Undergraduate EAL (English-as-an-Additional-Language) Students' Reported Use of
Vocabulary Learning Strategies and its Relationship vis-à-vis Language Proficiency,
Vocabulary Size, and Gender

by

Mengyue Cai
B.M, Nanjing University of Technology, 2009

A Thesis Submitted in Partial Fulfillment
of the Requirements for the Degree of

MASTER OF ARTS

in the Department of Linguistics

Supervisory Committee

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Abstract

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In the field of second language vocabulary learning, numerous studies had been done to investigate language learners' use of vocabulary learning strategies, as well as relationships between the use of vocabulary learning strategies and other individual variables (e.g., personality, intelligence, major, learning style, etc.). To fill the gap in the literature reviewed, the present study examined the use of vocabulary learning strategies reported by 95 Chinese undergraduate engineering students, and relationships between the use of vocabulary learning strategies and three key variables, i.e., language proficiency, vocabulary size, and gender.

Results of this study indicated: 1) With a reported frequency of overall vocabulary learning strategies use of medium, Chinese undergraduate engineering students use determination strategies most frequently, while social strategies the least. 2) There is a negative relationship between the use of overall vocabulary learning strategies reported by Chinese undergraduate engineering students and their language proficiency. In terms of the use of the five categories of vocabulary learning strategies, determination, cognitive, and metacognitive strategies are positively correlated to Chinese undergraduate engineering students' language proficiency. While social and memory strategies are negatively correlated. On the level of individual vocabulary learning strategies, ten individual vocabulary learning strategies are significantly correlated with language proficiency. 3) Chinese undergraduate engineering students' use of overall vocabulary learning strategies and vocabulary size are positively correlated. In terms of the use of the five categories of vocabulary learning strategies, social strategies is negatively correlated with vocabulary size while the remaining four categories are positively correlated. On the level of individual vocabulary learning strategies, significant correlations are identified between the use of three individual vocabulary learning strategies and vocabulary size. 4)

No significant difference is found between male and female Chinese undergraduate engineering students on uses of overall vocabulary learning strategies, although male Chinese undergraduate engineering students employ overall vocabulary learning strategies more frequently than females. When analyzing the use of the five categories of vocabulary learning strategies, male students employ social, memory, and cognitive strategies more frequently than female students while female students employ determination and metacognitive strategies more frequently. In terms of the gender differences on the use of individual vocabulary learning strategies, female students employ two individual vocabulary learning strategies more frequently than male students at significant levels.

Findings of the present study illustrate Chinese undergraduate engineering students' reported use of vocabulary learning strategies, as well as correlations between the use of vocabulary learning strategies and language proficiency, vocabulary size, and gender. It is recommended that English language teachers in China spending more time on vocabulary learning strategies training and taking advantages of the individual vocabulary learning strategies that can contribute to students' language learning.

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List of Acronyms

CET-2	College English Test Band 2
CET-4	College English Test Band 4
EAL	English as an additional language
EFL	English as a foreign language
FSU	frequency of strategy use
IELTS	International English Language Testing System
L1	first language
LLS	language learning strategy
TOEFL	Test of English as a Foreign Language
VLS	vocabulary learning strategy

Acknowledgments

It is never an easy journey, but you will be proud of the hard work and effort when you look back on this journey. My deepest gratitude goes to my supervisor Dr. Li-Shih Huang, who sent me the encouraging and inspiring words. Dr. Li-Shih Huang has provided me professional knowledge and depth experience in second language acquisition. She patiently guided me to find out my area of interest. She carefully reviewed my thesis drafts. She offered critical feedback and comments through my entire graduate study.

I would like to thank Dr. Suzanne Urbanczyk for her valuable feedback and suggestions on my thesis. Thanks for sharing your research experience with me. I am also very grateful to Dr. Richard King for his willingness and availability to serve as the external examiner, and his insightful feedback and questions on my thesis.

I would also like to thank everyone in the Department of Linguistics. First, I want to thank our secretary Jenny, who always says hello with a warming smile. I am thankful to Jessie Zhou, Carrie Hill and Alesia Malec for their friendship and the honour to study together.

Finally, I would like to thank my parents Yonglin Cai and Meifen Wu. I am truly thankful to be their daughter, and I hope that I made them proud. I would also like to thank my boyfriend, Xiao Ma, for his unconditional love and patience.

Chapter 1 Introduction

More and more Chinese students come to North America to pursue higher education. In 2011, China was the largest source of international students in the United States that 21.8% of 723,277 international students came from China (Institute of International Education, 2011). In 2012, 80,627 Chinese students came to Canada (Canadian Bureau for International Education, 2012), which made up over 30% of the entire international student population in Canada. While overall international enrolment in universities and colleges in the United States increased by 3% in fall 2009, students from the engineering department showed a rise of 6.5% (98,910 students) (National Science Foundation, 2009). In fall 2009, a total number of 19,200 Chinese engineering students were enrolled in universities and colleges in the United States, and 80% (15,670 Chinese engineering students) were graduate students (National Science Foundation, 2009). In other words, a significant number of Chinese undergraduate engineering students came to study in North America after finishing their undergraduate study in China.

The admission requirements for any graduate program at universities in North America typically include the student's grade point average (GPA), recommendation letters, personal statement, and so on. However, for international students, a proof of language proficiency is also required. For example, the University of Victoria requires a minimum score of 90 for the internet-based TOEFL, or a minimum score of 6.5 for IELTS for any graduate program. Language proficiency is not only the admission requirement for international students who want to study in North America, but also a positive factor of prediction for a student's future academic success (Sahragard et al., 2011; Oliver et al., 2012; Wilson & Komba, 2012).

Vocabulary knowledge has been recognized as an essential component and an important indicator of language proficiency (Stæhr, 2008; Schmitt, 2010), and its significance in language learning has been pointed out by a number of researchers (e.g., Horst et al., 2005; Coxhead, 2006; Lee & Munice, 2006). Although vocabulary is one of the areas that students find difficult despite of their language proficiency levels (Folse, 2004), vocabulary is generally given little emphasis in the universities in most Asian countries (Fan, 2003). In the present English classrooms in China, as Zhao (2009) described, "the popular model for college teachers to teach vocabulary is asking their students to read after them the whole word list in the text followed by the teachers' translation of each word or the teachers choose some basic words and just gives the Chinese equivalents" (p. 123).

VLS, as a part of LLS, is identified as a key-contributing factor to vocabulary knowledge (Kafipour et al., 2011). In other words, VLSs can help language learners improve their language proficiency. Therefore, the knowledge and employment of VLSs are essential for Chinese undergraduate students who are planning to pursue higher education in North America. However, to my knowledge, there is no previous study that investigates Chinese undergraduate engineering students' use of VLSs.

The significance of my study includes the followings:

1) The target participants in the present study are Chinese undergraduate engineering students, which have never been studied before.

2) The results will reveal the VLSs that are employed by Chinese undergraduate engineering students, as well as the relationships between Chinese undergraduate engineering students' use of VLSs and language proficiency, vocabulary size, and gender.

3) The results will contribute in finding a more efficient way in vocabulary teaching for Chinese undergraduate engineering students;

4) The results will contribute to the current knowledge of EAL students' use of VLSs, as well as the relationships with language proficiency, vocabulary size, and gender.

This thesis consists of five chapters. Chapter 1 illustrates the need for studies on Chinese undergraduate engineering students and the significance of this study. Chapter 2 reviews the definitions of key terms in this study and good language learner studies, the definitions and classifications of LLSs and VLSs, previous studies on the use of VLSs in relation to language proficiency, vocabulary size, and gender. Four research questions for the current study are also presented. Chapter 3 introduces the participants' characteristics, the data collection instruments and the detailed procedure of the main study. The data analyses are also presented in this chapter. Chapter 4 presents the results in the order of the four proposed research questions. Chapter 5 discusses the key findings as well as the limitations of the present study, and provides pedagogical implications and future research directions.

Chapter 2 Literature Review

Over the past few decades, researchers came to notice that some language learners seem to be more successful than others. This phenomenon attracted several researchers' (e.g., Rubin, 1975; Naiman et al., 1978; Ellis, 1985) attention and inspired future research with a wider range of foci, such as discovering the approaches that good language learners take, examining the differences between good language learners and poor language learners, generating definitions of LLS, developing classifications of LLS, identifying key variables related to the use of LLSs, and so on (e.g., Rubin, 1975; Chamot, 1987; Oxford, 1990; Griffins, 2013). Among the extensive research on LLS, VLS, as an inseparable part of LLS, has drawn particular attention from researchers (e.g., Gu & Johnson, 1996; Schmitt, 1997; Nation, 2001; Catalan, 2003).

Several researchers' (Rubin, 1975; Naiman et al., 1978; Ellis, 1985) work on good language learner studies are reviewed first. Then, the definitions and classifications of LLS, the definitions and classifications of VLS, and the working definitions in the current study of LLS and VLS are reviewed. Differences between key terms, such as strategy and skill, vocabulary and word, as well as vocabulary size and vocabulary knowledge, are also addressed. After that, previous studies on the use of VLSs in relation to language proficiency, vocabulary size, and gender are reviewed. Lastly, four research questions addressed by the present study are proposed.

2.1 Key Terms

2.1.1 Strategy and Skill

There is a lack of consistency in the use of the terms *strategy* and *skill*, reflecting an underlying confusion about how these terms are conceptualized (Afflerbach et al., 2008).

As defined in The Literacy Dictionary (Harris & Hodges, 1995), *strategy* is "a systematic plan, consciously adapted and monitored, to improve one's performance in learning" (p. 244). *Skill*, however, is "an acquired ability to perform well" and "skill is also used to refer to parts of acts that are primarily intellectual" (p. 235). As proposed by Afflerbach et al. (2008), strategy is "associated with a conscious and systematic plan", and skill is "associated with the proficiency of a complex act" (p. 365). Therefore, strategy and skill "differ in their intentionality and their automatic and non-automatic status" (Afflerbach et al. 2008, p. 368). For example, a student realizes that he or she has difficulty in understanding unknown vocabulary in the texts. Then he or she decides to guess the meanings of unknown vocabulary with textual information (which is a strategy). After months of practice, the strategy requires less deliberate attention, and the student uses it more quickly and more efficiently. When it becomes effortless and automatic, the strategy has become a skill (Afflerbach et al., 2008).

2.1.2 Vocabulary and Word

Before the investigation on the use of VLS, a clear distinction between the two terms – *word* and *vocabulary* should be established first. Several researchers (Hornby et al., 1984; Richards et al., 1992; Jackson & Amvela, 2000) viewed word and vocabulary in a comparative way. Richards et al. (1992) defined word as "the smallest of the linguistic units which can occur on its own in speech or writing" (p. 406), while vocabulary, as "a set of lexemes which includes single words, compound words as idioms" (p. 400). Moreover, word is defined as "an uninterruptible unit of structure consisting of one or more morphemes and which typically occurs in the structure of phrases" (Jackson & Amvela, 2000), whereas vocabulary is viewed as "the

total number of words which make up a language in language learning; and a range of words known to, or used by a person" (Hornby et al., 1984).

2.1.3 Vocabulary Size and Vocabulary Knowledge

Vocabulary knowledge, as a good indicator of language proficiency (Qian & Schedl, 2004) is generally considered to be a construct with multiple dimensions (Read, 2000), among which breadth and depth of vocabulary knowledge have been widely discussed (Qian, 2002). *Vocabulary size*, or breath of vocabulary knowledge, refers to "the number of words the meaning of which one has at least some superficial knowledge" (Qian, 2002, p. 515). Depth of vocabulary knowledge refers to "knowledge of the relevant concepts and referents, associations, grammatical functions, collocations and constraints on use of given words" (Li & MacGregor, 2010, p. 239). Both of these dimensions of vocabulary knowledge are important in language learning. Vocabulary size is indispensable in that "knowing the form and meaning of an adequate number of words is a prerequisite for unassisted comprehension of written and spoken discourse" (Zhang, 2013, p. 790). Depth of knowledge is crucial in that one needs to have sufficient knowledge of a word in order to be able to understand it and use it appropriately (Schmitt, 2008).

2.2 Good Language Learners Studies

Research on LLS began with good language learner studies. Good language learner studies refer to studies that investigate learning strategies used by good language learners in the area of second language acquisition. A number of researchers (e.g., Rubin, 1975; Naiman et al., 1978; Ellis, 1985) attempted to classify the learning strategies employed by good language learners.

2.2.1 Rubin's Good Language Learner Study

Rubin's (1975) landmark study made a significant shift in focus in the area of second language acquisition from teacher-centered methods to learner-centered approaches. Rubin (1975) suggested, "If we knew more about what the 'successful learners' did, we might be able to teach these strategies to poorer learners to enhance their success record" (p. 42). Rubin (1975, pp. 45-48) identified seven strategies from good language learners as follows.

1. The good language learner is a willing and accurate guesser (e.g., by using clues).

2. The good language learner has a strong drive to communicate or to learn from a communication (e.g., by using gestures, by using a circumlocution).

3. The good language learner is often not inhibited (e.g., by making mistakes).

4. The good language learner is prepared to attend to form (e.g., by constantly looking for patterns in the language, by looking for the interaction or relation of elements).

5. The good language learner practices (e.g., by practicing pronouncing words or making up sentences, by seeking opportunities to use the target language).

6. The good language learner monitors one's own and the speech of others.

7. The good language learner attends to meaning (e.g., by attending to the context of speech act, by attending to the rules of speaking, by attending to the mood of the speech act).

Rubin (1975) stated that the seven strategies employed by good language learners were identified "by observing students in classrooms in California and Hawaii, by observing herself and by talking to other good language learners, and by eliciting observations from some second language teachers" (p. 44). However, are these observations only targeting good language learners? If yes, then what is the definition of a good language learner and what are the differences between a good language learner and a poor language learner? In Rubin's (1975)

work, no information was given on the above questions. More importantly, whether good language learners only employ effective strategies and whether they employ those strategies effectively were both unknown.

2.2.2 Naiman et al.'s Good Language Learner Study

Naiman et al. (1978) believed that through an understanding of what language learners like and what they do to learn a language, it would be possible to improve the quality of language teaching. In particular, by examining what good language learners do to learn a language, one could determine how to help poor language learners improve their language learning. Naiman et al.'s (1978) study included two parts. The first part concerned adults who had learned a number of languages. The adults' descriptions of their learning experiences were correlated with self-ratings of their language learning success. Five significant strategies that adult good language learners appeared to use are listed as follows (Nainman et al., 1978, pp. 13-15).

1. The good language learners actively involve themselves in the language learning task.

2. The good language learners develop or exploit an awareness of language as a system.

3. The good language learners develop and exploit an awareness of language as a means of communication (i.e., conveying and receiving messages) and interaction (i.e., behaving in a culturally appropriate manner).

4. The good language learners realize initially or with time that they must cope with the affective demands made upon them by language learning and succeed in doing so.

5. The good language learners constantly revise their L2 systems. They monitor the language they are acquiring by testing their inferences (guesses); by looking for needed

adjustments as they learn new material or by asking native informants when they think corrections are needed.

The second part was a classroom study, which was carried out involving grades 8, 10, and 12 learners of French in Toronto. The results confirmed Naiman et al.'s (1978) hypothesis that certain aspects of learner characteristics are more significantly correlated with language learning success than others.

Without a doubt, Naiman et al.'s (1978) study contributed to the knowledge of strategies that good language learners employ in the language learning process. However, some details in the methodology are worth mentioning. First, Naiman et al. (1978) presented a chart describing the four skills of understanding, speaking, reading, and writing at three levels of proficiency, namely elementary proficiency, working knowledge, and advanced or native-like knowledge (p. 20). The participants were invited to rate their own proficiency levels. According to Naiman et al. (1978), participants were identified to have a high proficiency level in a given language when they reported to have an "advanced knowledge" or a "working knowledge" in at least three of the four skills. In other words, the language proficiency levels in Naiman et al.'s (1978) study were self-rated and self-reported data, which was a limitation of the study. Secondly, no definition of a good language learner was offered in the study. In the adult interview part, most of the participants had learned between three to five languages (ranging from one to 32 languages), and had reached at least a proficiency level of working knowledge or better in one or two languages. The confusing part is: will a participant who only speaks one second language at a high proficiency level be considered as a good language learner or will a participant who speaks five second languages at mediate proficiency levels or even beginner levels be considered as a good language learner? More specifically: is it the number of languages that a learner mastered or the

proficiency level of the mastered language that really defines a good language learner? Thirdly, the sampling of adult participants was generally restricted to well-travelled, highly educated participants who might not be the majority of language learners. Similar with Rubin's (1975) work, there was also a lack of comparison between the use of VLSs employed by good language learners and poor language learners.

Despite the limitations above, Naiman et al.'s (1978) study is an exploratory, in-depth analysis of language learners. The value of the study is well recognized in the second language acquisition research.

2.2.3 Ellis's Good Language Learner Study

In attempt to identify and classify individual language learner factors, Ellis (1985) proposed a list of characteristics of good language learners based on Rubin's (1975) and Naiman et al.'s (1978) study. Ellis (1985) believed that good language learner factors include personal and general factors, and both have social, cognitive, and affective aspects. As defined by Ellis (1985), social aspects concern "the relationship between the leaner and other speakers of his own language", cognitive aspects concern "the nature of the problem-solving strategies used by the learner", and affective aspects concern "the emotional responses aroused by the attempts to learn an L2" (p. 100). The list of good language learners' characteristics that Ellis (1985) proposed reflects all social, cognitive, and affective aspects. According to Ellis (1985, p. 122), good language learners will:

1. be able to respond to the group dynamics of the learning situation so as not to develop negative anxiety and inhibitions;

2. seek out all opportunities to use the target language;

3. make maximum use of the opportunities afforded to practise listening to and responding to speech in the L2 addressed to him or to others – this will involve attending to meaning rather than form;

4. supplement the learning that derives from direct contact with speakers of the L2 with learning derived from the use of study techniques (such as making vocabulary lists) - this is likely to involve attention to form;

5. be an adolescent or an adult rather than a young child, at least as far as the early stages of grammatical development are concerned;

6. possess sufficient analytic skills to perceive, categorize, and store the linguistic features of the L2, and also to monitor errors;

7. possess a strong reason for learning the L2 and also develop a strong task motivation (i.e., respond positively to the learning tasks chosen or provided);

8. be prepared to experiment by taking risks, even if this makes the learner appear foolish; and

9. be capable of adapting to different learning conditions.

One characteristic listed above drew my further attention. Ellis (1985) wrote that a good language leaner will "be an adolescent or an adult rather than a young child, at least as far as the early stages of grammatical development are concerned". This statement was based on findings of Snow and Hoefnagel-Hohle's (1978) study on Americans learning Dutch in Holland. The same study, however, showed that child learners had caught up with both adolescents and adults by the time of the third and final observations, just nine to ten months after their first exposure to the second language. Therefore, the statement that a good language leaner will "be an adolescent

or an adult rather than a young child, at least as far as the early stages of grammatical development are concerned" is in question.

2.3 Definitions and Classifications of LLSs

Since the pioneering work of Rubin (1975), Naiman et al. (1978), and Ellis (1985), researchers (Macaro, 2006; Huang, 2012) believed that LLSs play an important role in second language acquisition.

2.3.1 Definitions of LLSs

Although researchers (e.g., O'Malley et al., 1985; Phakiti, 2003; Vandergrift, 2003) have already identified a number of LLSs, there is still a lack of consensus about the definition of LLSs (Macaro, 2006).

There are three key issues that are in the debate on the definition of LLSs. The first is the confusion of different terms that have been used in second language acquisition publications to refer LLSs, such as "language learner strategies" (Phakiti, 2003; Cohen & Macaro, 2007), "strategic behaviours" (Vandergrift, 2003), "learning strategies" (O'Malley et al., 1985). Secondly, whether LLSs are effective themselves or not remained as a question. Lastly, the most important issue, do language learners use LLSs consciously or unconsciously? It is generally agreed by researchers that LLSs are consciously employed by language learners. As Chamot (1987) proposed that LLSs are "techniques, approaches, or deliberate actions that students take in order to facilitate the learning and recall of both linguistic and content area information" (p. 71). Swain et al. (2009) also refer LLSs as "the conscious thoughts and actions test-takers report using to acquire or manipulate information, such as attending, predicting, translating, planning, monitoring, linking, and inferenceing" (p. 2).

Based on the empirical studies in both language learning (Huang, 2004, 2012) and language use contexts (Huang, 2010), LLSs in the current study refer to learners' conscious thoughts or actions to improve their language learning or language use.

2.3.2 Classifications of LLSs

The lack of a consensus in classifying LLSs still exists (Macaro, 2006). Similar as the various ways of defining LLSs, there are also different approaches to the classifications of LLSs.

A number of LLSs have been identified by Rubin (1981) through a variety of procedures. These procedures include observations and videotapes of classrooms, observations of tutorial situations, student self-report, strip stories (students identify a complete story when each has been given only a single sentence out of context), self-reported diaries (students write what they do to learn a language), and directed diaries (explicit instructions on how to keep the diary). Rubin (1981, pp. 124-126) identified six direct strategies and two indirect strategies in language learning. The six direct strategies are: 1) clarification/verification (e.g., asking for an example of how to use a particular word/expression, putting words in sentence to check understanding, asking for translations from L1 to L2 or vice versa), 2) monitoring (e.g., correcting errors in own/other's pronunciation, vocabulary, spelling, grammar, and style; observing and analyzing language use of others to see how message was interpreted by addressee), 3) memorization (e.g., words, frequently-used simple sentences, basic sentence patterns, songs, verb declensions, dialogues/monologues, formulaic chucks), 4) guessing/inductive inference, which uses hunches from a wide range of possible sources of meaning for a particular circumstance, 5) deductive reasoning, which looks for and uses general rules, and 6) practicing (e.g., repeating sentences until produced easily, making use of new words when speaking); two indirect strategies are: 1)

creating opportunities for practice (e.g., initiating conversations with fellow student/teacher/native-speaker, identifying learning preferences and selecting learning situation accordingly), and 2) production tricks, which related to communication focus/drive, probably related to motivation and opportunity for exposure.

Most of Rubin's (1981) data was collected through observations and videotapes of classrooms and self-reported diaries. However, as Rubin (1981) pointed out, during the classroom observations, "teachers focus on accuracy and not on the learning process" and "there is no opportunity to question students on how they arrived at particular answers during class" (p. 119). Furthermore, self-reported diary is also a limitation. The main disadvantage of self-reported data is that data collected are personal thus may not always be the reality. As pointed out by Huang (2010), participants may "provide inauthentic answers thought to be more socially desirable" (p. 534).

Oxford's Strategies Inventory for Language Learning (SILL) has been regarded as the most comprehensive classification of LLSs (Ellis, 1994). Oxford (1990) classified LLSs into two major categories: direct strategies and indirect strategies. Direct strategies, which "involve direct learning and using of the subject matter", are subdivided into three groups: memory, cognitive, and compensation strategies. Indirect strategies, which "contribute indirectly but powerfully to learning" (Oxford, 1990, pp. 11-12), are also subdivided into three groups: metacognitive, affective, and social strategies.

According to Oxford (1990, p. 17),

1) Cognitive strategies are used for forming and revising internal mental modes and receiving and producing messages in the target language (e.g., analyzing, summarizing).

2) Memory strategies aid in entering information into long-term memory and retrieving information when needed for communication (e.g., grouping, using keywords).

3) Compensation strategies are needed to overcome any gaps in knowledge of the target language (e.g., guessing, gesturing).

4) Metacognitive strategies help learners exercise executive control planning, arranging, focusing, and evaluation of their own learning process (e.g., identifying the selecting resources).

5) Affective strategies enable learners to control feelings, motivation, and attitudes related to language learning (e.g., reducing anxiety, encouraging oneself).

6) Social strategies facilitate interaction with others, often in a discourse situation (e.g., asking for cooperation, working with peers).

However, researchers have other concerns about Oxford's (1990) SILL. For example, LoCastro (1994, 1995) argues that it is not transferable across sociocultural domains and that the results and conclusions therefore might be invalid. Furthermore, attempts to demonstrate that the SILL is psychometrical are also made by Dornyei (2005).

2.4 Definitions and Classifications of VLSs

LLSs form a sub class of learning strategies and VLSs constitute a sub class of LLSs. In this section, various definitions and classifications of VLSs proposed by researchers are reviewed first and the working definition and classification of VLSs employed in the present study are proposed.

2.4.1 Definitions of VLSs

Cameron (2001) defined VLSs as "actions that learners take to help themselves understand and remember vocabulary" (p. 92). According to Nation (2001, p. 271), VLSs have

the following features: 1) involve choice; that is, there are several strategies to choose from; 2) be complex; that is, there are several steps to learn; 3) require knowledge and benefit from training; and 4) increase the efficiency of vocabulary learning and vocabulary use. VLSs, proposed in Catalan's (2003, p. 56) study, are knowledge about the processes used in order to learn vocabulary as well as taken by students 1) to find out the meaning of unknown words; 2) to retain them in long-term memory; 3) to recall them at will; and 4) to use them in oral or written mode.

The debate of definitions of VLSs has not yet been settled. Vocabulary learning does not only describe the process of dealing with new words, but also the process of retrieving the words that are already learned. In other words, when defining VLSs, both processes should be taken into consideration. The working definition of VLSs for the present study are: VLSs are part of LLSs, which include conscious thoughts and actions that language learners use to help themselves in learning new vocabulary as well as enhancing vocabulary that they already knew.

2.4.2 Classifications of VLSs

Several classifications of VLSs have already been proposed by a number of researchers. Gu and Johnson (1996) and Schmitt (1997), for example, proposed their own classifications of VLSs based on their studies.

Gu and Johnson (1996) conducted a study to investigate 850 second-year non-English major students' use of VLSs in China. Three major instruments were employed in this study. Firstly, the Vocabulary Learning Questionnaire included three sections: Section 1 asked about participants' personal data; Section 2 was beliefs about vocabulary learning, which included 17 statements representing three dimensions of beliefs; and Section 3 is VLSs section, which

contained 91 vocabulary learning behaviours. Secondly, a vocabulary size test was invented by combining Goulden et al. (1990) and Nation's (1990) Vocabulary Levels Test at the 3,000-word level. Lastly, an English proficiency measurement - CET-2 was employed. The 91 statements of the Vocabulary Learning Questionnaire devised by Gu and Johnson corresponded to the following groups of strategies (Gu & Johnson, 1996, pp. 650-651): selective attention, self-initiating, guessing strategies (by using the existing knowledge/wider context or by using linguistic cues/immediate context), dictionary use strategies (for comprehension, extended strategies of dictionary use, strategies of looking up words in a dictionary), strategies of recording vocabulary (meaning oriented, usage oriented), strategies of memorization by repetition (using a list of words, oral repetition, visual repetition), strategies of memorization by coding (associating/elaborating, creating mental linkages, visual coding, auditory coding, word structure, semantic coding, contextual coding), and activation strategies.

For the 850 participants at Beijing Normal University, there is no more information provided other than they all had six years of English learning experience and they were all second-year non-English major. Studies (Riazi et al., 2005; Huang, 2010; Nosidlak, 2013; Seddigh, 2011;) focusing on the relationships between VLSs and individual learners' differences suggested that variables such as age, gender, major, and intelligence, have influence on language learners' use of VLSs. Therefore, more details of participants' characteristics are needed. Gu and Johnson (1996) employed CET-2 to composite 85% of the proficiency measures, ten quizzes taken throughout the year to composite 10%, and teacher's overall rating to composite 5%. According to Gu and Johnson (1996), CET-2, as a mock for CET-4 in format, "comprised sections on listening comprehension (15%), vocabulary (10%), structure (10%), reading comprehension

(30%), cloze (10%), and sentence translation from Chinese into English (10%)" (p. 649). However, without a speaking section and a writing section, the validity of CET-2 is in question.

Schmitt (1997) also employed a questionnaire as a research tool in his study of VLSs used by English language learners in Japan. The results of this study contributed to his classification of VLSs. In the study, participants of different ages were asked to complete a questionnaire including a list of strategies and to evaluate the helpfulness of each strategy. The final version of Schmitt's (1997) classification of VLSs included 58 statements (see Appendix A), which the researcher extracted from Oxford's (1990) SILL. Schmitt (1997) then divided the VLSs into two groups, i.e., discovery strategies and consolidation strategies. Discovery strategies are helpful to determine the meanings of new words when encountered for the first time, while consolidation strategies are helpful to remember meanings when encountered again. Schmitt's (1997, pp. 207-208) taxonomy defined each strategy as follows:

1. Discovery strategies:

Determination strategies (DET): used by an individual when faced with discovering a new word's meaning without recourse to another person's expertise;

Social strategies (SOC): use interaction with other people to improve language learning.

2. Consolidation strategies:

Social strategies (SOC): have group work to learn or practice vocabulary;

Memory strategies (MEM): relate new material to existing knowledge;

Cognitive strategies (COG): exhibit the common function of manipulation or transformation of the target language by the learner;

Metacognitive strategies (MET): involve a conscious overview of the learning process and making decisions about planning, monitoring, or evaluating the best way to study.

Despite the fact that Schmitt's (1997) classification of VLSs is currently the most comprehensive and most employed (Kudo, 1999; Amirian & Heshmatifar, 2013; Tanyer & Ozturk, 2014), several individual VLSs can be classified into both discovery strategies and consolidation strategies. For example, "ask classmates for meaning" is classified as a social strategy for discovery of a new word's meaning. However, when a language learner encountered a word again and he/she did not remember the meaning of the word, then he/she asked classmates for meaning. Actually, Takac (2009) pointed out that "practically all discovery strategies can be used as consolidation strategies" (p. 71). Therefore, Schmitt's (1997) taxonomy might need thoughts and revisions.

2.5 Use of VLSs

Attempts have been made by numerous researchers to discover EAL students' use of VLSs. In this section, recent studies that are most relevant to the present study are reviewed.

For the past few decades, researchers have investigated Iranian (Riazi et al., 2005; Hamzah et al., 2009; Arjoman & Sharififar, 2011; Kafipour et al., 2011; Zokaee et al., 2012; Amirian & Heshmatifar, 2013; Jafari & Kafipour, 2013), Turkish (Sener, 2009; Celik & Toptas, 2010; Tanyer & Ozturk, 2014), Thai EAL students (Komol & Sripetpun, 2011), Jordan (Al-Khasawneh, 2012), Taiwan (Liao, 2004; Tsai & Chang, 2009; Huang, 2010), and Chinese (Wu, 2005; Wei, 2007) EAL students' use of VLSs. Similar results were reported by a number of researchers (Hamzah et al., 2009; Sener, 2009; Huang, 2010; Komol & Sripetum, 2011; Jafari & Kafipour, 2013; Amirian & Heshmatifar, 2013; Tanyer & Ozturk, 2014) that the most frequently employed category of VLSs by language learners is the category of determination strategies, while the category of social strategies the least.

Komol and Sripetum (2011) reported the VLSs used by 192 second-year students at Prince of Songkla University. The purposes of the study are: 1) to identify the use of VLSs of the participants; 2) to look at the differences in VLSs used by participants with different vocabulary size; and 3) to find out the VLSs use in relation to vocabulary size. A VLS questionnaire adapted from Schmitt's (1997) work and a vocabulary level test were employed in the study as the research instruments. Komol and Sripetum (2011) found that the category of determination strategies was the most frequently used category of VLSs while the category of social strategies the least.

Some details in the methodology in this study are worth noticing. First of all, the participants' characteristics were incomplete. According to Griffiths (2008), variables such as gender and language learning background have influences on language learners' use of VLSs. In this study, however, neither of gender and language learning background was reported. Secondly, in order to find out the relationship between the use of VLSs and vocabulary size, Komol and Sripetum (2011) employed the vocabulary level test as the measurement of vocabulary size. However, there are some ongoing concerns about its validity (Nation, 2007). The test words were selected based on Thorndike and Lorge's (1944) word list, which is over 70 years old. Moreover, the word frequencies only reflect the English usage in the United States, which may differ from other countries (Li & MacGregor, 2010).

Amirian and Heshmatifar (2013) investigated the VLSs employed by 74 (18 males and 56 females) EAL Iranian students. A vocabulary learning strategies questionnaire developed by Schmitt (1997) and a semi-structured interview were carried out. The results revealed that among the five categories of VLSs, the category of determination strategies was reported as the most frequently employed, while the category of social strategies was the least frequently employed.

However, several factors should have been taken into consideration. First, among the 74 participants, 18 were postgraduate students and 56 were undergraduate students. Since English language background is an important variable (Griffiths, 2008), recruiting participants with similar English language background might reduce the unnecessary influence. Secondly, the number of the female participants ($n = 53$) was more than twice of the number of the male participants ($n = 21$). Thirdly, in the procedure, researchers mentioned that the VLS questionnaire with 40 items had a time limit of 20 minutes. No specific reason was given in the study why there was a time limit to complete the vocabulary learning strategies questionnaire. The participants' anxiety caused by the time limit might affect their performance in the questionnaire. Lastly, the category of memory strategies ranked as the third frequently employed category of VLSs in this study, and the explanation offered by Amirian and Heshmatifar (2013) was that "postgraduate students as the more successful language learners who tend to employ a wide range of VLSs rather than just memorization and rote learning" (p. 640). However, as mentioned before, only 18 participants in this study were postgraduate students, while the remaining 56 participants were undergraduate students. So the conclusion that "postgraduate students as the more successful language learners who tend to employ a wide range of VLSs rather than just memorization and rote learning" is in question. Besides, postgraduate students cannot be assumed as the more successful language learners in this study when no language proficiency data was provided.

Several studies (Gidney, 2009; Celik & Toptas, 2010; Arjoman & Sharfifiar, 2011; Zokaee et al., 2012; Kafipour et al., 2011; Al-Khasawneh, 2012) showed different conclusions. Gidney (2009) conducted a study to investigate VLSs used by high and low achiever students. A VLS questionnaire adopted from Schmitt (1997) and a semi-structured interview were employed in

the study. A number of 30 (15 high and 15 low achievers) third-year students were selected using purposive sampling. The findings showed: 1) the category of determination strategies ranked as the most frequently employed category of VLSs, while the category of metacognitive strategies ranked as the least frequently employed; 2) there was a positive relationship between VLSs and language proficiency. In other words, the more successful language learners use more VLSs than the less successful learners. Two things are worth mentioning. Firstly, information on participants, such as gender and age, was not provided in the study. Secondly, Gidney (2009) conducted semi-structured interviews with 12 participants (six high and six low achievers), and the data were not used as explanations for results of the VLSs questionnaire.

Arjoman and Sharfifiar (2011) conducted a study to explore the most and least frequently employed VLSs and the relationship between the use of VLSs and gender reported by 80 (15 males and 65 females) Iranian EAL freshman students. The instruments employed in this study were an information background questionnaire collecting participants' name, age, sex, a five-Likert scale vocabulary learning strategies questionnaire with 59 statements based on Schmitt's (1997) work, and a vocabulary size test to divide participants into poor and good learner groups. In order to validate the results, 12 randomly selected participants were interviewed individually. The results indicated that the category of cognitive strategies was the most frequently employed while the category of social strategies was the least used by Iranian EAL freshman students.

There are two details worth noticing. Starting from the characteristics of the participants, participants' ages were ranging from 16 to 40 years old, and no information on the standard deviation of participants' age was given. As researchers (Oyama, 1976; Harley, 1986; Griffiths, 2008) discovered, age difference is an important variable in language learning. Similar with Amirian and Heshmatifar's (2013) study, the number of female participants ($n = 65$) is larger

than the number of male participants (*n* = 15). It was pointed out by the researchers that rankings of categories of VLSs in the female participant group and those for all participants are the same. However, no explanation was given. With the dominant number of female participants in this study, it is not surprising to see the same results between the female participants and all participants.

As for the individual VLSs, researchers found that *guessing from textual contexts* (Riazi et al., 2005; Hamzah et al., 2009; Sener, 2009; Zhang, 2009; Huang 2010; Al-Khasawneh, 2012; Amirian & Heshmatifar, 2013; Ghouati, 2014; Tanyer & Ozturk, 2014), taking notes in classes (Riazi et al., 2005; Hamzah et al., 2009; Sener, 2009; Zhang, 2009; Ghouati, 2014; Tanyer & Ozturk, 2014), studying the spellings of words (Huang 2010; Al-Khasawneh, 2012; Ghouati, 2014), *studying the sounds of words* (Hamzah et al., 2009; Huang 2010; Amirian & Heshmatifar, 2013; Ghouati, 2014), *using bilingual or monolingual dictionaries* (Riazi et al., 2005; Hamzah et al., 2009; Zhang, 2009; Huang 2010; Amirian & Heshmatifar, 2013;), and using verbal repetitions (Sener, 2009; Huang 2010; Al-Khasawneh, 2012; Amirian & Heshmatifar, 2013; Tanyer & Ozturk, 2014) were employed by EAL students on FSUs of high or medium, whereas *asking teachers or classmates for meanings* (Riazi et al., 2005; Hamzah et al., 2009; Sener, 2009; Amirian & Heshmatifar, 2013;), *using flash cards or word lists* (Sener, 2009; Amirian & Heshmatifar, 2013; Al-Khasawneh, 2012; Tanyer & Ozturk, 2014), *teachers checking students' flash cards or word lists for accuracy* (Riazi et al., 2005; Tanyer & Ozturk, 2014), and *skipping or passing words* (Hamzah et al., 2009; Amirian & Heshmatifar, 2013;) were employed on FSUs of low or medium.

2.6 Use of VLSs vs. Language Proficiency

2.6.1 Definition of Language Proficiency

Language proficiency, along with language competence and language performance, is quite confusing when it comes to the differences among these terms. Proficiency is a term that suggests variability, and it has traditionally been related to measurement and testing in second language teaching and learning (Llurda, 2000). According to Stern (1983), proficiency was defined as the actual performance of given individual learners or groups of learners (p. 341); moreover, Stern (1983) also advocated the use of proficiency as a substitute for competence, especially when referring to non-native competence in contexts of second language teaching and learning. Therefore, in the current study, language proficiency, as well as language competence and language performance is referred to the ability of a language learner to perform in a target language.

2.6.2 Measurement of Language Proficiency

Three language proficiency test scores, i.e., TOEFL, IELTS and CET-4, are chosen to represent participants' language proficiency in the present study. TOEFL and IELTS scores were chosen to represent participants' language proficiency for the following reasons.

1) They are the two most recognized English language standardized tests in the world, especially in North America.

2) They both test English language skills on reading, listening, speaking, and writing.

CET-4 is a national English-as-a-foreign-language test in China, and taking the test is mandatory for undergraduate students who are non-English majors. The test is held nationally twice a year in June and December. However, CET-4 only includes reading, listening, and

writing sections, with optional speaking section, which is only eligible for students with a CET-4 score higher than 550, which was the reason that it was not considered as the measurement for participants' language proficiency in the pilot study. In the pilot study, however, only one male participant reported his TOEFL score while other participants reported that they did not have a TOEFL or IELTS score. Therefore, CET-4 scores were employed instead in the main study.

2.6.3 Previous Studies

Pioneering work on this topic was undertaken by Ahmed (1989), whose research centered on the different ways in which successful and less successful language learners approached vocabulary learning. He reported that successful learners do things such as using a variety of strategies, structuring their vocabulary learning, and reviewing and practicing target words. The successful learners were also aware of the semantic relationships between new and previously learned vocabularies. That is, they were conscious of their learning and they take steps to regulate their vocabulary learning. Less successful learners generally lacked this awareness and control. Several researchers (Fan, 2003; Riazi et al., 2005; Zhang, 2011; Jafari & Kafipour, 2013) reported that the use of VLSs is positively related to EAL students' language proficiency based on their own studies.

Riazi et al. (2005) recruited 213 (112 males and 101 females) students from different levels of language proficiency and different age groups (13 - 55 years old) in their study. A truncated form of a TOEFL test was used to determine participants' level of language proficiency. A total of 213 participants were then divided into three groups of language proficiency, i.e., high-level group ($n = 74$), middle-level group ($n = 68$), and low-level group ($n = 71$). A vocabulary learning strategies questionnaire based on Schmitt's (1997) taxonomy of VLSs was used to collect data

on participants' use of VLSs. The results of the study indicated that as EAL students' levels of language proficiency increase, they use VLSs more, especially for those strategies that are cognitively deeper (Riazi et al., 2005). However, the range of the participants' age was considerably wide. And researchers (Fan, 2003; Griffiths, 2008) believed that age is one of the variables that may potential affect language learning. Another limitation of this study is the instrument that was used to measure participants' level of language proficiency. The instrument was a shorten form (the listening section of the test was removed) of a TOEFL test. Without the listening section, it undermines the validity and reliability of the scores.

Jafari and Kafipour (2013) conducted an investigation on VLSs employed by Iranian EAL learners of different language proficiency levels (i.e., beginner, intermediate, and advanced). A total of 110 participants were recruited in the study. Among all participants, 38 participants were identified as beginners, 34 participants as intermediate learners, and 38 as advanced learners. A vocabulary learning strategies questionnaire was administered to gather EAL students' use of VLSs, which contained 36 statements under five categories of VLSs. There was no significant difference among EAL learners of different proficiency levels in applications of determination and metacognitive strategies, while EAL learners with lower level of language proficiency employed social, memory, and cognitive strategies more frequently.

As for the limitations of the study, first of all, no data was provided on the gender of the 110 participants, and the only statement on the age of the participants was that "participants belong to different age groups ranging from 13 years of age and above" (Jafari & Kafipour, 2013, p.25). Gender, as well as age, is an important variable related to vocabulary learning (Fan, 2003). Secondly, the levels of participants' language proficiency were determined by the institutes' English language replacement tests. However, there was no information on the placement tests

provided in the study. Lastly, it was mentioned in the procedures that there is a time limit to complete the 36-item vocabulary learning strategies questionnaire. Researchers did not indicate whether the vocabulary learning strategies questionnaire is in English or translated into the participants' first language. Requiring a 13 year-old EAL learner to complete a 36-item VLS questionnaire in 10 minutes might be challenging.

In an attempt to investigate the most and least frequently used VLSs and the relationship between gender and overall VLS use, Soodmand (2010) conducted a large-scale study with 328 Iranian EAL students (134 female and 70 male). Instruments employed in the study included a background questionnaire and a VLSs questionnaire. All participants were also divided into good and poor language learners. The results indicated that: 1) among the five most and the five least frequently used individual VLSs by good, poor, and all learners, three strategies in each category were commonly shared (e.g., I learn new words by reading books, newspapers, magazine, etc in English; I repeat the word orally several times; and I focus on the phonological form); 2) no statistically significant differences between Iranian EAL males and females' reported frequency of overall VLSs use, though female learners reported using them slightly more frequently.

In terms of the limitations of the study, firstly, significant differences between the number of VLSs employed by good ($n = 131$) and poor ($n = 73$) language learners, as well as female ($n = 134$) and male ($n = 70$) language learners were identified in the study. It can be argued that the differences in the number of female and male participants may have effects on the final results in the study. Secondly, the ages of the participants ranged from 18 to 35 year-old, with no information on the standard deviation. Age, as a key variable, has been reported to influence vocabulary learning (Griffiths, 2008). Finally, employment of qualitative data collection, such as interviews and think-aloud protocols, may give some insights into the results.

2.7 Use of VLSs vs. Vocabulary Size

2.7.1 Definition of Vocabulary Size

Vocabulary size, as addressed in the beginning of this chapter, refers to "the number of words the meaning of which one has at least some superficial knowledge" (Qian, 2002, p. 515).

2.7.2 Measurements of Vocabulary Size

There are three major vocabulary size tests. One of the most widely used is the Vocabulary Level Test (Nation, 1990). The Vocabulary Levels Test focuses on vocabulary at four frequency levels: 2,000, 3,000, 5,000, and 10,000. The four frequency levels are in line with the current consensus of how much vocabulary is necessary for achieving key goals. According to Schmitt (2010), around 2,000 word families are sufficient to engage in daily conversation; 3,000 word families are able to initial access to authentic reading, and 5,000 word families independent reading of that material. In addition, 5,000 word families represented the upper limit of general high-frequency vocabulary; 10,000 word families is a round figure for a wide vocabulary which would enable advanced usage in most cases. A word family is the base form of a word plus its inflected forms and derived form made from affixes (Hirsh & Nation, 1992, p. 692). However, Nation (2001) stated that the test "is a diagnostic test" (p. 373) whose "main purpose is to let teachers quickly find out whether learners need to be working on high frequency or low frequency words" (pp. 21-22). Thus, the main purpose of the Vocabulary Level Test is not estimating overall vocabulary size but rather vocabulary growth (Beglar, 2010; Nation, 2001).

The Yes/No Vocabulary Test (Meara & Buxton, 1987; Meara & Jones, 1990) is another popular employed test format that intends to measure language learners' vocabulary size. This test provides a fast and easy way to estimate the vocabulary size of learners. However, the results

of the Yes/No Vocabulary Test might be greatly affected by test-takers' variability judgment behaviour (Schmitt, 2010).

The last one form of vocabulary size test, the Vocabulary Size Test (Nation & Beglar, 2007), is developed to provide a reliable, accurate, and comprehensive measure of second language English learners' vocabulary size from the first 1,000 to the fourteenth 1,000-word families of English (Beglar, 2010). The Vocabulary Size Test consists of ten items from each 1,000-word family for a total of 140 items. The words included in the Vocabulary Size Test are based on fourteen 1,000 British National Corpus word lists developed by Nation (2006). Nation and Beglar's (2007) Vocabulary Size Test (Bilingual Mandarin Chinese Version) was administered in order to provide a comprehensive measurement of participants' vocabulary size in the present study.

Nation and Beglar's (2007) Vocabulary Size Test was chosen to measure participants' vocabulary size for the following reasons:

1. Vocabulary Size Test is a proficiency measure to determine how much vocabulary that language learners know (Beglar, 2010), which fits the purpose of the present study;

2. Nation and Beglar's (2007) Vocabulary Size Test measures largely decontextualized knowledge of the word although the word in the text appears in a single non-defining context in the test;

3. research reliability measure test were reported were around 0.96 (Beglar, 2010, p. 4);

4. the correct answer and the distracters in the Vocabulary Size Test usually share elements of meaning which means language learners have to have a moderately developed idea of the meaning of the word in order to answer;

5. Chinese students are familiar and comfortable with the multiple-choice format in the Vocabulary Size Test;

6. the multiple-choice format makes the marking as efficient and reliable as possible;

7. it offers a bilingual Mandarin Chinese version;

8. the items in the test are clear and unambiguous, and the test itself is easy to score and interpret the scores; and

9. the Vocabulary Size Test (Nation & Beglar, 2007) is a much updated version comparing to the Vocabulary Levels Test (Nation, 1990).

2.7.3 Previous Studies

As Meara (1996) stated that "all other things being equal, learners with bigger vocabularies are more proficient in a wide range of language skills than learners with smaller vocabularies" (p. 37). Positive relationship was reported between the use of VLSs and vocabulary size by a number of researchers (e.g., Cohen & Apek, 1981; Cohen, 1990; Ellis, 1985; Ellis & Beaton, 1994; Zhang, 2009; Sener, 2009; Hamzah et al., 2009; Khatib et al., 2011; Tanyer & Ozturk, 2014).

Tanyer and Ozturk (2014) conducted a study to investigate the relationship between VLSs use and vocabulary size. For the purpose of this study, 80 English Language Teaching majors from 1st to 4th year at the Education Faculty of Anadolu University were recruited, and they were assumed to be advanced English language learners since they have 10 to 14 years of English learning experience. Three instruments were employed in the study, namely the Vocabulary Level Test, the VLS Questionnaire, and a VLS Survey. Results revealed that participants' VLSs

use was positively correlated to vocabulary size, and also significantly explained 17.8% of the variation in participants' vocabulary size.

There are two major limitations in this study. First, Tanyer and Ozturk (2014) employed the Vocabulary Level Test as the measurement for participants' vocabulary size. However, the main purpose of the Vocabulary Level Test is not estimating overall vocabulary size but rather vocabulary growth (Beglar, 2010; Nation, 2001). Second, little information was offered regarding the participants' characteristics, such as number of male and female participants, language learning background, etc.

Different conclusion was reported by Seyed et al. (2012). Seyed et al. (2012) investigated the use of VLSs and vocabulary size of 125 undergraduate English Language Teaching students, and no relationship was found between VLSs and vocabulary size of the students. Two major instruments were used for data collection, a vocabulary learning strategies questionnaire and a Vocabulary Level Test. There are some concerns about this study. Firstly, the significant differences in numbers of male ($n = 34$) and female ($n = 91$) participants might affect the results in the study, since gender is proven to influence students' choice of VLSs (Griffiths, 2008). Secondly, there is litter information of participants' background, even participants' language proficiency level stayed unknown.

2.8 Gender Differences on the Use of VLSs

2.8.1 Definition of Gender

Gender as a broad term is often used to denote not only the biologically based, dichotomous variable of sex (that is, male or female) but also the socially constructed roles which are created by the different ways in which the sexes are raised from birth and socialized within a certain

culture (Ellis, 1994). In the current study, the term *gender* is used in a more restricted sense to denote merely the physical identity of male versus female.

2.8.2 Previous Studies

The relationship between the use of VLSs and gender is also a topic with conflicting conclusions. For example, Oxford and Nyikos (1989), Catalan (2003), Sahbazian (2004), Liao (2004), Sung (2006), Huang (2010), Arjoman and Sharififar (2011), Zokaee et al. (2012), and Seddign and Shokrpur (2012) reported similar findings in terms of the relationship between the use of VLSs and gender, that female tend to use more VLSs than male.

In a study aimed to explore VLSs used by Taiwanese college language learners, Huang (2010) recruited 607 (271 males and 336 females) participants from seven technological colleges in southern Taiwan. A vocabulary learning strategies questionnaire (Schmitt, 1997), a think-aloud protocol, and an interview were employed to assess the use of VLSs among the participants. Key findings were as follows. 1) Significant gender differences were detected on overall and all categories of VLSs. 2) Female participants were found to be more verbal, analytical, and tool relying in English vocabulary learning than male participants. 3) In the think-aloud procedure, female participants were found to have a higher use of verbal/written repetitions than males; and both gender use more verbal repetitions than written repetitions.

However, a number of researchers (e.g., Nemati, 2009; Zhang, 2009; Soodmand, 2010; Aliakbari & Hayatzadeh, 2010; Khatib et al., 2011) found no relationship between the use of VLSs and gender.

Zhang (2009) carried out a study investigating the vocabulary learning situation of 481 undergraduate students in terms of their use of VLSs and vocabulary size. Two instruments have

been adopted in the study: a vocabulary learning strategies questionnaire and a vocabulary level test. The results indicated that no significant difference exists between males and females, but the difference between different grades, and between English and non-English majors have reached significant level. To be exact, undergraduates in higher grades have more frequently use of VLSs than those in lower grades; English majors outperformed non-English majors in the use of 17 individual VLSs, and the differences in using textual knowledge and background information and using dictionary for word learning were significant. The limitation of Zhang's (2009) study is employing vocabulary level test as the measurement of participants' vocabulary size. As mentioned before, vocabulary size test is a more suitable measurement for participants' vocabulary size than the vocabulary level test, since the main purpose of vocabulary level test is not estimating overall vocabulary size but rather vocabulary growth (Beglar, 2010; Nation, 2001).

2.9 Statement of Problems

Since vocabulary learning is generally given little emphasis in the university curriculum in most Asian countries (Fan, 2003), a VLSs study focusing on Chinese students is needed. As presented in Chapter 1, Chinese undergraduate engineering students are becoming a major part of International students in North America, and yet have never been studied before. Therefore, the purposes of the current study are 1) to investigate the most and least employed VLSs employed by Chinese undergraduate engineering students; 2) to find out the relationship between the use of VLSs and their language proficiency; 3) to find out the relationship between the use of VLSs and their vocabulary size; and 4) to find out the gender differences between the use of VLSs employed by male and female Chinese undergraduate engineering students.

2.10 Research Questions

The following research questions are investigated in the present study:

1. What is the use of vocabulary learning strategies reported by the Chinese undergraduate engineering students?

2. What is the relationship between vocabulary learning strategies employed by Chinese undergraduate engineering students and their language proficiency?

3. What is the relationship between the use of vocabulary learning strategies reported by Chinese undergraduate engineering students and their vocabulary size?

4. Are there any gender differences in the use of vocabulary learning strategies between male and female Chinese undergraduate engineering students?

Chapter 3 Methods

In this chapter, characteristics of the 95 Chinese undergraduate engineering students are presented first, followed by the introductions to the three instruments (i.e., the Background Information Section, the Vocabulary Learning Strategies Section, and the Vocabulary Size Test) employed in the study. Then, detailed procedures used in the pilot study and the main study are introduced. Finally, data analyses regarding the four proposed research questions are presented.

3.1 Participants

The present study was designed to investigate the use of VLSs employed by Chinese undergraduate engineering students and its relationships with the students' language proficiency, vocabulary size, and gender. A total number of 100 undergraduate engineering students from a Chinese university were originally recruited. Since five participants provided incomplete answers in the Vocabulary Learning Strategies Section, their data were excluded. As a result, 95 participants' data were included.

The participants in the present study were selected according to the four criteria as follows. 1) They are undergraduate students from the Engineering Department. 2) Their first language is Mandarin Chinese. 3) They are in the third or fourth year of their undergraduate studies. Due to the policy of CET tests in China, those students already have a CET-4 score, which is employed to measure their language proficiency in the present study. 4) All participants have never resided or studied in an English-speaking country.

The Background Information Section (see Appendix B) is employed to collect the participants' demographic information, academic background, English language learning background, and English language proficiency test scores.

Table 1 *Participants' Characteristics*

Age in years	Mean	21
	Range	17 - 24
Years of English learning	Mean	10
	Range	6 - 15
Level of study	Third Year	$n = 65$ (68%)
	Fourth Year	$n = 30$ (42%)
Gender	Male	$n = 56$ (59%)
	Female	$n = 39$ (41%)
Academic background	Engineering Department	
Studied or resided in an English speaking country	None	

Note. N = 95

As shown in Table 1, the ages of the participants ranged from 17 to 24 years old, with an average of 21. Moreover, two things are worth mentioning. First, it is rare that a third or fourth year student is under 19 years old in China. However, four participants in this study are from a specialized program, which is offered for students who are gifted in science, and those four participants started their undergraduate studies earlier than most students. Meanwhile, two participants are over 23 years old in their third or fourth year, which is also not common. The reason may be that they took the National College Entrance Exam more than once in order to get accepted into an ideal university as the National College Entrance Exam only takes place once a year in China. Second, the average years of English language learning reported by all participants is ten years, with a range of six to 15 years. The differences in the years of English language learning may be due to the various educational policies in China. For example, in cities like Beijing and Shanghai, students are required to learn English as early as in their first grade in elementary school. While in other cities, such as Guiyang and Lanzhou, students do not start English language learning until middle school.

3.2 Instruments

Three instruments were included in the present study, i.e., the Background Information Section (see Appendix B), the Vocabulary Learning Strategies Section (see Appendix C), and the Vocabulary Size Test (see Appendix D). The Background Information Section and the Vocabulary Learning Strategies Section were translated into Mandarin Chinese by a certificated translator in order for the participants to understand the content of the instruments more clearly.

3.2.1 The Background Information Section

The Background Information Section was designed to collect the following information from the participants: gender, grade, age, years of English learning, TOEFL, IELTS, CET-4 scores, and whether they previously studied or resided in an English-speaking country.

3.2.2 The Vocabulary Learning Strategies Section

The Vocabulary Learning Strategies Section collected data on the participants' use of VLSs. This section was adapted from Schmitt (1997) with a reported reliability coefficient of 0.93. For the 58 individual VLSs that are included in Schmitt's (1997) VLS inventory, the participants were required to respond based on a five-point Likert-scale. Their answers ranged from never, rarely, sometimes, often, to always, in terms of the FSU. According to Oxford (1990), in a five-point Likert scale, a FSU lower than 2.50 indicates a low FSU, a FSU between 2.50 and 3.50 indicates a medium FSU, and a FSU higher than 3.50 indicates a high FSU.

3.2.3 The Vocabulary Size Test

The Vocabulary Size Test (Nation & Beglar, 2007), as presented in Appendix D, is developed to provide a reliable, accurate, and comprehensive measurement of second language

English learners' vocabulary size from the first 1,000- to the fourteenth 1,000-word families of English (Beglar, 2010). Nation and Beglar's (2007) Vocabulary Size Test (Bilingual Mandarin Chinese Version) was administered in order to provide a measurement of the participants' vocabulary size.

3.3 Procedures

3.3.1 Participant Recruitment

After the approval of the ethics application, I sent an email invitation (see Appendix E) to a professor in the English Department at a university in the People's Republic of China in May 2013. In the invitation, I explained the purposes, significance, and detailed procedures of the study. The professor responded and agreed to introduce my study in his English class to the undergraduate students from the Engineering Department. And over 100 students from his class volunteered in the present study. After that, the professor and I scheduled the date and time for the pilot study as well as the main study.

3.3.2 Pilot Study

Before the main study, I conducted a pilot study with 33 participants (consisting of 17 males and 16 females) from the same Chinese university in May, 2013. The participants' ages ranged from 18 to 22 years old with an average of 20 and they were all from the Engineering Department. The pilot study was conducted as a full-length study with the same procedures of the main study. It was designed to revise the Background Information Section and the Vocabulary Learning Strategies Section, and to check the procedures employed in the main study.

In the pilot study, all participants were required to sign the Participant Consent Form (see Appendix F) first and then complete all three instruments.

Based on the results of the pilot study, several modifications were made to the instruments employed in the main study:

1) I added "Years of English language learning" in the Background Information Section to collect information on the participants' English language learning background.

2) All participants were required to report their CET-4 scores in the Background Information Section. CET-4 scores were not considered as a measurement for the participants' language proficiency in the pilot study, because the test score does not include the speaking section. However, since only one participant reported a TOEFL score in the pilot study, the CET-4 score was then selected as the measurement for participants' language proficiency in the main study.

3) I modified the translations of several individual VLSs reported as "hard to understand" by the participants in the Vocabulary Learning Strategies Section. For example, Item 34 is "想象词汇的样子" (image word forms). In the revised version, I added "这项策略是指利用词汇的拼写形式或者发音形式帮助记忆" (Translation: This individual VLS helps memorize a word by its orthographical or phonological form).

4) I provided examples for several individual VLSs reported as "not sure what the individual VLS is" by the participants in the Vocabulary Learning Strategies Section. In the revised version, I used examples to illustrate some individual VLSs. For example, Item 26 is "用 Loci 方法来学习词汇" (use Loci Method). I added "在学习 bread 的时候，想象糕点师从发酵面团开始，然后放入烤箱烘烤，最后切片把面包放在你面

前" (Translation: When learning the word bread, start with imaging steps of how the bread is made, from mixing and raising the dough, putting it into the oven, and finally slicing it).

5) I added two open-ended questions at the end of the Vocabulary Learning Strategies Section in order to obtain more information on the participants' use of VLSs. The first question asked the participants to list the five most frequently employed individual VLSs among the 58 individual VLSs, and the second question asked them to list the individual VLSs that they used in their vocabulary learning process other than the 58 individual VLSs.

3.3.3 Main Study

A total of 95 participants volunteered in the main study in October 2013. The data collection of the main study included four segments (see Table 2). They were carried out on the same day during the participants' college English class. The total participation time was around 50 minutes, which is the length of a college English class.

Table 2 *Four Data Collection Segments*

Segment	Approximate Time
Introduction and the Participant Consent Form	3 minutes
Background Information	2 minutes
Vocabulary Learning Strategies Questionnaire	25 minutes
Vocabulary Size Test	20 minutes
Total Time	50 minutes

The step-by-step procedures are described as follows:

1) All instruments were printed out and delivered to the professor, and he brought them to the class on the day the study was scheduled.

2) The professor contacted me through Skype, so I was able to communicate with all the participants directly during the data collection process.

3) I thanked the professor and all the participants for volunteering in my study, and then briefly described the purposes of the present study. I also stated explicitly that the collected data would be confidential and used for this study only, and participants' responses would have no effect on the grades of their college English course.

4) The professor distributed the Participant Consent Forms to all the participants. Then, I explained the inconvenience, risks, and benefits of participating in the present study.

5) After all participants had signed the Participant Consent Forms, they kept one copy and submitted the other copy to the professor.

6) The professor distributed all three instruments, namely, the Background Information Section, the Vocabulary Learning Strategies Section, and the Vocabulary Size Test, to the participants. Meanwhile, I explained how to answer the instruments, and ensured that all the participants understood that they could ask questions at any time.

7) All participants submitted the three instruments to the professor after they finished.

8) I thanked all participants again for their participations and gave them my contact information in case they had any concerns about the study or they would like to know the results of the study.

3.4 Data Analysis

3.4.1 Data Coding

Since all participants had passed CET-4 test, whose pass mark is 425, and there is no consensus regarding interpretations of CET-4 scores higher than the pass mark, all participants'

language proficiency levels were considered as intermediate in the present study. In answering Research Question 2, a system for distinguishing different levels of language proficiency was devised. In particular, around one-third of the participants ($n = 34$) were categorized as low-intermediate level. Another one-third of the participants ($n = 31$) were classified as mid-intermediate level. And the remaining participants ($n = 30$) were grouped as high-intermediate level.

According to Nation and Beglar (2007), the test score from the Vocabulary Size Test multiplying by 100 equals to the test taker' vocabulary size. For example, if a participant scored 102 out of 140 in the Vocabulary Size Test, then his or her vocabulary size is 102*100=10,200 word families (groups of words that have a common feature or pattern). Based on the above scheme, all participants had a vocabulary size larger than 4,500 word families. Since CET-4 test's vocabulary size requirement is also 4,500 word families and there is no consensus regarding interpretations of vocabulary size higher than 4,500 word families, all participants' vocabulary size levels were considered as intermediate in the present study. In answering Research Question 3, a system for distinguishing different levels of vocabulary size was devised. In particular, around one third of the participants ($n = 31$) were categorized into low-intermediate level. One third participants ($n = 32$) were classified into mid-intermediate level and the remaining participants ($n = 32$) were categorized into high-intermediate level.

3.4.2 Statistical Analysis

To answer the four research questions, I conducted the statistical tests using IBM SPSS (Statistical Package for the Social Sciences) Version 20. For all four research questions, the

collected data was analyzed at three levels, i.e., the use of overall VLSs, the use of the five categories of VLSs, and the use of individual VLSs.

Research Question 1 asks about what the use of VLSs reported by the Chinese engineering undergraduate students is. The average FSU of overall VLSs was calculated first. Then, the rankings of the FSUs of the five categories of VLSs were presented. Finally, the ten most and least employed individual VLSs reported by all participants were listed.

Research Questions 2 concerns the relationship between the use of VLSs and the Chinese undergraduate engineering students' language proficiency. The Pearson's correlation test was employed to determine the relationships between the use of VLSs and the language proficiency of all participants and that of participants with different language proficiency levels.

Research Questions 3 examines the relationship between the use of VLSs and the Chinese undergraduate engineering students' vocabulary size. The Pearson's correlation test was employed to determine the relationships between the use of VLSs and the vocabulary size of all participants and that of participants with different vocabulary size levels.

Research Questions 4 investigates the differences in the use of VLSs between the male and female Chinese undergraduate engineering students. Similar to Research Question 1, the average FSU of overall VLSs and the rankings of the five categories of VLSs by male and female participants were presented first. Then, the ten most and least employed individual VLSs reported by male and female participants were revealed. Finally, the independent-sample t-test was employed to examine the significant differences between the male and female participants' use of VLSs.

Chapter 4 Results

Chapter 4 presents the results in the sequence of the four proposed research questions. The use of VLSs reported by 95 Chinese undergraduate engineering students is addressed first, followed by the relationships between the reported use of VLSs and participants' language proficiency and vocabulary size, respectively. Finally, the results derived from the independent-sample t-test are reported in order to examine the differences between male and female Chinese undergraduate engineering students in terms of their use of VLSs.

4.1 Use of VLSs

Research Question 1: What is the use of vocabulary learning strategies reported by the Chinese undergraduate engineering students?

4.1.1 Use of Overall VLSs

In order to examine the use of VLSs reported by all participants, the descriptive statistics of the overall VLS use were calculated by SPSS Version 20.0. In particular, the average FSU of overall VLS use reported by all participants was 2.59 (*SD* = 0.53). According to Oxford's (1990) evaluation scheme for FSUs, the FSU of Chinese undergraduate engineering students' use of overall VLSs was medium.

4.1.2 Use of Five Categories of VLSs

As shown in Table 3, the most frequently employed category of VLSs was determination strategies, while social strategies was least frequently employed. Among the five categories, the FSU of social strategies was reported as low, while the FSUs of the remaining four categories were medium.

Table 3 *Descriptive Statistics for the Use of Five Categories of Vocabulary Learning Strategies Reported by the Chinese Undergraduate Engineering Students*

Category	M	SD	Frequency of Strategy Use	Rank
Det	2.96	0.56	Medium	1
Met	2.93	0.78	Medium	2
Cog	2.88	0.77	Medium	3
Mem	2.51	0.57	Medium	4
Soc	1.95	0.68	Low	5

Note. N = 95. Det = determination; Met = metacognitive; Cog = cognitive; Mem = memory; Soc = social.

4.1.3 Use of Individual VLSs

Rankings of the FSUs of the 58 individual VLSs reported by all participants are listed in Appendix G. In Tables 4 and 5, the ten most and least frequently used individual VLSs are presented, respectively.

Table 4 *Ten Most Frequently Used Individual Vocabulary Learning Strategies by the Chinese Undergraduate Engineering Students*

Individual vocabulary learning strategy	Category	M	SD	Frequency of Strategy Use
Guess from textual contexts	Det	3.80	0.99	High
Use bilingual dictionaries	Det	3.79	1.19	High
Study the sounds of words	Mem	3.55	1.21	High
Study the spellings of words	Mem	3.54	1.16	High
Use verbal repetitions	Cog	3.52	1.14	High
Analyse parts of speech	Det	3.32	1.21	Medium
Use written repetitions	Cog	3.24	1.14	Medium
Use word lists	Det	3.23	1.15	Medium
Continue to study words over time	Met	3.20	1.07	Medium
Take notes in classes	Cog	3.16	1.31	Medium

Note. N = 95. Det = determination; Met = metacognitive; Cog = cognitive; Mem = memory.

As shown in Table 4, among the ten most frequently used individual VLSs, five of them had high FSUs, while the other five were reported with medium FSUs. It is worth noting that

none of the ten most frequently employed individual VLSs belong to social strategies, which was

the least employed category of VLSs reported by all participants, as revealed in Section 4.1.2.

Table 5 presents the ten least frequently used individual VLSs reported by all participants.

The FSUs of the ten individual VLSs were all reported as low. Herein, none of the ten least

frequently employed individual VLSs are from determination and metacognitive strategies,

which were the two most frequently used categories of VLSs employed by all participants, as

indicated in Section 4.1.2.

Table 5 *Ten Least Frequently Used Individual Vocabulary Learning Strategies by the Chinese Undergraduate Engineering Students*

Individual vocabulary learning strategy	Category	*M*	*SD*	Frequency of Strategy Use
Ask teachers for sentences including new words	Soc	1.78	0.94	Low
Ask teachers for paraphrases or synonyms of new words	Soc	1.80	0.83	Low
Teachers check students' flash cards or word lists for accuracy	Soc	1.80	0.99	Low
Put English labels on physical objects	Cog	1.82	0.97	Low
Discover new meanings through group work activities	Soc	1.84	1.04	Low
Use Peg Method	Mem	1.91	1.09	Low
Study and practice meanings in groups	Soc	1.93	0.97	Low
Use Loci Method	Mem	1.94	1.05	Low
Use physical actions when learning words	Mem	2.00	1.04	Low
Ask teachers for Chinese translations	Soc	2.03	1.02	Low

Note. N = 95. Cog = cognitive; Mem = memory; Soc = social.

4.2 Use of VLSs vs. Language Proficiency

Research Question 2: *What is the relationship between vocabulary learning strategies employed by Chinese undergraduate engineering students and their language proficiency?*

4.2.1 Use of Overall VLSs vs. Language Proficiency

As shown in Table 6, negative correlations were discovered between the use of overall VLSs and the language proficiency of all participants and that of the participants with low-intermediate language proficiency level.

The use of overall VLSs reported by the participants with mid-intermediate and high-intermediate language proficiency levels were positively correlated with their language proficiency. However, none of the correlations were at significant levels (2-tailed).

Table 6 *Correlations between the Use of Overall Vocabulary Learning Strategies and Language Proficiency*

	Pearson correlation	All	Language proficiency level		
			L-I	M-I	H-I
Overall vocabulary learning strategies	r	-.02	-.04	.19	-.01
	p	.824	.820	.318	.982

Note. N = 95. All = All participants; L-I = Low-intermediate; M-I = Mid-intermediate; H-I = High-intermediate. L-I: *n* = 34; M-I: *n* = 31; H-I: *n* = 30.

4.2.2 Use of Five Categories of VLSs vs. Language Proficiency

As shown in Table 7, for all participants, the use of determination, cognitive and metacognitive strategies were positively correlated to their language proficiency, while social and memory categories were negatively correlated.

In the case of the participants with low-intermediate and high-intermediate language proficiency levels, the use of social and memory strategies were negatively correlated with their language proficiency, while the remaining three categories were positively correlated.

Table 7 *Correlations between the Use of the Five Categories of Vocabulary Learning Strategies and Language Proficiency*

Category	Pearson correlation	All	Language proficiency level		
			L-I	M-I	H-I
Det	*r*	.04	.07	-.09	.05
	p	.708	.820	.625	.792
Soc	*r*	-.18	-.19	.06	-.22
	p	.076	.278	.735	.247
Mem	*r*	-.07	-.12	.21	-.17
	p	.487	.516	.269	.375
Cog	*r*	.11	.21	.19	.32
	p	.274	.234	.305	.080
Met	*r*	.12	.06	.20	.21
	p	.238	.758	.288	.257

Note. $N = 95$. All = All participants; L-I = Low-intermediate; M-I = Mid-intermediate; H-I = High-intermediate. L-I: $n = 34$; M-I: $n = 31$; H-I: $n = 30$.

Negative correlations were identified between the use of determination strategies by the participants with mid-intermediate language proficiency level and their language proficiency, and positive correlations were found for the remaining four categories of VLSs. None of the correlations were significant at significant levels (2-tailed).

4.2.3 Use of Individual VLSs vs. Language Proficiency

Correlations between the use of individual VLSs and Chinese undergraduate engineering students' language proficiency are presented in Appendix H. Among the correlations between the use of individual vocabulary learning strategies reported by all participants and their language proficiency, 10 individual vocabulary learning strategies were found to be significantly correlated (see Table 8). One individual VLS, studying words with pictorial representations of their meanings, was negatively correlated to all participants' language proficiency at .01 level (2-tailed). Six individual vocabulary learning strategies were significantly correlated with the language proficiency of the participants with low-intermediate language proficiency (see Table

9). One individual VLS, using Loci Method, was negatively correlated to all participants' language proficiency at .01 level (2-tailed).

As shown in Table 10, for the participants with mid-intermediate language proficiency, two individual VLSs were positively correlated with their language proficiency at .05 level (2-tailed), while keeping vocabulary notebooks was positively correlated at .01 level (2-tailed). Learning words of idioms together, which belongs to memory strategies, was negatively correlated with participants' language proficiency at .05 level (2-tailed).

Table 8 *Significant Correlations between the Use of Individual Vocabulary Learning Strategies Reported by All Participants and Language Proficiency*

Individual vocabulary learning strategy	Category	Pearson correlation	Language proficiency
Remember affixes and roots	Mem	r	.23*
		p	.027
Use vocabulary sections in textbook	Cog	r	.21*
		p	.045
Keep vocabulary notebooks	Cog	r	.25*
		p	.014
Ask teachers for sentences including new words	Soc	r	-.25*
		p	.017
Study and practise meanings in groups	Soc	r	-.22*
		p	.034
Teachers check students' flash cards or word lists for accuracy	Soc	r	-.22*
		p	.030
Study words with pictorial representations of their meanings	Mem	r	-.30**
		p	.003
Group words together within storylines	Mem	r	-.24*
		p	.018
Image word forms	Mem	r	-.25*
		p	.013
Remember parts of speech	Mem	r	-.22*
		p	.036

Note. $N = 95$. Mem = Memory; Cog = Cognitive; Soc = Social. *. Correlation is significant at .05 level (2-tailed).**. Correlation is significant at .01 level (2-tailed).

Table 9 *Significant Correlations between the Use of Individual Vocabulary Learning Strategies Reported by the Participants with Low-Intermediate Language Proficiency Level and Language Proficiency*

Individual vocabulary learning strategy	Category	Pearson Correlation	Language proficiency
Use bilingual dictionaries	Det	r	.37*
		p	.031
Use verbal repetitions	Cog	r	.36*
		p	.037
Use word lists	Cog	r	.35*
		p	.044
Teachers check students' flash cards or word lists for accuracy	Soc	r	-.40*
		p	.019
Use Peg Method	Mem	r	-.38*
		p	.026
Use Loci Method	Mem	r	-.49**
		p	.003

Note. n = 34. Det = Determination; Mem = Memory; Cog = Cognitive; Soc = Social. *. Correlation is significant at .05 level (2-tailed). **. Correlation is significant at .01 level (2-tailed).

Table 10 *Significant Correlations between the Use of Individual Vocabulary Learning Strategies Reported by the Participants with Mid-Intermediate Language Proficiency Level and Language Proficiency*

Individual vocabulary learning strategy	Category	Pearson Correlation	Language proficiency
Connect words to personal experiences	Mem	r	.37*
		p	.039
Use verbal repetitions	Cog	r	.37*
		p	.039
Keep vocabulary notebooks	Cog	r	.49**
		p	.005
Learn words of idioms together	Mem	r	-.43*
		p	.016

Note. n = 31. Mem = Memory; Cog = Cognitive. *. Correlation is significant at .05 level (2-tailed). **. Correlation is significant at .01 level (2-tailed).

As shown in Table 11, for the participants with high-intermediate language proficiency, using word lists and continuing to study over time were positive correlated, while imaging word

forms and remembering parts of speech were negative correlated. All correlations were significant at .05 level (2-tailed).

Table 11 *Significant Correlations between the Use of Individual Vocabulary Learning Strategies Reported by the Participants with High-Intermediate Language Proficiency Level and Language Proficiency*

Individual vocabulary learning strategy	Category	Pearson Correlation	Language proficiency
Use word lists	Cog	*r*	.39*
		p	.033
Continue to study over time	Met	*r*	.37*
		p	.043
Image word forms	Mem	*r*	-.40*
		p	.027
Remember parts of speech	Mem	*r*	-.37*
		p	.045

Note. n = 30. Mem = Memory; Cog = Cognitive; Met = Metacognitive. *. Correlation is significant at .05 level (2-tailed).

4.3 Use of VLSs vs. Vocabulary Size

Research Question 3: *What is the relationship between the use of vocabulary learning strategies reported by Chinese undergraduate engineering students and their vocabulary size?*

4.3.1 Use of Overall VLSs vs. Vocabulary Size

As shown in Table 12, positive correlations were identified between the use of overall VLSs and the vocabulary size of all participants and that of the participants with low-intermediate and mid-intermediate vocabulary size. For the participants with high-intermediate vocabulary size, a negative correlation was found. None of the correlations were at significant levels (2-tailed).

Table 12 *Correlations between the Use of Overall Vocabulary Learning Strategies and Vocabulary Size*

	Pearson Correlation	All	Vocabulary size level		
			L-I	M-I	H-I
Overall vocabulary learning strategies	*r*	.08	.18	-.02	-.09
	p	.431	.331	.916	.623

Note. N = 95. All = All participants; L-I = Low-intermediate; M-I = Mid-intermediate; H-I = High-intermediate. L-I: *n* = 31; M-I: *n* = 32; H-I: *n* = 32.

4.3.2 Use of Five Categories of VLSs vs. Vocabulary Size

As presented in Table 13, for all participants, their use of the five categories was positive correlated with their vocabulary size except for social strategies. In the case of the participants with low-intermediate vocabulary size, positive correlations were identified between their use of all five categories of VLSs and their vocabulary size. In particular, their use of determination strategies was positively correlated at .05 level (2-tailed). For the participants with mid-intermediate vocabulary size, their use of social, memory and metacognitive strategies was positively correlated with their vocabulary size, while the use of remaining two categories of VLSs, i.e., determination and cognitive strategies, was negatively correlated. In the case of the participants with high-intermediate vocabulary size, the use of the five categories was negatively correlated with their vocabulary size except for memory strategies.

Table 13 *Correlations between the use of the five categories of vocabulary learning strategies and vocabulary size*

Category	Pearson Correlation	All	Vocabulary size level		
			L-I	M-I	H-I
Det	r	.01	.31	-.25	-.25
	p	.945	.095	.163	.162
Soc	r	-.08	.14	.06	-.22
	p	.450	.469	.761	.22
Mem	r	.13	.13	.09	.07
	p	.220	.477	.644	.692
Cog	r	.09	.10	-.15	-.11
	p	.380	.599	.419	.553
Met	r	.03	.15	-.02	-.02
	p	.769	.426	.927	.912

Note. N = 95. Det = determination; Met = metacognitive; Cog = cognitive; Mem = memory; Soc = social. All = All participants; L-I = Low-intermediate; M-I = Mid-intermediate; H-I = High-intermediate. L-I: *n* = 31; M-I: *n* = 32; H-I: *n* = 32.

4.3.3 Use of Individual VLSs vs. Vocabulary Size

Correlations between the use of individual VLSs and Chinese undergraduate engineering students' vocabulary size are presented in Appendix I. As shown in Table 14, positive correlations were identified between the use of three individual VLSs by all participants and their vocabulary size at .05 level (2-tailed).

Table 14 *Significant Correlations between the Use of Individual Vocabulary Learning Strategies Reported by All Participants and Vocabulary Size*

Individual vocabulary learning strategy	Category	Pearson correlation	Vocabulary size
Study words with pictorial representation of their meanings	Mem	r	.21*
		p	.039
Group words together within a storyline	Mem	r	.21*
		p	.043
Use written repetitions	Cog	r	.26*
		p	.012

Note. N = 95. Cog = cognitive; Mem = memory. *. Correlation is significant at .05 level (2-tailed).

Among the use of 58 individual VLSs reported by the participants with low-intermediate vocabulary size level, none of them were significantly correlated with the participants' vocabulary size. For the participants with mid-intermediate vocabulary size, the use of one individual VLS, associating words with their coordinates, was positively correlated with their vocabulary size at .05 level. Taking notes in classes, which belongs to cognitive strategies, was negatively correlated at .05 level (see Table 15).

Table 15 *Significant Correlations between the Use of Individual Vocabulary Learning Strategies Reported by the Participants with Mid-Intermediate Vocabulary Size and Vocabulary Size*

Individual vocabulary learning strategy	Category	Pearson Correlation	Vocabulary size
Associate words with their coordinates	Mem	r	.36*
		p	.044
Take notes in classes	Cog	r	-.37*
		p	.040

Note. n= 32. Cog = cognitive; Mem = memory.

For the participants with high-intermediate vocabulary size, the use of one individual VLS, underlining initial letters of words, was positively correlated with their vocabulary size at .05 level (see Table 16).

Table 16 *Significant Correlations between the Use of Individual Vocabulary Learning Strategies Reported by the Participants with High-Intermediate Vocabulary Size and Vocabulary Size*

Individual vocabulary learning strategy	Category	Pearson Correlation	Vocabulary size
Underline initial letters of words	Mem	r	.45*
		p	.010

Note. n= 32. Mem = memory.

4.4 Gender Differences on the Use of VLSs

Research Question 4: Are there any gender differences in the use of vocabulary learning strategies between male and female Chinese undergraduate engineering students?

4.4.1 Gender Differences on the Use of Overall VLSs

In order to examine the use of overall VLSs reported by male and female Chinese undergraduate engineering students, descriptive statistics were analyzed. The average FSU of the overall VLSs reported by male participants ($M = 2.61$, $SD = 0.51$) was higher than that reported by female participants ($M = 2.57$, $SD = 0.44$). However, results derived from the independent-sample t-test indicated that the differences between male and female participants' use of overall VLSs were not at significant levels ($t = .48$, $p = .636$).

4.4.2 Gender Differences on the Use of Five Categories of VLSs

As presented in Table 17, the average FSUs of the five categories of VLSs reported by male participants ranged from 2.00 to 2.92, while female participants' average FSUs ranged from 1.87 to 3.05. More specifically, for male participants, the FSU of the category of social strategies was reported as low, while the remaining four categories were reported with medium FSUs. For female participants, the FSUs of the categories of social and memory strategies were reported as low, while the remaining three categories were reported with medium FSUs.

Table 17 *Independent-Sample T-Tests on the Frequencies of Strategy Use of Five Categories of Vocabulary Learning Strategies Reported by Male and Female Chinese Undergraduate Engineering Students*

Category	Male			Female			T-Test	
	M	*SD*	Rank	*M*	*SD*	Rank	*t*	*Sig.*
Det	2.89	0.58	3	3.05	0.53	1	-1.40	.163
Soc	2.00	0.75	5	1.87	0.58	5	.88	.379
Mem	2.55	0.61	4	2.45	0.50	4	.80	.425
Cog	2.92	0.83	1	2.82	0.68	3	.62	.538
Met	2.91	0.88	2	2.95	0.60	2	-.24	.808

Note. Male *n* = 56, female *n* = 39. Det = determination; Met = metacognitive; Cog = cognitive; Mem = memory; Soc = social.

4.4.3 Gender Differences on the Use of Individual VLSs

For the 58 individual VLSs, the rank orders for male and female participants are presented in Appendices J and K, respectively. Tables 18 and 19 list the ten most frequently employed individual VLSs reported by male and female participants, respectively.

Table 18 *Ten Most Frequently Used Individual Vocabulary Learning Strategies by Male Participants*

Individual vocabulary learning strategy	Category	*M*	*SD*	Rank
Use bilingual dictionaries	Det	3.71	1.06	1
Use written repetitions	Cog	3.54	1.24	2
Use monolingual dictionaries	Det	3.52	1.25	3
Say new words aloud when studying	Mem	3.38	1.23	4
Study the sounds of words	Mem	3.38	1.18	5
Use word lists	Cog	3.36	1.23	6
Use flash cards	Cog	3.30	1.29	7
Analyse affixes and roots	Det	3.27	1.23	8
Image word forms	Mem	3.05	1.21	9
Use flash cards	Det	3.02	1.14	10

Note. n= 56. Det = determination; Cog = cognitive; Mem = memory.

As shown in Table 18, the most frequently employed individual VLS by male participants was using bilingual dictionaries (*M* = 3.71, *SD* = 1.06). None of individual VLSs that belong to

the categories of social and metacognitive strategies were found in the list. According to Table 19, the most frequently employed individual VLSs by female participants was using bilingual dictionaries (M = 4.18, SD = 1.00). None of the individual VLSs from the category of social strategies were found in the list. It can be observed from Tables 18 and 19 that three individual VLSs, i.e., using bilingual dictionaries, studying the sounds of words, and using written repetitions, were shared in the lists of the ten most frequently employed individual VLSs reported by male and female participants.

Table 19 *Ten Most Frequently Used Individual Vocabulary Learning Strategies by Female Participants*

Individual vocabulary learning strategy	Category	M	SD	Rank
Use bilingual dictionaries	Det	4.18	1.00	1
Guess from textual contexts	Det	3.92	0.87	2
Study the sounds of words	Mem	3.79	1.15	3
Study the spellings of words	Mem	3.77	1.09	4
Use word lists	Det	3.54	1.12	5
Use verbal repetitions	Cog	3.49	1.00	6
Analyse parts of speech	Det	3.38	1.18	7
Continue to study words over time	Met	3.31	0.92	8
Take notes in classes	Cog	3.21	1.24	9
Use written repetitions	Cog	3.08	0.98	10

Note. n= 39. Det = determination; Met = metacognitive; Cog = cognitive; Mem = memory.

Tables 20 and 21 present the ten least frequently employed individual VLSs by male and female participants, respectively. As shown in Table 20, the least frequently employed individual VLS by male participants was studying and practising meanings in groups (M = 1.84, SD = 1.08). None of the individual VLSs that belong to the categories of determination and metacognitive strategies were found in the list. According to Table 21, the least frequently employed individual VLS by female participants was asking teacher for paraphrases or

synonyms of new words (*M* = 1.62, *SD* = 0.67). None of the individual VLSs that belong to the

categories of determination and metacognitive strategies were found in the list.

Table 20 *Ten Least Frequently Used Individual Vocabulary Learning Strategies by Male Participants*

Individual vocabulary learning strategy	Category	*M*	*SD*	Rank
Study and practice meanings in groups	Soc	1.84	1.08	1
Keep vocabulary notebooks	Cog	1.84	1.01	2
Ask classmates for meanings	Soc	1.86	0.98	3
Interact with native-speakers	Soc	1.88	1.08	4
Ask teachers for sentences including the new words	Soc	1.93	0.91	5
Use Loci Method	Mem	1.96	1.14	6
Group words together to study them	Mem	2.00	1.06	7
Teachers check students' flash cards or word lists for accuracy	Soc	2.04	1.08	8
Study words with pictorial representations of their meanings	Mem	2.09	0.96	9
Ask teachers for paraphrases or synonyms of new words	Soc	2.11	1.02	10

Note. n= 56. Cog = cognitive; Mem = memory; Soc = social.

Table 21 *Ten Least Frequently Used Individual Vocabulary Learning Strategies by Female Participants*

Individual vocabulary learning strategy	Category	*M*	*SD*	Rank
Ask teachers for paraphrases or synonyms of new words	Soc	1.62	0.67	1
Ask teachers for sentences including the new words	Soc	1.67	0.87	2
Teachers check students' flash cards or word lists for accuracy	Soc	1.69	0.86	3
Study and practice meanings in groups	Soc	1.77	0.78	4
Use physical actions when learning words	Mem	1.77	0.84	5
Put English labels on physical objects	Cog	1.79	0.92	6
Study words with pictorial representations of their meanings	Mem	1.82	0.94	7
Use Peg Method	Mem	1.82	1.02	8
Discover new meanings through group work activities	Soc	1.85	1.01	9
Use Loci Method	Mem	1.85	1.04	10

Note. n= 39. Cog = cognitive; Mem = memory; Soc = social.

It can be observed from Tables 20 and 21 that five individual VLSs, i.e., asking teachers for

paraphrases or synonyms of new words, asking teachers for sentences including the new words,

teachers checking students' flash cards or word lists for accuracy, studying and practicing

meanings in groups, and using Loci Method, were shared by male and female participants.

Moreover, the ten least frequently employed strategies by male and female participants are from the same categories, which are the categories of social, memory, and cognitive strategies.

Table 22 *Individual Vocabulary Learning Strategies that Different at Significant Level Reported by Male and Female Participants*

Individual vocabulary learning strategies	Male		Female		T-Test	
	M	*SD*	*M*	*SD*	*t*	*Sig.*
Use bilingual dictionaries	3.52	1.25	4.18	1.00	-2.8	.007**
Use word lists	3.02	1.14	3.54	1.12	-2.2	.030*
Study words with pictorial representations of their meanings	2.27	1.02	1.82	0.94	2.2	.032*

Note. n = 56, female *n* = 39. *. Correlation is significant at .05 level (2-tailed). **. Correlation is significant at .01 level (2-tailed).

When comparing the differences between individual VLSs employed by male and female participants (see Appendix L), the differences of the FSUs of three individual VLSs were at significant levels, as shown in Table 22. Therefore, male participants used the individual VLS of studying words with pictorial representations of their meanings more frequently than female participants at .05 level (2-tailed), while female participants used two individual VLSs more frequently than male participants at significant levels, namely, using word lists and using bilingual dictionaries.

Chapter 5 Discussions

The present study investigated Chinese undergraduate engineering students' use of VLSs, as well as its relationships with three key variables, namely, language proficiency, vocabulary size, and gender. Key findings are presented and discussed in the order of the four proposed research questions. Pedagogical implications, limitations, and future directions are also discussed in this chapter.

5.1 Key Findings

5.1.1 Use of VLSs

Overall VLSs. For Chinese undergraduate engineering students, a medium FSU was indicated on their reported use of overall VLSs in the present study. The result is consistent with previous studies. Studies on VLS use of Iranian EAL students (Hamzah et al., 2009; Arjoman & Sharififar, 2011; Kafipour et al., 2011; Zokaee et al., 2012; Jafari & Kafipour, 2013), Turkish EAL students (Sener, 2009; Celik & Toptas, 2010; Tanyer & Ozturk, 2014), Thai EAL students (Komol & Sripetpun, 2011), Taiwan EAL students (Liao, 2004; Tsai & Chang, 2009; Huang, 2010), and Chinese EAL students (Wei, 2007) all indicated that EAL students use VLSs with a medium FSU.

One possible explanation for this result is that after Chinese undergraduate engineering students find a small number of VLSs that work for them, they tend to use those VLSs and stop exploring new VLSs. Another possible reason is that Chinese undergraduate engineering students might not be familiar with different VLSs. As Zhao (2009) stated, "the popular model for college teachers to teach vocabulary is asking students to read after them the whole word lists

in the text followed by the teachers' translation of each word or the teacher chooses some basic words and just gives the Chinese equivalents" (Zhao, 2009, p.123). As a result, Chinese undergraduate engineering students may lack knowledge on VLSs.

Five Categories of VLSs. When analyzing the use of the five categories of VLSs, results showed that the most frequently employed category of VLSs reported by Chinese undergraduate engineering students is determination strategies, while the least is social strategies. The results are in line with several previous studies on EAL learners' use of VLSs (Liao, 2004; Hamzah et al., 2009; Sener, 2009; Huang, 2010; Komol & Sripetum, 2011; Amirian & Heshmatifar, 2013; Jafari & Kafipour, 2013; Ghouati, 2014; Tanyer & Ozturk, 2014). Several researchers (Liao, 2004; Ghouati, 2014) found that vocabulary learning is viewed as an individual learning process and students tend not to seek for others' help. The use of determination strategies indicated that students prefer to discover the meaning of a word without resource to another person's expertise (Tanyer & Ozturk, 2014) and are more conscious of assuming their responsibilities of their own vocabulary learning (Ghouati, 2014), while the use of social strategies, on the other hand, requires working and interacting with other people.

However, a number of previous studies (Celik & Toptas, 2010; Kafipour et al., 2011; Heidari et al., 2012; Al-Khasawneh, 2012) showed different results. Among the five categories, the most frequently employed category reported by Turkish EAL students was determination strategies, while the least was cognitive strategies (Celik & Toptas, 2010). It was believed that Turkish EAL learners did not exploit some VLSs although they perceived them as effective (Celik & Toptas, 2010). For Jordanian EAL students, it was found that the most frequently employed category is determination strategies, while the least is metacognitive strategies (Al-Khasawneh, 2012). For Iranian EAL learners, memory strategies was found to be the most

frequently used category, while cognitive strategies the least (Kafipour et al., 2011). As explained by Kafipour et al. (2011), the high frequency of the use of memory strategies showed that Iranian EAL students preferred vocabulary learning strategies that are simple with less need for mental activities and processing. It could also be due to the popularity of rote learning among students and teachers in Iran, and the focus of rote learning is on mnemonic techniques (Sahbazian, 2004; Kafipour et al., 2011). Another study focusing on Iranian EAL students (Heidari et al., 2012) discovered that memory strategies is the most frequently employed category and social strategies is the least. It was reported that Iranian EAL students' use of memory strategies was considerably higher than their use of other categories of VLSs.

Individual VLSs. Comparing the ten most frequently employed individual VLSs to the results from previous studies, similar as well as different conclusions were found. Among the ten most frequently employed individual VLSs reported by Chinese undergraduate engineering students, none of them belongs to social strategies, which is reported as the most frequently employed category of VLSs.

Guessing from textual contexts, which was reported as the most frequently employed individual VLS by Chinese undergraduate engineering students, was also used by Iranian (Riazi et al., 2005; Hamzah et al., 2009; Amirian & Heshmatifar, 2013), Turkish (Sener, 2009; Tanyer & Ozturk, 2014), Jordanian (Al-Khasawneh, 2012), Moroccan (Ghouati, 2014), Taiwanese (Huang, 2010), and Chinese (Zhang, 2009) EAL students with high FSUs. *Using bilingual dictionaries* was used by Chinese undergraduate engineering students with a high FSU in the present study. Similar results were revealed for Taiwanese (Huang, 2010) and Chinese (Zhang, 2009) EAL students. However, Sener (2009) reported a medium FSU on Turkish EAL students' use of *using bilingual dictionaries*. *Studying the sounds of words* was employed by Chinese

undergraduate engineering students with a high FSU. High FSUs of this individual VLS were also reported by Iranian (Hamzah et al., 2009; Amirian & Heshmatifar, 2013), Moroccan (Ghouati, 2014), and Taiwanese (Huang, 2010) EAL students. *Studying the spellings of words* was reported with a high FSU by Chinese undergraduate engineering students. Similarly, Taiwanese (Huang, 2010), Jordanian (Al-Khasawneh, 2012), and Moroccan (Ghouati, 2014) EAL students also reported high FSUs. *Using verbal repetitions* was employed by Chinese undergraduate engineering students with a high FSU, and ranked as the fifth most frequently employed individual VLS. Studies focusing on Turkish (Sener, 2009; Tanyer & Ozturk, 2014), Jordanian (Al-Khasawneh, 2012), Iranian (Amirian & Heshmatifar, 2013), and Taiwanese (Huang, 2010) EAL students also reported similar results.

A medium FSU was reported on Chinese undergraduate engineering students' use of *analyzing parts of speech*. Similar results were found in Ghouati's (2014) study on Moroccan EAL students' use of VLSs. However, Iranian EAL students reported high FSUs (Amirian & Heshmatifar, 2013; Tanyer & Ozturk, 2014). *Using written repetitions* was employed by Chinese undergraduate engineering students with a medium FSU. Turkish EAL students reported similar results (Sener, 2009). For Taiwanese EAL students, however, a high FSU was revealed (Huang, 2010). *Using word lists* was employed by Chinese undergraduate engineering students with a medium FSU. Similar results were found for Turkish EAL students (Sener, 2009). A medium FSU was reported on Chinese undergraduate engineering students' use of *continuing to study over time*. Turkish EAL students reported the same results (Sener, 2009). However, a high FSU was found for Iranian EAL students (Hamzah et al., 2009). *Taking notes in classes* was employed by Chinese undergraduate engineering students with a medium FSU. Similar results were reported by Iranian (Riazi et al., 2005) and Chinese (Zhang, 2009) EAL students. However,

high FSUs of *taking notes in classes* were reported by Turkish (Sener, 2009), Iranian (Hamzah et al., 2009; Tanyer & Ozturk, 2014), and Moroccan (Ghouati, 2014) EAL students.

For the ten least frequently employed individual VLSs, previous studies revealed similar as well as different conclusions. Among the ten least frequently employed individual VLSs reported by Chinese undergraduate engineering students, none of them belongs to determination and metacognitive strategies, which are the two most frequently employed category of VLSs.

Asking teachers for sentences including new words was employed by Chinese undergraduate engineering students with a low FSU. Amirian and Heshmatifar (2013) found a similarly low FSU for Iranian EAL students. However, for Turkish EAL students, a FSU of medium was reported (Sener, 2009). Chinese undergraduate engineering students reported a low FSU on the use of *asking teacher for paraphrase or synonym of new words*, while Sener (2009) reported a medium FSU for Turkish EAL students. *Teachers checking students' flash cards or word lists for accuracy* was reported with a low FSU by Chinese undergraduate engineering students. Studies focusing on Iranian (Riazi et al., 2005), Turkish (Tanyer & Ozturk, 2014), and Jordanian (Al-Khasawneh, 2012) EAL students reported similar results. *Putting English labels on physical objects*, which was the fourth least frequently employed individual VLS, was reported with a low FSU by Chinese undergraduate engineering students. Similar results were reported by studies focusing on Iranian (Riazi et al., 2005; Amirian & Heshmatifar, 2013) and Turkish (Tanyer & Ozturk, 2014) EAL students. *Discovering new meanings through group work activities* was reported with a low FSU by Chinese undergraduate engineering students, while a medium FSU was reported by Turkish EAL students (Sener, 2009). Two individual VLSs, *Using Peg Method* and *using Loci Method*, were reported with low FSUs by Chinese undergraduate engineering students. Al-Khasawneh (2012) reported similar results on those two individual VLSs employed

by Jordanian EAL students. The possible explanation is that Chinese undergraduate engineering students are not familiar with the two individual VLSs. A low FSU was identified on Chinese undergraduate engineering students' use of *studying and practicing in groups*. Hamzah et al. (2009) reported similar results on Iranian EAL students. *Using physical actions when learning words* was employed by Chinese undergraduate engineering students with a low FSU and similar result was revealed by Hamzah et al.'s (2009) study on Iranian EAL students. However, Sener (2009) found that Turkish EAL students use this individual VLS with a medium FSU. A low FSU was found on the use of *asking teachers for Chinese translations* by Chinese undergraduate engineering students. This result is in line with previous studies. Iranian (Riazi et al., 2005; Hamzah et al., 2009; Amirian & Heshmatifar, 2013) and Turkish (Sener, 2009) EAL students similarly reported low FSUs.

5.1.2 Relationship between the Use of VLSs and Language Proficiency

Overall VLSs vs. Language Proficiency. A weak and negative correlation is identified between the use of overall VLSs by Chinese undergraduate engineering students and their language proficiency at a non-significant level. Similarly, a study focusing on advanced Hungarian EAL students indicated that higher levels of language proficiency correlated with less practice on a regular basis or less use of strategies (Doczi, 2011). One possible reason is that for students with higher levels of language proficiency, they may have already discovered certain VLSs that work effectively for them. Thus, applying more VLSs may have a negative influence on their language proficiency. Another possible reason is that students with lower levels of language proficiency are more aware and conscious of their own learning process, so they may be in search for more helpful VLSs (Doczi, 2011).

Previous studies (Fan, 2003; Riazi et al., 2005; Tsai & Chang, 2009; Zhang, 2011; Jafari & Kafipour, 2013) found that when EAL students employed more VLSs, their levels of language proficiency tend to be higher, and vice versa. The possible reason is that students with higher levels of language proficiency tend to have more vocabulary learning motivations and interests (Tsai & Chang, 2009).

Five Categories of VLSs vs. Language Proficiency. For Chinese undergraduate engineering students, the use of determination, cognitive, and metacognitive strategies are positively correlated with their language proficiency, while social and memory categories are negatively correlated. However, none of the correlations is at a significant level ($p <. 05$). Different results were reported by Riazi et al. (2005) in their study focusing on Iranian EAL students. Among the five categories of VLSs, only the use of cognitive strategies was positively correlated with Iranian EAL students' language proficiency. As suggested by Rizai et al. (2005), when language learners reach a certain language proficiency level, they tend to use more VLSs, especially cognitive strategies.

Individual VLSs vs. Language Proficiency. For correlations between the use of individual VLSs and language proficiency, there are several interesting findings. First, all individual VLSs that are negatively correlated with language proficiency at significant levels ($p < .05$) belong to social and memory strategies, which are the two least frequently employed categories. Looking at the similarities among the results, *keeping vocabulary notebooks* is positively correlated to language proficiency at a significant level ($p < .05$) for all participants and participants within mid-intermediate language proficiency range. *Teachers checking students' flash cards or word lists for accuracy,* however, is negatively correlated with language proficiency at a significant level ($p < .05$) for all participants and participants within high-intermediate language proficiency range.

Imaging word forms and *remembering part of speech* are both positively correlated with language proficiency at a significant level ($p < .05$) for all participants and participants within high-intermediate language proficiency range. Among the three ranges of language proficiency, *using verbal repetitions* and *using word lists* are positively correlated with language proficiency at significant levels for participants within low-intermediate range.

Previous studies on Japanese (McCrostie, 2007) and Vietnamese (Dang, 2013) EAL students' use of *keeping vocabulary notebooks* indicated that most EAL students cannot correctly and efficiently use vocabulary notebooks even though they are aware of the importance and potential benefits of this individual VLS (McCrostie, 2007; Dang, 2013).

5.1.3 Relationship between the Use of VLSs and Vocabulary Size

Overall VLSs vs. Vocabulary Size. There is a weak but positive relationship between Chinese undergraduate engineering students' overall VLS use and vocabulary size at a non-significant level, which shared the same conclusion with previous studies (Cohen & Apek, 1981; Cohen, 1990; Ellis, 1985; Ellis & Beaton, 1994; Zhang, 2009; Sener, 2009; Hamzah et al., 2009; Khatib et al., 2011).

Five Categories of VLSs vs. Vocabulary Size. For Chinese undergraduate engineering students, their use of the five categories was positively correlated with their vocabulary size except for social strategies. However, in Nirattisai and Chiramanee's (2014) study, for Thai EAL students with advanced vocabulary size, positive correlations were identified between the use of all five categories of VLSs and vocabulary size.

Individual VLSs vs. Vocabulary Size. Positive correlations were identified between the use of three individual VLSs by all participants and their vocabulary size at a significant level ($p < .05$),

namely *studying words with pictorial representations of their meanings*, *grouping words together within a storyline,* and *using written repetitions*.

There are two points that are worth mentioning. For all participants, *studying words with pictorial representations of their meanings* and *grouping words together within a storyline* are both positively correlated with vocabulary size. However, those two individual VLSs are negatively correlated with language proficiency. So, employing different VLSs based on the task at hand may be important for Chinese undergraduate engineering students. For Chinese undergraduate engineering students within mid-intermediate vocabulary size range, *taking notes in class* is negatively correlated with vocabulary size. One possible explanation is that language teachers in China tend to emphasize a great deal on taking notes in class, and it may become a burden rather than a strategy that Chinese students can use appropriately and effectively. Another explanation is that in order to take notes in class, Chinese students may be distracted from the class itself. Therefore, it is suggested that the key point in using VLSs in English learning, or in any language learning, is to use VLSs appropriately and effectively based on the task at hand.

5.1.4 Gender Differences on the Use of VLSs

Overall VLSs vs. Gender. For Chinese undergraduate engineering students, male students reported more use of VLSs than female students, yet the difference was not at a significant level. Therefore, there is no significant difference between male and female Chinese undergraduate engineering students' reported use of VLSs. This result is consistent with that of Tsai and Chang (2009).

However, several studies (Oxford & Nyikos, 1989; Catalan, 2003; Sahbazian, 2004; Liao, 2004; Sung, 2006; Huang, 2010; Arjoman & Sharififar, 2011; Zokaee et al., 2012; Seddign &

Shokrpur, 2012) reported that female EAL students tend to use more VLSs than male students. Participants recruited in previous studies were either varied in disciplines or from Humanities Department, while the target participants in the present study are from Engineering Department. Therefore, major might be the cause of the different results.

Five Categories of VLSs vs. Gender. Male Chinese undergraduate engineering students employed more social, memory, and cognitive strategies than female students did, while female students employed more determination and metacognitive strategies than male students did. However, the differences were not at significant levels.

Different conclusions were reported. In Huang's (2010) study on Taiwanese EAL students. It was reported that female Taiwanese EAL students employ more VLSs than male students in all five categories of VLSs. Zokaee et al. (2012) reported that both male and female Iranian EAL students' most frequently employed category of VLSs is metacognitive strategies, with social strategies being the least frequently employed one Arjoman and Sharififar (2011) reported that male Iranian EAL students employed metacognitive strategies most frequently and social strategies the least, while female Iranian EAL students reported that the most frequently employed category of VLSs is cognitive strategies and the least one is social strategies.

Individual VLSs vs. Gender. Among the ten most frequently employed individual VLSs, four strategies are shared by male and female Chinese undergraduate engineering students. However, a high FSU does not mean that the particular individual VLS is helpful. *Using word lists*, for example, for mid-intermediate participants, is negatively correlated with language proficiency and vocabulary size. Among the ten least frequently employed individual VLSs, male and female Chinese undergraduate engineering students share six out of ten strategies. Again, a low FSU

does not mean that the particular individual VLS is not helpful. For example, *using Loci Method* is positively correlated with Chinese undergraduate engineering students' vocabulary size.

Female Chinese undergraduate engineering students employed the individual VLS of *using bilingual dictionaries* significantly more than male students did. Similar results were revealed in Huang's (2010) study on Taiwanese EAL students. Female Taiwanese EAL students were found to have significantly more use of *using bilingual dictionaries* than male students.

5.2 Pedagogical Implications

Pedagogically, the findings of the present study provide insights on the use of VLSs by Chinese undergraduate engineering students, as well as the relationships between the use of VLSs and language proficiency, vocabulary size, and gender.

Firstly, it is important for language teachers and language learners in China to be aware of the existence of VLSs. Although studies focusing on VLSs can date back to the 1970s, some Chinese language teachers and language learners are still not aware of the various VLSs that can be helpful in vocabulary teaching and learning. Chinese undergraduate engineering students in the present study reported a medium FSU on the use of overall VLSs, and only five individual VLSs were reported with high FSUs. Therefore, Chinese undergraduate engineering students employed a significant amount of individual VLS with a low or medium FSU. For example, several Chinese undergraduate engineering students who participated in the present study reported that they did not know several individual VLS (i.e., using Peg Method, using Loci Method, and using semantic maps).

Moreover, as suggested in Section 5.1.3, using VLSs appropriately and effectively based on the task at hand is more important than using VLSs frequently. In addition of introducing

more VLSs to Chinese students, language teachers in China may also consider providing more task-based strategy trainings in order to help students. As suggested by Cohen and Weaver (2005), language learners should be explicitly taught how, when, and why certain strategies can be used. In Zhao's (2009) study on the effectiveness of metacognitive strategy training on vocabulary learning of Chinese EAL students, it was found that the task-based strategy training is proved to be effective.

Finally, similarities and differences between the use of VLSs and Chinese undergraduate engineering students were reported in the present study. It may be essential for Chinese language teachers to use different approaches in their language teaching to help students at different levels to discover the effectiveness of VLS use. For example, for Chinese undergraduate engineering students within low-intermediate language proficiency range, *teachers checking students' flash cards or word lists for accuracy* is negatively correlated with language proficiency. However, for Chinese undergraduate engineering students within mid-intermediate and high-intermediate language proficiency ranges, *teachers checking students' flash cards or word lists for accuracy* is positively correlated with language proficiency. This implication may also potentially apply to teaching and learning other languages.

5.3 Limitations

5.3.1Sample Size

A total number of 95 Chinese undergraduate engineering students were recruited in the present study, which is large enough for studies in linguistics. However, a larger sample size would be better considering the current study is based on quantitative data. Furthermore, participants in the present study are Chinese undergraduate engineering students from the same

university and they are all at intermediate level. For this reason, the generalizability of the study may be limited. However, language teachers in this university may still benefit from the results.

5.3.2 Instruments

As for the instruments employed in the present study, there are several limitations.

1. Although CET-4 is a national English-as-a-foreign-language test, it is not as well recognized as TOEFL or IELTS. In addition, CET-4 only includes reading, listening, and writing sections with the speaking section being optional. The total score of 710 for CET-4 does not include the speaking section.

2. Since both the Background Information Section and the Vocabulary Learning Strategies Section are self-reported data, it is not clear whether the participants actually use the VLSs they indicated in their real life learning situation. Their responses may be just their beliefs or thoughts that they have about their use of VLSs. It is possible that not all students are at the stage where they can "accurately self-report and self-diagnose" (Huang, 2010, p. 533).

3. In the Vocabulary Learning Strategies Section, I asked participants to circle their frequency level of VLS use in a five-point Likert-scale, ranging from "never," "rarely," "sometimes," "often," and "always." Participants may have difference interpretations on the frequency. For example, one participant might consider talking to a native speaker once a week as "sometimes," while another participant might consider it as "always."

4. It took 50 minutes for participants to complete all instruments in the study, which might lead to participants' fatigues.

5.4 Future Research Directions

To my knowledge, the present study is the first to investigate Chinese undergraduate engineering students' use of VLSs, and its relationships with language proficiency, vocabulary size, and gender. In order to obtain a fuller picture of Chinese EAL students' use of VLSs, future research may consider qualitative data collection (i.e., semi-structured interviews, think-aloud protocols, and classroom observations). The use of qualitative data may show whether students' self-reported use of VLSs in the Vocabulary Learning Strategies Section is consistent with what they actually do.

To investigate the relationship between the use of VLSs and language proficiency, future studies may use a standard language test, such as TOEFL or IELTS. Studies reported that there are several variables that may affect language learners' use of VLSs (Griffins, 2008), for instance, motivations, personalities, and task-based strategy trainings. The relationships between these variables and VLSs can also be considered as the future research directions.

More importantly, a shorter VLS questionnaire is much needed, as Schmitt's VLS questionnaire includes 58 statements and requires at least 25 minutes to complete. The shorter version will also benefit language teachers. For example, when dealing with new students, with a shorter version of VLS questionnaire, language teachers will be able to know the students' use of VLSs more quickly, and design more suitable teaching plans and task-based strategy trainings.

Conclusions

By conducting a study with 95 participants, the current study investigated the use of VLSs reported by Chinese undergraduate engineering students, and the relationships between language proficiency, vocabulary size, and gender. A medium FSU is reported by Chinese undergraduate engineering students; the result is inline with previous studies focusing on EAL students. Among the five categories of VLSs, the most frequently employed category is determination strategies, while the least is social strategies. The findings offer language teachers and learners the information about the frequencies and categories of VLSs employed by Chinese undergraduate engineering students.

Findings from the present study suggest that there is a negative yet non-significant correlation between the use of VLSs and language proficiency. Drawing on insights from previous studies, one may speculate that, for Chinese undergraduate engineering students with higher levels of language proficiency, the use of certain VLSs is efficient enough, and employing more VLSs may not contribute to language learning or language use. Students with lower levels of language proficiency may be more aware and conscious of their vocabulary learning and thus may be searching for more effective VLSs.

It is found that the use of VLSs is positively correlated with vocabulary size at non-significant level. Two individual VLSs, *studying words with pictorial representations of their meanings* and *grouping words together within a storyline* are positively correlated with vocabulary size at significant level. However, the two individual VLSs are also negatively correlated with language proficiency at significant level. As suggested, it is important to use appropriate VLSs based on the task at hand. *Taking notes in class*, which is negatively correlated

with vocabulary size at significant level. One possible explanation is that this individual VLS may become a burden for Chinese engineering students since Chinese teachers tend to emphasize taking notes a great deal; another explanation is that Chinese undergraduate engineering students may be distracted from the class when taking notes. Therefore, using VLSs effectively in response to the task at hand is also a key point that language learners and teachers should not ignore.

For the gender differences on Chinese undergraduate engineering students' reported use of VLSs, it is discovered that male students tend to use VLSs more frequently than female students; however, the difference is not at significant level. On the use of individual VLSs, female students reported employing *using bilingual dictionaries* and *using word lists* significantly more than male students. While male students employ *studying words with pictorial representations of their meanings* significantly more.

Based on the findings, it is important that language teachers, students, and administers recognize the value of VLSs, and how VLSs can contribute to language learning. It is essential for future research to take other key variables into consideration as well as to incorporate methods such as think-aloud introspection or classroom observation to collect qualitative data in order to obtain a fuller picture of EAL students' use of VLSs.

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Appendix A Schmitt's Taxonomy of Vocabulary Learning Strategies

	Analyse part of speech
	Analyse affixes and roots
	Check for L1 cognate
	Analyse any available pictures or gestures
Determination	Guess from textual context
	Bilingual dictionary
	Monolingual dictionary
	Word lists
	Flash cards
	Ask teacher for an L1 translation
	Ask teacher for paraphrase or synonym of new word
	Ask teacher for a sentence including the new word
	Ask classmates for meaning
Social	Discover new meaning through group work activity
	Study and practice meaning in a group
	Teacher checks students' flash cards or word lists for accuracy
	Interact with native-speakers
	Study word with a pictorial representation of its meaning
	Image word's meaning
	Connect word to a personal experience
	Associate the word with its coordinates
	Connect the word to its synonyms and antonyms
	Use semantic maps
	Use 'scales' for gradable adjectives
	Peg Method
	Loci Method
	Group words together to study them
	Group word together spatially on a page
Memory	Use new word in sentences
	Group words together within a storyline
	Study the spelling of a word
	Study the sound of a word
	Say new word aloud when studying
	Image word form
	Underline initial letter of the word
	Configuration
	Use Keyword Method
	Affixes and roots (remembering)
	Parts of speech (remembering)
	Paraphrase the word's meaning

	Use cognates in study
	Learn the words of an idiom together
	Use physical action when learning a word
	Use semantic feature girds
	Verbal repetition
	Written repetition
	Word lists
	Flash cards
Cognitive	Take notes in class
	Use the vocabulary section in your textbook
	Listen to tape of word lists
	Put English label on physical objects
	Keep a vocabulary notebook
	Use English-language media (songs, movies, newscasts, etc.)
	Testing oneself with word tests
Metacognitive	Use spaced word practice
	Skip or pass new word
	Continue to study word over time

Schmitt (1997, pp. 207-208)

Appendix B The Background Information Section

Please answer the Background Information Section first before you complete the Vocabulary Learning Strategies Section. Please be note that your personal information will be kept confidential and will only be used for the purpose of this study.

Background Information Section

Gender:

Grade:

Age:

Years of English learning:

TOEFL score and year (if you have):

IELTS score and year (if you have):

CET-4 (College English Test-Band 4) score:

Have you ever studied or lived in an English-speaking country?

If you have studied or lived in an English-speaking country, please indicate where, when (how old are you when you went there) and how long.

Chinese Translation

请先完成背景信息部分然后完成词汇学习策略部分。你的个人信息将被妥善保管，并且只用于此项研究。

背景信息部分

性别：

年级：

年龄：

学习英语的年份：

托福成绩以及考试年份（如果你有）：

雅思成绩以及考试年份（如果你有）：

英语四级的成绩以及考试年份：

是否曾经在英语国家学习或居住过：

如果你曾经学习或居住在英语国家，请说明哪个国家，在你多大的时候和持续的时间。

Appendix C The Vocabulary Learning Strategies Section

Vocabulary Learning Strategies Section

The following is a list of vocabulary learning strategies. In this study, vocabulary learning strategies refer to conscious and semi-conscious thoughts and actions that language learners use to help them to enhance vocabulary learning and use.

<u>I would like to know what you actually do, NOT what you should do or want to do</u>. I would like you to indicate how often you have used a certain strategies when you learn English vocabulary, irrespective of the skills (i.e. listening, reading, speaking, and writing) and of the place of learning (i.e. school, preparatory school, and home).

If you do not use a strategy at all, please circle the word **never (approximately 0%)**. If you use a strategies, please circle one of the words, **rarely (approximately 25%)**, **sometimes (approximately 50%)**, **often (approximately 75%)**, or **always (approximately 100%)**, according to the frequency.

Vocabulary Learning Strategies Section					
No.	Statement	Never	Rarely	Sometimes	Often	Always
1	I analyze part of speech of a new word to discover its meaning.					
2	I analyze affix and roots to discover its meaning.					
3	I check for Chinese cognate.					
4	I analyze any available pictures or gestures when I meet a new word.					
5	I guess the meaning of a new word from the context when I read.					
6	I use English-Chinese dictionary.					
7	I use English-English dictionary.					
8	I use word lists to help me study new words.					
9	I use flash cards to help me study new words.					
10	I ask teacher for Chinese translation of a new word.					
11	I ask teacher for paraphrase or synonymy of a new word.					
12	I ask teacher for a sentence including the new word to help me study.					
13	I ask classmate to explain the meaning of new word.					
14	I work in group to discover meaning of a new word.					
15	I study and practice meaning of a new word in group.					

Vocabulary Learning Strategies Section

16	My teacher will check my flash cards or word lists for accuracy.					
17	I interact with native speakers.					
18	I study words with a pictorial representation of its meaning.					
19	I image a new word's meaning.					
20	I connect a new word to my personal experience to remember a new word.					
21	I associate the word with its coordinates.					
22	I group words to their synonyms and antonyms.					
23	I use semantic maps to remember new English words.					
24	I use "scales" for gradable adjectives.					
25	I use Peg Method to study new words.					
26	I use Loci Method to study new words.					
27	I put the words in groups to study them together.					
28	I group words spatially on a page in order to study them.					
29	I use new words in sentences and in conversations so I can remember them.					
30	I put new words into a story so I can remember them.					
31	I study the spelling of a word.					
32	I remember the sound of a word.					
33	I pronounce the new word aloud when I study.					
34	I image the word form when I study.					
35	I underline initial letter of the word when I study.					
36	Configuration.					
37	I use key word method when I study new words.					
38	I remember the affixes and roots of a new word.					
39	I remember part of the speech of a new word.					
40	I paraphrase the meaning of a word.					
41	I use cognates in study.					
42	I learn the words with an idiom together.					
43	I use physical action when learning to remember new words.					
44	I use semantic feature grids to remember new words.					
45	I see a new English word several times.					
46	I write a new English word several times.					
47	I use word lists to study and remember words.					
48	I use flash cars to study and remember words.					
49	I take vocabulary notes in class.					
50	I take vocabulary sections in my textbook.					
51	I listen to tapes of word lists.					
52	I put English labels on physical objects.					
53	I use a vocabulary notebook.					
54	I listen to English radio, watch TV programs, or read books, magazines or fictions					
55	I test myself with word test.					
56	I use spaced word practice.					
57	I skip or pass new words.					
58	I continue to study words over time.					

Chinese Translation

词汇学习策略部分

    以下是一个词汇学习策略的清单。在此项研究中，词汇学习策略是指语言学习者在有意识或半有意识的情况下所采取的想法或者行为，以帮助加强他们的词汇学习和使用。

    我希望知道你在学习英语词汇时所使用的策略，而不是你觉得应该使用或者你希望使用的策略。 我希望了解你使用某一种策略的频率，不管使用在哪一个方面（例如，听力，阅读，口语或者写作），也不管你使用的场所（例如，学校，语言学习或者家里）。

    如果你完全没有使用某项策略，请依照你的使用率在"从不（使用率约为 0%）"这个选项上打勾。如果你使用某项策略，请在"很少（使用率约为 25%）"，"有时（使用率约为 50%）"，"较常（使用率约为 75%）"或者"经常（使用率约为 100%）"中选择。

Appendix D The Vocabulary Size Test

Vocabulary Size Test

The following is a Vocabulary Size Test in bilingual version; please choose the correct meaning for the bold word.

Chinese Translation

词汇量测试

以下是一个双语的词汇量测试，请从四个选项中选出你认为正确的选项

The Vocabulary Size Test (bilingual Mandarin Chinese version) is retrieved from Nation's website: http://www.victoria.ac.nz/lals/about/staff/paul-nation

Appendix E Email Invitation

Hi Prof. Li,

I am a graduate student in Linguistics Department, University of Victoria. I am writing to invite you and your students to participant in my research. My research is focused on vocabulary learning strategies, which has been widely studied over the last several decades. However, few studies have focused on Chinese students, especially Chinese engineering students. Therefore, in my present research, I put my emphasis on the employment of vocabulary learning strategies of Chinese engineering students, and the relationships with language proficiency, gender, as well as vocabulary size.

As potential participants in my research, your students will be expected to finish a questionnaire with the Background Information Section and the Vocabulary Learning Strategies Section, and a Vocabulary Size Test. The total estimated time for completing is around 40 minutes. Please let the students know that their information will be used and only used in my present research, and they can withdraw from my research anytime they want.

To show my appreciation to your students' participation, I will prepare a 30-45 minutes talk regarding my application to graduate school in Canada, my study and living experience in Canada, also I will share some beautiful pictures that I took in Canada. Moreover, I am happy to answer questions regarding studying abroad for students through emails or in person.

Thank you for your kind consideration and I look forward to hear from you.

Sincerely,
Mengyue

MA Candidate
Principal Researcher
Department of Linguistics
University of Victoria

Appendix F Participant Consent Form

Participant Consent Form

Linguistics Department

Undergraduate EAL (English-as-an-Additional-Language) Students' use of Vocabulary learning strategies and its Relationship vis-a-vis Language Proficiency, Vocabulary Size, and Gender

You are invited to participate in a study entitled Undergraduate EAL (English-as-an-Additional-Language) Students' use of Vocabulary learning strategies and its Relationship vis-a-vis Language Proficiency, Vocabulary Size, and Gender that is being conducted by Mengyue Cai.

Mengyue Cai is a graduate student in the Department of Linguistics at the University of Victoria and you may contact her if you have further questions by mengyue@uvic.ca.

As a graduate student, I am required to conduct research as part of the requirements for a degree in Master of Arts. It is being conducted under the supervision of Dr. Li-Shih Huang. You may contact my supervisor at (250)-472-4665.

Purpose and Objectives

The purpose of this research project is to discover the relationships between the use of vocabulary learning strategies and language proficiency, vocabulary size, and gender.

Importance of this Research

Research of this type is important because there is no previous research in vocabulary learning strategies focusing on Chinese engineering undergraduate students.

Participants Selection

You are being asked to participate in this study because you are Chinese engineering undergraduate students.

What is involved

If you consent to voluntarily participate in this research, your participation will include firstly complete a questionnaire, which includes a background information section and a vocabulary learning strategies section, then a vocabulary size test.

Inconvenience

Participation in this study may cause some inconvenience to you, including the time required for you to complete all the instruments for this research.

Risks

There are no known or anticipated risks to you by participating in this research.

Benefits

The potential benefits of your participation in this research include researcher will share some information on how to apply for graduate school in Canada, her studying experience in Canada, and life in Canada.

Voluntary Participation

Your participation in this research must be completely voluntary. If you do decide to participate, you may withdraw at any time without any consequences or explanations. If you do withdraw from the study after your completion of the instruments, your data will still be used in the present research due to the anonymously submitted data.

Anonymity

In terms of protecting your anonymity, all data will be collected anonymously.

Confidentiality

Your confidentiality and the confidentiality of the data will be protected by storing the data in a locked filing cabinet and password protected computer files.

Dissemination of Results

It is anticipated that the results of this study will be shared with others in the following ways: thesis and conference.

Disposal of Data

Data from this study will be disposed five year after the research has been completed and the results has been published, paper will be shredded and files will be deleted.

Contacts

Individuals that may be contacted regarding this study include Mengyue Cai (mengyue@uvic.ca) and Dr. Li-Shih Huang (lshuang@uvic.ca).

In addition, you may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or ethics@uvic.ca).

Your signature below indicates that you understand the above conditions of participation in this study, that you have had the opportunity to have your questions answered by the researchers, and that you consent to participate in this research project.

Name of Participant	*Signature*	*Date*

A copy of this consent will be left with you, and a copy will be taken by the researcher.

Appendix G Rank Orders of the Frequency of Use of Individual Vocabulary Learning Strategies Reported by Chinese Undergraduate Engineering Students

Individual Vocabulary Learning Strategies	Category	*M*	*SD*
Guess from textual contexts	Det	3.80	0.99
Use bilingual dictionaries	Det	3.79	1.19
Study the sounds of words	Mem	3.55	1.21
Study the spellings of words	Mem	3.54	1.16
Use verbal repetitions	Cog	3.52	1.14
Analyze parts of speech	Det	3.32	1.21
Use written repetitions	Cog	3.24	1.14
Use word lists	Det	3.23	1.15
Continue to study words over time	Met	3.20	1.07
Take notes in classes	Cog	3.16	1.31
Use word lists	Cog	3.05	1.21
Say new words aloud when studying	Mem	3.03	1.17
Use the vocabulary sections in textbooks	Cog	3.03	1.22
Use spaced-word practices	Met	2.96	1.06
Skip or pass new words	Met	2.95	1.26
Analyze affixes and roots	Det	2.91	1.06
Connect words to their synonyms and antonyms	Mem	2.89	1.09
Connect words to personal experiences	Mem	2.81	1.06
Use English-language medias	Met	2.80	1.12
Remember affixes and roots	Mem	2.80	1.15
Associate words with their coordinates	Mem	2.79	1.05
Keep vocabulary notebooks	Cog	2.75	1.22
Testing oneself with word tests	Met	2.75	1.16
Image words' meanings	Mem	2.73	1.16
Use flash cards	Cog	2.72	1.26
Listen to tapes of word lists	Cog	2.65	1.16
Check for Chinese cognates	Det	2.65	1.12
Image word forms	Mem	2.64	1.06
Use 'scales' for gradable adjectives	Mem	2.62	1.21
Use Keyword Method	Mem	2.55	1.16
Use new words in sentences	Mem	2.52	1.17
Group words together within a storyline	Mem	2.48	1.19
Paraphrase the words' meanings	Mem	2.44	1.22
Use monolingual dictionaries	Det	2.41	1.19
Use cognates in study	Mem	2.39	1.01
Group words together to study them	Mem	2.38	1.11
Learn words of idioms together	Mem	2.32	1.04

Ask classmates for meanings	Soc	2.29	1.08
Use semantic maps	Mem	2.26	1.07
Analyze any available pictures or gestures	Det	2.26	1.07
Use flash cards	Det	2.25	1.15
Remember parts of speech	Mem	2.24	1.12
Use configurations	Mem	2.24	1.27
Group words together spatially on a page	Mem	2.21	1.18
Use semantic feature grids	Mem	2.17	1.11
Underline initial letters of words	Mem	2.16	1.31
Interact with native-speakers	Soc	2.09	0.92
Study words with pictorial representations of their meanings	Mem	2.08	1.01
Ask teachers for Chinese translations	Soc	2.03	1.02
Use physical actions when learning words	Mem	2.00	1.04
Use Loci Method	Mem	1.94	1.05
Study and practice meanings in groups	Soc	1.93	0.97
Use Peg Method	Mem	1.91	1.09
Discover new meanings through group work activities	Soc	1.84	1.04
Put English labels on physical objects	Cog	1.82	0.97
Teachers check students' flash cards or word lists for accuracy	Soc	1.80	1.00
Ask teachers for paraphrases or synonyms of new words	Soc	1.80	0.83
Ask teachers for sentences including new words	Soc	1.78	0.94

Note. $N = 95$. Det = determination; Met = metacognitive; Cog = cognitive; Mem = memory; Soc = social.

Appendix H Correlations between the Use of Individual Vocabulary Learning Strategies Reported by Chinese Undergraduate Engineering Students and Their Language Proficiency

	Pearson correlation	All	Language proficiency level		
			L-I	M-I	U-I
Analyze parts of speech	r	.01	.01	-.25	.20
	p	.912	.965	.173	.283
Analyze affixes and roots	r	.10	-.08	.11	.04
	p	.322	.665	.541	.848
Check for Chinese cognates	r	.04	.21	-.09	-.11
	p	.672	.237	.629	.551
Analyze any available pictures or gestures	r	-.11	-.12	-.16	.10
	p	.302	.501	.384	.584
Guess from textual contexts	r	.07	.28	.01	-.04
	p	.516	.105	.944	.822
Use bilingual dictionaries	r	.13	**.37***	.13	-.12
	p	.194	**.031**	.501	.516
Use monolingual dictionaries	r	-.05	-.32	.05	.11
	p	.642	.066	.786	.581
Use word lists	r	.16	-.04	-.04	.13
	p	.132	.843	.828	.492
Use flash cards	r	-.18	-.02	-.18	-.04
	p	.076	.924	.337	.824
Ask teachers for Chinese translations	r	-.04	-.13	-.06	.01
	p	.725	.451	.735	.962
Ask teachers for paraphrases or synonyms of new words	r	-.16	-.04	-.22	-.27
	p	.118	.832	.231	.151
Ask teachers for sentences including the new words	r	**-.25***	-.19	-.12	-.27
	p	**.017**	.285	.513	.149
Ask classmates for meanings	r	-.05	-.09	.18	-.12
	p	.645	.610	.326	.521
Discover new meanings through group work activities	r	-.15	-.02	.09	-.19
	p	.150	.902	.626	.310
Study and practice meanings in groups	r	**-.22***	-.14	.11	-.31
	p	**.034**	.440	.561	.097
Teachers check students' flash cards or word lists for accuracy	r	**-.22***	**-.40***	.26	-.31
	p	**.030**	**.019**	.164	.099
Interact with native-speakers	r	.05	-.09	.03	.20
	p	.662	.609	.877	.282
Study words with pictorial representations of their meanings	r	**-.30****	-.23	-.05	-.16
	p	**.003**	.193	.772	.395

Image words' meanings	r	.03	-.04	.27	.11
	p	.750	.827	.148	.547
Connect words to personal experiences	r	.01	-.12	**.37***	-.26
	p	.917	.490	**.039**	.158
Associate words with their coordinates	r	.06	-.12	.00	-.10
	p	.543	.486	.999	.588
Connect the words to their synonyms and antonyms	r	.01	-.01	.16	-.16
	p	.923	.939	.397	.403
Use semantic maps	r	-.10	-.21	-.15	-.07
	p	.323	.245	.415	.712
Use 'scales' for gradable adjectives	r	.06	-.04	.32	.08
	p	.545	.816	.082	.663
Use Peg Method	r	.15	**-.38***	.32	.17
	p	.160	**.026**	.078	.369
Use Loci Method	r	-.06	**-.49****	-.04	.08
	p	.582	**.003**	.851	.671
Group words together to study them	r	.09	-.06	.04	.32
	p	.392	.754	.837	.089
Group words together spatially on a page	r	.01	-.01	.15	.15
	p	.901	.981	.431	.419
Use new words in sentences	r	-.14	-.28	.20	-.12
	p	.183	.111	.281	.527
Group words together within a storyline	r	**-.24***	-.00	-.18	-.10
	p	**.018**	.997	.346	.607
Study the spellings of words	r	.05	.10	.20	-.19
	p	.642	.561	.288	.320
Study the sounds of words	r	.15	.06	.19	-.27
	p	.157	.742	.310	.146
Say new words aloud when studying	r	-.01	-.05	.02	-.22
	p	.941	.776	.925	.246
Image word forms	r	**-.25***	.08	-.05	**-.40***
	p	**.013**	.640	.804	**.027**
Underline initial letters of words	r	-.12	.05	.30	-.25
	p	.246	.764	.107	.189
Use configuration	r	-.06	.12	.22	-.13
	p	.576	.496	.246	.510
Use Keyword Method	r	.13	.01	-.05	.07
	p	.204	.979	.810	.723
Remember affixes and roots	r	**.23***	.12	.12	.29
	p	**.027**	.519	.524	.123
Remember parts of speech	r	**-.22***	-.20	.35	**-.37***
	p	**.036**	.261	.057	**.045**
Paraphrase the words' meanings	r	-.01	-.07	.30	-.30
	p	.915	.687	.103	.105

Use cognates in study	r	-.03	-.10	-.13	-.15
	p	.763	.557	.473	.426
Learn words of idioms together	r	-.18	-.18	**-.43***	-.11
	p	.087	.313	**.016**	.565
Use physical actions when learning words	r	-.19	.12	-.05	-.29
	p	.065	.506	.783	.122
Use semantic feature grids	r	-.11	.09	.05	.03
	p	.286	.616	.802	.887
Use verbal repetitions	r	.11	**.36***	**.37***	.21
	p	.312	**.037**	**.039**	.263
Use written repetitions	r	-.02	.24	.10	.24
	p	.829	.179	.587	.200
Use word lists	r	.14	**.35***	-.05	**.39***
	p	.166	**.044**	.788	**.033**
Use flash cards	r	-.07	.12	.15	.01
	p	.534	.510	.422	.979
Take notes in classes	r	.19	.03	.18	.11
	p	.071	.880	.348	.550
Use the vocabulary sections in textbooks	r	**.21***	.26	.07	.28
	p	**.045**	.134	.715	.139
Listen to tapes of word lists	r	-.02	-.09	-.03	.28
	p	.858	.608	.868	.131
Put English labels on physical objects	r	-.19	-.04	-.23	-.11
	p	.071	.813	.224	.568
Keep vocabulary notebooks	r	**.25***	.07	**.49****	.33
	p	**.014**	.697	**.005**	.072
Use English-language medias	r	.11	.11	.05	.35
	p	.308	.526	.811	.061
Testing oneself with word tests	r	-.09	.00	.04	-.10
	p	.403	.998	.827	.605
Use spaced-word practices	r	.14	.19	.21	.31
	p	.166	.287	.251	.095
Skip or pass new words	r	.14	-.17	.23	-.11
	p	.169	.338	.206	.559
Continue to study words over time	r	.12	.10	.11	**.37***
	p	.259	.585	.567	**.043**

Note. $N = 95$. All = All participants; L-I = Low-intermediate; M-I = Mid-intermediate; H-I = High-intermediate. L-I $n = 34$; M-I $n = 31$; H-I $n = 30$.
*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Appendix I Correlations between the Use of Individual Vocabulary Learning Strategies Reported by Chinese Undergraduate Engineering Students and Their Vocabulary Size

	Pearson correlation	All	Vocabulary size level		
			L-I	M-I	U-I
Analyze parts of speech	r	.04	.31	.06	-.27
	p	.675	.087	.736	.129
Analyze affixes and roots	r	.17	.27	-.16	-.05
	p	.111	.143	.395	.800
Check for Chinese cognates	r	-.01	.08	-.13	.02
	p	.910	.684	.481	.902
Analyze any available pictures or gestures	r	.01	.01	-.05	-.18
	p	.896	.953	.792	.328
Guess from textual contexts	r	.03	.20	-.11	-.19
	p	.749	.289	.535	.301
Use bilingual dictionaries	r	-.10	.21	-.11	-.19
	p	.361	.262	.551	.294
Use monolingual dictionaries	r	.07	.21	-.21	-.01
	p	.480	.256	.242	.946
Use word lists	r	-.15	.25	-.35	-.34
	p	.138	.182	.053	.054
Use flash cards	r	-.02	-.28	-.04	.02
	p	.846	.126	.821	.903
Ask teachers for Chinese translations	r	-.07	.01	-.14	-.18
	p	.494	.966	.455	.315
Ask teachers for paraphrases or synonyms of new words	r	-.14	.07	.02	-.10
	p	.190	.723	.937	.576
Ask teachers for sentences including the new words	r	-.01	.13	.03	-.14
	p	.971	.473	.874	.456
Ask classmates for meanings	r	-.07	.07	.07	-.26
	p	.497	.721	.692	.158
Discover new meanings through group work activities	r	-.04	.21	.11	-.10
	p	.676	.253	.556	.578
Study and practice meanings in groups	r	-.11	.13	.08	-.12
	p	.311	.479	.678	.524
Teachers check students' flash cards or word lists for accuracy	r	-.01	-.07	.14	-.13
	p	.895	.709	.450	.470
Interact with native-speakers	r	-.00	.08	.02	-.28
	p	.979	.674	.921	.116
Study words with pictorial representations of their meanings	r	**.21***	.12	.18	.16
	p	**.039**	.516	.325	.395

Image words' meanings	r	.19	.14	.19	.24
	p	.072	.450	.289	.184
Connect words to personal experiences	r	.15	.21	.10	.04
	p	.160	.265	.573	.811
Associate words with their coordinates	r	.16	.23	**.36***	.09
	p	.128	.205	**.044**	.641
Connect the words to their synonyms and antonyms	r	.16	.14	.08	.08
	p	.135	.461	.684	.664
Use semantic maps	r	.02	.01	-.07	-.07
	p	.864	.940	.708	.703
Use 'scales' for gradable adjectives	r	-.04	.12	.10	-.33
	p	.698	.520	.576	.066
Use Peg Method	r	.15	-.21	-.03	-.03
	p	.150	.262	.875	.861
Use Loci Method	r	.15	.13	.01	.09
	p	.157	.501	.980	.631
Group words together to study them	r	.18	-.13	.14	-.02
	p	.079	.480	.458	.915
Group words together spatially on a page	r	-.04	-.09	.08	-.15
	p	.683	.628	.660	.413
Use new words in sentences	r	.15	.33	-.02	.04
	p	.145	.070	.924	.825
Group words together within a storyline	r	**.21***	.06	-.15	.25
	p	**.043**	.744	.428	.173
Study the spellings of words	r	.16	.17	.06	.09
	p	.111	.364	.745	.608
Study the sounds of words	r	-.08	.02	.02	-.06
	p	.457	.932	.910	.730
Say new words aloud when studying	r	.04	.06	.17	.09
	p	.737	.738	.365	.633
Image word forms	r	.16	-.12	.11	.23
	p	.120	.525	.547	.216
Underline initial letters of words	r	.15	-.13	.12	**.45***
	p	.145	.501	.503	**.010**
Use configuration	r	.02	.24	.10	.10
	p	.816	.196	.580	.581
Use Keyword Method	r	-.13	.15	.14	-.20
	p	.224	.407	.458	.278
Remember affixes and roots	r	.01	.16	-.07	-.16
	p	.913	.392	.711	.375
Remember parts of speech	r	-.06	-.01	-.14	.26
	p	.566	.970	.435	.156
Paraphrase the words' meanings	r	.02	.08	-.24	-.04
	p	.883	.674	.184	.814

		All	L-I	M-I	H-I
Use cognates in study	r	-.04	-.06	-.27	-.06
	p	.723	.746	.139	.746
Learn words of idioms together	r	-.01	-.01	.04	.07
	p	.911	.963	.841	.706
Use physical actions when learning words	r	.01	-.03	.04	.11
	p	.907	.882	.829	.548
Use semantic feature grids	r	-.14	.16	.09	-.31
	p	.163	.402	.611	.090
Use verbal repetitions	r	.06	.20	-.06	-.14
	p	.562	.276	.758	.460
Use written repetitions	r	**.26***	.14	.18	.07
	p	**.012**	.459	.326	.688
Use word lists	r	.15	-.11	.09	-.31
	p	.141	.566	.611	.087
Use flash cards	r	.03	.08	-.11	.19
	p	.755	.652	.551	.307
Take notes in classes	r	-.01	.12	**-.37***	-.16
	p	.914	.510	**.040**	.391
Use the vocabulary sections in textbooks	r	.07	.03	-.21	-.09
	p	.482	.865	.246	.640
Listen to tapes of word lists	r	-.03	.02	-.30	.07
	p	.812	.908	.095	.689
Put English labels on physical objects	r	-.00	.23	.05	.06
	p	.980	.224	.777	.739
Keep vocabulary notebooks	r	-.01	-.08	-.04	-.32
	p	.911	.658	.846	.071
Use English-language medias	r	-.09	-.02	-.14	-.23
	p	.413	.907	.457	.197
Testing oneself with word tests	r	.05	.11	-.18	.00
	p	.663	.558	.323	.992
Use spaced-word practices	r	.12	.08	-.06	.11
	p	.248	.667	.740	.534
Skip or pass new words	r	.03	.18	.17	-.03
	p	.787	.344	.361	.865
Continue to study words over time	r	-.00	.16	.14	.11
	p	.989	.392	.461	.568

Note. N = 95. All = All participants; L-I = Low-intermediate; M-I = Mid-intermediate; H-I = High-intermediate. L-I *n* = 31; M-I *n* = 32; H-I *n* = 32.
*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Appendix J Rank Orders of the Use of Individual Vocabulary Learning Strategies Reported by Male Chinese Undergraduate Engineering Students

Individual Vocabulary Learning Strategy	Category	*M*	*SD*
Use bilingual dictionaries	Det	3.71	1.06
Use written repetitions	Cog	3.54	1.24
Use monolingual dictionaries	Det	3.52	1.25
Say new words aloud when studying	Mem	3.38	1.23
Study the sounds of words	Mem	3.38	1.18
Use word lists	Cog	3.36	1.23
Use flash cards	Cog	3.30	1.29
Analyze affixes and roots	Det	3.27	1.23
Image word forms	Mem	3.06	1.21
Use flash cards	Det	3.02	1.14
Listen to tapes of word lists	Cog	3.02	1.24
Skip or pass new words	Met	3.02	1.24
Use the vocabulary sections in textbooks	Cog	2.95	1.20
Use semantic maps	Mem	2.95	1.09
Continue to study words over time	Met	2.93	1.35
Analyze parts of speech	Det	2.91	0.88
Take notes in classes	Cog	2.89	1.33
Remember parts of speech	Mem	2.89	1.25
Connect words to personal experiences	Mem	2.88	1.19
Check for Chinese cognates	Det	2.82	1.18
Associate words with their coordinates	Mem	2.80	1.15
Use English-language medias	Met	2.80	1.29
Connect words to their synonyms and antonyms	Mem	2.80	1.13
Testing oneself with word tests	Met	2.77	1.13
Use spaced-word practices	Met	2.73	1.24
Underline initial letters of words	Mem	2.71	1.14
Remember affixes and roots	Mem	2.63	1.23
Study the spellings of words	Mem	2.61	1.20
Group words together within a storyline	Mem	2.61	1.09
Put English labels on physical objects	Cog	2.61	1.22
Analyze any available pictures or gestures	Det	2.56	1.11
Use Peg Method	Mem	2.52	1.25
Group words together spatially on a page	Mem	2.48	1.08
Use word lists	Det	2.45	1.19
Use cognates in study	Mem	2.36	1.20
Learn words of idioms together	Mem	2.36	1.00
Guess from textual contexts	Det	2.36	1.14
Use 'scales' for gradable adjectives	Mem	2.36	1.05
Ask teachers for Chinese translations	Soc	2.32	1.08
Paraphrase the words' meanings	Mem	2.30	1.14

Use new words in sentences	Mem	2.30	1.16
Use configurations	Mem	2.29	1.36
Image words' meanings	Mem	2.27	1.02
Use Keyword Method	Mem	2.27	1.27
Discover new meanings through group work activities	Soc	2.25	1.07
Use physical actions when learning words	Mem	2.25	1.04
Use verbal repetitions	Cog	2.18	1.19
Use semantic feature grids	Mem	2.16	1.14
Ask teachers for paraphrases or synonyms of new words	Soc	2.11	1.02
Study words with pictorial representations of their meanings	Mem	2.09	.96
Teachers check students' flash cards or word lists for accuracy	Soc	2.04	1.08
Group words together to study them	Mem	2.00	1.06
Use Loci Method	Mem	1.96	1.14
Ask teachers for sentences including the new words	Soc	1.93	0.91
Interact with native-speakers	Soc	1.88	1.08
Ask classmates for meanings	Soc	1.86	0.98
Keep vocabulary notebooks	Cog	1.84	1.01
Study and practice meanings in groups	Soc	1.84	1.08

Note. n = 56. Det = determination; Met = metacognitive; Cog = cognitive; Mem = memory; Soc = social.

Appendix K Rank Orders of the Use of Individual Vocabulary Learning Strategies Reported by Female Chinese Undergraduate Engineering Students

Individual Vocabulary Learning Strategies	Category	*M*	*SD*
Use bilingual dictionaries	Det	4.18	1.00
Guess from textual contexts	Det	3.92	.87
Study the sounds of words	Mem	3.79	1.15
Study the spellings of words	Mem	3.77	1.09
Use word lists	Det	3.54	1.1
Use verbal repetitions	Cog	3.49	1.00
Analyze parts of speech	Det	3.38	1.18
Continue to study words over time	Met	3.31	0.92
Take notes in classes	Cog	3.21	1.24
Use written repetitions	Cog	3.08	0.98
Use the vocabulary sections in your textbooks	Cog	3.05	1.19
Analyze affixes and roots	Det	3.03	0.87
Say new words aloud when studying	Mem	3.00	1.12
Skip or pass new words	Met	2.97	1.14
Use word lists	Cog	2.95	1.32
Use spaced-word practices	Met	2.87	.73
Use English-language medias	Met	2.85	1.11
Connect words to personal experiences	Mem	2.82	.94
Connect words to their synonyms and antonyms	Mem	2.82	1.10
Check for Chinese cognates	Det	2.79	1.13
Testing oneself with word tests	Met	2.77	1.04
Use 'scales' for gradable adjectives	Mem	2.77	1.16
Associate words with their coordinates	Mem	2.77	.93
Listen to tapes of word lists	Cog	2.72	1.10
Keep vocabulary notebooks	Cog	2.67	1.13
Remember affixes and roots	Mem	2.67	1.01
Paraphrase the words' meanings	Mem	2.56	1.25
Image word forms	Mem	2.54	.94
Image words' meanings	Mem	2.51	1.10
Use flash cards	Cog	2.46	1.12
Use cognates in study	Mem	2.44	1.05
Use Keyword Method	Mem	2.44	1.07
Learn words of idioms together	Mem	2.41	1.04
Use new words in sentences	Mem	2.38	1.27
Ask classmates for meanings	Soc	2.36	1.11
Use monolingual dictionaries	Det	2.36	1.20
Group words together within a storyline	Mem	2.31	1.17
Group words together to study them	Mem	2.23	1.16
Use configurations	Mem	2.21	1.28
Use semantic feature grids	Mem	2.15	0.99

Remember parts of speech	Mem	2.15	1.09
Use flash cards	Det	2.15	1.25
Analyze any available pictures or gestures	Det	2.13	0.98
Use semantic maps	Mem	2.13	1.10
Interact with native-speakers	Soc	2.10	0.88
Group words together spatially on a page	Mem	2.08	1.20
Underline initial letters of words	Mem	1.97	1.22
Ask teachers for Chinese translations	Soc	1.92	1.01
Use Loci Method	Mem	1.85	1.04
Discover new meanings through group work activities	Soc	1.85	1.01
Use Peg Method	Mem	1.82	1.02
Study words with pictorial representations of their meanings	Mem	1.82	.94
Put English labels on physical objects	Cog	1.79	.92
Use physical actions when learning words	Mem	1.77	.84
Study and practice meanings in groups	Soc	1.77	.78
Teachers check students' flash cards or word lists for accuracy	Soc	1.69	.86
Ask teachers for sentences including the new words	Soc	1.67	.87
Ask teachers for paraphrases or synonyms of new words	Soc	1.62	.67

Note. n = 39. Det = determination; Met = metacognitive; Cog = cognitive; Mem = memory; Soc = social.

Appendix L Gender Differences in the Use of Individual Vocabulary Learning Strategies

Individual vocabulary learning strategy	M		T-Test	
	Male	Female	*t*	*Sig.*
Analyze parts of speech	3.27	3.38	-.46	.645
Analyze affixes and roots	2.82	3.03	-.92	.360
Check for Chinese cognates	2.55	2.79	-1.04	.303
Analyze any available pictures or gestures	2.36	2.13	1.02	.309
Guess from textual contexts	3.71	3.92	-1.02	.312
Use bilingual dictionaries	**3.52**	**4.18**	**-2.75**	**.007****
Use monolingual dictionaries	2.45	2.36	.351	.726
Use word lists	**3.02**	**3.54**	**-2.21**	**.030***
Use flash cards	2.32	2.15	.70	.487
Ask teachers for Chinese translations	2.11	1.92	.87	.388
Ask teachers for paraphrases or synonyms of new words	1.93	1.62	1.83	.071
Ask teachers for sentences including the new words	1.86	1.67	.98	.332
Ask classmates for meanings	2.25	2.36	-.48	.631
Discover new meanings through group work activities	1.84	1.85	-.03	.975
Study and practice meanings in groups	2.04	1.77	1.32	.189
Teachers check students' flash cards or word lists for accuracy	1.88	1.69	.88	.382
Interact with native-speakers	2.09	2.10	-.07	.945
Study words with pictorial representations of their meanings	**2.27**	**1.82**	**2.17**	**.032***
Image words' meanings	2.88	2.51	1.51	.136
Connect words to personal experiences	2.80	2.82	-.08	.940
Associate words with their coordinates	2.80	2.77	.16	.876
Connect words to their synonyms and antonyms	2.95	2.82	.55	.581
Use semantic maps	2.36	2.13	1.02	.309
Use 'scales' for gradable adjectives	2.52	2.77	-.99	.323
Use Peg Method	1.96	1.82	.63	.531
Use Loci Method	2.00	1.85	.70	.485
Group words together to study them	2.48	2.23	1.08	.281
Group words together spatially on a page	2.30	2.08	.92	.358
Use new words in sentences	2.61	2.38	.92	.363
Group words together within a storyline	2.62	2.31	1.21	.231
Study the spellings of words	3.38	3.77	-1.65	.102

Study the sounds of words	3.38	3.79	-1.68	.096
Say new words aloud when studying	3.05	3.00	.22	.828
Image word forms	2.71	2.54	.79	.430
Underline initial letters of words	2.29	1.97	1.14	.256
Use configurations	2.27	2.21	.24	.814
Use Keyword Method	2.63	2.44	.78	.439
Remember affixes and roots	2.89	2.67	.94	.350
Remember parts of speech	2.30	2.15	.64	.524
Paraphrase the words' meanings	2.36	2.56	-.81	.418
Use cognates in study	2.36	2.44	-.37	.712
Learn words of idioms together	2.25	2.41	-.73	.465
Use physical actions when learning words	2.16	1.77	1.82	.071
Use semantic feature grids	2.18	2.15	.11	.915
Use verbal repetitions	3.54	3.49	.20	.839
Use written repetitions	3.36	3.08	1.19	.239
Use word lists	3.30	2.95	1.31	.195
Use flash cards	2.89	2.46	1.66	.101
Take notes in classes	2.9464	3.21	-1.02	.310
Use the vocabulary sections in textbooks	3.02	3.05	-.13	.896
Listen to tapes of word lists	2.61	2.72	-.45	.651
Put English labels on physical objects	1.84	1.79	.22	.827
Keep vocabulary notebooks	2.80	2.67	.54	.593
Use English-language medias	2.77	2.85	-.34	.739
Testing oneself with word tests	2.73	2.77	-.15	.879
Use spaced-word practices	3.02	2.87	.66	.512
Skip or pass new words	2.93	2.97	-.17	.863
Continue to study words over time	3.12	3.31	-.82	.415

Note. Male *n* = 56; Female *n* = 39.
*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).