



The Effect of Synonym Relationship Upon the Acquisition of Multi-Dimensional Vocabulary Knowledge

NIE Kaihua^{[a],*}

^[a]School of Foreign Language, Hubei Engineering University, Xiaogan, China.

*Corresponding author.

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Abstract

Based on Nation's framework of multi-dimensional vocabulary knowledge, this study designed a multi-dimensional vocabulary knowledge test and examined the effect of word pair and sentence with and without synonyms on the acquisition of the multi-dimensional vocabulary knowledge of target words with respect to orthography, meaning and form, grammatical function syntagmatic association and paradigmatic association. Experiment results indicated that the participants obtained significant more scores for the target words with known high frequency synonyms than for those without known synonyms in terms of the receptive vocabulary knowledge of syntagmatic association and orthography and the productive vocabulary knowledge of paradigmatic association. Hence it can be concluded that the known synonyms might be conducive to the acquisition of the unknown synonyms. Implications of the results were discussed.

Key words: Known synonym; Multi-dimensional Vocabulary knowledge; Sentence; Word pair

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INTRODUCTION

There is both something in common and subtle difference between synonyms in meaning. In the same language

there are seldom absolute synonyms that can be replaced by each other in any context. To be more exact, synonyms are word units with the same major semantic features and different minor or external characteristics (Zhang, 2002, p.179). L2 learners, in particular the advanced ones, can usually acquire large amount of words in the later period of language learning. Nevertheless, there have been few researches which indicated that it was the result of learners' intentional learning, since accidental vocabulary acquisition was slow and learners had to meet the target words several times before they could memorize them. As for the reason why advanced L2 learners are able to acquire large amount of vocabularies in the later period of language learning, the following hypothesis is proposed: the known synonyms can be conducive to the acquisition of the unknown synonyms, in particular the acquisition of syntagmatic association and paradigmatic association. As learners' vocabulary size and vocabulary knowledge increase, more and more known synonyms become related to the unknown ones, which make it easier for the latter to be acquired. Hence, learners have to make the most out of the known synonyms when they acquire the new unknown ones so as to decrease the burden of vocabulary learning.

Based on the above hypothesis, this research designed a multi-dimensional vocabulary knowledge test to validate the effect of the known synonyms on the acquisition of the unknown synonyms in order to better understand the process of L2 vocabulary acquisition and increase the efficiency of L2 vocabulary acquisition.

1. THEORETICAL BASIS

1.1 Nation's Theory of Learning Burden

Nation's theory of learning burden suggested that it required different cognitive burden for learners to acquire different target words. One of the principles of the theory is that the more familiar the learners are with the

vocabulary knowledge of the target words, the lighter the cognitive burden will be. Vocabulary knowledge may come from learners' L1 or L2, or even the inter-language. According to the theory, the knowledge of the known high frequency synonyms covers each dimension of vocabulary knowledge, such as syntagmatic association, grammatical function and paradigmatic association, etc. Although there is different overlapping between synonyms in terms of meaning and register, even partial overlapping may to some extent decrease the cognitive burden of the unknown synonyms and be conducive to the acquisition of partial-dimensional vocabulary knowledge.

1.2 Researches Related to Synonyms

Although synonyms are widespread in a language, there have been few researches which used theoretical framework based on semantics to examine the effect of synonym relationship on vocabulary acquisition, and fewer ones which investigated the effect of the known synonyms on the acquisition of the unknown synonyms.

Laufer (1990) believed that synonym relationship, as one of the seven inter-lexical factors, increased the difficulty level of vocabulary acquisition. The previous relevant empirical researches found that it was more difficult to learn new synonyms than the new words with semantically unrelated sets (Waring, 1997; Nation, 2000; Finkheiner & Nicol, 2003; Erten & Tekin, 2008; Zhang & Sheng, 2009). The above researches examined the cognitive difficulty that occurred when the new synonyms were presented simultaneously and pointed out that if the words with semantic sets were presented at the same time, interference effect would be easily produced, which was unfavorable for vocabulary acquisition. Hence those researches suggested that the target words with no synonyms but relevant to each other in theme ought to be presented to learners. However, they failed to touch upon the effect of known high frequency synonyms on the unknown synonyms. It was Webb (2007) who firstly investigated the effect of the known synonyms on the acquisition of the unknown words and pointed out that the vocabulary knowledge of the known high frequency synonyms, such as syntagmatic features and association, could be positively transferred to the unknown words and decrease the cognitive burden. The point is that in Webb's experiment the word pair and sentence failed to be labeled as synonyms so that it was difficult to make it sure whether it was the synonyms that should account for the significant differences between the effects of vocabulary learning.

Within China researches relevant to synonyms started much later. Zeng (2007) studied the effect of theme clustering and semantic clustering on the intentional learning of English notional words and concluded that the former way of presentation was better than the latter one. Zhang and Sheng (2009) also proved that the presentation of semantically unrelated sets was more

conductive to vocabulary learning than that of semantic sets. Pang and Zhang (2012) interpreted the synonym relationship between vocabularies from the pragmatic and cognitive perspective and pointed out that the semantic indecisiveness proved to be the cognitive premise that might account for the synonym relationship between vocabularies while pragmatic inference could be the cognitive mechanism through which to understand it.

1.3 Framework of Multi-Dimensional Vocabulary Knowledge

The notion of multi-dimensional vocabulary knowledge was proposed by Richards (1976). After him, many linguists studied multi-dimensional vocabulary knowledge and made attempts to create a more perfect framework of vocabulary knowledge (Nation, 1990, 2001; Miller, 1999; Schmit, 2000). The most detailed framework of multi-dimensional vocabulary knowledge was proposed and extended by Nation (1990, 2001), covering nine categories of vocabulary knowledge (oral form, written form, affixes, morphology and meaning, concept and referent, paradigmatic association, grammatical function, collocation and usage). Each of the vocabulary knowledge was sub-divided into receptive vocabulary knowledge and productive vocabulary knowledge. Based on the previous relevant researches, Chinese scholar Ma (2007) created a theoretical framework of L2 vocabulary knowledge which consisted of twelve components, such as phoneme, orthography/spelling, morphology, paradigmatic, native tongue, word frequency, collocation, syntax, genre, pragmatics, variant and word strategy, and firstly introduced meta vocabulary knowledge into the research field of L2 vocabulary acquisition.

It is evident that the known/unknown method adopted by the traditional vocabulary acquisition researches have already given in to the new notion "multi-dimensional" one. Researchers have begun to focus on the progressive acquisition process (Zhang & Wang, 2006). Nevertheless, the traditional vocabulary test merely investigated learners' command of the form and meaning of the target words, with the usual evaluation criterion of whether learners were able to spell and identify the target words, and seldom examined the other aspects of vocabulary knowledge. Hence it seems to be of great significance to evaluate the effect of synonyms on the acquisition of L2 vocabulary knowledge by means of designing multi-dimensional vocabulary knowledge tests based on the framework of multi-dimensional vocabulary knowledge and investigating the effect of the known synonyms on the vocabulary knowledge acquisition of the unknown synonyms via empirical research.

This research aims to design a multi-dimensional vocabulary knowledge test according to Chinese EFL learners' characteristics and investigate the effect of word pair and sentence with and without synonyms on the vocabulary knowledge acquisition of the target words'

orthography, meaning and form, paradigmatic association, syntagmatic association and grammatical function so as to know better the effect of the known synonyms on the acquisition of unknown or new synonyms.

2. METHODS

2.1 Questions

This study aims to answer the following three questions: (a) In the learning of word pair and sentence, which are easier to be acquired, the target words with known synonyms or those without known synonyms? (b) Which aspects of the target words' acquisition do the known synonyms affect? (c) Are there any significant differences between the acquisition of word pair learning and sentence learning in terms of multi-dimensional vocabulary knowledge?

2.2 Participants

The participants of this study were 65 sophomores of non-English majors from Hubei Engineering University, China. They had all passed the national College English Test-Band 4 (CET4) and got over 90% in Nation's Vocabulary Levels Test (VLT) with 2000 words and turned out to be intermediate EFL learners (Schmitt, 2000, p.192). Participants' mean scores for VLT were 28.2 (30 for the full mark). Pilot study indicated that the participants could recognize all the words in the vocabulary test except the target words, and they were randomly divided into word pair group (WPG) composed of 35 students and sentence group (SG) consisted of 30.

2.3 Materials and procedures

The twenty target words for both groups were the same with Chinese version. Ten of the target words had high frequency synonyms and the other ten did not have. Each of the target words for SG had an example sentence from British National Corpus (BNC). Participants were familiar with the other words in the example sentence. The two groups respectively learnt the target words within 8 minutes via their own materials (word pair or sentence), and then had a vocabulary test. The participants learnt word pairs and sentences according to their own habits and the teacher gave no direction or guidance. Of the twenty target words, twelve were nouns and seven were verbs, whose proportion (3: 2) accorded with the ratio of noun to verb in the corpus (Kucera & Francis, 1996, p.363). In addition, the target words in this experiment were disguised words or coined words in order to ensure that the participants had no prior knowledge of the target words.

The multi-dimensional vocabulary knowledge test used Nation's (1999, 2001) framework of multi-dimensional vocabulary knowledge and part of Webb's (2007) vocabulary knowledge test. The test was composed of

ten parts and investigated the target words' receptive and productive vocabulary knowledge with respect to their orthography, meaning and form, syntagmatic association, paradigmatic association and grammatical function. The ten parts were tested in a particular order, firstly receptive vocabulary knowledge and then productive one so as to decrease the possible learning effect of the pretest on the posttest. Items for the productive vocabulary knowledge test included dictation, Chinese-English translation, filling in the blanks and making sentences according to paradigmatic association and syntagmatic association, while items for the receptive vocabulary knowledge test had English-Chinese translation and multiple-choice. Participants were not allowed to begin the next part unless they had handed in their answer sheets to the teacher when they finished each part of the test. Time was limited for the first part and all the participants simultaneously wrote down the target words according to the recordings (consecutively twice). As for the other 9 parts, participants were allowed to finish them one by one at their own pace.

After the test, several students from each group were randomly chosen, interviewed and recorded so that the researcher might collect qualitative data on participants' attitude towards the test.

3. RESULTS AND ANALYSIS

3.1 Descriptive Statistics for the Test

From Table 1 it could be seen that both WPG and SG got high scores for the various dimensional vocabulary knowledge, indicating that these two presentation methods were effective for L2 vocabulary learning (see Table One). As for the five dimensions of orthography, meaning and form, syntagmatic association, paradigmatic association and grammatical function, the scores obtained were uneven, which was revealed between the various dimensions with respect to both receptive vocabulary knowledge and productive one. Therefore it can be concluded that there is absolutely a need to measure the multi-dimensional vocabulary knowledge of the target words via the framework of multi-dimensional vocabulary knowledge.

It was obvious that there were significant differences between the scores for the four categories of presentations in the multi-dimensional vocabulary knowledge test, and the scores for the productive vocabulary knowledge were generally lower than those for the receptive vocabulary knowledge, in particular in terms of grammatical function, syntagmatic association and paradigmatic association. In addition, the sentence group (SG) with synonyms got comparatively higher scores for each of the dimensions in the vocabulary knowledge test while the word pair group (WPG) without synonyms obtained relatively lower ones.

Table 1
Descriptive Statistics for the Test Results of WPG & SG (With/Without Synonyms)

	WPG with synonyms (N=35)		WPG without synonyms (N=35)		SG with synonyms (N=30)		SG without synonyms (N=30)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
PO	1.23	1.285	1.40	1.376	1.90	1.788	2.03	1.790
RO	8.20	1.471	7.29	1.934	7.93	1.461	7.07	1.818
PM	4.46	2.683	4.40	2.614	5.43	2.445	4.90	2.746
PG	3.40	1.684	3.14	1.287	4.23	1.654	4.20	1.901
PS	2.63	2.059	2.51	1.946	3.50	2.193	3.93	2.333
PP	3.69	2.361	1.29	1.363	4.63	1.956	1.90	1.185
RG	6.46	1.884	5.91	2.241	7.03	1.564	6.67	2.139
RS	5.09	2.106	5.14	2.060	5.20	1.584	6.63	1.884
RP	6.29	2.108	5.40	2.488	7.27	1.818	6.37	2.341
RM	4.57	2.973	3.86	2.463	5.20	1.846	5.00	2.600

Note. The full mark for each part was ten. The abbreviations for them were listed as the following:

PO=productive vocabulary knowledge for orthography; RO=receptive vocabulary knowledge for orthography; PM=productive vocabulary knowledge for meaning and form; PG= productive vocabulary knowledge for grammatical function; PS=productive vocabulary knowledge for syntagmatic association; PP=productive vocabulary knowledge for paradigmatic association; RG=receptive vocabulary knowledge for grammatical function; RS=receptive vocabulary knowledge for syntagmatic association; RP=receptive vocabulary knowledge for paradigmatic association; RM=receptive vocabulary knowledge for meaning and form. The abbreviations in table four mean the same as the above.

3.2 Correlations Between The Retest-Data

The result of Mauchly's spherical test ($P=.000<0.01$) indicated that there was a significant correlation between

the scores for the ten parts and analysis of variance was employed to adjust it. Epsilon adjusted coefficient (Greenhouse-Geisser) proved to be .829 (see Table 2).

Table 2
Mauchly's Spherical Test

Mauchly's <i>W</i> value	Approximate chi-square	<i>df</i>	<i>P</i>	Spherically symmetric coefficient		
				G-G	H_F	L-B
.390	115.708	44	.000	.829	.908	.111

3.3 Test for the Within-Subjects Effects and Between-Subjects Effects

Tests for the within-subjects effects and between-subjects effects revealed that there were statistically significant differences between the ten parts ($P=.000<0.01$), indicating that there were significant differences between the scores. In addition, there were also significant differences in the interaction between the vocabulary test and the ways of presentations (WPG with synonyms, WPG without synonyms; SG with synonyms and SG without synonyms; $P=.000<0.01$),

which meant that participants' scores varied significantly as ways of presentation varied (see Table 3).

Test for the between-subjects effect revealed that the *P* value for the different presentations was statistically significant ($P=.009<0.01$), indicating that the four ways of vocabulary presentation significantly affected the scores for the different dimensions of vocabulary knowledge. To be more exact, there were differences between the scores for the four sorts of presentations with regard to each dimension of the vocabulary knowledge test.

Table 3
Vocabulary Test, Ways of Presentation and Interaction Between Them

Source of variation	Sum of square	df	Mean square	F	P	Adjusted P		
						G-G	H_F	L-B
(Within-subjects)	(6915.287)	1170						
Vocabulary test	4030.864	9	447.874	195.510	.000	.000	.000	.000
Interaction effect	286.665	27	10.617	4.635	.000	.000	.000	.000
Errors within subjects	2597.758	1134	2.291					
(Between subjects)	(2881.001)	129						
Ways of presentation	250.116	3	83.372	3.992	.009			
Errors between subjects	2631.485	126	20.885					
Total	9796.888	1299						

3.4 Multiple Analysis of Variance for the Different Presentations and Multiple Comparisons

From Table Four, it could be seen that there were significant differences between WPG and SG in terms of the receptive vocabulary knowledge of orthography ($F(3,126)=3.257, P=.024$), productive vocabulary knowledge of grammatical function ($F(3,126)=3.745, P=.013$), productive vocabulary knowledge of syntagmatic

association ($F(3,126)=3.345, P=.021$), productive vocabulary knowledge of paradigmatic association ($F(3,126)=24.157, P=.000$), receptive vocabulary knowledge of syntagmatic association ($F(3,126)=4.610, P=.004$) and receptive vocabulary knowledge of paradigmatic association ($F(3,126)=3.851, P=.011$). There were no significant differences between the test results for other dimensions of vocabulary knowledge (see Table 4).

Table 4
Multiple Analysis of Variance for the WPG and the SG (With/Without Synonyms)

Source of variance	Sum of square	df	Mean square	F value	P value
PO	14.531	3	4.844	1.993	.118
Ro	27.801	3	9.267	3.257	.024*
PM	21.925	3	7.308	1.059	.369
PG	30.040	3	10.013	3.745	.013*
PS	45.419	3	15.140	3.345	.021*
PP	232.571	3	77.524	24.157	.000**
RG	21.430	3	7.143	1.818	.147
RS	51.674	3	17.225	4.610	.004**
RP	56.516	3	18.839	3.851	.011*
RM	34.874	3	11.625	1.827	.146
Error	126				

Note. * $p<0.05$, ** $p<0.01$

Results of multiple comparisons indicated that WPG with synonyms got significantly higher scores than WPG without synonyms in the receptive vocabulary knowledge of orthography ($P=.025<0.05$) and the productive vocabulary knowledge of paradigmatic association ($P=.000<0.01$). SG with synonyms got significantly higher scores than SG without synonyms in the receptive vocabulary knowledge of orthography ($P=.049<0.05$), the productive vocabulary knowledge of paradigmatic association ($P=.000<0.01$) and the receptive vocabulary

knowledge of syntagmatic association ($P=.005<0.01$). There were also differences regarding other dimensions of vocabulary knowledge but the differences were not significant.

In addition, SG without synonyms got significantly higher scores than WPG without synonyms in the productive vocabulary knowledge of grammatical function ($P=.010<0.05$) and both the productive and receptive vocabulary knowledge ($P=.008<0.01$; $P=.005<0.01$) of syntagmatic association. SG with synonyms got

significantly higher scores than WPG with synonyms in the productive vocabulary knowledge of grammatical function ($P=.043<0.05$) and paradigmatic association ($P=.035<0.05$). The significant differences between WPG and SG in their scores for the vocabulary knowledge validated the fact that it would be more effective to learn EFL vocabulary in the context.

4. DISCUSSION

4.1 Comparisons Between the Relevant Results

The experiment results revealed that the known synonyms proved to be conducive to the acquisition of the unknown new synonyms. Participants got significantly higher scores for target words with known synonyms than for those without known synonyms in the receptive vocabulary knowledge of orthography, the productive vocabulary knowledge of paradigmatic association and the receptive vocabulary knowledge of syntagmatic association. In this research the significant differences between the group with synonyms and the group without synonyms for their scores in orthography and paradigmatic association accorded with Webb's (2007). Nevertheless, there were also differences between the results of this research and those of Webb's. Firstly, there were no significant differences between the group with synonyms and the group without synonyms in the productive vocabulary knowledge of syntagmatic association. It could be seen from the interview after the experiment that some participants failed to understand the meaning and requirements of "context" in the productive vocabulary knowledge test of syntagmatic association. Secondly, there were significant differences between the group with synonyms and the group without synonyms in the productive vocabulary knowledge of syntagmatic association. The possible explanation might be that the items in the revised test of receptive vocabulary knowledge were comparatively more reasonable than those in Webb's and easier for Chinese learners to understand.

As there are great similarities between synonyms in meaning, it is predictable that there might be significant differences between the group with synonyms and the group without synonyms in the acquisition of vocabulary knowledge of paradigmatic association. Nevertheless, there were also significant differences between the group with synonyms and the group without synonyms in the acquisition of vocabulary knowledge in terms of orthography and syntagmatic association, which proved that it was easier to acquire the unknown or new synonyms accompanied with known synonyms. From the pilot study and the interview after the experiment, it could be seen that participants deemed it to be easier to acquire and use the target words with synonyms. Hence it was a surprise that there were no significant differences

between the group with synonyms and the group without synonyms in their acquisition of the meaning and form of vocabularies. The reason might be that the word pairs and the sentences in the experiment were all labeled the Chinese meaning of the target words. If the experiment was conducted without providing the Chinese version of the target words in an accidental learning, there would be possibly significant differences between the group with synonyms and the group without synonyms in the acquisition of target words' meaning and form since participants merely guessed the meaning of the target words according to the known synonyms and the context.

4.2 Theoretical Interpretation

The significant differences between the group with synonyms and the group without synonyms in the acquisition of vocabulary knowledge of syntagmatic association might be attributed to the transfer of L2 vocabulary knowledge of the known high frequency synonyms to the unknown or new synonyms. When learning the target words without known high frequency synonyms, learners mainly depend on the meaning and form, grammatical and syntagmatic association of the target words and it may be much less effective to learn L2 target words via combining the vocabulary knowledge of the known synonyms with the background knowledge of L1. For example, for the low frequency words such as "doze", "lane" and "sob", the acquisition of their collocation may become easy due to the high frequency words "cry", "sleep" and "street". However, for the words "pier", "pawn" and "recluse" without known high frequency synonyms, it becomes relatively difficult to acquire their collocations. There is no doubt that the partial overlapping of L1 and L2 vocabulary knowledge is conducive to the development of L2 vocabulary knowledge, while L1 background knowledge and the vocabulary knowledge of the known high frequency synonyms may greatly decrease the difficulty level of the acquisition of the unknown new synonyms.

The above result can be also interpreted from the perspective of schema theory. This theory emphasizes the effect of learners' known background knowledge structure on the current cognitive activities. The stored knowledge may play a key role in the absorption way and application effect of new knowledge (Wang, 2012) and is a method via which people use the known structure to memorize the new material (Gui, 2003). Language itself possesses the function of referent and is riddled with the outside world and its ideological contents. The acquisition and development of a language can be regarded as the creation of schema. Vocabulary, as the essential meaningful unit of a language, is stored in learners' memory as schema and the vocabulary acquisition of L2 learners is a creation of schema (Xu, 2011). The known high frequency synonyms can activate the existing L2 or L1 schema knowledge (Li,

2001) so as to greatly decrease the difficulty level of the acquisition of the unknown or new synonyms and increase the effectiveness of vocabulary acquisition.

4.3 Implications for L2 Vocabulary Acquisition

The result of this research supports Nation's (1990, 2001) theory of learning burden. In view of the fact that the syntagmatic association of the known synonyms can be positively transferred to the unknown new synonyms, the learning burden of the new synonyms turns out to be relatively lighter, which might provide some implications for the L2 classroom vocabulary acquisition. When teaching vocabularies, teachers ought to attend to the learning burden of the target words and provide comparatively more teaching resources for the target words without high frequency synonyms. At the same time, teachers and students are supposed to strengthen the relations between the new words and the known synonyms so that the latter can be conducive to the acquisition of the former.

It is not linear for the effect of the known synonyms to be transferred to the new unknown synonyms, mainly due to the fact that there are no absolute synonyms and that the subtle distinction between synonyms may lead to the inappropriate use of new synonyms. Only when learners have frequent contact with the target words, use them, correct their own errors can the vocabulary knowledge of the target words become rich, complete and accurate, which does not only exist in the acquisition of synonyms but also universally in L2 vocabulary acquisition, or the U-shaped behavior in learning (Kellerman, 1985).

This experiment is also conducive to better understanding the process of L2 vocabulary acquisition. The transfer of vocabulary knowledge from one synonym to another easily occurs in the later period of language acquisition, or on the intermediate and advanced learners. At the early stage of language learning, in particular for young beginners, the vocabulary knowledge of each target word seems to be fairly rich. As learners continuously learn different affixes, become familiar with pronunciation rules, master more word associations and improve their understanding of grammatical rules and registers, it becomes relatively easy for the acquisition of the unknown new words. In addition, as learners' vocabulary size increases, the possibility of acquired multi-dimensional vocabulary knowledge of the unknown new words also increases, which might be also the reason why advanced L2 learners rapidly increase their vocabulary size and knowledge.

The result of this experiment again highlights the necessity of measuring the multi-dimensional vocabulary knowledge. There is an absolute need to measure the multi-dimensional vocabulary knowledge when investigating the effect of vocabulary learning. The mere measurement of the form and meaning of target words will not be able to examine the significant differences

between the acquisition of various dimensional vocabulary knowledge.

CONCLUSION

Many scholars believed that the presentation of new words in semantic sets produced interfering effect and was less effective than the simultaneous presentation of new words in semantically unrelated sets (Tinkham, 1997; Nation, 2000; Zhang & Sheng, 2009). Nevertheless, this research indicated that the new words with synonyms could be more effectively acquired, compared with the new words with semantically unrelated sets or the new words without synonyms.

There might also be some drawbacks for this research. It took the intermediate and advanced L2 learners as its participants. If young learners or L2 beginners were simultaneously investigated, there would be richer and more comprehensive result. Based on it, the focus might be whether there are significant differences between high-level L2 learners and low-level L2 learners with regard to the accidental acquisition of L2 vocabulary and whether there is a vocabulary threshold for both of the learners via autonomous learning, extensive reading, auditory and visual accidental acquisition of large amount of vocabulary. Nation (2000) once pointed out that learners were supposed to know 5,000 word families so as to better understand the passages and accidentally acquire the words. Whether this vocabulary threshold suits with L2 learners, such as Chinese students, is to be validated in the future.

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