Journal of Pan-Pacific Association of Applied Linguistics, 22(2), 27-52.
https://doi.org/10.25256/PAAL.22.2.2

The Relationship between the Depth of Vocabulary Knowledge and Chinese MA Students' Use of Vocabulary Learning Strategy and L2 Contact in a Study-Abroad Context

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Liu, X. F. (2018). The relationship between depth of vocabulary knowledge and Chinese MA students' use of vocabulary learning strategy and L2 contact in a study-abroad context. *Journal of Pan-Pacific Association of Applied Linguistics*, *22*(2), 27-52.

The purpose of the study was to investigate the relationship between Chinese MA students' depth of vocabulary knowledge, their use of L2 vocabulary learning strategy (VLS), and the types of L2 contact they encountered while studying abroad. 165 Chinese MA students from a British university participated in the study by filling out the questionnaire which comprised a measure of L2 contact (Freed, Dewey, Segalowitz, & Halter, 2004), a survey of vocabulary learning strategy (Gu, 2005), and a vocabulary test based on the Word Associates Format (WAF) (Read, 2000) used for measuring their vocabulary knowledge depth. Exploratory factor analysis yielded five types of VLS and five types of L2 contact. Results of stepwise regression analysis indicated that strategies related to contextual guessing and using a dictionary as well as L2 contact variables of reading and interacting in English were positive predictors of vocabulary knowledge depth. However, Pearson's correlation coefficients revealed no relationship between the vocabulary test results and the variables of either VLS or L2 contact. Implications of the findings suggested how advanced Chinese ESL learners could maximize their lexical gains by using VLS and engaging L2 contact while studying abroad.

Keywords: vocabulary learning strategy, L2 contact, depth of vocabulary knowledge

1 Introduction

Study-abroad has been regarded as the best context for L2 learning due to its constant exposure to L2 input as well as the opportunities to use and practice L2 (Collentine & Freed, 2004). Although frequent and intense exposure of L2 input may facilitate L2 development (Flege, 2009), not everyone can attain a satisfactory outcome after finishing their study in the host country. Some students may expand their vocabulary size dramatically and acquire in-depth knowledge of English vocabulary whereas others may not have such remarkable accomplishments. The majority of existing research has focused on the less proficient learners in terms of their L2 development while

studying language course abroad (e.g. Collentine, 2004; DeKeyser, 1991; Dewey, 2008; Fitzpatrick, 2012; Milton & Meara, 1995) and their strategic behaviors of learning L2 vocabulary (e.g. Briggs, 2015a; Takac, 2008; Zhang & Lu, 2015), without paying enough attention to the more advanced leaners who take academic courses in English. Besides, existing studies on L2 lexical development have concentrated heavily on the expansion of vocabulary size, leaving the development of vocabulary knowledge depth under-researched. Against this background, the present study attempts to investigate the relationship between vocabulary knowledge depth, L2 contact and vocabulary learning strategies used by advanced L2 learners. The findings of the study will be of some help for understanding the predictive role of different vocabulary learning strategies and L2 contacts on lexical development in study-abroad contexts.

2 Literature Review

2.1 Vocabulary knowledge depth

Depth of vocabulary knowledge refers to "the quality or depth of understanding" (Anderson & Freebody, 1981, p. 93). In other words, it stands for how well a learner knows a particular lexical item (Qian, 2002). Vocabulary knowledge depth, as a complex entity, consists of multiple components, ranging from general productive skill of putting the target words into actual use (Nation, 2001; Schmitt, 2014), to specific linguistic dimensions (e.g. pronunciation; spelling; meaning; morphological, syntactic and collocational properties) (Li & Kirby, 2015; Milton, 2009; Qian, 2002). SLA researchers believe that collocation is one of the most important aspects of vocabulary knowledge depth especially for the advanced L2 learners and the EAP students (Coxhead, 2008). Similarly, being able to use different words express similar idea is also considered to be an important ability for EAP students especially for the development of academic writing skills. Such believes probably came from the fact that most L2 learners have difficulty in mastering formulaic language (Ellis, Simpson-Vlach, & Maynard, 2008) as well as developing extended and structured mental lexicon (Wray, 2002). Thus, in the present study the concept of vocabulary knowledge depth is operationalized as the ability of forming collocations and identifying synonyms.

One of the most popular measures of vocabulary knowledge is Paribakht and Wesche's (1993) Vocabulary Knowledge Scale (VKS) which aims to capture self-reported knowledge of a specific group of words in written form. However, it cannot be used to measure the knowledge of polysemic words, nor can it be applied to measure the knowledge of word associations (Schmitt, 2010). Another well-known test attempting to assess vocabulary knowledge depth is Word Associates Format (WAF) (Read, 1993; 2000) which measures word associations, including synonymies and

collocations. The WAF measure has been applied widely in many studies (e.g. Qian, 2002), and has been proved to be a valid and stable instrument to measure L2 vocabulary knowledge depth.

2.2 Vocabulary gain and study-abroad experience (SAE)

Previous research has identified a positive relationship between SAE and improvement of learners' overall L2 proficiency (Taguchi, 2008; Tanaka & Ellis, 2003). In terms of lexical development, previous studies have shown conflicting results. Many studies (e.g. Dewey, 2008; Fitzpatrick, 2012; Serreno, Llanes & Tragant, 2011; Sunderman & Kroll, 2009) showed observable vocabulary gains by L2 learners during SAE, suggesting a positive relationship between L2 contact and lexical development. However, a recent one conducted by Briggs (2015b) failed to establish any significant relationships between vocabulary gain and various L2 contacts. Briggs (2015b) suggested that insufficient language proficiency might inhibit the use of L2 in out-of-class scenarios, such as engaging in conversations with other English speakers. Since the participants' proficiency level in Briggs (2015b) were low-intermediate, equivalent to the B1 level of Common European Framework of Reference (CEFR), the frequency and the types of L2 contact they encountered could be very different from advanced learners. Thus, the results can hardly be generalized to the learners with higher L2 proficiency level. Besides, previous studies focused on examining the impact of L2 contacts on L2 learners' general lexical proficiency measured by using Nation's (1990) level test, thus it is not clear to what degree the knowledge of academic vocabulary is affected by various types of L2 contact. Finally, no signal study examined the Chinese ESL students' lexical development during SAE. Therefore, as the largest group of overseas students in the UK, a study targeting specifically on the Chinese students, particularly the ones with more advanced L2 proficiency, is worth conducting, in order to bridge this gap.

2.3 Vocabulary learning strategies (VLS) and vocabulary knowledge depth

Vocabulary learning strategies refer to the techniques that L2 learners use to facilitate learning new lexical items of the target language (Ellis, 2008; Gu & Johnson, 1996; Gu, 2005). Previous research on VLS favored quantitative method to elicit learners' voice on how they use VLS, and many of them utilized large-scale questionnaire surveys which require participants to respond the degree of agreement with the statements appeared in the questionnaires (e.g. Briggs, 2015b; Fan, 2003; Gu, 2005; Gu & Johnson, 1996; Macaro, 2006; Schmitt, 1997; Takac, 2008). Many studies targeted on the L2 learners' strategic behaviors revealed that certain VLS (e.g. consulting dictionaries; keeping notes, contextual guessing) were more likely to promote better lexical development (Gu, 2005; Gu & Johnson, 1996; Kojic-Sabo & Lightbown, 1999; Nyikos & Fan, 2007).

In the case of Chinese EFL learners, previous research revealed that more competent L2 learners tend to apply a wide range of vocabulary learning strategies depending on the L2 tasks they are conducting, whereas less proficient learners tend to stick to individual VLS (e.g. silent and voiced repetition) (Gu, 2005; Gu & Johnson, 1996). To be more specific, proficient Chinese L2 learners used memory strategies and consulted dictionaries for meaning in the situations of independent learning, whereas they asked their interlocutors for paraphrases of unknown words when engaging in communicative activities. However, since learning context may affect L2 learners' strategic behaviors and their perception on the usefulness of VLS (Briggs, 2015a), Chinese EFL students' preferred VLS may not be popular among Chinese ESL learners with a higher level of English proficiency. Thus, it is necessary to examine the preferred VLS commonly used by Chinese MA students while studying abroad.

Few studies relate VLS to vocabulary knowledge depth. For instance, Nassaji (2006) found that students with greater vocabulary knowledge depth appeared to be more successful in lexical inferencing and that they applied certain strategies (e.g. section repeating, self-inquiry and verifying, and monitoring strategies) more frequently and more effectively compared to their less competent counterparts. Such finding suggested that "richer lexical knowledge" may support L2 learners to "better make use of potential cues available in the texts" (p. 395). With similar research design, Zhang and Lu (2015) found that strategies of learning word forms and associations were positive predictors of vocabulary knowledge depth, indicating that learners who used such strategies scored high on the Word-Associate Test. Such findings suggested that learning word forms and associating words with other words may help learners building "a richer vocabulary network" (p.749) and ultimately promoting stronger depth of lexical knowledge. However, since the participants were intermediate level of proficiency (e.g. IEITS band 5 in Zhang & Lu, 2015), such results may not be able to generalize to advanced leaners in study-abroad contexts.

In light of the empirical evidence of previous research on the relationship between lexical development and VLS, as well as the vocabulary knowledge gain and L2 contact, the present study aims to answer the following three research questions:

1. What strategies do the study-abroad MA students use for learning academic English vocabulary?
2. What is the relationship between VLS and the depth of vocabulary knowledge?
3. What is the relationship between L2 contact and the depth of vocabulary knowledge?

3 Research Method

3.1 Participants

Participants who took part in the present study were 165 Chinese ESL students who were in the process of doing their MA courses at the University College London. They had been studying in London for at least 7 months by the time the study was conducted. 69% of them were female and 31% were male students. All of them were adult ESL learners with an average age of 25. More than half of the students majored in science-related subjects, including physics, biology and chemistry, while the remaining participants majored in either social science or humanity-related majors, such as film design, management, linguistics and education. Most of the participants did not have study-abroad experience before starting their MA study in the UK. As an essential entry requirement for admission, all participants had taken the IELTS test (International English Language Testing System) with an average overall score of 7. IELTS band 7 is equivalent to the C1 level of the Common European Framework of Reference (CEFR), representing that candidates with such band score have the ability to work and study in higher educational institutes in English speaking countries (Comparing scores to IELTS, 2018). Thus, the participants in the present study can be considered as L2 speakers with relatively advanced English proficiency.

3.2 Instrument

The instrument employed in the present study consists of some simple questions asking about participants' personal information, a questionnaire of vocabulary learning strategies, a questionnaire of L2 contact, and a small test to measure the depth of students' vocabulary knowledge. Within the instrument, the first part of the questionnaire is about asking participants' personal information, such as their gender, previous experience of learning English, current English language proficiency and their current living situation.

The second part of the instrument dedicated to measure the L2 contact in the study-abroad context was adapted from a well-known questionnaire named Language Contact Profile (LCP) developed by Freed, Dewey, Segalowitz and Halter (2004). This particular questionnaire was originally created for the purpose of eliciting L2 Spanish learners' L2 contact during their overseas study experience. It consisted of two sections: a pre-test version of the LCP used before studying abroad and a post-test version used after studying abroad. The pre-test version consisted of several open-ended questions, aiming to collect information about students' previous L2 learning experience, their L2 proficiency, as well as their exposure to the L2 while staying in their home country. The post-test, on the other hand, involved questions asking about L2 learners' living arrangements while studying in the

host country, as well as 30 multiple-choice questions describing different types of L2 contact that L2 learners were likely to encounter. Participants need to state the average amount of time they had engaged in L2 while studying abroad.

In order to elicit learners' voice about the L2 contact during their study-abroad experience, only the post-test version was adapted in the present study. The rating scale of the LCP has been modified, changing from reporting the cumulated amount of time engaged in various types of L2 contact to approximate frequency. It employed a 5-point Likert-scale in which 1 stands for never happen whereas 5 stands for always happen. The reason of making such change was because L2 learners may not remember exactly how many hours they had exposed themselves to the L2 each day. Therefore, it would be more appropriate and reasonable to ask about the approximate frequency instead of the exact hours of engagement with the L2. In order to minimize miscomprehension and to ensure data accuracy, it would be better to change it (Briggs, 2015b).

In order to depict the strategic profile of the Chinese ESL learners, the Vocabulary Learning Questionnaire (VLQ, Version 5) (Gu, 2005) was adopted to gather data. The original questionnaire contained 78 statements about vocabulary learning techniques with a 7-point Likert-scale indicating the degree to which each statement was true to the participants (ranging from extremely untrue to extremely true). However, the original rating scale was modified to a 5-point Likert-scale. The reason of making such modification was to reduce the ambiguity and miscomprehension of the rating scale, thus making the questionnaire more explicit for the participants to understand. If the rating scale were too complicated to understand, participants would be less likely to finish the whole questionnaire and they might be reluctant to take part in the survey. To avoid misunderstanding of the statements, all questionnaire items were translated and presented in Mandarin, participants' native language.

The 78 statements involved various types of vocabulary learning strategies, including metacognitive strategies, contextual guessing, consulting dictionary, taking notes, memory strategies, encoding strategies, and activation strategies (see Gu, 2005, p.219-225). Previous studies had provided evidence of the validity and reliability of the VLQ5 yielded a very high level of Cronbach's Alpha of 0.77 (Gu, 2005).

In order to measure the depth of L2 vocabulary knowledge of the participants, a vocabulary test was administered at the end of the survey. The vocabulary test was developed on the basis of the Word Associates Format (WAF) (Read, 2000) which could be used to measure learners' vocabulary knowledge in terms of collocation and synonyms. WAF had been modified and adopted by many researching, such as Qian (2002) who investigated the relationship between vocabulary breadth and depth in the context of TOEFL reading comprehension as well as three dimensions of the depth of vocabulary knowledge. The reliability of the test had reached 0.91, suggesting WAF as a valid and reliable instrument.

In the present study, the vocabulary test consisted of 20 target words (see Appendix 1). Each target word was accompanied with two groups of words distributed into two rows. Participants were asked to select two words which have the same meaning with the target word from the first row. In the second row, they were required to choose another two words which collocate with the target word. Therefore, there were four correct answers in each question item and the maximum score of the whole test was 80 points. The target words were all academic vocabulary essential for taking the General Record Examination (GRE) test which specifically measures international students' ability of using English for academic purpose. The target words were selected from a popular vocabulary book named *Essential Words for the GRE* (Geer, 2010). All the target words were blow the first 8000 level. The reason for choosing academic vocabulary was because of the nature of study-abroad experience. As all of the participants came to Britain for academic pursuit, knowing more academic vocabulary was one of the skills they would like to improve. In addition, to complete their degree, international students have to read many academic journal articles and write various assignments in English, thus academic vocabulary appears to be very important. The choices of each target word were composed based on authentic English material from the British National Corpus (BNC). Before put it into application, the test was double-checked by a native speaker of English from the United States to eradicate inappropriate options and ultimately make sure that it measures the participants' vocabulary knowledge depth correctly and reliably.

As for the approach for scoring the test, the present study did not adopt the "all-or-nothing approach in which only responses that hit all the four correct answer were counted" (Zhang and Lu, 2015: 744). Instead, participants who selected more than two correct answers could receive points because they demonstrated partial knowledge of the target words (Schmitt, Ng & Garras, 2011). The average score obtained was 53.4 out of the full score 80. The standard deviation was 11.52.

3.3 Procedure

The process of data collection lasted more than a month, starting in the middle of May 2016 and ending in the beginning of July. Paper-based questionnaires were distributed to the voluntaries at the campus of UCL. The questionnaire was translated into participants' first language, Mandarin, in order to avoid miscomprehension of the question content. Instructions about how to answer the question items were provided in advance and it took approximately 30 minutes for participants to finish responding all the items. It was mentioned that the data was only used for academic research and assured the confidentiality of participants' personal information as well as the anonymity of their identity. To express my appreciation to the students' cooperation, each of them was given a small present.

3.4 Data analysis

Quantitative data obtained from the questionnaire survey was analyzed using SPSS. Before conducting statistical analysis, descriptive statistics was carefully examined to check whether there were items with floor or ceiling effect. The distributions of such items were extremely skewed. Therefore, those items were eliminated from the analysis. In order to identify the vocabulary learning strategies used by Chinese ESL learners in the study-abroad context, an exploratory factor analysis (EFA) was used to discover the latent factor underlying the construct. The newly extracted factors were renamed according to their interpretability.

After performing the EFA of vocabulary learning strategies, correlation analysis were conducted to check whether the extracted factors of VLS correlated with the scores of the vocabulary knowledge test. In order to investigate whether a causal relationship existed between vocabulary learning strategies and vocabulary knowledge depth, a multiple regression analysis was conducted with the extracted VLS factors as the independent variables and the test scores of vocabulary knowledge as the dependent variable.

To examine the relationship between L2 contact and vocabulary knowledge depth, an EFA was run to determine the types of L2 contact commonly encountered by the participants when studying in the UK. After submitting the results of L2 contact to EFA, the correlations between different L2 contact factors and the vocabulary test scores were examined. Finally, a multiple regression analysis was run to identify whether the depth of vocabulary knowledge was affected by L2 contact in the study-abroad context.

4 Results

4.1 Vocabulary learning strategies commonly used by Chinese ESL learners

Items were analyzed by using an exploratory maximum likelihood factor analysis with direct oblimin rotation (a type of oblique rotation). Yong and Pearce (2013) recommended employing the maximum likelihood extraction when the data was normally distributed. The reason of applying the oblique rotation was because it allows the extracted factors to be inter-correlated with one another (Facrigar et al. 1999).

To check the sampling adequacy, the result of Kaiser-Meyer-Olkin (KMO) was 0.825, suggesting that the sample size was adequate to proceed to factor analysis (Field, 2013). The result of chi-square from Bartlett's Test of Sphericity was 3931.09, reaching to a statistically significant level. The number of extracted factors was determined according to two criteria, including the eigenvalues greater than 1 and the screen plot (Li and Kirby, 2014). The analysis yielded a five-factor solution, and the five factors explained 34.39% of the total variance. Table 3 presented the factor loading

of the items loaded on each factor. Field (2013) suggested that factor loadings should be greater than 0.30 to be meaningful. Thus, all items have satisfactory factor loadings.

Table 1. Exploratory Factor Analysis for VLS

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
VLS_60	0.725				
VLS_73	0.708				
VLS_74	0.672				
VLS_23	0.615				
VLS_3	0.57				
VLS_22	0.564				
VLS_61	0.524				
VLS_4	0.489				
VLS_41	0.485				
VLS_42	0.44				
VLS_6		0.748			
VLS_64		0.721			
VLS_25		0.719			
VLS_75		0.673			
VLS_76		0.623			
VLS_44		0.557			
VLS_45		0.539			
VLS_7		0.513			
VLS_63		0.496			
VLS_26		0.429			
VLS_1			0.886		
VLS_39			0.801		
VLS_58			0.618		
VLS_20			0.606		
VLS_71			0.441		
VLS_24				0.83	
VLS_62				0.544	
VLS_5				0.429	
VLS_43				0.383	
VLS_28					0.759
VLS_65					0.566
VLS_46					0.54
VLS_9					0.386

The results of EFA yielded a five-factor solution. Appendix 1 illustrated the value of Cronbach's alpha of each extracted factor, ranging from 0.817 to 0.613. Each factor was named according to the items loaded on it. Factor 1 contained ten vocabulary learning strategies, all of which were related to guessing the meaning of an unknown word. Therefore, Factor 1 was named as 'Contextual guessing'. Factor 2 comprised ten items related to the strategies of looking-up information from dictionaries, thus Factor 2 was labelled 'Dictionary strategies'. Factor 3 included five items pertaining to metacognitive strategies of selective attention, so it was named as 'Selective attention'. Factor 4 consisted of four items, all of which related to looking up dictionary for the meanings of unknown words, therefore Factor 4 was labelled as 'Consulting dictionary for meaning'. Factor 5 had four items, all of which referred to noting down useful information, so it was named as 'Taking notes'.

Table 2. VLS Items Loaded on Each Factor

Factor 1 Contextual guessing (α=0.817)
60. I make use of my knowledge of the topic when guessing the meaning of a new word
73. I look for any definitions of paraphrases in the passage that support my guess about meaning of a word.
74. I analyze the word structure when guessing the meaning of a word.
23. I look for any examples provided in the context when guessing the meaning of a new word
3. I make use of the logical development in the context (e.g. cause and effect) when guessing the meaning of a word
22. I make use of my common sense and knowledge of the world when guessing the meaning of a word
61. I check my guessed meaning against the immediate context to see if it fits in
4. I make use of the grammatical structure of a sentence when guessing the meaning of a word
41. I check my guessed meaning against the wider context to see if it fits in
42. I make use of the part of speech of a new word when guessing its meaning
Factor 2 Dictionary strategies (α=0.800)
6. I pay attention to the examples of use when I look up a word in a dictionary
64. If there are multiple senses or homographic entries, I use various information (e.g., part of speech, pronunciation, style, collocation, meaning, etc.) to reduce them by elimination
25. When I want to know more about a word that I already have some knowledge of, I look it up
75. When looking up a word in the dictionary, I read sample sentences showing various meanings of the word
76. I try to integrate dictionary definitions into the context where the unknown word appears and arrive at a contextual meaning by adjusting for complementation and colocation, part of speech, and breadth or meaning

44. I look up a word for its usage even though I already have some knowledge of it
45. If the unknown word appears to be an irregularly inflected form or spelling variant, I will scan nearby entries in the dictionary
7. If the new word is inflected, I remove the inflection and look up the original form of the word
63. I consult a dictionary to find out about the subtle difference in the meaning of English words
26. If the new word I try to look up seems to have a prefix or suffix, I will try the entry for the stem
Factor 3 Selective attention (α=0.735)
1. I know when a new word or phrase is essential for adequate comprehension of a passage
39. I have a sense of which words I can guess and which word I can't
58. When I come across a new word or phrase, I have a clear sense of whether I need to remember it
20. I know which words are important for me to learn
71. I know what cues I should use in guessing the meaning of a particular word
Factor 4 Consulting dictionary for meaning (α=0.708)
24. When I want to confirm my guess about a word, I look it up
62. I look up words that are crucial to the understanding of the sentence or paragraph in which it appears
5. When I see an unfamiliar word again and again, I look it up
43. I look up a word, when it hinders my understanding of the whole sentence or paragraph
Factor 5 Taking notes (α=0.613)
28. I make note of the collocations of the word I look up
65. I write down both Chinese equivalent and English synonyms of the word I look up
46. I write down the English synonyms or explanations of the word I look up
9. I make notes when I see a useful expression or phrase

4.2 Relationship between L2 contact and vocabulary knowledge depth

Exploratory factor analysis was performed to identify the latent variables underlying the structure of the L2 contact identified by the participants in the UK. All of the items were retained to the EFA analysis since none of them had either floor or ceiling effect. Similar to the statistical method used to analyze vocabulary learning strategies, the items of L2 contact were factor analyzed by maximum likelihood extraction with direct oblimin rotation.

The value of Kaiser-Meyer-Olkin (KMO) of measuring sampling adequacy was 0.839 which was greater than 0.5, indicating that the sample was adequate. The result of Bartlett's Test of Sphericity had yielded statistically significant (p=0.000). Screen plot and eigenvalues of each item

were carefully examined to determine the number of extracted factors. The EFA yielded a five-factor solution, in which the factors explained 41.8% of the total variance. Table 5 illustrated the factor loading of all items, and all loadings were greater than 0.4.

Table 3. Exploratory Factor Analysis of L2 Contacts

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
LC_1	0.68				
LC_15	0.613				
LC_10	0.582				
LC_3	0.565				
LC_5	0.56				
LC_9	0.522				
LC_7	0.502				
LC_14	0.48				
LC_2	0.448				
LC_13	0.36				
LC_18		0.854			
LC_20		0.672			
LC_17		0.553			
LC_19		0.543			
LC_21		0.508			
LC_16		0.47			
LC_26			0.738		
LC_22			0.707		
LC_23			0.591		
LC_25			0.56		
LC_24			0.462		
LC_28				0.8	
LC_29				0.702	
LC_27				0.687	
LC_30				0.455	
LC_12				0.44	
LC_6					0.668
LC_12					0.565
LC_8					0.441
LC_4					0.438

As shown in Table 4, the value of Cronbach's alpha of the five extracted factors were 0.875, 0.847, 0.729, 0.671, and 0.642 respectively. Ten items loaded on Factor 1, in which all items were related to interacting with people who speak the target language, therefore Factor 1 was labelled as 'Interactions'. Factor 2 comprised of six items, in which all of them were concerning activities of reading in English, thus Factor 2 was named as 'Reading'. Factor 3 consisted five items referring to the activities of listening English, so Factor 3 was labelled as 'Listening. Factor 4 contained five items relating to various activities of writing in English, thus this factor was named as 'Writing'. Factor 5 had four items about speaking in English, so Factor 5 was labelled as 'Speaking'.

Table 4. Items of L2 Contact Loaded on Each Factor

Factor 1 Interactions (α=0.875)
1. Interact in English with my instructor
15. Speaking English with non-native speakers of English
10. Extended conversations with acquaintances and friends
3. Speak English with my classmates
5. Speak English with roommates, flatmates, and other English speakers in the dormitory
9. Greeting with acquaintances and friends
7. Speak English for the purpose of clarifying classroom-related work
14. Speaking English with native speakers of English
2. Interact with my friends who are native or foreign speakers of English
13. Speaking in Chinese with other Chinese speakers
Factor 2 Reading (α=0.847)
18. Reading novels in English
20. Reading announcements, menus in English
17. Reading English newspaper
19. Reading English magazines
21. Reading emails or Internet web pages in English
16. Overall, reading in English outside classroom
Factor 3 Listening (α=0.729)
26. Trying to catch other people's conversations in English
22. Overall, in listening to English outside classroom
23. Listening to English television and radio programs
25. Listening to English songs
24. Listening to English movies and videos

Factor 4 Writing (α=0.671)
28. Writing assignments in English
29. Writing emails in English
27. Overall, in writing in English outside classroom
30. Writing for internet communication in English, such as leaving messages on Facebook, twitter, Instagram, blogging in English
11. How often did you try deliberately to use things you were taught in the classroom with native or fluent speakers outside the classroom?
Factor 5 Speaking (α=0.642)
6. Speak English with services personnel
12. How often did you take things you learned outside of classrooms back to classroom for discussion?
8. Speak English for the purpose of obtain information and direction
4. Speak English with strangers whom I thought could speak English

To investigate the relationship between L2 contact and the depth of vocabulary knowledge, correlation coefficients were calculated to describe the magnitude of the relationship among these variables. As shown in Table 5, all L2 contact variables were positively correlated with the result of vocabulary knowledge test. However, the values of these correlation coefficients were very small, with the largest value of 0.186 and the smallest of 0.003. Such small values indicated that no linear relationship existed among the five L2 contact variables and vocabulary knowledge depth.

Table 5. Correlations between L2 Contacts and Vocabulary Knowledge Depth

	Factor 1 Interactions	Factor 2 Reading	Factor 3 Listening	Factor 4 Writing	Factor 5 Speaking
Vocabulary knowledge test	0.179^{**}	0.186^{**}	0.114^{**}	0.135^{**}	0.003^{**}

Note: $^{*}p < .05$, $^{**}p < .01$

In order to determine the casual relationship between L2 contact and the gain of vocabulary knowledge depth, hierarchical multiple regression analysis was performed, in which the five L2 contact factors were set as the independent variable and the result of vocabulary knowledge test was set as the dependent variable.

Table 6 illustrated the results of the hierarchical multiple analysis, in which the variable of reading in the target language accounted for almost 20% of the variance in the development of lexical knowledge in terms of the depth.

In addition, interactions with speakers of the target language accounted for 14.5% of the variance. Variables related to listening, writing and speaking in the target language all accounted for less than 10% of the variance. The results suggested that vocabulary knowledge depth seemed to be affected by reading in the L2 as well as interacting with other L2 speakers to a certain degree, whereas the variables speaking, writing and listening in L2 did not contribute much to the gain of vocabulary knowledge depth.

Table 6. L2 Contacts as Predictors of Vocabulary knowledge Depth

Predictors	Beta	Adjusted R^2
Factor 1 Interactions	0.300	0.145**
Factor 2 Reading	0.223	0.192**
Factor 3 Listening	0.020	0.078**
Factor 4 Writing	0.122	0.072**
Factor 5 Speaking	0.197	0.052**

Note: ** $p < .001$

4.3 Relationship between vocabulary learning strategies and vocabulary knowledge depth

To examine how each VLS factor was related to L2 learners' lexical knowledge depth, correlation analysis was conducted between these variables. Table 7 showed the correlation coefficients among the five factors of VLS and the score of vocabulary knowledge test. All the variables of VLS were positively correlated with the vocabulary knowledge test score. The correlation coefficient between contextual guessing and test results of vocabulary knowledge was the largest among all ($r=0.217$, $p<.01$). The variables of dictionary strategies and consulting dictionary for meaning also positively correlated with the vocabulary knowledge test. However, the variables of selective attention and taking notes did not reveal significant correlations with the test score. According to Larson-Hall (2009), the values of correlation coefficients range from 1 to -1. The absolute value of a correlation coefficient ranges from 0 to 1, which shows how strongly two variables are related to each other, thus the larger the value the stronger the relationship (Field, 2013). The absolute values of the correlation coefficients among the six variables were very close to 0, suggesting an extremely weak relationship among them. Therefore, the results of correlation analysis indicated that no significant relationship exist between various VLS variables and the vocabulary knowledge depth.

Table 7. Correlations between VLS and Vocabulary Knowledge Depth

	Factor 1 Contextual guessing	Factor 2 Dictionary strategies	Factor 3 Selective attention	Factor 4 Consulting dictionaries for meaning	Factor 5 Taking notes
Vocabulary knowledge test	0.217**	0.122**	0.020*	0.189**	0.032*

Note: * $p < .05$, ** $p < .01$

Person's correlation coefficient is not enough to identify the relationship between two variables, because correlation analysis does not denote the direction of effect (Cohen et al. 1983). In other words, it does not show which variable receives the effect and which variable gives the effect. Thus, it is essential to conduct a hierarchical multiple regression analysis to determine the degree to which the VLS factors contribute to predict the vocabulary knowledge depth. The five VLS factors were set as independent variables, whereas the score of vocabulary knowledge test was set as the dependent variable.

Table 8 presented the results of the hierarchical regression analysis. The column of adjusted R^2 shows "how much of the variability in the outcome is accounted for by the predictors" (Field, 2013: 187). As shown in Table 6, the use of contextual guessing strategies accounted for 12% of the variance in the gain of vocabulary knowledge depth. Additionally, the use of various dictionary-related strategies also accounted for a considerable proportion of the variance in development of vocabulary knowledge depth. The remaining three predictors accounted less than 10% of variance, indicating that their contribution to the gain of vocabulary knowledge depth was less significant. The results suggested that all the five VLS variables seemed to predict the depth of vocabulary knowledge to a certain degree. However, the accounted proportion of variance of all five predictors was not very large, implying that the gain of vocabulary knowledge depth was not heavily affected by the strategies used to learn vocabulary.

Table 8. VLS as Predictors of Vocabulary Knowledge Depth

Predictors	Beta	Adjusted R^2
Factor 1 Contextual guessing	0.345	0.124**
Factor 2 Dictionary strategies	0.239	0.117**
Factor 3 Selective attention	0.158	0.049**
Factor 4 Consulting dictionaries for meaning	0.135	0.053**
Factor 5 Taking notes	0.012	0.062**

Note: * $p < .001$

5 Discussion

5.1 Vocabulary learning strategies used by Chinese MA students

The present study examined the types of vocabulary learning strategies used by Chinese MA students who were studying in the UK. Quantitative data from questionnaire survey revealed the strategic profile of these learners in terms of the commonly used techniques and tactics related to vocabulary learning during their study abroad experience. Initial analysis of the descriptive statistics showed that the participants did not employ all types of VLS proposed by Gu (2005). To be more specific, VLS related to rote learning (silent and sound repletion), encoding strategies (semantic and visual encoding), and making associations (connecting a newly learned words with known words) were not commonly used by the Chinese MA students.

In order to study in a British university, international students whose L1 is not English need to prove that they have reached a certain level of English proficiency to support their study in the UK. The test results of high-stake examinations, such as the IELTS and TOEFL are commonly used to demonstrate overseas students' English ability. In the case of the participants in the present study, they have obtained an average overall band score of 7 (IELTS) to get admitted by the university in which they were doing their master degrees. Such test result indicates that the participants have already reached to a certain level that they could study through the medium of English. Many researchers have pointed out that advanced learners tend to use more complex strategies, while simpler ones, such as repetition and mnemonic strategies, did not enjoyed a high popularity among the more competent learners (Fan, 2003; Gu, 2005; Macaro, 2001; Schmitt, 1997). As the participants of the present study have reached a relatively higher level of L2 proficiency, they may not use the rote learning strategies favored by less competent learners.

As the participants came to Britain for further academic study, learning academic words appears to be more important and essential than learning vocabulary related to everyday life. Most academic words are quite abstract in nature, which cannot be explicitly illustrated by pictures. Zhang and Lu (2015) argued that VLS related to imaginary learning was only effective in learning concrete words which could be described and shown in images and pictures, whereas such strategies appeared to be useless in learning abstract words. Similar argument has also been made by Marschark and Surian (1989) who claimed that images helped memorizing concrete words. Thus, it is not surprising that the participants did not apply encoding strategies which connect L2 words to images.

One interesting finding was that the participants of the present study did not employ associating strategies (e.g. group words according to certain criterion, connecting a newly learned word with known words of similar spelling or meaning). Previous research have shown the popularity of this particular type of strategies among adult learners, and have confirmed the

significance of such strategies because they tend to help L2 learners to build connections between the words they know (Gu and Johnson, 1996; Zhang and Lu, 2015). The discrepancy between the result of the present study and the finding of previous research suggested that certain VLS may not be universally appreciated by all learners.

In terms of the strategic profile of the participants in the present study, exploratory factor analysis yielded a five-factor solution, including contextual guessing, dictionary strategies, selective attention, consulting dictionaries for meaning, as well as note taking. The finding indicated that these five types of VLS were the most commonly used strategies by the Chinese ESL learners in the study-abroad context. It has been found that Chinese ESL learners in the UK utilize a variety of VLS, including paying attention to important words (Wang, 2015). The finding of ESL learners' selective attention in the present study was in line with Wang's (2015) results.

In addition, the sample of the present study also demonstrated their preference of using VLS related to guessing through the context and looking up dictionaries. Such results were in line with the findings from Briggs's (2015a) study in which she found that the ESL learners studying in the UK often use strategies of "guessing from textual context" and "from background knowledge", as well as consulting dictionary for meaning, usage and examples (p. 306). As intensive reading of academic references and materials forms an important part of ESL students' life while studying abroad, it is very natural of them to use dictionary or simply make a guess when they come across unknown words.

5.2 Relationship between VLS and vocabulary knowledge depth

In terms of the relationship between vocabulary learning strategies and the development of vocabulary knowledge depth, the Pearson's correlation coefficients were examined, and the values ranged from 0.020 to 0.217. The findings showed that the five VLS factors were not significantly correlated with vocabulary test result, indicating that no significant relationships existed among the six variables. Stepwise regression analysis showed that VLS of contextual guessing and dictionary-related strategies were positive predictors of the depth of vocabulary knowledge, accounting for 12% and 11% of the variance respectively. The predictors of consulting dictionary for meaning, note taking, and selective attention accounted less than 10% of the variance, suggesting that vocabulary knowledge depth was not affected intensively by these three variables.

Concerning the relationship between VLS and the gain of vocabulary knowledge depth, the strategies related to inferencing by using contextual clues made a positive and significant contribution to the participants' depth of vocabulary knowledge. The results were in line with the findings of Fan (2015) who argued that inferencing strategies were positive predictors of the depth of vocabulary knowledge. Similarly, Nassaji (2006) also established a positive relationship between vocabulary knowledge depth and the use of L2

inferencing strategies. Zhang and Lu (2015), on the other hand, identified that strategies of learning word forms and associations were positive predictors of vocabulary knowledge depth. However, the present study did not obtain such results. Such difference in results indicated that learning context tend to affect the predictive roles of VLS on vocabulary knowledge depth. Additionally, Huckin and Bloch (1993) argued that the ESL learners studying at an English-speaking country preferred to use strategies related to word parts and word formation, and they observed a positive relationship between the vocabulary knowledge depth and strategies related to evaluating and analyzing word parts. The discrepancy of results suggested that leaners' L1 background may also impact on the relationship between VLS and vocabulary knowledge depth, that certain VLS may appear to be effective to Chinese advanced L2 learners, but they might be useless to the learners who speak a different L1, and vice versa.

5.3 Relationship between L2 contact and vocabulary knowledge

Concerning the relationship between L2 contact and the gain of vocabulary knowledge depth, correlation coefficients did not show any relationship existed between them, because the values of correlations were very small. On the other hand, results of stepwise regression analysis showed that the variables related to interacting and reading in English were positive predictors of the gain of vocabulary knowledge depth. These two variables accounted for 12% and 11% of the variance respectively. However, L2 contact related to speaking, writing and listening to English did not seem to predict the gain of knowledge depth. In other words, vocabulary knowledge depth was not significantly affected by these three variables.

Although Briggs (2015b) identified that general reading and interacting with different L2 speakers to be the most frequent type of L2 contact, no significant relationship existed between these variables and the gain of vocabulary knowledge depth. The results of the present study were not in line with the findings of Briggs's (2015b) study. One possible reason of such discrepancy could result from the participants' English proficiency. L2 learners need to reach a relatively higher level to interact with peers and understand each other. Otherwise, interactions would be meaningless if interlocutors could not get each other understood.

The findings of the present study proved that reading and interacting in English positively affect the depth of academic vocabulary knowledge. While doing an MA program in the UK, Chinese students have to submit various written assignments based extensive reading on their field of study. Through reading academic textbooks and journal articles, learners are constantly exposed to academic English vocabulary, and they are likely to remember the ones that appear more frequently within the texts (Webb, 2005; 2007). Additionally, teaching practices of group discussion and group work are widely implemented in British universities, which offers the overseas students more opportunities to use and practice academic vocabulary they

learnt from reading. Through interacting with different L2 speakers both in and out of the classroom, L2 learners can activate their previously acquired vocabulary knowledge and ultimately enhance the mental lexicon stored in their long-term memory (Macaro, 2003). Therefore, to maximize their vocabulary gain, advanced Chinese learners should not only rely on extensive reading, interacting with peers is also a very useful and effective method.

6 Conclusion

With a specific focus on advanced L2 learners, the present study identified the commonly used VLS by Chinese MA students and examined the relationship between VLS, L2 contact and depth of vocabulary knowledge in a study-abroad context. The finding revealed that advanced L2 learners utilize a variety of VLS to facilitate learning academic English vocabulary, and it suggested that certain types of L2 contact and VLS were positive predictors of lexical gains in terms of the depth. This study sheds light on investigating the effects of various individual difference-related variables on the development of vocabulary knowledge depth.

The present study has several limitations. One is that its scope is rather narrow, with students from only one British university, which does not seem to allow for generalization to different contexts. In terms of the design, the study only utilize a questionnaire to probe participants' VLS and L2 contact profiles, which potentially generalized their responses. Thus, the findings only explained the effect of VLS and L2 contact on vocabulary knowledge at a macro level. As for measuring vocabulary knowledge depth, the test only assessed two aspects, leaving the other aspects unattended.

Future studies should employ participants from various British institutes to explore their common VLS and L2 contact profiles. In addition, it is necessary to employ different research approach, such as the qualitative approach, to provide more detailed analysis about the variables that predict vocabulary knowledge development at a micro level. Furthermore, future research can explore the nature of VLS from the connectionist perspective, because it emphasizes on the impact of environment of learning and it has the potential to shed light on the future research of language learning strategy, particularly about the effectiveness of VLS on the development of vocabulary knowledge depth (Lightbown & Spada, 2013; Macaro, 2003). Last but not least, future research should examine the effect of VLS and L2 contact on other aspects of vocabulary knowledge depth.

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Appendix
Appendix 1 Vocabulary knowledge test

For each item, in the first row, please select two words which have the same meaning with the target words; in the second row, please select two words which collocate with the target words.

1.	ambivalent			
	artificial	conflicting	equivocal	mutual
	attitude	course	manner	people
2.	rigid			
	adamant	determined	flexible	sharp
	charge	lifestyle	system	person
3.	adjacent			
	about	near	next	separate
	columns	farewell	greeting	runways
4.	persistent			
	diligent	intended	intrepid	relevant
	fear	light	police	worry
5.	inclination			
	disposition	frequency	propensity	sorcery
	for war	of superiors	to play games	towards
				fashion
6.	grandiose			
	exaggerated	heretical	naturalistic	turgid
	approval	manner	plan	sight
7.	exacerbated			
	aggravated	ameliorated	ascertained	worsened
	analysis	idiosyncrasy	poverty	problems

8. orthodox			
accepted	conventional	innovative	original
belief	church	cycle	duty
9. instructive			
controllable	informative	enlightening	regulated
comment	comparison	decumbence	documentary
10. plummeted			
assuaged	decreased	plunged	rebounded
critical analysis	exchange rate	medical treatment	stock price
11. meticulous			
careful	efficient	painstaking	unhurried
attention	preparation	recreation	tradition
12. surfeit			
excess	dearth	confusion	overabundance
of choice	of food	of illness	of talk
13. tacit			
contentious	implied	insinuated	trivial
agreement	consent	mistake	proposal
14. eccentric			
accustomed	bizarre	outlandish	pragmatic
agony	personality	review	sight
15. quotidian			
laconic	metaphorical	ordinary	unexceptional
commute	conductor	disciple	scene
16. remuneration			
compensation	commendation	deprecation	stipend
committee	interest	package	reporter
17. epitome			
archetype	debacle	example	prototype
of a wise test taker	of sophistication	of a science fiction	of a strike
18. indigent			
deleterious	deprived	fatuous	impecunious
childhood	enrolment	knowledge	poverty
19. incongruous			
inappropriate	insignificant	unsuitable	unreasonable
behavior	element	pesticide	practice
20. fortuitous			
anticipated	coincidental	haphazard	intended
amendment	circumstance	opportunity	porcelain

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Received: September 21, 2018
Revised: November 15, 2018
Accepted: November 25, 2018