The Effects of Explicit Semantic Radical Instruction on Beginner Level CFL Reading Comprehension: The Third Dimension of Teaching Chinese as a Foreign Language

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Abstract

The present study examined the effects of explicit semantic radical instruction on beginner level Chinese foreign language learners' overall comprehension by descriptively translating a given Chinese text. The study also investigated how the participants would perceive the effects of instruction of semantic radicals and whether their motivation level in learning Chinese would change because of the explicit instruction on Chinese semantic radicals. The participants were asked to translate the same Chinese text before and after receiving explicit instruction of ten semantic radicals. The results demonstrated that the explicit instruction on Chinese semantic radicals helped participants significantly enhance their descriptive translation (indicating improved overall comprehension) of a given Chinese text. Overall, the participants recognized the facilitative role of semantic radicals in learning Chinese, and their intention to continue learning semantic radicals suggests their willingness to improve their Chinese proficiency.

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Chapter 1

Introduction

Background

The interest in learning Mandarin Chinese as a foreign language (CFL) in the United States has been on the increase for several decades. According to a survey conducted by the Modern Language Association (Goldberg, Looney, & Lusin, 2015) to investigate the enrollments in languages other than English in the United States, Chinese was the only one that registered enrollment growth among the top ten most studied foreign languages. In order to prepare a new generation of U.S. leaders to engage effectively with China and create a pipeline of China-savvy employees in a range of fields, Barack Obama announced the "1 Million Strong" initiative which will boost the number of learners of Mandarin Chinese in the United States to 1 million by 2020 (Allen, 2015). The Foreign Service Institute (FSI) has ranked Chinese as a Category V language, indicating that Chinese is exceptionally difficult for native English speakers. The continuing and indubitable uptrend of CFL learners demands more effective ways to improve Chinese language proficiency among native speakers of English within limited classroom learning periods.

In their Natural Approach, Krashen and Terrel (1983) emphasized the indispensable role that reading plays in foreign language learning.

> Reading may contribute significantly to competence in a second language. There is good reason, in fact, to hypothesize that reading makes a contribution to overall competence, to all four skills. (p.131)

It is also true that reading is a major channel to acquire information and knowledge in today's world. Reading in Chinese, as one of the most prominent components of CFL learning, is of great importance in the academic field and the job market, and can contribute to additional learning skills (Chen, 1992). Considering the significant role of reading, this study focused on beginner level CFL reading comprehension, one of the utmost important and difficult areas of Chinese language proficiency (Lee-Thompson, 2008).

Important Features in the Chinese Writing System

Reading in a foreign language is more challenging than reading in one's native language, especially when they are not in the same language family. Unlike English, written Chinese, a non-alphabetic language, is represented by characters, which are typically written with strokes in square-shaped symbols instead of letters in linear forms. For instance, in the character 木, which means tree, there are four strokes. In terms of pronunciation, each character contains only one syllable. However, different from alphabetic systems, graphemes in Chinese do not map onto individual phonemes (Mattingly, 1992). Pinyin, the Chinese national standard alphabetic system, is used to teach children the pronunciation of Chinese characters but does not appear in daily reading texts (Liu, Wang & Perfetti, 2007). In terms of meaning, each character represents a free morpheme or a combination of morphemes.

As to the structural complexity, Chinese characters are composed of radicals and can be categorized as simple and compound characters (Kim, 2010). Shen (2010) defined Chinese radicals as the smallest meaningful orthographic units in Chinese characters. There are about 200 semantic and 800 phonetic radicals (Hoosain, 1991). The former

gives a cue to the general meaning of a compound character and the latter cues the pronunciation of the character. Radicals that are characters by themselves are simple characters, while a compound character contains more than one radical. Over 90% of Chinese characters are compound characters (D. Li, 1993, cited by Chen, Wang, & Cai, 2010, p.141).

According to Hanley (2005), compound characters can be further divided into two types: sematic compounds and semantic-phonetic compounds. A semantic compound has two or more semantic radicals, and the meaning of the compound is derived from both radicals. For instance, the character 明 (bright) consists of 日 (sun) and 月 (moon). The derived meaning is bright because it is the light released by both the sun and the moon. On the other hand, a semantic-phonetic character contains a semantic radical and a phonetic radical. For about 75% of the semantic-phonetic characters, the former is located on the left side and the latter on the right side (Feldman & Siok, 1999; Hanley, 2005). For instance, the left side of the character 清 (clear), 氵 (water), is a semantic radical. It suggests that 清 is related to water. The right side of that character, 青(qīng), serves as a phonetic radical for 清 (qīng). It is noteworthy that when tone is not considered, the proportion of semantic-phonetic characters having the same pronunciation as their phonetic radicals is about 40% (Shu, Chen, Anderson, Wu, & Xuan, 2003). The predictive accuracy of sematic radicals for the meanings of semantic-phonetic characters is estimated to be much higher than the accuracy of using phonetic radicals to cue the pronunciations.

A Chinese word can be a character or a combination of several characters to render the meaning of a single word in English. In a Chinese text, words are arranged in a grammatically appropriate way and there are no boundaries between words.

It is obvious that the intrinsic differences between Chinese and English pose enormous barriers for readers of CFL. However, the heterogeneous structure of Chinese characters can also be turned into an advantage.

Statement of the Problem

Considering the meaning-cuing function of semantic radicals, many researchers found a positive correlation between semantic radical knowledge and character recognition, resulting in the teaching of semantic radicals just as a means to remember characters in some classrooms. However, there is minimal empirical research conducted to examine whether the explicit instruction of Chinese semantic radicals can assist readers of CFL to better understand the meaning of a given Chinese text.

Currently, the primary focus of most research in reading of CFL has been on the cognitive and metacognitive strategies of nonnative readers of Chinese. Pang (2008) suggested that good reader characteristics include linguistic knowledge and processing ability, cognitive ability, and metacognitive strategic competence. The first refers to readers' knowledge of vocabulary, syntax, and discourse and their abilities to utilize the knowledge to process the reading material. The second is about readers' use of strategies in the comprehension process. The last means readers' monitoring of their own cognitive processes.

According to Grabe (2014), reading comprehension involves using rapid and efficient word recognition, sentence processing, cognitive skill, and metacognitive skill to

generate text comprehension. Reading abilities can be divided into lower-level and higher-level processes. Lower-level processes include word recognition, semantic processing, and syntactic processing. Higher-level processes are concerned with identifying main idea, using background knowledge, anticipating, planning, monitoring comprehension, and evaluating strategy use (Grabe, 2014; Lee-Thompson, 2008).

However, Anderson (2003) claimed that an expert in L1 reading does not need to relearn how to comprehend in L2, but just needs to access the higher-level reading skills which are already there. Therefore, attention to lower-level skills such as character recognition efficiency in CFL (L2) is considered as a prerequisite for increasing reading comprehension. With a limited amount of Chinese words, the beginner level CFL learners are at a disadvantage when it comes to reading comprehension in Chinese. This deprives the beginner level CFL learners the opportunity to be exposed to a large amount of reading, which is an important predictor of reading ability both in L1 and L2 reading (Grabe, 2009; Stanovich, 2000).

Before they are equipped with a sufficient amount of characters and words, the CFL learners are intimidated by the idea of reading in Chinese and are hesitant to take the first step. Without understanding the meaning of the text, reading can be frustrating (Zygouris, 2009). If semantic radical knowledge can directly facilitate reading comprehension in Chinese, the beginner level CFL learners, after learning the semantic radicals, can be exposed to and learn from the Chinese reading texts, elevating their overall Chinese language proficiency. This, in turn, will increase CFL learners' willingness to read in the L2 for various purposes (Grabe, 2014). In other words, students who are reading well will read more, learn more word meanings, and read even better

(Stanovich, 1986). Hence, it is imperative to investigate possible effective teaching strategies, such as the instruction of semantic radicals, to improve reading comprehension of beginner level CFL learners.

Purpose of Study

It is the researcher's experience that reading comprehension of beginner level CFL students is hindered because of limited knowledge of vocabulary, orthography, grammar, and background knowledge. This has had negative effects on students' confidence and motivation to continue learning Chinese. It is hoped that the explicit instruction of semantic radicals would improve students' reading comprehension performance, boosting their confidence and motivating them to continue learning Chinese.

The CFL students take two Chinese courses each semester. In Integrated Chinese (three sessions per week), the teacher mainly instructs students on vocabulary and grammar. In Oral Chinese (one session per week), the teacher's role is to facilitate conversation in Chinese by the students. The explicit teaching of semantic radicals is not an integral part of the CFL curriculum.

The present study aims to investigate whether adding a third dimension, explicit semantic radical instruction, to CFL teaching, would improve beginner level Chinese L2 reading comprehension performance. The purpose of this study is threefold. The first is to explore the effects of explicit semantic radical instruction on beginner level Chinese L2 reading comprehension. The second is to solicit CFL learners' opinions of the effects of semantic radicals in reading comprehension. The third is to examine whether the teaching of semantic radicals will change CFL learners' motivation level in learning Chinese.

Research Questions

1. Will explicit teaching of semantic radicals significantly improve beginner level CFL readers' descriptive translation (indicating improved overall comprehension) of a given Chinese text?

2. How do CFL learners perceive the effects of instruction of semantic radicals on their ability to translate text, thereby improving their reading comprehension?

3. Will explicit instruction on Chinese semantic radicals change CFL learners' motivation level in learning Chinese?

Definition of Terms

L1: a person's native language or the first language a person has learned since that person was born.

L2: the second language a non-native speaker knows, is learning, or acquiring in addition to L1.

CFL: the study of Mandarin Chinese as a foreign language by non-native speakers.

Beginner level CFL learner: students who have learned Chinese as their L2 for one year in college.

Reading comprehension: "the process of simultaneously constructing and extracting meaning through interaction and engagement with print" (RRSG, 2002, p.11).

Morpheme: the smallest meaningful linguistic component in a language. A morpheme contains no smaller part that has a meaning.

Orthography: a set of conventions for writing a language. There are three levels in Chinese orthography: strokes, radicals and characters. Strokes constitute radicals and radicals constitute characters.

Radical: the smallest meaningful orthographic unit in Chinese (Shen, 2010).

Chinese Character: Character is the largest unit in Chinese orthography. Chinese characters are composed of radicals.

Semantic radical: the smallest meaningful orthographic unit that gives a cue to the general meaning of a Chinese character.

Translation: a text written in another language that transports the meaning of the original text in a detailed, faithful, and natural way. However, it does not require complete fidelity to the lexical details and grammatical structure of the original language.

Compound character: A Chinese character that contains more than one radical and over 90% of Chinese characters are compound characters (D. Li, 1993, cited by Chen, Wang, & Cai, 2010, p.141).

Chapter Summary

The intrinsic differences of written Chinese and English texts have been thwarting beginner level CFL learners' attempt to read Chinese for comprehension. This has huge negative effects on students' confidence and motivation to continue learning Chinese. In the past, studies of most research in reading of CFL mainly concentrated on the cognitive and metacognitive strategies of nonnative readers of Chinese and the acquisition of Chinese characters through the assistance of semantic radicals by CFL learners. However, there is minimal empirical research conducted to examine whether the explicit instruction of Chinese semantic radicals can promote reading comprehension performance. The present study aimed to investigate whether adding a third dimension, explicit semantic radical instruction, to CFL teaching, could improve beginner level Chinese L2 reading comprehension performance. Chapter 2 outlines the foundation and rationale of the problem under investigation by reviewing related literature.

Chapter 2

Review of the Literature

Overview

The present study aimed to explicitly teach semantic radicals to beginner-level CFL learners to improve reading comprehension performance, thereby possibly boosting their confidence and motivating them to continue learning Chinese. To achieve that end, the researcher reviewed the previous research on the role of semantic radicals, explicit instruction of semantic radicals, the relationship between reading competence and motivation, and the evaluation of reading comprehension. The literature in each section is organized in chronological order.

The Role of Semantic Radicals in Chinese L1 Character Learning

There has been an abundance of research studying the role of semantic radicals in recognizing and learning Chinese characters by both native speakers of Chinese and CFL leaners. The positional regularity and functional regularity of semantic radicals were reported to be main factors that affect character recognition (Ho, Ng & Ng, 2003). Positional regularity of semantic radicals refers to the fact that about 75% of semantic-phonetic characters have their semantic radicals located on the left side, while functional regularity points to the meaning cuing function of semantic radicals. In the past research, the correlation between semantic radical knowledge and character recognition performance has been well documented.

Shu and Anderson (1997) carried out two experiments to examine the role of semantic radical awareness in the acquisition of characters and words by Chinese children. In both experiments, children at different grade levels were respectively presented with a series of two-character compound words in which the target character was represented by Pinyin, a Chinese alphabetic system that provides pronunciation of characters. The children were familiar with the compound words from oral language, but they had not seen the target characters before the experiments. The children's task was to choose the right character from four alternatives to replace the Pinyin in each compound word.

Children at first, third and fifth grade levels participated in the first experiment. The statistics showed that third and fifth graders selected characters containing correct semantic radicals even though they were not familiar with the characters. Only third and fifth graders took part in the second experiment where the meaning cuing transparency

and familiarity of semantic radicals in target radicals were controlled. The results showed that children performed significantly better with target characters containing transparent and familiar semantic radicals than with characters containing opaque and unfamiliar semantic radicals. In comparison, the children's unsatisfactory performance with characters containing unfamiliar semantic radicals suggested that children might benefit from the explicit instruction of unfamiliar semantic radicals.

The findings from both experiments demonstrated that Chinese children at third grade level and above were aware of the meaning cuing function of semantic radicals, and that they were capable of deriving the meaning of Chinese characters with semantic radicals. In addition, it is worth mentioning that children rated as "poor" readers by their teachers were less likely to use semantic radicals to make inferences about new characters. Therefore, the explicit teaching of semantic radicals and strategy of using them might be beneficial to struggling readers of Chinese.

Williams and Bever (2010) further demonstrated the informative attribute of semantic radicals for native speakers of Chinese in their study of 36 participants who were asked to take a semantic categorization test. In the test, there were 35 multiple-choice questions covering 35 different semantic categories (e.g. water, animal, etc.). Four characters were provided as choices for each question. One was semantically relevant and possessed associated radical; one was not semantically relevant but possessed associated radical; one was semantically relevant but did not possess associated radical; one was totally irrelevant. The participants were shown a semantic category and then presented the four characters one at a time. They were asked to determine if the character was in correspondence with that particular semantic category. The reaction time of each question

was recorded.

It was found that the participants reacted faster when shown a character with semantic relevance and associated semantic radical than when shown a character with semantic relevance but without associated semantic radical. The error rates and response time showed that semantically relevant radicals could facilitate character recognition, and that radicals without semantic relevance could produce inhibitory effect. The implication of this study was that learners should be taught explicitly how to identify semantic radicals and differentiate characters with semantic radicals that do not correspond to character meaning.

The Role of Semantic Radicals in CFL Character Learning

The role played by semantic radicals in Chinese character learning for CFL learners has been extensively investigated. Shen (2000) tested the semantic radical knowledge of first-year and second-year college CFL learners who had completed their first and second year Chinese respectively. After the semantic radical knowledge test, the two groups of students then took two semantic radical knowledge application tests that aimed to examine the participants' character recognition and production abilities. In the first application test, having been provided with an English word, the students were required to select the appropriate character with the same meaning from three novel Chinese characters. For the second application test, the students had to add semantic radicals to a list of incomplete compound characters based on their meaning. The results showed that students with a higher level of semantic radical knowledge performed significantly better in both application tests than did students with a lower level of semantic radical knowledge. This indicated the positive role played by semantic radicals

in students' recognition and production of Chinese characters. However, the results also showed that only transparent semantic radicals (radicals that signify the general meaning of compound characters), not opaque semantic radicals (radicals that do not provide meaning cues of compound characters), assisted students with their test performances.

In their subsequent study, Shen and Ke (2007) defined semantic radical awareness as "the functional understanding of the role of radicals in forming Chinese characters and the ability to use this knowledge consciously in learning characters (Shen and Ke, 2007, p.100)." Based on the previous study, Shen and Ke (2007) investigated the developmental trends of semantic radical knowledge acquisition and its relationship with semantic radical knowledge application skills. The relationship between semantic radical knowledge application skills and Chinese word acquisition was also examined. The participants were college CFL learners enrolled in first year to fourth year Chinese classes. Each one of them took a radical perception test, a radical knowledge test, a radical knowledge application test, and a vocabulary test. The results showed that semantic radical knowledge did not develop synchronously with semantic radical knowledge application skills, but semantic radical knowledge application skills had a positive correlation with semantic radical knowledge. As to the relationship between semantic radical application skills and Chinese word acquisition, a moderate positive correlation was found.

Shen and Ke (2007) indicated that if CFL learners had sufficient semantic radical knowledge and application skills, they would reduce the encoding and decoding time and be more efficient when learning new characters.

Wang and Koda (2013) investigated the effect of transparency level of semantic

radicals on novel character meaning inference. They also examined whether semantic radicals could help in inferring novel character meaning in context. The participants were 37 first year college CFL students who had finished a whole academic year of Chinese learning in the United States. They were asked to complete a character meaning inference task in isolation condition and a character meaning inference task in contextual condition. The target characters contained either transparent or less transparent semantic radicals. In isolation condition, participants had to choose the right character according to the meaning provided. In contextual condition, the target character was put in an English sentence, and then the participants needed to choose the right English translation to replace the character. The results showed that less transparent semantic radicals could help learners infer character meaning, but students performed better with characters containing more transparent semantic radicals in both isolation and contextual conditions. The accuracy rates for characters with transparent semantic radicals in two conditions were similar. Contextual information did not produce benefits for learning characters with transparent or less transparent semantic radicals. On the contrary, it seemed to hinder the learning of characters with less transparent semantic radicals.

The findings indicated that even though semantic radicals only provide partial information about the whole character, they could be conducive to Chinese character acquisition. The negative influence of contextual information in the study is inconsistent with the results of previous research and requires further exploration. The study implied that teaching components of compound characters and raising semantic radical awareness could benefit CFL learners in new character learning.

Similar to the study by Wang and Koda (2013), Lu, Koda, Zhang and Zhang

(2015) examined the influence of saliency level of semantic radicals and semantic radical knowledge on character meaning extraction and inference among CFL learners. The participants were 69 second-year CFL learners at an American university. Each of them took a lexical inference text and semantic radical knowledge test. In the lexical inference task, the participants were presented with 40 simple Chinese sentences each of which contained an unfamiliar character with either a high-salient semantic radical or a low-salient semantic radical. The participants were instructed to select the most appropriate meaning for the unfamiliar character. The results showed that when the target characters contained high-salient semantic radicals, learners with a high level of semantic radical knowledge achieved higher scores than learners with a low level of semantic radical knowledge. When the target characters contained low-salient semantic radicals, the character inference performance of all participants did not differ. The findings indicated that both semantic radical salience and semantic radical knowledge could affect character processing, and that CFL learners might greatly benefit from explicit instruction on the relationship between semantic radicals and character meaning.

The aforementioned studies have provided positive evidence that semantic radicals could be useful in learning Chinese characters and words. However, Chinese language teachers should be aware of the limitations posed by opaque semantic radicals when applying semantic radical knowledge (Shen & Ke, 2007). The instruction of characters with transparent and opaque semantic radicals should be different (Wang & Koda, 2013).

The Role of Semantic Radicals in Chinese Reading Comprehension

Few studies have addressed the question whether the knowledge of semantic

radicals could lead to increased level of reading comprehension of Chinese texts in CFL. However, the following three studies shed light on how the knowledge of semantic radicals influenced reading comprehension of native Chinese speakers.

Ho, Ng and Ng (2003) designed a study to examine Chinese children's development of semantic radical knowledge and the relationship between children's semantic radical knowledge and their reading development. The study included 60 Chinese children, of whom 20 were first graders, 20 were third graders, and 20 were fifth graders. The experimenters measured the children's knowledge of positional and functional regularities of semantic radicals through various tasks. Then the students at each grade received a Chinese sentence comprehension test with appropriate difficulty according to their grade levels. Containing 30 incomplete sentences, the test required children to choose the most appropriate character from four alternatives to complete the sentences. Half of the correct characters had transparent semantic radicals, and the rest had opaque semantic radicals that were not able to cue meaning of characters. The experimenters found that children's knowledge of semantic radicals improved with their grade levels, and fifth graders did significantly better with sentences needing characters containing transparent semantic radicals. The results of the sentence comprehension test suggested that fifth graders utilized the semantic radicals for meaning cues when processing sentences.

Based on the assumption that children would attempt to understand a Chinese text by taking advantage of the meaning-cuing function of semantic radicals, Cheung, Chan, and Chong (2007) studied whether having knowledge of semantic radicals could predict Chinese children's reading comprehension. In the study, the participants' knowledge of

functional regularities of semantic radicals was tested by a novel object-labeling task. Then, the participants were asked to read four Chinese texts, each of which was followed by four multiple-choice questions to assess the children's understanding of the comprehension passage. The results showed a correlation between children's semantic knowledge and their passage comprehension performance. The study has confirmed the assumption that the meaning cuing function of semantic radicals plays a role in interpreting the meaning of Chinese texts.

Zhang and colleagues (2012) carried out a one-year longitudinal study to investigate the associations of vocabulary knowledge, character knowledge, and semantic radical awareness to reading comprehension of Chinese children (7 and 8 years old) at the sentence level. The factor of semantic radical awareness was considered in this study, because semantic radicals could provide meaning cues for novel characters. The participants were tested individually by a trained psychology major two times with a 12-month interval. In both Time 1 and Time 2, children's knowledge, character knowledge, and semantic radical awareness were measured. Each time, the children also completed a reading comprehension task where each test item provided a Chinese sentence and five pictures related to the sentence description. The children were asked to select a picture that best reflected the correct meaning of the sentence. Regression was used for data analysis. The results demonstrated that vocabulary and character knowledge were important predictors of reading comprehension at Time 1. However, at Time 2, semantic radical awareness, along with character knowledge, was strongly associated with reading comprehension.

The findings of the study highlighted the importance of semantic radical awareness in Chinese reading comprehension at the sentence level. It was also pointed out that a higher level of semantic radical awareness enabled children to guess the meaning of novel characters and relate background knowledge and context to the current information. Thus, developing children's semantic radical awareness could give them a distinct advantage when it comes to Chinese reading comprehension.

The three studies mentioned above displayed that the knowledge of semantic radicals could be important for native speakers to comprehend Chinese texts. The results of the three studies implied the necessity to teach children semantic radicals explicitly so as to improve their character decoding skills and reading comprehension. However, the role of semantic radicals in Chinese reading comprehension of CFL learners has not been thoroughly investigated. Based on these findings, the current study hypothesized that there would be positive effect of semantic radical knowledge on CFL learners' Chinese reading comprehension.

The Explicit Instruction of Semantic Radicals

Based on the growing evidence that radicals are important to both native and non-native readers in recognizing Chinese characters (Shu & Anderson, 1997; Shen & Ke, 2007), some studies were devoted to examining the effect of explicit instruction of radicals on Chinese learning.

Taft and Chung (1999) investigated whether giving prominence to Chinese radical structure in teaching Chinese characters to CFL learners could facilitate their character learning. The participants in the study were 40 students from the University of New South Wales who knew nothing about the structure of Chinese. They were divided into

four groups of 10 and asked to learn 24 Chinese characters that were made of 16 radicals. All of them were exposed three times to the 24 Chinese characters, with each character being presented singly and accompanied by its meaning (e.g., 听-Listen) on each of the three occasions. However, the four groups were taught differently in terms of radicals. Before the exposure to the characters, the participants in the first group were told about radicals being the building blocks of Chinese characters and given time to learn the 16 radicals. The second was told about the radicals just before their first exposure. Participants in the third group were told about the radicals just before their third exposure. The last group performed the learning without being told about the radicals. Immediately after the learning period, the participants were presented with the 24 characters and asked to write down the appropriate meaning of each character. The results showed that the first three groups, with the awareness of radicals, performed better in learning Chinese characters than the last group that did not have any knowledge about radicals. Furthermore, the outstanding performance of the second group suggested that it was more effective to teach radicals of a character at the same time as the first encounter of that character. The study has provided positive evidence that the explicit instruction of radical structure could enhance the learning of Chinese characters for CFL learners.

In the study by Taft and Chung (1999), the teaching focused only on radical structure of Chinese characters, and not the meaning and sound cuing function of radicals. However, they were optimistic that teaching the meaning cuing function of semantic radicals would be conducive to Chinese learning, “because it provides extra cue to remembering both a part of the character and the meaning-character association (Taft and Chung, 1999, p.249).”

Wang, Liu and Perfetti (2004) carried out a study to investigate the effect of explicit instruction of semantic radicals on CFL learners' meaning inference capabilities of Chinese characters. Before the study, the students were not explicitly taught the visual-orthographic structure of characters, or knowledge of radicals. In the study, they were asked to identify visually and infer the meaning of novel Chinese characters that they had not been exposed to in their curriculum. However, the characters were manipulated to contain high and low frequency semantic radicals that the participants had encountered in their curriculum. When the participants were asked to identify unknown characters on their own, they were not aware of the function of semantic radicals and made unsuccessful attempts to infer meaning. When the participants were probed with questions (Have you seen any part of this character before?) and encouraged to identify familiar radicals and to guess meaning cues, they could identify visually the majority of the semantic radicals and were able to make appropriate meaning inferences of some characters. After the participants received explicit instruction of the function of the semantic radicals and were explained the relation between semantic radicals and the characters that were known to them, they performed significantly better in visual identification and making appropriate meaning inference of novel characters. In addition, they did better with characters containing high-frequency semantic radicals than characters containing low-frequency semantic radicals. The results indicated that the explicit teaching of semantic radicals, even for only a short period of time, could contribute to the CFL learners' ability to make appropriate meaning inference of novel characters, thereby facilitating CFL learning.

Liu and Fang (2014) investigated the short-term effectiveness of teaching

beginner-level CFL learners declarative knowledge of Chinese radicals and compound characters. In the intervention group, the students were taught the skill to analyze the structure and components of unknown characters and how to exploit the meaning clues of semantic radicals. The results of the study did not show a significant difference in the memory retention test between the intervention group and control group. However, the ability of students in the intervention group to correctly decode the meaning of unknown characters was significantly stronger than that of students in the control group.

The results of this section supported the facilitative role of explicit teaching of semantic radicals in learning Chinese, thus providing rationale for the treatment in this study. Moreover, previous studies have lent inspiration to the way in which explicit instruction of semantic radicals should be carried out in this study.

Language Competence and Motivation in L2

Voluminous research findings have suggested that motivation was the primary impetus and determining factor to achieve success and sustain the learning of a foreign language (Dörnyei, 1998; Nicholson, 2013). Cook (2000) believed that age, personality, and motivation were the three major factors that influenced foreign language learning, and that motivation was the most significant one among these three factors. Dörnyei (1998) stated that even the students with remarkable aptitude could not achieve long-term goals if they did not have sufficient motivation. However, learners' high motivation could make up for deficiencies in their language talent and learning conditions. Therefore, one of the language teachers' roles is to cultivate and sustain learners' motivation so that they could invest continued efforts in their language learning.

Self-determination theory (SDT), introduced by Ryan and Deci (2000), has been one of the most influential mainstream psychological paradigms of motivation, and it has been incorporated into L2 motivation research. SDT postulated that self-motivation and mental health could be enhanced when three innate psychological needs, namely competence, autonomy, and relatedness, are satisfied. Competence refers to learners' feelings of content mastery. Autonomy refers to choice and opportunities for self-direction. Relatedness means the feeling of being accepted by and receiving relational support from others. Supporting the three innate psychological needs could promote intrinsic motivation. According to Kohn (1993), intrinsically motivated students are more likely to be life-long learners.

Linguistic self-confidence, learners' perception or judgment about their own competence and ability to accomplish tasks successfully, plays an important role in motivating students to learn a foreign language, because it affects the amount of effort they are willing to devote to language learning (Dörnyei, 2005). After surveying the motivational strategies used by 387 Taiwanese teachers of English, Cheng and Dörnyei (2007) agreed that satisfying students' needs for achievement and fostering their self-confidence had positive influence on academic motivation and performance.

Having examined predominant motivational theories in foreign language learning and identified certain key factors that motivate students to put more efforts in learning a foreign language, Nicholson (2013) proposed that bolstering learners' competence, confidence, and autonomy could boost levels of motivation in students. Providing tasks that ensure students regularly experience a sense of achievement to increase learners' confidence would be a case in point.

Ruan, Duan and Du (2015) enhanced beginner-level CFL learners' orientations and motivation by using task-based teaching and learning in a Danish University. In the study, learner orientation was considered as a reflection and predictor of motivation. Data were collected through pre-course and post-course surveys. The results showed that the CFL learners had positive orientation change, demonstrated higher levels of interest in Chinese language and culture, and expressed willingness to continue learning Chinese. The enhanced learner orientation and motivation were attributed to learners' perception of the difficulty of learning Chinese or learners' self-confidence, learners' satisfaction with achievement levels, and the motivating course design.

Based on the motivational theories and empirical studies, it is reasonable to believe that promoting learners' competence, self-confidence, and autonomy can greatly improve their intrinsic motivation. To stimulate students to direct their efforts into language learning and sustain sufficient levels of devotion, language teachers should endeavor to make sure those psychological needs are met.

Translation as an Indicator of Reading Comprehension

Translating has long been used as a teaching method and learning strategy in second language acquisition. It has also been used as a tool to verify learners' knowledge of the target language (Eyckmans, Anckaert & Segers, 2016). Over the last 40 years, the learner-centered communicative approach, which emphasizes learner interaction and using authentic target language materials in the classroom, has minimized the role of translating as a teaching method (Kemp, 2012). In spite of that, translation is still considered the preferential way of checking reading comprehension (Eyckmans et al., 2016).

There has been positive evidence regarding often-used reading comprehension test methods such as immediate written recall tasks, multiple-choice questions, cloze tests, and open-ended questions. However, Chang (2006) pointed out that multiple-choice technique, cloze tests, and short answer questions might affect readers' understanding of the text during the comprehending process. Since the readers would be required to write down what they could remember and comprehend from the text, the immediate written recall tasks involve memorizing instead of just understanding the reading passage. As a result, readers might not be able to remember what they have understood. Thus, the performance on the immediate written recall task might not accurately reflect to what extent the readers really understand the reading passage.

To examine whether the requirement of memory negatively affects the assessment of readers' comprehension, Chang (2006) compared learners' performance on an immediate written recall task and a translation task. Participants were 97 native speakers of Chinese who were learning English as their foreign language. The participants were first given enough time to read a text, and then after submitting the original text, they were asked to write down everything they could remember from the text in Chinese. After the participants handed in their recalls, they got the reading passage back and were instructed to translate the text as detailed as possible. The results showed that learners of all proficiency levels produced significantly more words and scored higher on the translation task than on the recall task. This indicated that the translation task presented more evidence of comprehension than the recall task regardless of readers' proficiency levels. Furthermore, the error patterns showed that even though most participants could recall the main idea units, they had problems remembering causal relationship between

ideas and detailed information.

Kemp (2012) stated that one of the goals of translation exams was to test language learners' linguistic competence, which included vocabulary range, comprehension of linguistic structures, and register awareness. He suggested that a translation exam could be considered a practical, fair and efficient tool to assess students' comprehensive linguistic competence.

Sun and Cheng (2013) demonstrated that translation tasks could mirror foreign language learners' language competency by examining the relationship between English learners' performance on the translation task and their performance on other tasks such as listening comprehension, reading comprehension, cloze, and writing in the College English Test in China. In the cloze task, students were required to choose correct answers from four alternatives for 20 blanks embedded in a short passage. Thus, the cloze task also reflected students' reading comprehension ability. As to the translation task, the participants were asked to translate the Chinese content that had been embedded five English sentences. The correlation analyses showed that participants' performance on the translation task was moderately correlated with writing, but significantly correlated with their performance on listening comprehension, reading comprehension, and cloze. The findings of this study were supportive of the validity of implementing translation tasks to evaluate foreign language learners' reading comprehension.

In conclusion, the research findings support the idea that translation can function as a measure of comprehension ability in the target language when translating from the target language to the native language (Eyckmans et al., 2016). With regard to the

assessment of readers' comprehension of a text, translation task could provide a more complete picture than the immediate written recall test.

Conclusion

The results of previous studies consistently have demonstrated that semantic radicals play a crucial role in learning Chinese characters for both native speakers of Chinese and CFL learners. Raising learners' semantic radical awareness by way of explicit instruction has a positive bearing on their abilities to make meaning-character association and infer the meaning of novel characters, attesting to the importance of semantic radicals in learning Chinese. Some studies have revealed that knowledge of semantic radicals could positively affect the reading comprehension of native speakers. However, the findings from this review showed a lack of significant extant literature on the relationship between explicit instruction of semantic radicals and reading comprehension of beginner-level CFL learners.

Given that learners' competence, self-confidence, and autonomy can greatly improve their intrinsic motivation, the current study is meaningful in that the explicit instruction of semantic radicals might advance CFL learners' reading competence and empower them to read Chinese by themselves, thus enhancing their motivation levels and encouraging them to continue learning Chinese. Using translation task as a reading comprehension assessment tool could present more evidence of comprehension, which could improve the validity of the current study.

Chapter Summary

This chapter elaborated on past research concerning the role of semantic radicals, explicit instruction of semantic radicals, the relationship between reading competence and motivation, and the evaluation of reading comprehension in chronological order. The findings of the reviewed empirical studies provided scientific foundation and rationale for the present study. Chapter 3 provides detailed information about the complete procedures of the experiment and the collection of data.

Chapter 3

Methodology

Overview

The present study examined whether explicit teaching of semantic radicals would significantly improve beginner level CFL readers' overall comprehension of a given Chinese text, how CFL learners would perceive the effects of instruction of semantic radicals, and their motivation level in learning Chinese after the experiment. The reading comprehension was assessed by the accuracy of the translation. This chapter specifies the process adopted in this study by providing information regarding research design, participants, instruments, procedure, and data analysis.

Research Design

Both quantitative and qualitative data were critical for answering the research questions of this study. Johnson and Turner (2003) argued that the mixed-method research combines the strengths of quantitative and qualitative methods and provides insights not possible when data are collected using only one method. Therefore, a mixed-method approach was deemed most appropriate for this study. The quantitative part aimed to evaluate the performance of CFL learners in translating the Chinese text, thereby assessing their overall reading comprehension. The qualitative part was employed to triangulate the quantitative data and reveal more detailed information about the results, learners' perceptions towards the effects of instruction of semantic radicals, and the change of motivation level in learning Chinese.

Considering the limited pool of participants, this study adopted a within-subjects design rather than a between-subjects design. Another reason to adopt a within-subjects design was to minimize the distortions because of individual differences and to detect the change caused by the independent variable on an individual basis.

Participants

There were 1 male and 4 female participants (age range=19-21; mean age=20.3) in the study, all of whom were attending the second year Chinese language program at a Liberal Arts college in the Midwest. All the participants have English as their first language and Chinese as their second language. All 5 participants had taken and passed the first year Chinese courses at the same college.

All the participants took two Chinese courses each week. One course consisted of three 65-minute sessions of vocabulary and grammar instruction using Integrated Chinese

Level I Part II (Tao-chung Yao, 2009) as the textbook. The other course was called Oral Chinese where the students practiced speaking Chinese. Because Chinese was not used outside the classroom, the two courses were the major sources of exposure to the Chinese language. After examining the textbook and interviewing instructors and students, it was certain that none of the participants had received explicit instruction on Chinese semantic radicals.

Convenience sampling, a sampling method that selects participants because of their convenient availability, was used in this study because the researcher was the instructor of the 5 participants for the Oral Chinese class. The participants were informed of the intervention and procedure of the study and their participation in this study was voluntary.

Instruments

Two instruments were used in this study to collect data: A Chinese-to-English translation task (See Appendix A) and a questionnaire (See Appendix B) containing open-ended questions.

Chinese-to-English Translation Task

The purpose of the translation task, conducted both before and after the explicit instruction of ten Chinese semantic radicals, was to find out whether the intervention would influence the participants' performances in translating the Chinese paragraph into English. As it was indicated in chapter two of this study, a more detailed translation suggests an increased overall reading comprehension of the target text.

To evaluate the participants' performance change more accurately, the same Chinese paragraph was used in the translation tasks before and after the intervention. In

order to align the translation task with the investigative purpose of this study, the researcher developed the Chinese paragraph. There were 186 Chinese characters in the paragraph. The participants should be familiar with over 90 percent of the characters because they had encountered and been tested on those characters in their first-year Chinese language classes.

Within the Chinese text, ten Chinese semantic radicals were embedded in twelve characters that had never appeared in the Chinese textbook used by the participants (See Appendix C). All ten semantic radicals selected were unknown to the participants and could provide transparent meaning cues for the whole characters. In addition to the twelve characters, there were nine extra new characters (See Appendix C) in the text that they had never met before this study. The purpose of this was to evaluate the effects of explicit instruction of semantic radicals on the students' ability to utilize context to improve their comprehension of those extra new characters.

Simplified Chinese characters were used in the Chinese paragraph since the participants were taught with simplified characters. Another native Chinese speaker, an instructor of Chinese from the same college with the researcher, was invited to proofread the Chinese paragraph and she rated the text as authentic and confirmed that the target semantic radicals provided transparent cues for the twelve whole characters.

Questionnaire

The purpose of the questionnaire was to triangulate the quantitative data, solicit the participants' perceptions toward the explicit instruction of semantic radicals, and find out the change in their motivation level in terms of learning Chinese. There were six open-ended questions that fell into the following four categories of information.

Category 1: Impact of semantic radical knowledge on the posttest

Question 1: Did you use your semantic radical knowledge in comprehending the Chinese text in the posttest (second translation task)?

Question 2: In what ways do you think your semantic radical knowledge influenced your comprehension of the Chinese text in the posttest? Please give some examples if you could still remember.

Category 2: Useful elements of explicit instruction on semantic radicals

Question 3: Which part (meaning, sound, shape, etymology, etc.) of the explicit instruction of semantic radicals do you think is the most useful in your comprehension of the Chinese text in the posttest?

Category 3: Further learning and utilization of semantic radical knowledge

Question 4: In terms of CFL learning, how would you further utilize your semantic radical knowledge?

Question 5: Do you want to learn more about Chinese semantic radicals? Why?

Category 4: Change of motivational level in learning Chinese

Question 6: Has your motivation level in learning Chinese changed after the posttest? (or do you find out that learning Chinese is actually not that difficult?) Why has it changed?

Questionnaires were used to collect qualitative data because the participants might feel less uncomfortable to fill out questionnaires than having interviews.

Procedure

The experimental procedure consisted of four steps, namely, pre-test, intervention, and post-test. The four steps were carried out in a 65-minute Oral Chinese class session.

The reason to complete the experiment in a single session was to eliminate the effects from outside sources of variability and thus accurately reflect the impact of the intervention.

At the beginning of the session, the participants were given the abovementioned Chinese text and were asked to translate the Chinese text into English. The instructions were as follows, “Please translate the Chinese text into English. You are encouraged to take a guess and write down as many details as possible.” They were asked to hand in the Chinese text and translation before the intervention.

For step two, the participants received explicit instruction of the ten semantic radicals (See Appendix C). The method used in this study was in accordance with the instructional method used by Shen (2010) to analyze radical knowledge development among beginning CFL learners. In her study, Shen (2010) found that the following instructional methods were considered effective by the students: a combination of aural, oral, and visual repetition and review; explaining the etymology of the radical along with its origin and its historical development; relating radicals to character learning; taking quizzes and tests on radical knowledge; and using games and activities in learning radicals. In this study, the researcher first explained the meaning, writing, etymology, and meaning cueing function of each target semantic radical. Then, the researcher presented sample characters containing those radicals and explained the relationship between each semantic radical and the meaning of its corresponding character. After that, ten extra sample characters containing those semantic radicals were introduced and the participants were asked to infer the meaning of each character with the help of those meaning-cueing radicals. The students were also made aware that semantic radicals could only help infer

the meanings and not convey the exact meaning of characters. At the end of the semantic radical instruction, each participant was asked to match each semantic radical with its English meaning on a piece of paper. None of the participants made a mistake on this matching quiz (See Appendix D), suggesting they had acquired the meaning of the semantic radicals.

In the post-test, the participants were given the same Chinese text as the one in the pre-test to translate into English. They followed the same instructions. In addition, the participants were allowed to refer to the matching quiz in case they forgot the meaning of some radicals. It is worth noting that the quiz was only helpful after the participants had received the explicit instruction of target semantic radicals and understood the meaning-cueing function of semantic radicals. After the post-test, each participant handed in the Chinese text and the translation. After the participants handed in the texts and translations, they were asked to fill out the questionnaire.

Data Analysis

This study adopted the Johnson (1970) system to quantify the participants' translation performance in both pre-test and post-test. Following the Johnson system, the researcher and the Chinese instructor who helped evaluate the authenticity of the Chinese text demarcated the text into pausal units based on normally paced oral reading. For example, the first sentence, 王明的家很贫穷, which means *Wangming's family was very poor*, was divided into 王明的家 and 很贫穷 based on paced oral reading. The researcher and the Chinese instructor discussed to resolve any disagreement regarding the division of the text into pausal units. The reading passage was divided into 29 units (See Appendix E).

The researcher and the Chinese instructor scored each participant's translation in the pre-test and post-test based on how many correctly translated pausal units were present. The presence of each correctly translated pausal unit led to 1 point. If the translation was close to the exact meaning of the pausal unit, the participant was given 0.5 point. An incorrect translation or blank space resulted in 0 point. For example, in the pausal unit 没有钱，there is the target semantic radical 钅(related to metal or gold) in the character 钱. If the participant translates the pausal unit as *has no money*, 1 point will be recorded. If the pausal unit is translated as *has no gold*, 0.5 point will be recorded.

Inter-rater reliability was established between the researcher and the Chinese instructor. The reliability for results of the pre-test was 0.93 and for the post-test performance was 0.89. A paired sample t-test was implemented to find out whether the performance difference between the pre-test and post-test was statistically significant.

The qualitative data obtained from the questionnaires were used to detect how the participants perceived the effects of instruction of semantic radicals and whether their motivation levels changed in learning Chinese after the experiment.

Chapter Summary

This chapter outlined the information with regard to the design of this research, participants, instruments, procedure, and data analysis. A within-subjects pretest-posttest design was considered most suitable for the present study. Two instruments were included in this study to collect both quantitative and qualitative data. The researcher also laid out in detail the data analysis plan geared toward the research questions.

Chapter 4

Results

Overview

The aim of the present study was to investigate the effects of explicit semantic radical instruction on beginner-level Chinese foreign language learners' overall comprehension as demonstrated by descriptively translating a given Chinese text. It was hypothesized that the participants would produce more evidence of reading comprehension in the posttest than in the pretest due to the explicit instruction on semantic radicals. The mean scores of the participants' translation performances in the pretest and posttest were compared using paired sample t-tests. The quantitative results were summarized in relation to research questions. The analyses of participants' responses to the questionnaire shed light on how beginner-level CFL learners perceive the effects of instruction of semantic radicals and how their motivation levels in learning Chinese change due to the treatment.

Research Question 1-- Quantitative Data

Research question 1: Will explicit teaching of semantic radicals significantly improve beginner level CFL readers' descriptive translation (indicating improved overall comprehension) of a given Chinese text?

The researcher used the data tools embedded in *Microsoft Excel* to analyze the data. Paired sample t-tests were administered to evaluate the statistical significance of the score difference between the pretest and posttest. The following reveals the quantitative findings regarding the overall score difference, score difference on pausal units containing target characters, score difference on pausal units containing extra new characters, and score difference on pausal units without target characters or extra new characters between the pretest and posttest.

Overall score difference between the pretest and posttest

Figure 1 presents a comparison of scores the participants achieved on the translation tasks before and after the explicit instruction on the ten Chinese semantic radicals. In Figure 1, it is obvious that all the participants improved their scores in the posttest, with the mean pretest score standing at 10.3 and the mean posttest score at 15.4.

Table 1. Paired sample t-test: scores on translation tasks

Mean		t Critical one-tail	t Stat	p value one-tail	df
Pretest	10.3				
Posttest	15.4	2.13	3.74	0.01	4

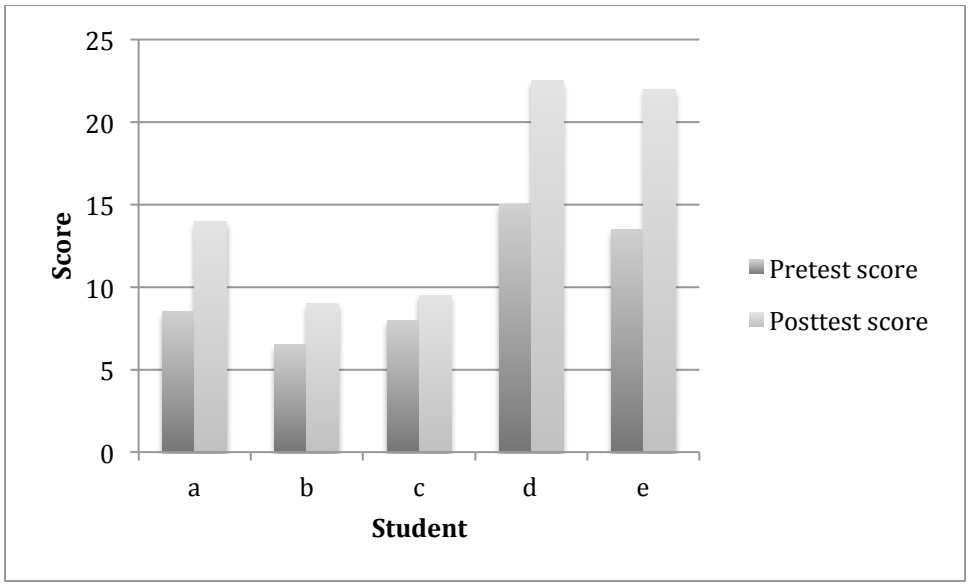

Figure 1. Comparison of overall pretest and posttest scores

To determine whether the improvement in the scores is statistically significant, the researcher administered a paired sample t-test using a significance level of 0.05. The t-test result is shown in Table 1.

Table 1 shows that the difference between the pretest and posttest scores is statistically significant (p value = 0.01). In other words, participants performed significantly better in translating the given Chinese text after receiving explicit instruction of the ten Chinese semantic radicals.

Score change on pausal units containing target characters

Figure 2 displays a sharp increase in the posttest scores on the pausal units containing characters with target semantic radicals that were explicitly taught to the participants during the intervention stage. The mean score on the pausal units containing target characters rose from 0.4 to 3.1. In particular, student d and e made significantly greater progress than the other students.

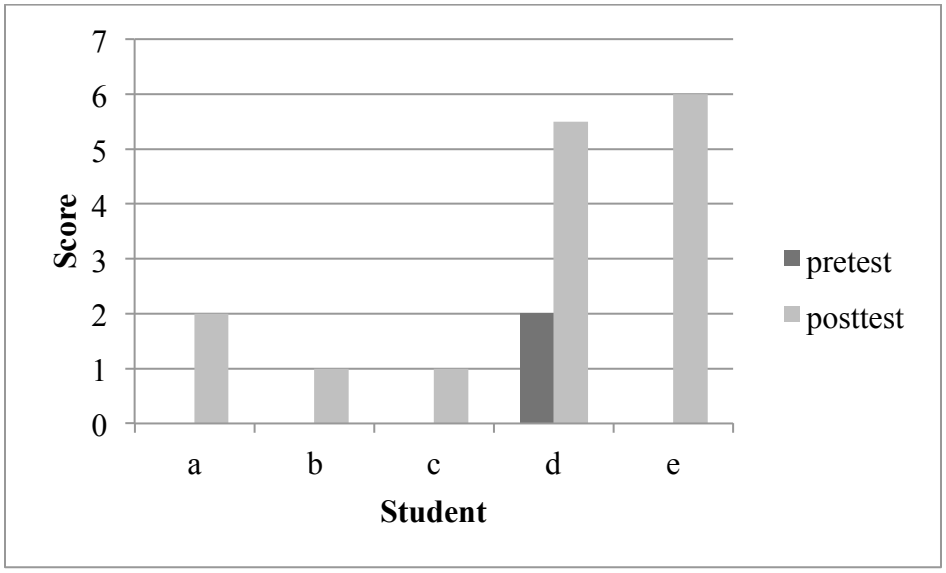

Figure 2. Comparison of pretest and posttest scores on pausal units containing target characters

To determine whether the score change on pausal units containing targets characters is statistically significant, the researcher administered a paired sample t-test using a significance level of 0.05. The t-test result is shown in Table 2.

Table 2. Paired sample t-test: scores on pausal units containing target characters

Mean		t Critical one-tail	t Stat	p value one-tail	df
Pretest	0.4				
Posttest	3.1	2.13	2.86	0.02	4

The t-test result in Table 2 confirms that the participants scored significantly higher in translating the pausal units containing target characters in the posttest than in the pretest (p value = 0.02).

Score change on pausal units containing extra new characters

Extra new characters stand for characters that were unknown to the participants and that did not contain target semantic radicals. Similar to their performance in translating pausal units containing target characters, the participants' mean score on pausal units containing extra new characters changed from 0.3 in pretest to 3.2 in posttest. Again, student d and e made significantly greater progress than the other students.

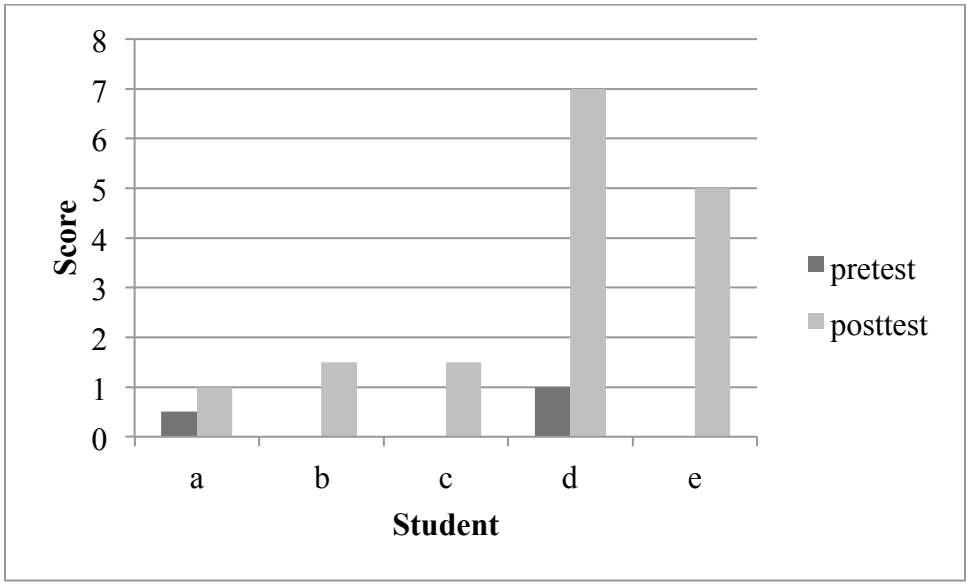

Figure 3. Comparison of pretest and posttest scores on pausal units containing extra new characters

To decide the statistical significance of the score change on pausal units containing extra new characters, the researcher administered a paired sample t-test using a significance level of 0.05. The t-test result is shown in Table 3.

Table 3. Paired sample t-test: scores on pausal units containing extra new characters

Mean		t Critical one-tail	t Stat	p value one-tail	df
Pretest	0.3				
Posttest	3.2	2.13	2.66	0.03	4

Table 3 shows that the score change from pretest to posttest with regard to the pausal units that contain extra new characters is statistically significant (p value = 0.03). In other words, they improved their performance in translating those pausal units with extra new characters after the intervention.

Score change on pausal units without target characters or extra new characters

Figure 4 demonstrates a slight advancement of the mean score on pausal units containing neither target characters nor extra new characters, changing from 9.6 in pretest to 10.9 in posttest. However, one student maintained the same score on the aforementioned pausal units before and after the intervention.

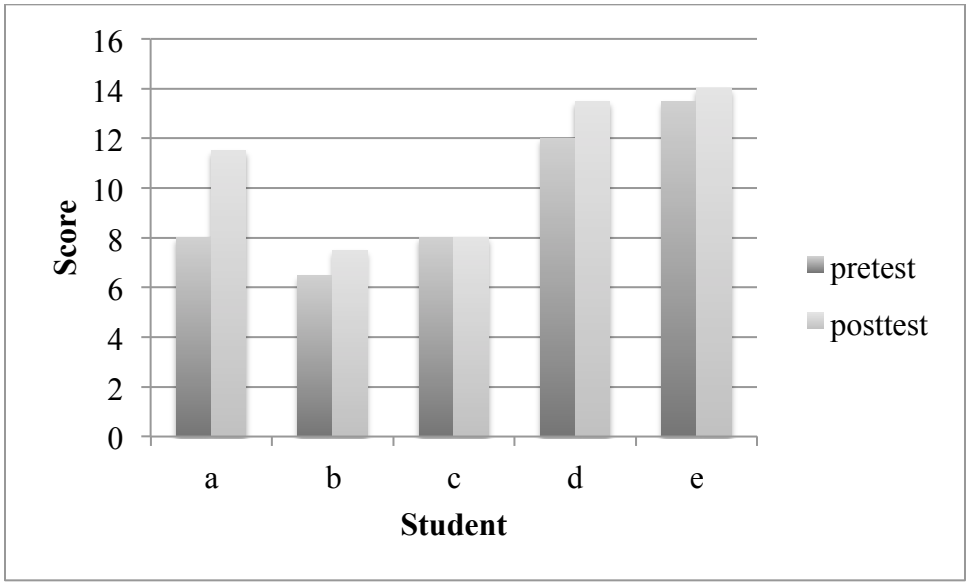

Figure 4. Comparison of pretest and posttest scores on pausal units without target characters or extra new characters

To determine the statistical significance of the score change on pausal units without target characters or extra new characters, the researcher administered a paired sample t-test using a significance level of 0.05. The t-test result is shown in Table 4.

Table 4. Paired sample t-test: scores on pausal units without target characters or extra new characters

Mean		t Critical one-tail	t Stat	p value one-tail	df
Pretest	9.6				
Posttest	10.9	2.13	2.15	0.05	4

The t-test result in Table 4 attests to the fact that participants did slightly better in translating the pausal units without target characters or extra new characters, but the statistical significance remains in doubt with a p value of 0.05.

According to the paired sample t-tests, the positive change in the participants' overall score, score on pausal units containing target characters, score on pausal units containing extra new characters was statistically significant. In other words, the explicit instruction of semantic radicals significantly improved the participants' descriptive translation (indicating improved overall comprehension) of a given Chinese text.

Research Question 2 and 3 -- Qualitative Data

Research question 2: How do CFL learners perceive the effects of instruction of semantic radicals on their ability to translate text, thereby improving their reading comprehension?

Research question 3: Will explicit instruction on Chinese semantic radicals change CFL learners' motivation level in learning Chinese?

The questionnaires completed by the 5 participants (See Appendix F) were collected after the posttest. The researcher analyzed the responses to the 4 categories of questions.

Category 1: Impact of semantic radical knowledge on the posttest

All the participants reported that they used the semantic radicals that they had learned during the intervention stage to help translate the given text in the posttest. This can be supported by the fact that all the participants achieved better scores in the posttest than in the pretest. One of the participants noted that she utilized the semantic radicals to add more contexts and better guess at the meanings of characters containing these semantic radicals. Another participant stated:

> "I didn't have the exact translation for some of the words, but I could make a good guess based off the context around the word and what the specific semantic radical meant. For example, one of the first few sentences had an unfamiliar word to me, but thanks to the □ radical (the radical means shell and it is related to money) that was in the word, I could guess that it meant poor or something close to it."

Category 2: Useful elements of explicit instruction on semantic radicals

All 5 participants agreed that the instruction on the meanings of semantic radicals was the most useful element in this research. This is understandable since this research focused on the meaning cueing function of semantic radicals. As one participant stated, "For comprehension, I think that the meaning helps the most. Then you can use the context with the meaning and better understand what is trying to be said."

However, some participants also mentioned the shape and etymology of semantic radicals as important parts of explicit instruction. For instance, a participant said:

> "I think for me it was the meaning and the shape of the radical that helped me the most. The meaning helped me with the overall meaning of the new character, and the shape helped me recognize which radical it was."

Another participant claimed that the history of the semantic radicals were more fascinating than she had thought.

Category 3: Further learning and utilization of semantic radical knowledge

After the posttest, all participants expressed their intent to continue learning Chinese semantic radicals. There were 3 main reasons behind the participants' willingness to enhance their knowledge of semantic radicals. First, some participants believed that semantic radical knowledge could help them better understand and connect with the language. For instance, one participant noted:

> "I would love to learn more about semantic radicals because I feel like the knowledge would let me to fully connect with Chinese rather than just memorize the language. I've found that a hands-on learning approach is the best way for me to learn something new and fully understand it."

The majority of the participants emphasized the facilitative role that semantic radicals could play in the Chinese character acquisition process. One participant compared the English and Chinese language and specifically pointed out that semantic radicals could help students better approach unknown characters. She said:

> "I do want to learn more radicals because I feel like it could better my Chinese. Since there are so many characters and there is no way of sounding it out like a you could do with words in English since you know the alphabet, it would be nice

to have a solid knowledge of radicals so that you could at least have something to recognize in unfamiliar characters."

Another participant regarded semantic radicals interesting and powerful tools in helping her remember characters. She remarked:

"I would definitely like to learn the meanings of all of them and practice to connect with other characters, because it was not only interesting but also extremely helpful to remember characters and made sense."

As to the further utilization of semantic radicals, 2 participants claimed that they would try to infer the meaning of new characters with familiar semantic radicals before resorting to dictionaries. One participant said, "If I came across new vocabulary I would see if I recognize any radicals before looking it up to see what it means to see if I could figure it out."

Category 4: Change of motivational level in learning Chinese

Three out of 5 participants admitted that their motivation level in learning Chinese went up after the intervention and post-test because they thought semantic radicals could make it easier for them to study Chinese. One of the participants commented:

"I think my motivation has strengthened in learning Chinese after the post-test. Using semantic radical knowledge makes learning Chinese more simple and a bit closer to learning English in the sense that you take pieces of the new word to help figure out what the overall meaning for the word is."

Another participant felt that semantic radical knowledge was conducive to a better understanding of the Chinese language. The participant stated:

"I think it does change my motivation because I like learning how the words connect. I feel like Chinese makes more sense when you pick apart the radicals and that excites me! I now want to learn more radicals because maybe it can make my Chinese better!"

Chapter Summary

This chapter presented the quantitative and qualitative findings, and the researcher integrated these findings as well as the results of data analysis to answer the 3 research questions. It was found that the semantic radical knowledge obtained through receiving the explicit instruction on Chinese semantic radicals helped participants significantly enhance their descriptive translation (indicating improved overall comprehension) of a given Chinese text. The researcher elaborated on participants' perceptions of the effects of explicit semantic radical instruction and how their motivation levels changed in learning Chinese. The final chapter provides interpretation of the findings and discusses the limitations, areas for further research, and educational implications.

Chapter 5

Discussion

Overview

The present study aimed to evaluate whether explicitly teaching semantic radicals to beginner-level Chinese foreign language (CFL) learners could improve their descriptive translation of a given Chinese text, indicating improved overall comprehension. The study also investigated how the participants would perceive the effects of instruction of semantic radicals and whether their motivation level in learning Chinese would change because of the explicit instruction on Chinese semantic radicals. The quantitative and qualitative results were presented in Chapter 4. This chapter presents conclusions of the results and discusses the limitations, areas for further research, and implications.

Conclusions

In this section, the researcher summarized the results of the 3 research questions raised in Chapter 1. Then, the researcher discussed the results and provided possible explanations with regard to those results.

Research question 1: Will explicit teaching of semantic radicals significantly improve beginner level CFL readers' descriptive translation (indicating improved overall comprehension) of a given Chinese text?

It was hypothesized that the overall mean score on the descriptive translation task would improve significantly due to explicit instruction on Chinese semantic radicals. According to the quantitative results, participants did perform significantly better in translating the given Chinese text after receiving explicit instruction of the ten Chinese semantic radicals (p value = 0.01). Therefore, the research hypothesis that explicit teaching of semantic radicals will significantly improve beginner-level CFL readers' descriptive translation (indicating improved overall comprehension) of a given Chinese text is accepted.

In the pretest, the participants either left out or mistranslated the pausal units where there were target characters or extra new characters. However, in the posttest, the participants left fewer blanks and became more accurate in inferring the meanings of those pausal units. When looking at score differences on pausal units containing target characters, pausal units containing extra new characters, and pausal units without target characters or extra new characters between the pretest and posttest, the participants' improvement on pausal units containing target characters (p value = 0.02) or extra new characters (p value = 0.03) was statistically significant. This concurs with previous

research (Wang, Liu and Perfetti, 2004) that demonstrated that the explicit teaching of semantic radicals, even for only a short period of time, could contribute to the CFL learners' ability to make appropriate meaning inference of novel characters.

The improvement on pausal units containing extra new characters suggested that the participants benefited from their improvement on pausal units containing target characters. It might be that the participants' improvement on pausal units containing target characters helped them extract more meaning out of the context, resulting in an increased comprehension of the extra new characters. For example, the sentence 他的眼睛很疼，但是他的爸爸妈妈没有钱给他买药，meaning *His eyes hurt, but his parents did not have money to buy him medicine,* contains the target character 药 which means medicine and extra new character 疼 which means hurt. In the pretest, the total score on the target character 药 was 1 point and that of the extra new character 疼 0.5 point. In the posttest, the total score on the target character 药 increased to 2.5 points and that of the extra new character 疼 logged 3 points. The cause of this change might be that some participants inferred the meaning of the target character based on the semantic radical, enabling them to get more meaning out of the surrounding context. As a result, they were able to guess the meaning of the extra new character. In their research, Zhang and colleagues (2012) agreed that if students could successfully infer the meanings of new words, they were more able to relate background knowledge or context to the existing information to assimilate it. However, the question whether there is a bidirectional relationship between meaning-inference ability and the understanding of context requires further investigation.

Following is a description of how the evaluators assessed the thoroughness of the participants' translation of two pausal units. The pausal unit 很贫穷, meaning *very poor*, contains the target character 贫 which consists of two components: the upper part 分 and the semantic radical 贝. The literal meaning of the semantic radical 贝 is *shell* which was used as currency in ancient China. Thus, the semantic radical 贝 is related to money. In the pretest, none of the participants scored on this pausal unit. Yet the score on this pausal unit increased to 2.5 in the posttest. Two participants translated the pausal unit completely right, and one participant translated 贫 as *inexpensive*, earning half a point. Another pausal unit 他的眼睛很疼, meaning *his eyes hurt*, contains the extra new character 疼 which means *hurt*. In the pretest, only one participant translated the pausal unit as *his eyes aren't good,* earning half a point, and the other 4 participants just left out the unit. In the posttest, 2 participants got the right translation, and another 2 participants scored 0.5 point respectively by translating the unit as *his eyes can't see well* and *his eyes are bad*. Though students improved enormously in translating pausal units with target characters or extra new characters, it is worth mentioning that they failed to make meaning inferences about some target characters because the scores on pausal units with those target characters did not change. The reason might be that compared with other target characters in the text, the meaning-cueing function of the semantic radicals in those target characters was less transparent. This is in line with the results of a previous study by Wang and Koda (2013). Their study showed that less transparent semantic radicals could help learners infer character meaning, but students performed better with characters containing more transparent semantic radicals in both isolation and contextual conditions.

There was positive score change on pausal units without target characters or extra new characters, but the change was only close to statistical significance (p value = 0.05). In both pretest and posttest, participant d and e showed stronger performance than the others did in translating these pausal units. In the posttest, they also made significantly greater progress than the others in translating pausal units with target characters or extra new characters. This indicates that the effect size of semantic radical instruction on beginner level CFL learners' reading comprehension might be contingent on individual differences. For example, one difference is that student d and student e tend to typically come to class more prepared than their classmates. They study the materials and participate more often in class discussions.

In sum, the semantic radical knowledge obtained through receiving the explicit instruction on Chinese semantic radicals helped participants significantly enhance their descriptive translation (indicating improved overall comprehension) of a given Chinese text. In particular, the participants leveraged their newly gained semantic radicals knowledge to boost their performance on translating the target characters and extra new characters.

Research question 2: How do CFL learners perceive the effects of instruction of semantic radicals on their ability to translate text, thereby improving their reading comprehension?

In general, all the participants acknowledged on their questionnaire responses the positive effects of instruction of semantic radicals on their ability to translate text. Their increased attempts to make meaning inferences about new characters and the enormous

overall score change before and after the intervention (p value = 0.01) is reflective of the abovementioned perception.

The students recalled in the questionnaires that they had used the meanings of semantic radicals to better guess the overall meanings of target characters. Some participants mentioned they sometimes had referred to the context surrounding the target characters to infer their meanings. The immense growth of correctly translated pausal units containing target semantic radicals provides a clue as to why participants attached great importance to the meanings of semantic radicals in helping them tackle the translation task.

The participants also made more appropriate meaning inferences on pausal units with extra new characters that did not contain target semantic radicals. This indicates the participants might have taken advantage of the semantic radicals to make sense of other new characters.

In short, though semantic radicals do not provide the exact meanings of Chinese characters, the participants considered the semantic radicals could help them make more meaning inferences about the target characters either by adding more contexts or by relating the semantic radicals to the contexts around the new words.

Research question 3: Will explicit instruction on Chinese semantic radicals change CFL learners' motivation level in learning Chinese?

Three out of 5 participants reported that they were more motivated to learn Chinese because they thought semantic radical knowledge would make learning Chinese simpler and their Chinese better. They believed that semantic radicals would help them take characters apart and better understand the Chinese language. The other 2 participants

were uncertain whether their motivation changed or not. Interestingly, two of the 3 participants who reported increased motivation level were the participants, namely students d and e, who registered significantly more progress than the others in translating pausal units with target characters or extra new characters. Their improved performance resulted from explicit semantic radical instruction might explain the increase in their motivation level in learning Chinese, suggesting a potential correlation between achievement and motivation in CFL learning. This is consistent with the results of a meta-analysis study (Masgoret & Gardner, 2003) that documented a high correlation between second language achievement and motivation.

Though not all 5 participants directly reported that their motivation level in learning Chinese had increased, all of them claimed that they would like to have more explicit instruction on Chinese semantic radicals because of the following reasons. First, semantic radicals help students better understand and connect with the language rather than just memorize the language. Second, semantic radicals give CFL learners something to hold onto when they approach unknown characters. One participant compared the function of semantic radicals in learning unknown characters to the function of letters in helping sound out a new English word. Finally, the interesting history of semantic radicals engages CFL learners and helps them remember new characters.

By and large, the participants recognized the facilitative role of semantic radicals in learning Chinese, and their intention to continue learning semantic radicals suggests their willingness to better their Chinese proficiency level.

Limitations

One limitation of the present study was the small sample size. Though the study adopted a within-subjects design to minimize distortions that might have been caused by individual differences, the small sample size made the results of the experiment susceptible to some factors that would not pose a problem if the sample size were large enough.

In the same vein, only ten semantic radicals were explicitly taught to the participants during the intervention. This poses a threat to the generalizability of the results of the present study. It is possible that with the growth of their semantic radical knowledge, the participants could better infer the meaning of unknown characters that contain meaning-cueing semantic radicals and better leverage the context to figure out the meaning of extra new characters, and thus could extract more thoroughly the overall meaning of a Chinese text.

In addition, the Chinese text used in the pretest and posttest for the present study was manipulated to contain target characters with transparent semantic radicals, the meaning of which gives a clue to the meaning of the overall character. However, in a naturally running Chinese text, there is a certain amount of semantic radicals that are unable to provide meaning cues to their host characters. To increase the reliability of the results achieved by present study, future studies can use Chinese text that includes a natural proportion of characters with transparent and non-transparent semantic radicals.

Future Research

As mentioned above, the present study had a small sample size and adopted a within-subjects design. Future research could enlarge the number of participants and adopt a pre-test/post-test control group design to increase the validity of the conclusion of this study.

In addition, since the current study only involved the explicit instruction of ten semantic radicals in a single class session, the results were not able to show the effects of long-term explicit instruction of semantic radicals on CFL learners' reading comprehension. It is worthwhile to carry out a longitudinal study to investigate the relationship among the growth of semantic radical knowledge, the improvement of Chinese reading comprehension, and the motivation level in learning Chinese by CFL learners.

Though Masgoret and Gardner (2003) documented a high correlation between second language achievement and motivation, the results of the present study only indicated a potential correlation between achievement and motivation in CFL learning. The uncertainly of this correlation calls for further research into the relationship between motivation of and achievement by CFL learners.

The fact that the participants improved their scores not only on pausal units containing target characters but also on pausal units containing extra new characters prompts further investigation of the question whether there is a bidirectional relationship between meaning-inference capability, determined by semantic radical knowledge, and understanding of context.

Implications

Previous work (Shen and Ke, 2007; Williams and Bever, 2010) has demonstrated and emphasized the importance of semantic radicals in helping both native speakers and CFL learners acquire Chinese. Despite the limitations, the present study has confirmed the facilitative role of semantic radicals in learning Chinese. This study has also provided support to the research (Cheung, Chan, and Chong, 2007) that showed a correlation between Chinese children's semantic knowledge and their passage comprehension performance.

Though previous research (Cheung, Chan, and Chong, 2007; Zhang and colleagues, 2012) has displayed a strong association between Chinese native speakers' knowledge of semantic radicals and their ability to comprehend Chinese texts, the role of semantic radicals in Chinese reading comprehension of CFL learners has barely been investigated. By focusing on examining the direct impact of explicit instruction of semantic radicals on beginner-level CFL readers' descriptive translation (indicating improved overall comprehension) of a given Chinese text, the present study has enriched the knowledge base in the research of CFL Chinese reading comprehension.

The present study also has pedagogical implications. As previous research (Wang and Koda, 2013; Lu, Koda, Zhang and Zhang, 2015) has shown the benefit of semantic radicals in learning Chinese characters, many researchers have suggested that CFL teachers should teach components of compound characters and raise CFL learners' semantic radical awareness to help them approach new characters. However, the improvement made by the participants in their overall comprehension of the given Chinese text and their responses to the questions regarding their perceptions of semantic

radicals and motivation level have implied that explicit instruction of semantic radicals could play a bigger role in CFL teaching and learning, especially in CFL reading comprehension. It is suggested that CFL teachers explicitly teach CFL learners semantic radicals and how to leverage their semantic radical knowledge to help them better comprehend Chinese texts.

Chapter Summary

After discussing the results, the present study concluded that explicit teaching of semantic radicals would significantly improve beginner-level CFL readers' descriptive translation (indicating improved overall comprehension) of a given Chinese text. The participants perceived the semantic radicals useful in helping them make more meaning inferences about the target characters either by adding more contexts or by relating the semantic radicals to the contexts around the new words. The participants' intention to continue learning semantic radicals suggested their willingness to better their Chinese proficiency level. Limitations and implications of the present study and future research suggestions were presented.

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Appendices

Appendix A

Translation Task

Translation Task (Pretest and Posttest) **Name:**

王明的家很贫穷。冬天很冷，他们家没有钱买棉袄和被子。但是他觉得他很幸福，因为他的爸爸妈妈都很爱他。他喜欢吃竹笋。王明很喜欢读书，也很喜欢听他的爸爸妈妈讲故事。但是他们家没有钱，所以他不能去学校上学。12 岁的时候，王明生病了。他的眼睛很疼，但是他的爸爸妈妈没有钱给他买药，也没有钱给他打针。12 岁的王明变成了盲人因为王明是一个盲人，他在家摸着墙壁走路，有时候他的脚会踢到地上的东西。

29 pausal units

Please translate the Chinese text into English. You are encouraged to take a guess and write down as many details as possible.

Translation:

Appendix B

Questionnaire

The Effects of Explicit Semantic Radical Instruction on CFL Reading Comprehension

1. Did you use your semantic radical knowledge in comprehending the Chinese text in the posttest (second translation task)?

2. In what ways do you think your semantic radical knowledge influenced your comprehension of the Chinese text in the posttest? Please give some examples if you could still remember.

3. Which part (meaning, sound, shape, etymology, etc.) of the explicit instruction of semantic radicals do you think is the most useful in your comprehension of the Chinese text in the posttest?

4. In terms of CFL learning, how would you further utilize your semantic radical knowledge?

5. Has your motivation level in learning Chinese changed after the posttest? (or do you find out that learning Chinese is actually not that difficult?) Why has it changed?

6. Do you want to learn more about Chinese semantic radicals? Why?

Appendix C

Target Semantic Radicals, Target Characters, and Extra New Characters

Target semantic radicals	**Meaning**	**Examples**	**Target characters**	**Extra new characters**
土	Earth/soil	在、地	墙壁	穷、棉、幸福、故事、病、疼、踢
手/扌	Hand	打、拍	摸	
钅	Gold/metal	铜、铁	针、钱	
衤	Clothes	衬衫、裤子	袄	
月	Meat	肚子、腿	脚	
艹	Plant	花、茶	药	
目	Eye	眼睛	盲	
讠	Speech	请、读	讲	
贝	Money	赊、赢	贫	
竹	Bamboo	竹、篮	笋	

Appendix D

Matching Quiz

Please match each semantic radical with the correct meaning.

土	clothing
扌	metal/gold
钅	hand
衤	meat/body parts
月	eye
艹	money/currency
目	dirt/earth
讠	bamboo
贝	plant/grass
竹	words/language

Appendix E

Pausal Units

Translation Task (Pretest and Posttest) **Name:**

王明的家/很贫穷。/冬天很冷/，他们家/没有钱/买棉袄和被子。/但是他觉得/他很幸福，/因为他的爸爸妈妈/都很爱他。/他喜欢吃竹笋。/王明很喜欢读书，/也很喜欢听他的爸爸妈妈/讲故事。/但是他们家没有钱，/所以他不能去学校上学。/12 岁的时候，/王明生病了。/他的眼睛很疼，/但是他的爸爸妈妈没有钱/给他买药，/也没有钱/给他打针。/12 岁的王明/变成了盲人。/因为王明是一个盲人，/他在家/摸着墙壁走路，/有时候/他的脚/会踢到地上的东西。/

29 pausal units

Please translate the Chinese text into English. You are encouraged to take a guess and write down as many details as possible.

Translation:

Appendix F

Completed Questionnaires

Questionnaire Completed by Student a

1. Did you use your semantic radical knowledge in comprehending the Chinese text in the posttest (second translation task)?

Yes. I used semantic radicals to help translate the text.

2. In what ways do you think your semantic radical knowledge influenced your comprehension of the Chinese text in the posttest? Please give some examples if you could still remember.

The semantic radicals helped me understand some of the new words, for example, the character money.

3. Which part (meaning, sound, shape, etymology, etc.) of the explicit instruction of semantic radicals do you think is the most useful in your comprehension of the Chinese text in the posttest?

The meanings of semantic radicals were useful.

4. In terms of CFL learning, how would you further utilize your semantic radical knowledge?

Use them to better understand the meanings of new characters.

5. Has your motivation level in learning Chinese changed after the posttest? (or do you find out that learning Chinese is actually not that difficult?) Why has it changed?

Perhaps.

6. Do you want to learn more about Chinese semantic radicals? Why?

Yes.

Questionnaire Completed by Student b

1. Did you use your semantic radical knowledge in comprehending the Chinese text in the posttest (second translation task)?

Yes.

2. In what ways do you think your semantic radical knowledge influenced your comprehension of the Chinese text in the posttest? Please give some examples if you could still remember.

Helped me to better understand the text posttest.

3. Which part (meaning, sound, shape, etymology, etc.) of the explicit instruction of semantic radicals do you think is the most useful in your comprehension of the Chinese text in the posttest?

Meaning.

4. In terms of CFL learning, how would you further utilize your semantic radical knowledge?

I would definitely like to learn the meanings of all of them and practice to connect with other characters.

5. Has your motivation level in learning Chinese changed after the posttest? (or do you find out that learning Chinese is actually not that difficult?) Why has it changed?

Yes I think I find the history of the language much more fascinating than I thought I would.

6. Do you want to learn more about Chinese semantic radicals? Why?

Yes because it was not only interesting but also extremely helpful to remember characters and made sense.

Questionnaire Completed by Student c

1. Did you use your semantic radical knowledge in comprehending the Chinese text in the posttest (second translation task)?

Yes, I did.

2. In what ways do you think your semantic radical knowledge influenced your comprehension of the Chinese text in the posttest? Please give some examples if you could still remember.

It helped a little bit.

3. Which part (meaning, sound, shape, etymology, etc.) of the explicit instruction of semantic radicals do you think is the most useful in your comprehension of the Chinese text in the posttest?

I think meaning was the most important.

4. In terms of CFL learning, how would you further utilize your semantic radical knowledge?

Learn new words.

5. Has your motivation level in learning Chinese changed after the posttest? (or do you find out that learning Chinese is actually not that difficult?) Why has it changed?

Not sure.

6. Do you want to learn more about Chinese semantic radicals? Why?

Yes.

Questionnaire Completed by Student d

1. Did you use your semantic radical knowledge in comprehending the Chinese text in the posttest (second translation task)?

Yes, I did use the semantic radicals that I had just learned to help translate the story the second time.

2. In what ways do you think your semantic radical knowledge influenced your comprehension of the Chinese text in the posttest? Please give some examples if you could still remember.

I didn't have the exact translation for some of the words, but I could make a good guess based off the context around the word and what the specific semantic radical meant. For example, one of the first few sentences had an unfamiliar word to me, but thanks to the metal radical that was in the word, I could guess that it meant poor or something close to it.

3. Which part (meaning, sound, shape, etymology, etc.) of the explicit instruction of semantic radicals do you think is the most useful in your comprehension of the Chinese text in the posttest?

I think for me it was the meaning and the shape of the radical that helped me the most. The meaning helped me with the overall meaning of the new character, and the shape helped me recognize which radical it was.

4. In terms of CFL learning, how would you further utilize your semantic radical knowledge?

5. Has your motivation level in learning Chinese changed after the posttest? (or do you find out that learning Chinese is actually not that difficult?) Why has it changed?

Yes, I think my motivation has strengthened in learning Chinese after the post-test. Using semantic radical knowledge makes learning Chinese more simple and a bit closer to learning English in the sense that you take pieces of the new word to help figure out what the overall meaning for the word is.

6. Do you want to learn more about Chinese semantic radicals? Why?

I would love to learn more about semantic radicals because I feel like the knowledge would let me to fully connect with Chinese rather than just memorize the language. I've found that a hands-on/for yourself learning approach is the best way for me to learn something new and fully understand it.

Questionnaire Completed by Student e

1. Did you use your semantic radical knowledge in comprehending the Chinese text in the posttest (second translation task)?

Yes, I tried to use the radicals to add more context and better guess at what the characters I didn't know meant.

2. In what ways do you think your semantic radical knowledge influenced your comprehension of the Chinese text in the posttest? Please give some examples if you could still remember.

Some of the new characters in the text didn't have many of the radicals in them, but for the ones that did, it helped. I especially helped for me to figure out the word blind. I saw the eye radical and the death radical so I figured out he was blind. Then the next sentences also made the story make way more sense.

3. Which part (meaning, sound, shape, etymology, etc.) of the explicit instruction of semantic radicals do you think is the most useful in your comprehension of the Chinese text in the posttest?

For comprehension, I think that the meaning helps the most. Then you can use the context with the meaning and better understand what is trying to be said.

4. In terms of CFL learning, how would you further utilize your semantic radical knowledge?

I guess if I came across new vocabulary I would see if I recognize any radicals before looking it up to see what it means to see if I could figure it out.

5. Has your motivation level in learning Chinese changed after the posttest? (or do you find out that learning Chinese is actually not that difficult?) Why has it changed?

I think it does change my motivation because I like learning how the words connect. I feel like Chinese makes more sense when you pick apart the radicals and that excites me! I now want to learn more radicals because maybe it can make my Chinese better!

6. Do you want to learn more about Chinese semantic radicals? Why?

I do want to learn more radicals because I feel like it could better my Chinese. Since there are so many characters and there is no way of sounding it out like a you could do with words in English since you know the alphabet, it would be nice to have a solid knowledge of radicals so that you could at least have something to recognize in unfamiliar characters.