instructors' teaching methods when encountering unknown words that are not required by the syllabus in class. A total of 15 learners who participated in both Phase 1 and Phase 2 of this study was recruited in the supplementary study for individual interviews. Moreover, six language instructors from the three universities (two from each) introduced their related teaching methods by participating in interviews with the researcher. Due to the limited number of participants of the supplementary study, the results of the supplementary study might be not representative, but they can still provide valuable information. In this section, all quoted conversations were extracted from the qualitative data of the supplementary study.

Both the previous studies and the present study showed that reading was one of major channels for language learners to enlarge their

vocabulary size. However, the learners who participated in the interviews pointed out that they could not find appropriate text to read for this purpose so that they had to learn new words in other ways, although they knew that reading was an effective method.

C54. (Translated from Chinese)

XDE: I also think reading Chinese publications is very important. However, my classmates and I cannot understand Chinese novels. I do not often read Chinese newspapers since they are difficult. I cannot understand most articles in newspapers. It would be better if we could have more appropriate reading materials.

I: So can I say actually you seldom read Chinese newspapers or books?

XDE: I will try again. I believe it will become easier. But currently it is difficult. Last night, I read a book online. It seemed not very difficult. But soon later, more and more unknown words appeared, reading became difficult.

I: So the amount of new words you learned through reading is small?

XDE: It depends on word types, like written words or spoken words. I can speak Chinese relatively free. But I feel I cannot understand

many paragraphs when reading books. Too many unknown written words.

When talking with XDE, the researcher could tell that his spoken Chinese was relatively proficient and his motivation to learn was strong. His word-learning channels were diverse, including both in-class and out of-class channels. He understood the importance of reading and tried to read Chinese publications such as newspapers and books. However, a large number of unknown words discouraged him. Then, could CSL learners try to solve this problem by looking up dictionaries?

C55. (Translated from Chinese)

AN: Our student dormitory provides many Chinese newspapers. But I feel there are many difficult words in newspapers.
I: So do you look up these words in a dictionary?
AN: Looking up in a dictionary is really time-consuming. I have to do my homework every day, so I don't have time.

Obviously, language educators cannot expect learners to stop many times to look up unknown words in dictionaries. Therefore, the most useful method to encourage learners to acquire new words through

reading is to develop appropriate reading materials for CSL learners at different levels.

This study found that the passage-level reading significantly improved the accuracy of inferring semi-transparent words than the sentence-level reading. Considering a large number of semi-transparent words in Chinese and the finding that the accuracy of inferring transparent and opaque words were improved as well in the passage-level texts in this study, the researcher thinks developing passage-level reading texts would provide important help to CSL learners, especially for those at the intermediate level.

The results of this study yield the following guidelines for language educators when they are developing reading materials for CSL learners. First, this study demonstrates that word semantic transparency plays critical role in CSL learners' incidental vocabulary learning through reading. Accordingly, language educators should consider the semantic transparency of unknown words when developing reading materials for CSL learners and design suitable contextual cues for individual target words with different levels of transparency. For example, since the accuracy of inferring semi-transparent words are more likely to be affected by context strength, language educators should pay most attention to designing helpful contextual cues for this type of words. For transparent words, the educators do not need to design extra contextual

cues. The cues in the original context usually are enough for learners to infer the meanings of this kind of words. For opaque words, it might be better to put a note to suggest learners that they should look up this word in a dictionary if necessary. Additionally, given that the relatively large percentage of contextual cues were not used effectively by the learners in this study, the researcher suggests that language educators underscore the useful contextual cues in the reading texts for CSL learners at low levels, such as those at the elementary and intermediate level, so that they could easily identify the helpful contextual cues and then conduct reading and word learning more smoothly.

The qualitative data of the supplementary study revealed that most Chinese language instructors did not teach students how to infer the meanings of unknown words encountered in reading systematically or not at all. Out of a total of 15 interviewees, 10 learners said that their instructors did not teach them how to infer the meanings of unknown words. In particular, six learners said their instructors told them the meanings of the unknown words directly. Another four learners said their instructors would ask if any students in the class knew the answer. If some students knew the answer, the instructors would ask them to tell the answer to the whole class directly.

C56. (Translated from Chinese)

I: Usually, how does your Chinese teacher teach you to infer the meaning of an unknown word? Does she teach you the method to infer the meaning or just tell you the meaning of the word?

AN: She usually asks the whole class to see who know the meaning of that word. If someone knows, the teacher will ask that student to tell the meaning of the word to the whole class. If nobody knows, she tells us the meaning directly.

I: If a student knows the meaning, does the instructor ask that student to explain his/her inference methods?

AN: No, she just requires that student to tell the meaning of the word.

The other five learners reported that their instructors taught them the methods for inferring unknown words. However, among these learners, three learners said that their language teachers only instructed them to infer unknown words from the characters making up the compound word.

C57. (Translated from Chinese)

I: I would like to ask if your Chinese teachers teach you how to infer the meanings of unknown words in class?

JZL: Our current reading textbook has a few introductions about this. For example, it is said that 月 radical has relation to human body. But since class time is short, teachers usually do not spend time on this topic.

I: So when encountering an unknown word in class, does your teacher ask you to guess or does she tell you the meaning directly?

JZL: Usually, my teacher tells the meaning directly.

Even when instructors taught students about the inference methods, they often instructed them to analyze the composing characters but ignoring the use of contextual cues according to the following student's response.

C58. (Translated from Chinese)

I: Do your Chinese teachers teach you how to infer the meaning of an unknown word encountered in reading?

CGQSL: She does. For example, if a word has two characters, one is known, and the other is unknown, she would tell us just to look at the known character to guess the meaning of the word.

I: If an unknown word is presented in a sentence or a passage, does she say that you can guess the meaning of that word based on the information provided by the context?

CGQSL: No, she does not.

Only two learners said that some instructors sometimes taught them to infer unknown words based on the hints provided by characters as well as context.

C59. (Translated from Chinese)

I: You have studied Chinese in Italy, Dalian (a city in China), and here. Could you tell me if your Chinese teachers in these places taught you how to infer the meaning of an unknown word in reading?

AL: My teachers in Italy never taught me this. But in Dalian my reading teacher taught me to guess the meaning of a word according to radicals. I think it is useful.

I: Besides inferring the meaning based on radicals, does your teacher teach you how to guess the meaning of an unknown word based on context?

AL: Yes. In Dalian and here, sometimes, they teach us to guess the meaning of a word based on both radicals and context.

From the students' feedback, it can be implied that many Chinese instructors did not realize the importance of teaching students the methods of lexical inferencing. The interviews with the instructors also confirmed this point.

C60. (Translated from Chinese)

W: When we encounter a new word in class, I would tell the word's meaning to my students directly. If I think that word is useful, I may also give example sentence to them, and ask them to create sentences with it.

In this example, we can see that this instructor did not teach inference methods to her students at all. She always told an unknown word's meaning to students directly. If she found that one target word was important, she would use traditional methods such as creating sentences for required words to teach an incidentally encountered target word.

Although some instructors may teach inference methods in class, the time they spend on them is very limited according to the interview below.

The related teaching is just a basic introduction and cannot help students fully develop lexical inference abilities.

C61. (Translated from Chinese)

S: I apply different teaching methods depending on the types of the courses. If it was an intensive reading class, I would teach the vocabulary list first, and then go over the text together with students. When we go over the text, I focus on the analysis of grammar. I don't spend time teaching inference strategies in this kind of class. If it was an extensive reading class, I would still teach the vocabulary list first and then go over the text together with students. This time when we go over the text, I would not do any grammar analysis. Instead, I only explain the meaning of the text to help students comprehend the text. Sometimes, I would remind students to pay attention to some hints, for example, telling them some conjunctions like "but, however" indicate the adverseness of the meaning. Additionally, there are some introductions about word structure in our textbooks, for example, the meanings of radicals, or some words with a special structure like reduplicated words. Sometimes, I go over these together with students. Otherwise, I ask them to read these after class.

From this example, we know that this instructor seldom let students infer unknown words in her reading class or taught them inference methods. Sometimes, she taught something about coherence such as the functions of conjunctions but never introduced useful contextual cues systematically. Although the textbooks sometimes introduced knowledge on word structure, the instructor still did not treat the knowledge as important as other required knowledge points. Students in her class just learned the knowledge but did not know how to use it in reading. It appeared that the instructor was the person who spoke most in the class. The students did not have many opportunities to learn about reading or inference methods in the class.

Through the interviews with the learners and instructors, we know that lacking instruction on inference methods might be a problem in current Chinese teaching pedagogy. Therefore, the researcher proposes the following suggestions for pedagogical implications based on the findings from this study.

First, Chinese language educators should increase the class time spent on lexical inferencing. Second, instructors need to improve instruction on teaching lexical inferencing by combining teaching with students' practice to guarantee that students really understand the instruction. Furthermore, since two main information sources that provide vital help in lexical inferencing are word cues and contextual cues, instructors need

to cultivate students' abilities to analyze word and extract useful contextual cues in reading. More importantly, instructors should encourage students to combine multiple information sources to improve the accuracy of inferencing.

The results of the present study indicate that the performance in lexical inferencing of Japanese/Korean students and that of non-Japanese/Korean students are very close to each other. This finding suggests that language distance is not a critical factor influencing the outcome of lexical inferencing in Chinese reading. Therefore, language educators should believe that the students without a Chinese character background in their L1s can also learn Chinese very well. On the other hand, instructors should be aware that Japanese/Korean students' advantages are at the character or word levels. Their knowledge of Chinese characters does not guarantee high reading comprehension ability at the passage level. They need to receive training similar to other students.

Additionally, language instructors need to understand that some of their Japanese/Korean students' knowledge of Chinese characters or words comes from their native languages. Since the meanings and pronunciations of many such characters are not exactly the same among Chinese, Japanese, and Korean, Japanese/Korean students' prior knowledge in Chinese characters before learning Chinese as a second

language is a double-edged sword for these students. Helping them take advantages of their L1s without negative transfer is an important task for language instructors. To complete this task, instructors should focus on cultivating Japanese/Korean students' ability to use contextual cues effectively, preventing them from overusing their L1s and encourage them to combine the L1 strategy with other types of strategies when inferring the meaning of an unknown word. For example, the instructor can remind them to check whether the meaning of a word inferred from their native languages makes sense in a particular context, which can prevent obvious misinterpretation.

Limitations of the Study

As any other studies, this study has a few limitations. Although the study reveals the comprehensive picture of the relationship between semantic transparency and CSL learners' incidental vocabulary learning, the findings from this study need to be carefully interpreted due to the limitations. Since the overall limitations of this study have been discussed in the first chapter, this section concentrates on the limitations of the individual phases of the study.

Limitations of Target Words

Most studies focusing on the role of semantic transparency on word recognition often asked participants to complete word decision tasks. In such tasks, target words were usually presented separately and without context. The current study had to present target words in passage-level text. Compared with selecting target words for word decision tasks, selecting appropriate target words from the passage-level texts with appropriate topics and difficulty levels is more difficult if one wants to control all other word-related variables at the same time. Therefore, when selecting target words, the researcher primarily considered the three main factors, including word semantic transparency, whether the words were unknown words for the participants, and whether the composing characters of the words were known by the participants. Meanwhile, the researcher tried all best to control other word-related variables. Most variables were controlled very well, such as word concreteness, word length, conceptual difficulty, and exposure frequency. However, there are still limitations on the control of some other word variables.

First, since the evaluation of semantic transparency was mainly based on the semantic relationship between a word and its components, the word, 谈吐, was categorized as a semi-transparent word. However, the composing morphemes of this word have radicals, i.e. 讠(speak radical) and 口(month radical), providing hints to the word meaning, which

resulted in high accuracy of inferencing. Therefore, 谈吐 might not be a good representative for semi-transparent word. Fortunately, other target words with low transparency do not have such suggestive radicals, and their negative effects on the research results are negligible.

Second, the frequencies of a word or its composing characters used in daily life might influence word inferencing(Gao & Gao, 2005; Wang & Peng, 1999). The frequencies of target words' composing characters were controlled very well, since all target words in this study are composed of A-level or B-level characters in the syllabus of HSK. However, the frequency of the target word varies from one to another, although all A-level or B-level words in the syllabus of HSK were excluded from the list of target words. Fortunately, the researcher has minimized the negative effect of frequency variation since there were only three high-frequency words in the list, and these three words were evenly distributed across three transparency categories, including one transparent word 设想, one semi-transparent word 正经, and one opaque word 从容. The accuracy values of these three words are approximately identical to the mean accuracy values of all words in the same categories, respectively.

Limitations of Phase 1

Through the interviews in Phase 2, one minor limitation is identified. Because some answers written down by the participants were polysemous words, the translation conducted by a professional company might not exactly match the participants' original answers. Fortunately, this kind of negative influence had been controlled to a minimum as several native speakers were invited to check the translations.

Limitations of Phase 2

The main limitation in the second phase is related to the sample size of the participants. Only 29 learners were selected from 90 learners who participated in the first phase of the study. Although the researcher set strict criteria to select interviewees, considering the participants' willingness and availability, these interviewees were not selected completely randomly. So these interviewees might not faithfully represent all 90 learners who participated in Phase 1. For example, there were more interviewees (17 persons) who had high Chinese morphological awareness than those who had low awareness (12 persons) in the second phase of study, which was likely because good students had stronger motivation to participate in the study.

Limitations of the Supplementary Study

The main limitation of the supplementary study is also related to the sample size of the participants. First, the sample was small. Only 15 of 29 learners who participated in both Phase 1 and Phase 2 of the study were selected; meanwhile, there were only six instructor participants. Second, the participants of the supplementary study were not randomly selected either. In addition, the percentage of student participants across different groups was not balanced. For example, among 15 student participants, there were eight students with high Chinese morphological awareness and seven with low awareness. According to the home country, eight students were from Japan or South Korean while seven students were from other countries. The numbers of participants were balanced regarding to their Chinese morphological awareness ability and first language background. However, due to time conflicts, few students from S University were able to participate in the supplementary study. Consequently, there were seven students from W University, seven from J University, and only one from S University. Due to the limited number of participants and representativeness of the sample, this thesis presents the results of the supplementary study in the section of implications instead of including them in the results and discussion chapter.

Directions for Future Research

To the researcher's best knowledge, this study is one of the first to focus on the role of semantic transparency of Chinese disyllabic compound words in CSL learners' incidental vocabulary learning through passage-level reading. In order to uncover a more comprehensive picture in the effect of semantic transparency on L2 incidental vocabulary learning, more studies are needed to explore the multiple aspects of this topic to cover variations in populations, the types of target words, the types of contexts and research methods, or designs as elaborated below.

First, studies on different populations can be conducted to explore if the effect of semantic transparency on incidental vocabulary learning through passage-level reading will change for CSL learners who are not at the intermediate level, children, or those who learn other languages as a second language. We may discover a different trend for each type of learner.

Second, there are some other types of words in the Chinese language that can be investigated. This study only examined the effect of Chinese disyllabic compound words' transparency on incidental vocabulary learning. Will the semantic transparency of other types of words affect CSL learners' incidental word learning? How does it affect the learning? Further studies are needed to answer these interesting questions.

The two types of reading materials used in this study were single sentences and passages. The sentence-level texts were included as references only, since the main research purpose was to examine the effect of word semantic transparency on incidental vocabulary learning through the passage context. However, the passage-level texts applied in this study were not authentic texts but pedagogical texts developed or revised by the researcher. For this reason, all contexts in this study are directive contexts. In authentic texts, by contrast, there should be various contexts, including directive, non-directive, or even misleading contexts. Future research could consider using authentic texts to investigate the related topics. The researcher believes that such studies would provide more practical guidelines to language learners and educators.

Furthermore, to control the test time and difficulty level, all passage-level texts used in this study had only one passage and no more than 200 characters. Therefore, it was impossible for the present study to investigate CSL learners' performance when reading multiple-passage texts or articles. Testing the effect of semantic transparency on L2 learners' incidental vocabulary learning through multiple-passage or article reading could be one future direction.

Additionally, various types of contextual cues could play different roles in incidental vocabulary learning. Since the present study needed to compare learners' performance in the passage context with that in the

sentence context, the researcher had to stick to near contextual cues to control the variable of context position. Future studies that conduct research in the condition of multiple-passage or article-level contexts could explore the role of far contextual cues in incidental word learning.

When developing the reading materials, the researcher applied various linguistics methods, for example, synonyms, antonyms, or discourse coherence, to adjust the context strength. The useful information provided by these contextual cues for lexical inferencing should be different. However, we do not know how different the use across all individual types of cues can be. Future studies could compare the effects on incidental word learning of contextual cues exerted by different linguistic methods.

The main research methods applied in this study were a questionnaire and follow up interview. There was one-week break between the questionnaire survey and the interview. When a participant was interviewed, what he/she said might not be exactly the same as what he/she thought when filling in the questionnaire. Since the interviewees answered the interview questions mainly according to their recall, the researcher cannot know their complete on-site thinking on lexical inferencing. This leads to another future direction, i.e., to design studies that apply the think-aloud method to further uncover the complete and instant picture of learners' usage of inference strategies.

Finally, since language instructors' teaching methods on lexical inferencing were not the research objective of this study, the researcher only conducted a supplementary study with a small sample size on this topic. However, this topic is worth further exploring, since it could directly help instructors improve their teaching methods and assist learners to enlarge their vocabulary size through reading.

Notes

[1] Fraser (1999) described three strategic options of L2 readers when they confront an unknown word as 1) ignoring; 2) consulting a dictionary or another person; or 3) inferring word meaning.

[2] All 90 participants in Phase 2 were median-split into two groups (High and Low) according to their scores of morphological awareness test.

[3] The researcher excluded the learner approach mainly because of the big differences among individual L2 learners. L1 learners usually study L1 following similar curriculums and syllabi. L2 learners, however, might be diversified in learning experience, L1 and culture background, which make the estimation of their previous knowledge a difficult task.

[4] The New Chinese Proficiency Test (new HSK), level four developed by Hanban and Confucius Institute Headquarters is the most popular Chinese language test for CSL learners at the intermediate level. All individual reading materials in this test usually has 15 to 150 Chinese characters.

APPENDIX A

QUESTIONNAIRE

姓名(Your Name):_____ 国籍(Nationality) :_____ 中文班(Chinese Class) :_____

第一部分(Part I)

请独立阅读下表中的句子和段落并写出划线词的意思，你可以选用以下任何一种你用得最好的语言来回答：英语、韩语、日语、俄语、法语、德语、西班牙语、意大利语、越南语、泰语、马来语、印尼语、蒙古语、土耳其语、汉语。请不要查字典或和其他人讨论，已经回答过的问题请不要再回头修改。(Please read the sentences and passages in the following table and write down the meaning of the underlined words in any of the following languages you feel most confident, including English, Korean, Japanese, Russian, French, German, Spanish, Italian, Vietnamese, Thai, Malay, Indonesian, Mongolian, Turkish or Chinese. Please do not use any dictionary or discuss the sentences, passages or questions with other people. Please do not go back to revise your answers.)

选项说明 （Instruction on multiple choices）

在下表中回答"你是怎么知道词义的？"这个问题时，你需要做选择题，选择题可以多选。如果你选择了"其他"，请你在对应的空格中给一个简短的解释 (To answer the question "How did you infer the meaning of the word?" in the table, you need to do multiple choices. You could select more than one choice. If you choose "Others", please also write a short note in the corresponding blank.)

选项如下(The choices are as the following):

A=根据句子或段落提供的信息（from the context of the sentence or passage）
B=根据词中的字（from the characters in the word）
C=我的母语里有相同或相近的汉字词（my native language has the same or similar Chinese character word）
D=我猜的 (I just guess)

第一部分上部 (Part I- Section 1) **句子(Sentence)**	**词** **Word**	**词义** **(Meaning of the word)**	**你是怎么知道词义的？(How did you infer the meaning of the word?)**				
			A	**B**	**C**	**D**	**其他** **Others**
例子（Example）: 早上我去报到，外事处的人很**和气**，也很愿意帮我忙。	和气	待人友好	√	√			我学过这个词
1. 假冒产品**败坏**了商场的声誉。	败坏						
2. 人们常常会根据你的**谈吐**来判断你的社会地位。	谈吐						
3. 他现在已经没有什么**抱负**。	抱负						
4. 一些父母可能会不**认同**这个观点。	认同						
5.从 200 立方公里的海水中只能捞到 1 公斤黄金，很不**划算**。	划算						
6. 他一肚子墨水呢！	墨水						
7. 求职者都想收到被录用的**喜讯**。	喜讯						

8. 婴孩的左右手都能运用**自如**。	自如						
9. 他上学的时候就不**检点**。	检点						
10. 如果姑娘把花**丢弃**，就表示拒绝。	丢弃						
11. 经历了这么多的**周折**，老张终于和家人团聚了。	周折						
12. 很多数据证实海水中含有黄金，所以有人就**设想**从海水里提取黄金。	设想						
13. 小伙子**知趣**地离开了。	知趣						
14. 有的孩子的哭闹就有**名堂**。	名堂						
15. 近视的人需要配戴眼镜**补救**视力。	补救						
16. 人们一生说的话，总计起来，**正经**的话很少。	正经						
17. 求职者面试时，态度一定要**从容**。	从容						
第一部分上部到此结束，请不要再返回来修改答案。(This is the end of the Section 1 of Part I. Please do not go back to revise your answers.)							

第一部分下部 (Part I- Section 2) **段落(Passage)**	**词 Word**	**词义(Meaning of the word)**	**你是怎么知道词义的？(How did you infer the meaning of the word?)**				
			A	**B**	**C**	**D**	**其他 Others**
18. 假冒产品对社会的危害极大，既**败坏**了商场的声誉，破坏了产品在人们心中的形象，又使购买者遭受了经济损失。应该坚决予以抵制。	败坏						
19. 如果求职者想收到被录用的**喜讯**，就不要轻视外表在求职中的作用。求职者除了要准备简历以外，还应该准备好面试的行头。因为合适的服装会给人留下好的印象，有助于求职的成功。	喜讯						
20. 他上学的时候就不**检点**，经常偷同学的东西。后来因为成绩不好，刚上完初中就不上学了。现在更加学坏了。	检点						
21. 爱说话是人的本性。人们一生说的话，总计起来，大约还是闲话多，废话多，**正经**的话少，因为说严肃正式的话太累。人们不论多么	正经						

忙，总爱闲谈。							
22.中国布朗族的小伙子如果看中哪个姑娘，便采来鲜花相送。姑娘有意，便把花插在自己的头巾上，小伙子就开始和姑娘交往。如果姑娘把花**丢弃**不要，就表示拒绝，小伙子就会**知趣**地离开。	丢弃						
	知趣						
23. 很多数据证实海水中含有黄金，所以有人就**设想**从海水里提取黄金。可是，要实现这个假想很困难。因为，从 200 立方公里的海水中只能捞到 1 公斤黄金，投入大大超过产出，很不**划算**。	设想						
	划算						
24. 世界上多数的成年人习惯使用右手。其实婴孩的左右手都能运用**自如**。他们总是用离东西近的那只手去抓东西，可是大人们总是把东西放在他们右手容易拿到的地方。	自如						
25. 教育孩子有时候需要采用“忽视”的方法，虽然一些父母可能会不**认**	认同						

同这个观点，觉得这样做不好。例如，有的孩子的哭闹就有**名堂**——我一哭闹，你就得百事依我。所以父母面对孩子的无理哭闹，必要时可以不理他，当孩子觉得这样的哭闹无效时，就再不会无理哭闹了。	名堂						
26. 长时间近距离看东西会造成眼球变形，形成近视。一个人如果近视就会看不清远处的物体。这时，就需要配戴眼镜进行**补救**，以弥补眼球变形所造成的视力缺陷。	补救						
27. 人们常常会根据你的**谈吐**、态度来判断你的能力、社会地位、受教育的程度。所以，求职者面试时，除了注意说话的方式和用词外，态度一定要**从容**。不要紧张。	谈吐						
	从容						
28. 你知道王文吗？这个问题还是去问问他吧，他一肚子**墨水**，知道的很多呢！	墨水						
29. 经历了这么多的**周折**和不顺，老张终于和家人团聚了。他现在已经	周折						

没有什么**抱负**，再也不去想他曾经有过的远大志向，只想过安稳的日子。	抱负						

The language you just used to answer the questions in Part I is (你是用哪种语言回答第一部分的)_____，**and your proficiency level of that language is** (你对该语言的熟练程度是)_____. (1=Poor (很差), 5=my native language(我的母语))

Poor (很差) My native language(我的母语)

1 2 3 4 5

第二部分(Part II)

I. 判断下列每组词语中的划线字的意思是否相同。如果相同，请在 YES 下打勾；如果不同，请在 NO 下打勾。
Compare the meanings of the underlined characters between two words in each pair. If their meanings are identical in the two words, please tick the blank under YES. If their meanings are different, please tick the blank under NO.

	YES	NO
例子（Example）：晚饭　吃饭	___√____	_____
杯子　子女	_____	___√___

	YES	NO
1. 高大　高原	_____	_____
2. 称赞　赞成	_____	_____

3. 白菜　白天　_____　_____

4. 办法　法律　_____　_____

5. 小孩　小姐　_____　_____

6. 今年　年轻　_____　_____

7. 瓶子　热水瓶　_____　_____

8. 金属　奖学金　_____　_____

9. 关心　关门　_____　_____

10. 练习　训练　_____　_____

II. 请用给出的字组词，每个字**最多组四个词**。
Please create Chinese words with the given Chinese character. Please try to create **four words at most** with each given character.

例子（Example）：课：上课，课堂，课本，课文

1. 外：_____，　_____，　_____，　_____

2. 客：_____，　_____，　_____，　_____

3. 同：_____, _____, _____, _____

4. 口：_____, _____, _____, _____

5. 护：_____, _____, _____, _____

6. 看：_____, _____, _____, _____

7. 工：_____, _____, _____, _____

8. 费：_____, _____, _____, _____

9. 气：_____, _____, _____, _____

10. 西：_____, _____, _____, _____

第三部分 (Part III)

请用英语或汉语填写 (Please fill in the blanks in English or Chinese)

1. 年龄 (Your Age):_____
2. 性别 (Gender): 男 (Male)/女 (Female)
3. 教育水平 (Education level) :_____

A. 高中文凭 (High School Diploma) B. 学士学位 (Bachelor Degree) C. 硕士学位 (Master Degree)
D. 博士学位 (PhD Degree) E. 其他 (Others) _____

4. 专业 (Major) :_____
5. 母语 (Native Language) :_____
6. 你学了多长时间的中文？ _____年_____月
   (How long have you studied Chinese up to date? _____years _____months)
7. 你在讲中文的国家或地区住过多久？ _____年____月
   (How long have you lived in a country or region in which one of the official languages is Chinese? _____years ____months)
8. 现在，你在上什么级别的中文课？
   (Currently, you take Chinese courses at the _____level.)
   A. 初级 (Elementary) B. 中级 (Intermediate) C. 高级 (Advanced)
9. 电邮 (Your email address):_____
10. 电话号码 (Your phone Number)：_____

APPENDIX B

INTERVIEW GUIDLINES FOR THE MAIN STUDY

The researcher asked the following questions in Chinese or in English, depending on the needs of interviewees.

1. 你能读懂阅读材料的大意吗？

   (Can you understand the main points of the reading materials?)

2. 你觉得句子阅读和段落阅读这两种阅读，哪一种对你猜测生词的词义帮助更大？

   (Which level of reading, the sentence-level or passage-level reading do you think helps you more to infer the meanings of the unknown words?)

3. 你是如何猜测出词 A 是这个意思的？文中的哪些线索帮助了你？

   (How could you infer the meaning of this word? What cues in the reading helps you?)

4. 关于词 A，你在关于词义推测策略的答题纸上是这样写的“……”,你能具体解释一下吗？

   (As to word A, you wrote “……” on the answer sheet to explain your inference strategies. Could you please explain it a bit more?)

5. 在阅读了段落之后，你改变了原来对于词 A 词义的猜测，能说说为什么会发生这样的改变吗？

   (After reading the passage, you changed your answer on the meaning of word A. Could you explain why did you make such changes?)

6. 在阅读了段落之后，你对于词 A 词义的猜测没有改变，你注意到段落阅读材料里增加了的新线索吗？你觉得这些新线索有没有为你猜测词义提供新的帮助？

   (After reading the passage, you did not make any changes on the meaning of word A. Did you notice that there are extra new contextual cues in the passage? Do you think if these new cues provide new assistance for you to infer the meaning of the word?)

APPENDIX C

INTERVIEW GUIDLINES FOR THE

SUPPLEMENTARY STUDY

Questions for the leaners

(The researcher asked the following questions in Chinese or in English, depending on the needs of interviewees.)

1. 如果在上课时遇到生词，你的中文老师会教你们如何猜测生词的词义吗？

   (Do your Chinese teachers teach you how to infer the meaning of an unknown word encountered in class?)

2. 如果你的中文老师曾经教过你如何猜测生词的词义，他们是如何教的？

   (Does your Chinese teacher teach you how to infer the meaning of an unknown word? If yes, how do they do this?)

Questions for the instructors

(The researcher interviewed all Chinese instructors in Chinese.)

1. 您能介绍一下您是如何教授生词的吗？

   (Could you please introduce your teaching methods on the new words?)

2. 您能介绍一下您是如何教授在课堂教学时遇到的大纲不要求掌握的生词吗？

(Could you please introduce your teaching methods on the unknown words encountered in class, which are not required based on the syllabus?)

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