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To cite this article:

Li, J. (2022). The Relationship Between Depth of Vocabulary Knowledge and Chinese Non-English Majors' L2 Lexical Inferencing Strategy Use and Success. Cambridge Educational Research e-Journal, 9, 101-117. <https://doi.org/10.17863/CAM.90579>



Link to the article online: <https://doi.org/10.17863/CAM.90579>



Published online: 30 November 2022



The Relationship Between Depth of Vocabulary Knowledge and Chinese Non-English Majors' L2 Lexical Inferencing Strategy Use and Success

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ABSTRACT

The present study aims to explore the correlation between Chinese non-English majors' depth of vocabulary knowledge (DVK) and their lexical inferencing strategy use and inferential success in English as a foreign language (EFL) reading comprehension. With Qian and Lin's DVK framework (2020) and Nassaji's classification of the lexical inferencing strategies (2003) as the theoretical foundation, this mixed methods study investigates 40 third-year non-English major participants, who are categorised into the low-intermediate DVK level (LIL) group and the high-intermediate DVK level (HIL) group. The major findings reveal that: (1) The HIL learners adopted more strategies of word associations, discourse knowledge, and world knowledge, while the LIL learners chose more strategies regarding homonymy, morphology, and sentence-level grammatical knowledge. (2) The HIL learners made more effective use of all types of strategies. However, when both groups utilised the strategies of word associations and sentence-level grammatical knowledge, the difference in their inferential success was not remarkable. (3) Participants' different choices on strategy use were mainly caused by their understanding of vocabulary meanings and lexical collocations. The LIL learners tended to be attracted to the sound relationships, word forms, and sentence structures, whilst the HIL learners were adept at internalising mnemonic techniques, contextual clues, and their common sense, and thus they focused more on the relationship between unknown words and the whole text. (4) The HIL learners' inferential success was attributed to both their richer accumulation of vocabulary meanings as well as collocations and their higher degree of risk taking in lexical inferencing. Findings of this study may help Chinese college English teachers effectively with the training of English vocabulary and reading by offering pedagogical implications for non-English majors' DVK improvement and lexical inferencing strategy development.

KEYWORDS

second language vocabulary learning, depth of vocabulary knowledge, lexical inferencing strategies, EFL reading comprehension, Chinese non-English major students

Introduction

The learning of second language (L2) vocabulary is one of the most essential components of second language acquisition (SLA). Since vocabulary competence is a prerequisite for the development of other language skills (Dong et al., 2020), researchers and educators have long recognised that vocabulary knowledge is a reliable predictor of learners' proficiency in a second language (L2). As an indispensable part to the assessment of learners' vocabulary knowledge, depth of vocabulary knowledge (DVK) was defined as "the knowledge learners have of a word from different levels"

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1 Chinese non-English majors refer to those Chinese university students who are not studying English as their major. 102

(Qian, 1999). Therefore, in order to assess how well a learner knows a word, DVK has received great attention, with many scholars claiming that it has a strong impact on non-native speakers’ learning of vocabulary (e.g., Hasan & Shabdin, 2016; Schmitt, 2014; Tsai, 2017).

It is inevitable for L2 learners to encounter a myriad of new words during their English as a foreign language (EFL) learning process. On this occasion, lexical inferencing strategies were found to be widely used by them to comprehend those unknown words, especially in reading. Haastrup (1991) defined lexical inferencing as “making informed guesses about the meanings of unknown words based on the available linguistic and nonlinguistic cues in the text” (p. 13). It was also believed that non-native speakers usually differ in their choice of lexical inferencing strategies and their inferential success rate (Wesche & Paribakht, 2010). These differences are attributed to a number of factors, one of which is DVK. Yet the relationship between them has far from been well understood in SLA. Given this, the present study aims to explore the relationship between DVK and Chinese non-English majors’ use of lexical inferencing strategies and inferential success in EFL reading comprehension.

Literature Review

Definition of Vocabulary Knowledge

According to Webb (2013), vocabulary knowledge includes the breadth and the depth of vocabulary knowledge. Breadth of vocabulary knowledge refers to “the size of vocabulary or the number of words, the meaning of which one has at least some superficial knowledge”, and DVK relates to “how well one knows a word” (p. 348). Qian and Lin (2020) further conceptualised DVK into six components as shown in Table 1.

Table 1

Qian and Lin’s DVK Framework (2020)

Dimension	Explanation
Pronunciation and Spelling	How different forms of the word are pronounced and spelled.
Morphological Properties	The word’s stem, its capability of derivation, inflection, and other word formation devices, and its possible parts of speech.
Syntactic Properties	The word’s possible positions and its syntagmatic relations, including collocation relations, with other words in a sentence.
Meanings	Not only identification of the denotative meaning of a word in context, but also, where applicable, knowledge of connotations, as well as antonymy, polysemy, and other paradigmatic relations the word may have.
Register, or Discourse Features	Including possible adherence to a stylistic, social, or regional variety, and the field, mode, and manner of discourse concerning the application of the word.
Frequency	Frequency of the word in the language, or whether this word is a commonly used word or one appearing only in specialised texts.

Qian and Lin’s DVK framework (2020) enriched the previous definitions and provided new foundations for the later studies. The current study is based on Qian and Lin’s theory of vocabulary knowledge (2020) owing to the credibility and validity of their theoretical framework.

Studies on the Assessment of L2 learners' DVK

In the aspect of DVK assessment, there exist mainly two approaches, which are the developmental approach and the dimensional approach. The latter has been acknowledged by many scholars, and it also provides the measures used to assess L2 learners' DVK level for this research.

The dimensional approach measures L2 learners' vocabulary knowledge from different aspects of a word. One measure that has attempted to capture as many lexical meaning relationships as possible, and has been adopted as the sampling tool in this study, is the Word-Associates Format (WAF) test (see the example in Appendix I) developed by Schmitt et al. (2011). It is composed of 40 target words, each followed by a list of eight words, four of which are semantically related to the target word while the other four are not. The four related words are selected to represent three main types of semantic relationships with the target word: paradigmatic relationships, syntagmatic relationships, and analytic relationships. The KR-20 reliability of the test, as reported by Schmitt et al. (2011), is 0.884. The WAF test succeeds in measuring learners' DVK through word associations, that is, the various semantic and collocation relationships that a word has with other words in the language. The test has been found to be closely correlated with English as a second language (ESL) reading comprehension ability and has also been shown to have a high degree of internal reliability (Zhang & Koda, 2017).

The WAF tests of Schmitt et al. (2011) mainly focuses on the assessment of word meanings and word collocations. Its components are significant because they have appeared frequently in the discussions of DVK (Schmitt, 2014). After all, it is too broad to test all the aspects of DVK (Read & Dang, 2022), and the best thing to do is to test some key aspects, which makes the WAF test a suitable choice for this study.

Classification of Lexical Inferencing Strategies in EFL Reading Comprehension

In the present study, the classification of lexical inferencing strategies by Nassaji (2003) is employed, as it is comprehensive enough and quite easy to understand. Nassaji (2003) studied the knowledge sources and contextual clues used by readers and classified them into the following eight types:

1. Homonymy: As Paribakht and Wesche (1999) stated, learners use their knowledge of sound relationships or the phonetic similarity between the target word and another word in the learners' mental lexicon to guess the meaning of an unknown word. The association may be with a first language word or another second language word and is often misleading.
2. Morphology: This category contains knowledge of derivations and grammatical inflections.
3. Word associations: They include paradigmatic relations (e.g., synonyms or antonyms), syntagmatic relations (e.g., words in the same category), and members of the same taxonomy (e.g., superordinates, subordinates, coordinates).
4. Sentence-level grammatical knowledge: This category includes knowledge of relationships in the sentence such as word-class information and the syntactic category of the word.
5. Discourse knowledge: This includes using information beyond sentence boundaries such as the knowledge of cohesive devices and establishing semantic links.
6. Cognates: As Richards et al. (1985) stated "cognates are words in one language which are similar in form and meaning to a word in another language" (p. 43).
7. World knowledge: This category is related to the familiarity of the theme and topic of the text to the learner.

8. Punctuation: This refers to “mechanics of writing” (Nassaji, 2003, p. 648).

The Relationship Between DVK and Lexical Inferencing

Currently, the correlation between DVK and lexical inferencing is still under-researched. Nassaji (2006) investigated the relationship between DVK and L2 learners’ use of lexical inferencing strategies and success. Ten adults from different language backgrounds were chosen as participants. The Word-Associate Test (Read, 1998) was used to measure their DVK and the think-aloud technique was utilised to discover the degree to which DVK contributed to lexical inferencing and the types of inferencing strategies they applied. The results indicated a significant relationship among L2 learners’ DVK, the type of inferencing strategies they used, and their inferential success. Nassaji discovered that: (1) learners with a stronger DVK used context-based strategies more frequently than their weaker counterparts; (2) when using the same strategy, the stronger learners tended to be more successful in guessing the meaning of the unfamiliar word; and (3) DVK made a significant contribution to inferential success. Ge (2020) performed a similar study on the same topic in a Chinese context. Ge invited Chinese tertiary-level English majors as research participants and drew similar conclusions.

The participants in the above studies were either ESL learners from different language backgrounds or Chinese students majoring in English. Building on these findings, this study explores the relationship between DVK and Chinese non-English majors’ use of lexical inferencing strategies to examine whether this population would exhibit similar results. With the research gap identified, this study would lead the way by addressing two research questions as follows.

1. Does non-English majors’ DVK correlate with their choice of lexical inferencing strategies in EFL reading comprehension? If so, what strategies do non-English majors with a deeper DVK choose to use and what strategies do their weaker counterparts prefer? Why are their choices different?
2. Does non-English majors’ DVK correlate with their inferential success? If so, what lexical inferencing strategies do students with a deeper DVK use more successfully? What strategies do their weaker counterparts use more successfully? Why is there a difference in their inferential success?

Research Design

Epistemological Paradigm and Methodology

The current study is guided by the pragmatist paradigm, which puts an emphasis on combining multiple ways of understanding the phenomenon being studied (Cohen et al., 2018). Utilising a repertoire of methodological choices makes it possible for researchers to generate a fuller and more reliable understanding of the research questions (Creswell & Plano Clark, 2011). In order to yield multi-dimensional interpretations of learners’ lexical inferencing strategies, I adopted the mixed methods methodology by bringing in the quantitative and qualitative approaches. The greater convergence between both numerical and narrative elements may not only enable a systematic set of data collection and analysis methods, but also triangulate the findings obtained from different methods.

Participants and Sampling

The participants for this research were selected from a public university in China during the winter vacation of the 2020-2021 academic year. Following the British Educational Research Association’s (BERA, 2018) ethical guidelines, 40 third-year non-English majors aged between 19 and 21 participated in this study. Pseudonyms were given to them in light of ethical considerations. Since all the participants had been learning English for about 11 years, received formal instruction in College

English2 at the university for two years, and passed the College English Test (CET),³ their English proficiency had presumably reached college level, which facilitated the implementation of my fieldwork. Moreover, these non-English majors, with diverse commitments to English learning, were situated at different proficiency levels in vocabulary mastery and lexical inferencing, increasing the feasibility and applicability of the research findings.

To inform participant selection and distinguish participants' DVK level, the aforementioned WAF test (with an explanation and a sample given in Appendix I) designed by Schmitt et al. (2011) was implemented during the sampling process. Based on the cumulative frequency distribution for the WAF test score (Table 2), 40 participants could be equally categorised into the low-intermediate DVK level (LIL) group (n=20), whose score was less than 100, and the high-intermediate DVK level (HIL) group (n=20), with a score no less than 100.

Table 2
Cumulative Frequency Distribution for WAF Test Scores

Level	Score	Frequency
LIL	60-69	1
	70-79	3
	80-89	6
	90-99	10
HIL	100-109	8
	110-119	7
	120-129	4
	130-139	1
Mean of Scores: 100.825		Total: 40

Data Collection

Data was collected from the lexical inferencing task during the quantitative phase and from the think-aloud protocol during the qualitative phase, both of which were piloted⁴ with students from the same university before the actual fieldwork. In order to gather participants' lexical inferencing data and assess their inferential success rate, I employed the lexical inferencing task sheet (see Appendix II), in which participants were asked to independently read an English passage for comprehension and infer the meanings of the unknown words. Previous research suggested that successful inferencing depended heavily on the ability to comprehend the text as a whole and most of the words in it (Deschambault, 2012). To meet these requirements, I adapted the reading passage developed by Nassaji (2006) in a study on L2 learners' lexical inferencing. Several sophisticated words and phrases were substituted by CET vocabulary for participants' better understanding. The passage was designed to elicit participants' use of a variety of inferencing strategies (Hu & Nassaji, 2014), ranging from those involved in the use of nonlinguistic global comprehension processes to those involved in the use and integration of word-level cues such as prefixes and affixes. The main topic of this passage is health

2 College English is the only compulsory course for Chinese non-English major students. They are required to take this course during their first and second academic years.

3 CET is a national EFL test examining the English proficiency of undergraduate students in China.

4 The pilot study was distributed to another 30 non-English major students (15 HIL students and 15 LIL students) who have undertaken the WAF test and were assumed to have equivalent DVK level to the participants in the main study. Subsequent to the pilot study, several ambiguous vocabulary and complicated sentences in the research instruments were modified.

services, a familiar theme to Chinese undergraduates. It contains 374 words, with 10 target words underlined and numbered. The whole task took 30 minutes with each participant. During the task, the participants read the passage and wrote down the English synonym or Chinese meaning of each underlined word. The underlined words were presumed to be unknown⁵ to them. Participants were encouraged to spare no effort to infer the meanings of target words with whatever lexical inferencing strategies they could come up with, whereas talking and consulting were strictly prohibited.

In the qualitative phase, the think-aloud protocol, which originates from psychological research and has been commonly used in cognitive science, was employed to record participants' inferencing processes. L2 learners were asked to verbalise the contents of their thoughts in Chinese while attempting to infer the meanings of unknown words from contexts. Data was collected in individual sessions lasting about 30–45 minutes each. The participants were initially trained on how to think aloud. I gave them a group of sentences, inquired whether they had learned the underlined words before, and sifted out those words that they had known. The participants were then asked to report their thoughts when deriving the meanings of unfamiliar words. Then proceeded a formal session, in which the participants were required to explain how they inferred the meaning of each new word on the same passage they had already read and which strategies were used during the previous lexical inferencing task. The advantages of think-aloud protocol are obvious. Not only was it convenient to operate, but also it presented rich and reliable information on the participants' thinking and inferencing processes. With its assistance, I could easily identify and verify the inferencing strategies that learners used in EFL reading comprehension.

Data Analysis

The quantitative data was handled with SPSS software. Descriptive analysis was conducted to provide a general description of the types and success of the two groups' inferencing strategy use. Pearson's Chi-Squared test was carried out for the purpose of examining whether there were some inter-relationships between DVK and the types of inferencing strategies used, while Fisher's exact test was implemented to find out the contribution of participants' DVK to their inferential success.

Meanwhile, the qualitative think-aloud protocols were audio recorded, transcribed, and then translated from Chinese to English. The data were coded and checked using the principle of thematic coding (Braun & Clarke, 2013). Two main themes were identified and reported in this paper. The emergent themes strengthened the quantitative findings and provided fresh insights into why the HIL and LIL participants' lexical inferencing strategy use and successes differ.

Findings

The Use of Different Lexical Inferencing Strategies

Based on Nassaji's (2003) classification, the lexical inferencing strategies employed by the participants were classified into six groups.⁶ After reviewing the participants' reports, 11 invalid answers were excluded and the total number of answers was 389, with 198 being strategies used by the HIL group and 191 by the LIL group. A Pearson's Chi-Squared test was implemented to examine whether there was any discrepancy in the overall use of lexical inferencing strategies between the HIL and

⁵ The underlined words are ten new words that were commonly identified by ten HIL participants and ten LIL participants in the pilot study. These words were further piloted with the remaining ten participants. Since the participants all confirmed that the underlined words were unknown to them, these words were tested to be valid. Participants in the main study were allowed to report and skip any target word they had already known.

⁶ Two groups including cognates and punctuation were excluded from Nassaji's (2003) classification, as the use of these strategies was not identified in the present study.

LIL groups. The number of the lexical inferencing strategies used by the two groups was different ($\chi^2=1.009E2a$, $P=.000<.001$), which demonstrates that the HIL learners tended to use more strategies than the LIL learners when encountering unfamiliar words.

The frequencies and percentages of each strategy (Table 3) were calculated. It seems that learners with different DVK levels differed in the use of strategies. The HIL group used word association, discourse knowledge, and world knowledge more frequently, whilst the LIL group surpassed the HIL group in the use of homonymy, morphology, and sentence-level grammatical knowledge.

Table 3
Types and Percentage of Strategies Used in the HIL and LIL Groups

Type	Group	Frequency	Percentage (%)	Std. Deviation
S1 ⁷	HIL	2	16.67	0.36
	LIL	10	83.33	0.78
S2	HIL	32	39.02	1.13
	LIL	50	60.98	0.81
S3	HIL	41	65.08	0.92
	LIL	22	34.92	0.95
S4	HIL	20	25.64	0.94
	LIL	58	74.36	1.18
S5	HIL	56	74.67	1.36
	LIL	19	25.33	0.85
S6	HIL	47	59.49	1.24
	LIL	32	40.51	0.97
Total	HIL	198	50.90	1.49
	LIL	191	49.10	1.41

When using the strategy of homonymy, although it was obvious that both groups rarely used this strategy, the LIL group attempted to use relatively more sound relations to deduce the meaning of a novel word. In contrast, the HIL group only made 2 phonetic guesses in total, which was 5 times less than that of the LIL group.

Apart from that, it can be seen that, of all the strategies, morphology was the most frequently used. It was adopted 82 times, with 50 (60.98%) coming from the LIL group and 32 (39.02%) from the HIL group. This demonstrates that the LIL group tended to use the morphology strategy more frequently when inferring the meaning of an unknown word.

Moreover, Table 3 displays that both groups applied the word association strategy from time to time, yet the HIL group employed this strategy 41 times, a number almost double that of its counterpart (22 times).

In addition, we can find that the frequency of sentence-level grammatical knowledge strategy use of the LIL group (58 times) was approximately triple that of the HIL group (20 times). It was particularly noticeable that sentence-level grammatical knowledge was the strategy used most frequently by

7 S1: Homonymy; S2: Morphology; S3: Word Associations; S4: Sentence-Level Grammatical Knowledge; S5: Discourse Knowledge; S6: World Knowledge.

the LIL group, accounting for 30.37% of all the strategies they used.

The discourse knowledge strategy, however, was the strategy applied most frequently by the HIL group. They used it 56 times, which was nearly 3 times higher than that of the LIL group.

Moreover, according to Table 3, with a frequency of 47, the use of the world knowledge strategy by the HIL group was more frequent than by the LIL group, which only made use of it 19 times.

Inferential Success by Using Each Type of Lexical Inferencing Strategies

Pearson’s Chi-Squared test (Table 4) was conducted to examine whether there was any difference in the overall successful use of lexical inferencing strategies between the HIL and LIL groups.

Table 4

Results of Pearson’s Chi-Squared Test of the Overall Successful Use of Lexical Inferencing Strategies Between the Two Groups

Total Number of Successful Use of the Lexical Inferencing Strategies by the Two Groups	HIL	148
	LIL	73
Pearson’s Chi-Squared Test Score	Value=93.275 ^a	
	df=1	
	Asymp. Sig. (2-sided)=.000	

Of a total of 389 target words, 221 (56.81%) were successful inferences, while the other 168 (43.19%) were unsuccessful, demonstrating that about half of the inferencing strategies were used ineffectively. Additionally, among the 221 successful guesses, 148 came from the HIL group, while the LIL group only made up half of this number (n=73). This result reveals that the difference in the number of successful inferencing applications between the two groups was significant ($\chi^2=93.275a$, $p=.000<.001$), which suggests that the HIL participants were capable of guessing word meanings more successfully than the LIL students.

Subsequently, Fisher’s exact test was implemented to examine whether there was any significant difference between the HIL and LIL groups in the successful use of each lexical inferencing strategy. The results of the test are given in Table 5.

Table 5

Results of Fisher’s Exact Test for Difference in Inferential Success for Each Lexical Inferencing Strategy

Type	Group	Number of Successful Guesses	Rate of Successful Guesses	P-Value
S1	HIL	2	100.00	.018
	LIL	1	10.00	
S2	HIL	23	71.88	.000
	LIL	17	34.00	
S3	HIL	28	68.29	.926
	LIL	14	63.64	
S4	HIL	9	45.00	.553
	LIL	20	34.48	
S5	HIL	51	91.07	.000
	LIL	7	36.84	
S6	HIL	38	80.85	.000
	LIL	10	31.25	
Total	HIL	151	76.26	.000
	LIL	69	36.13	

When using the homonymy strategy, only 1 in 10 guesses in the LIL group (10.00%) were correct, while in the HIL group, all of the guesses were correct. The results of the P-value in Fisher's exact test showed that the distinction in inferential success between these two groups was significant ($p=.018 < .05$).

It should also be noted that the LIL group made 17 correct inferences out of 50 guesses (34.00%) by applying the morphology strategy, while the HIL group achieved 38 correct guesses, with their success rate standing at 71.88%. Although the HIL participants made use of the morphology strategy less frequently, they outperformed their counterparts in the results of their inferential success when applying this strategy ($p= .000<.05$).

Table 5 also shows that, among the 22 guesses by the LIL group using the word association strategy, 14 (63.64%) were correct, while the HIL group made 28 correct inferences (68.29%). According to the P-value, the success rates (65.8% and 68.29% respectively) of the two groups were very close ($p= .926>.05$), which suggests that this strategy has brought similar success rates to the two groups.

When using the strategy of sentence-level grammatical knowledge, 20 out of 58 cases (34.48%) in the LIL group were correct, while 9 out of 20 cases (45.00%) were successful guesses in the HIL group. The results of Fisher's exact test show that the discrepancy in inferential success between the two groups was not sufficiently significant ($p= .553>.05$).

Furthermore, it can be seen that the rate of the successful guesses of the HIL group (91.07%) when employing the strategy of discourse knowledge was significantly ($p= .000 < .05$) higher than that of the LIL group (36.84%).

Additionally, Table 5 displays that, when applying the strategy of world knowledge, the LIL group, with the success rate reaching 31.25% was undoubtedly ($p=.000< .05$) overshadowed by the HIL group (80.85%), which shows that the HIL students benefited more from the use of the world knowledge strategy.

Explaining the Relationship Between DVK Levels and Lexical Inferencing Strategy Use and Success

The quantitative findings indicate that the HIL participants were more accurate in guessing the meanings of unknown words and were more successful in lexical inferencing. According to the qualitative think-aloud reports, the most essential explanation of such a difference is learners' accumulation of vocabulary meanings and collocations. The HIL learners, with richer understandings of a wider range of words in their minds, may make better use of the vocabulary that they know in the text as linguistic cues or contextual knowledge. They were likely to form a more profound interpretation of the passage and make more informed guesses accordingly. For example, the following two excerpts vividly illustrate the lexical inferencing attempts made by Yuelin (an LIL participant) and Yi (an HIL participant), during their think-aloud sessions pertaining to the first lexical inferencing question.

And the smell of "excrement" in their nose ... in their nose ... their toes ... umm ... because it is in their nose. I think ... between their toes. The smell of "excrement" ... it's the smell ... the "excrement" it is something ... there is some smell ... I'm not sure. (Yuelin)

"Excrement" in their nose ... smell of their "excrement" in their nose ... has dust between their

toes and the smell of “excrement” in their nose ... I think, there are a lot of dirty things around the city and that those things are making smells, and the smell goes to their noses, so “excrement” are dirty things like rubbish. (Yi)

Yuelin concentrated his efforts mostly on the random repetition of certain words or parts of the text. He was seemingly focusing neither on the meanings in the text, nor on the lexical collocations, since his repetitions largely picked up on inappropriate meaning boundaries and incoherent collocations from the text.

In contrast, Yi seemed to be more focused. There were fewer random repetitions, and, when repeating, she repeated a bigger meaningful section of the text including the word and the context in which the word had occurred. The crucial reason behind this is that Yi has made better use of the meanings from understandable words and information from coherent lexical collocations in the text compared with Yuelin. This is evident from the semantic connections she established between the different sections of the text and from the conclusion that the word “excrement” should be related to dirty things because “dirty” is a proper word to describe the environment of an economically disadvantaged city.

It can be further argued that the HIL learners with a higher level of proficiency in lexical meanings and collocations have better access to knowledge sources and, hence, could construct a more accurate semantic and contextual representation of the unknown words during inferencing. As a result, compared with the LIL learners, they might prioritise different strategies and might correspondingly infer the target words more effectively.

Another explanation could be participants’ degree of risk taking in lexical inferencing, which means students with deeper DVK were relatively bolder, braver, and more confident and therefore they dared to make a decision even though they knew there was a possibility that the decision would be incorrect. One such instance is that there were two HIL participants firmly believing that the word “waver” derived from “wave,” and they insisted with full confidence that their inferences could not be wrong. More examples come from the think-aloud report of Hong (an HIL participant) and Jin (an LIL participant).

Well, there is the phrase “for example” so don’t read this sentence... because it is just an explanation of the last sentence. “Mysterious”... and... “unfathomable”... umm, there is an “and.” I guess “unfathomable” just means “mysterious.” They must have the same meaning... to describe heart diseases are not “mysterious.” The causes of... “tuberculosis”... What does “tuberculosis” mean? Anyway, just ignore it. It may just be a certain kind of disease. (Hong)

I am not quite sure... let me think... umm... “affluence”... what is “affluence?” Wow, another word... “tuberculosis... “well-known”... so “tuberculosis” is “well-known,”... and “well-known... means “famous”... then... “unfathomable” must mean “famous” because... umm... these two words are so close. (Jin)

The effective participants can be considered to be risk-takers as they dared to formulate hypotheses (Hong’s assumption of the meaning of “unfathomable”), eliminate some of the alternative explanations, (the function of the whole sentence led by “for example”), and throw out the useless information (the meaning of the word “tuberculosis” skipped by Hong).

In comparison, Jin was prone to paying unnecessary attention to interpreting each specific word such as “affluence,” “tuberculosis,” and “well-known” for fear that he could not comprehend the passage. Additionally, fearing they might make mistakes, the LIL participants might become reluctant to take risks and thus were likely to be surpassed by the HIL learners in the overall inferential success rate.

Discussion

The above findings correspond to many previous studies and may strengthen them with illuminating explanations. Regarding the homonymy strategy, the LIL participants used the homonymy strategy more frequently than their counterparts. This is in accordance with the results of Kaivanpanah and Soltani Moghaddam’s study (2012), as L2 learners who are at a lower stage in their foreign language learning tend to “acquire vocabulary using mnemonic techniques or strategies which involve phoneme correspondences” (p. 381). Participants’ think-aloud reports suggest that learners lacking DVK felt like adopting this strategy mainly because they were weak at finding contextual clues and were not flexible in practising the vocabulary knowledge they had learned.

Besides, both the HIL and LIL learners’ success rates for using the homonymy strategy was quite low. This finding echoes that of Tavakoli and Hayati (2011), who argued that, when using the homonymy strategy, EFL learners were not very successful in guessing the meanings of unknown words. In this research, 83.33% of the LIL learners’ phonetic guesses were wrong. According to participants’ think-aloud protocols, there were four LIL students holding the same opinion mistakenly that “squalor” is lexically related to “square” solely because these two words are related in pronunciation. Similar examples are “contract” and “contact”, “permeated” and “permitted”, “excrement” and “excitement”.

The use of the morphology strategy accounted for about 21.08% of all the guesses, which constituted the largest proportion and thus became the most frequently used strategy in this study. Learners tended to use their knowledge of derivations and grammatical inflections to guess the meanings of unknown words. For instance, 21 participants realised that the word “affluence” is a noun due to “-ence” as a suffix. Meanwhile, the LIL learners applied the morphology strategy more frequently, which supports Zhang and Lu’s (2015) finding that learners with greater DVK appeared to focus more on word meanings, whereas those with less DVK tended to focus more on word forms.

The word association strategy was favoured by both groups in the present study and, when employing this strategy, they shared similar success rates. This reveals that learners tended to use mnemonic techniques when trying to infer the meanings of unfamiliar words. For instance, a total of 25 participants associated the target word “contract” with a well-remembered word in its close proximity—“infectious”, indicating that participants tended to be reminded of the words they had known while doing lexical inferencing.

As presented by Ge (2020), learners with weaker DVK needed to know all the words to understand a passage, so that when encountering an unknown word, they usually stopped reading the rest of the passage and tried hard to figure out its connotation. They did not pay much attention to the context, whilst students with deeper DVK usually tried to find clues from the whole passage. The current study yields the similar finding that while the HIL learners exceeded the LIL learners in the use of the word association strategy, the latter outnumbered the former in that they made 82 guesses using homonymy, morphology, and word association strategies whereas the former only completed 75 guesses of these kinds, demonstrating that the LIL group was more prone to neglect the relationship between the unknown words and the whole text.

Sentence-level grammatical knowledge was the strategy that the LIL participants employed the most, as it accounted for 30.37% of all their inferences. This finding corresponds with that of Nassaji (2006). However, it should be noted that participants in the present study could not fulfil this strategy satisfactorily, as most of their guesses were incorrect. Both groups possessed a very low success rate when using this strategy. According to think-aloud reports, using sentence-level grammatical knowledge means that students were able to associate unknown words to the context, but they could only find help in the nearest context, or in other words, within the sentence in which the unknown words appeared. This sort of short-sightedness, to some extent, undermined students' general comprehension of the whole passage and gave rise to the inefficacy of EFL readers' sentence-level grammatical knowledge strategy use.

Discourse knowledge was the most frequently and most effectively used strategy by the HIL group. However, it was the second least adopted strategy by the LIL students and manifestly they did not make successful use of it, as 63.16% of their guesses based on this strategy were wrong. Using discourse knowledge indicates that students could infer the meanings of unknown words by means of understanding the general idea of the whole text. Zhang et al. (2022) found that capable EFL learners tended to use the context in lexical inferencing and they tried to make guesses on the basis of what was familiar to them, which brings about the result that their performance prevailed over that of the less linguistically proficient learners. The findings of Thu (2021) also suggest that students who were more linguistically skilled could benefit more from contextual clues. The findings in this study conform to those of Zhang et al. (2022) and Thu (2021).

The HIL learners utilised the strategy of world knowledge more frequently than the LIL learners. Moreover, the former came out with a larger number of successful results than the latter. In this research, the theme of the passage in the lexical inferencing task pertains to health services, which is particularly close to university students' lives. The HIL participants could easily associate what they had learned about health care with the text and employ their knowledge to infer the meanings of unfamiliar words, while the LIL students, on most occasions, were not able to apply their subject knowledge effectively. This result matched with the similar findings of Vafadar and Mohebbi (2021).

In summary, the LIL learners focused mostly on mnemonic techniques, phoneme correspondences, and word forms in lieu of the relationship between the unknown words and the whole text, while the HIL students paid more attention to word meanings, lexical connotations as well as contextual clues, and did better in understanding the general idea of the whole text.

Conclusions

The present study adds to the findings that DVK contributes greatly to Chinese L2 learners' preference for lexical inferencing strategies in English reading comprehension. The LIL non-English majors resorted to the strategies of homonymy, morphology, and sentence-level grammatical knowledge because they paid relatively more attention to the sound relationships and word forms, together with sentence structures. In contrast, students who had learned plenty of vocabulary meanings and lexical collocations were adept at utilising mnemonic techniques, contextual clues, and their common sense. Focusing more on the relationship between the unknown words and the whole text, they tended to more frequently prefer the strategies of word association, discourse knowledge, and world knowledge. The HIL learners were strongly affected by their accumulation of vocabulary meanings and collocations in choosing lexical inferencing strategies. They were therefore able to construct a more accurate semantic representation and contextual clue of the unknown words during the lexical

inferencing process.

Evidence offered by the current study also demonstrates that DVK correlated with the inferential success of Chinese non-English majors. On the whole, with a relatively abundant understanding of words in mind, the HIL participants surpassed their weaker counterparts in making correct guesses of unknown words. When using most of the lexical inferencing strategies, the HIL learners always prevailed over their counterparts, which might be both because they were relatively more confident and bolder at taking risks, and also due to the fact that they were able to associate the target words with the discourse in context. However, as the LIL students stressed the form rather than meaning, when using the strategies of word associations and sentence-level grammatical knowledge, there was not a significant difference in inferential success between the two groups.

Pedagogical Implications

This research calls for effective DVK instruction on vocabulary meanings and lexical collocations. When teaching the meaning of a word, Chinese college English teachers are advised to introduce some other words that are related to it, such as its synonyms, antonyms, and hyponyms. Under such circumstances, EFL learners will establish a network of words in their minds and manage to master the new words solidly. When teaching the collocation of a word, teachers should not only introduce how it can be applied to a sentence, but also require students to understand it in the entire context.

The main findings also suggest implications for lexical inferencing training in EFL reading comprehension. As the HIL learners rarely used morphology in lexical inferencing, teachers can emphasise this strategy by training the HIL students to use word inflections and derivations in English reading classrooms. On the contrary, since the LIL students seldom adopted word association strategy, teachers should heighten the awareness of this and improve the LIL learners' abilities to associate unknown words with other words like their synonyms and antonyms. Furthermore, findings reveal that both the HIL and LIL non-English majors obtained a low rate of success when using sentence-level grammatical knowledge, which suggests that teachers ought to take the training of this strategy into full consideration. Students can be exposed to different types of reading materials and subsequently make progress in inferring the meanings of unknown words by means of not only the whole sentence but also the whole reading material.

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Appendices

Appendix I: The Explanation and Sample of Word-Associates Format Test

The test consists of 40 items, aiming to measure two aspects of participants’ DVK: meanings and collocations. Each of the 40 items is composed of one stimulus word and two boxes. There are four words in each box. Among the four words in the left box, one to three words could be synonymous with either one aspect of, or the whole meaning of, the stimulus word. Also, there could be one to three words that collocated with the stimulus word in the right box. Each item contains four correct answers, yet they do not evenly spread in the two boxes. Each word correctly chosen could be awarded one point. The maximum possible score is 160 for the 40 items. An example has been given as follows.

1. sudden ()

A. beautiful	B. quick	E. change	F. doctor
C. surprising	D. thirsty	G. noise	H. school

In this example, the word “sudden” means “happening quickly and unexpectedly”, so “quick” and “surprising” in the left box should be associated with the stimulus word, as they both represent certain aspects of the meaning of “sudden”. In the right box, only “change” and “noise” can collocate with “sudden”. Therefore, the correct answers in this case must be “quick”, “surprising”, “change”, and “noise”.

Appendix II: Lexical Inferencing Task Sheet

Lexical Inferencing Task Sheet

Duration: 30 minutes Name:

Instruction: Please read the passage and infer the English synonym or Chinese meaning of each underlined word.

Health in the Rich World and in the Poor

An American journalist, Dorothy Thompson, criticises the rich world’s health programs in the poor world. She describes her trip to Africa where she got food poisoning and her friend malaria: “The town is very dirty. All the people are hot, have dust between their toes and the smell of **excrement** in their noses. We both fell ill, and at ten o’clock in the morning I got frightened and took my friend to the only private hospital in town, where you have to pay. After being treated by a doctor, we caught the next aeroplane home.

“Now, I believe that the money of the World Health Organisation (WHO) should be spent on bringing health to all people of the world and not on expensive doctors and hospitals for the few who can pay. But when we ourselves become ill, our beliefs **waver**. After we came back to the States we thought a lot about our reaction to this sudden meeting with health care in a poor country. When **appraising** modern medicine, we often forget that without more money for food and clean water to drink, it is impossible to fight the diseases that are caused by infections.

“Doctors seem to overlook this fact. They ought to spend much time thinking about why they themselves do not **contract** some of the serious and infectious diseases that so many of their patients die from. They do not realise that an illness must find a body that is weak either because of stress or hunger. People are killed by the conditions they live under, the lack of food and money and the **squalor**. Doctors should analyse why people become ill rather than take such a keen interest in the **curative** effect of medicine.

“In the rich world many diseases are caused by **affluence**. The causes of heart diseases, for instance, are far from being mysterious and **unfathomable**—they are as well-known as the causes of tuberculosis. Other diseases are due to **hazards** in the natural conditions in which we live. Imagine

the typical American worker on his death-bed: every cell **permeated** with such things as chemicals and radio-active materials. Such symptoms are true signs of an unhealthy world.”

Please write down the English synonym or Chinese meaning of each underlined word.

1. excrement
2. waver
3. appraising
4. contract
5. squalor
6. curative
7. affluence
8. unfathomable
9. hazards
10. permeated