# *Exploring Chinese EFL Learners' Vocabulary Depth Knowledge: the Role of L1 Influence*

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This paper reports findings of a study that investigated the vocabulary depth knowledge of 87 postsecondary Chinese EFL learners from the perspective of L1 influence. By means of a set of self-designed Vocabulary Depth Knowledge Test, L1 influence was respectively examined on the meaning sense and collocation aspect of vocabulary depth. Results showed that as vocabulary breadth increased, the meaning sense knowledge also increased, whereas collocation knowledge tended to stabilize. Learners' L1 was found to exert asymmetrical influence upon meaning senses and collocations, and the participants appeared more vulnerable to L1 congruence effect on the collocation aspect. Their collocation knowledge also tended to stabilize, and their cross-linguistic awareness did not improve as the vocabulary breadth or depth knowledge increased. The paper concludes with several pedagogical implications for EFL vocabulary teaching.

**Key words: second language vocabulary acquisition, vocabulary depth, L1 influence, stabilization, cross-linguistic awareness**

## INTRODUCTION

The past decades have witnessed a rapid development of second language (L2) vocabulary acquisition research, which has now gained prominence in

the field of second language acquisition (Meara, 2002). Plentiful empirical studies have generated abundant findings, enabling us to better understand the relationship and development paths of receptive and productive vocabulary, the structure of the L2 mental lexicon, various conditions that facilitate vocabulary acquisition, and vocabulary learning strategies of different groups of learners who learn English as a foreign language (EFL). However, empirical research specifically on EFL learners' vocabulary depth knowledge remains scarce, and this is particularly true as regards Chinese EFL students.

On the other hand, as L2 learners always try to build up the L2 mental lexicon with their L1 lexicon relatively established, L1 influence can hardly be avoided (Jiang, 2000; Ringbom, 1987). But even if no researchers would deny the influence of L1 lexical network on L2 lexical acquisition, the nature of such connection remains largely unexplored (Wolter, 2006). The present study took the initiative to probe into the linkage between L1 influence and the L2 vocabulary depth knowledge of a group of postsecondary Chinese EFL learners. A set of self-designed Vocabulary Depth Test was employed to achieve the aim. Research findings shed informative light on the differentiating and unequivalent influence exerted by the learners' L1 on different aspects of their depth knowledge, and pedagogically useful implications for L2 vocabulary learning and teaching are generated.

## L2 VOCABULARY DEPTH

It is a consensus that vocabulary knowledge is a multi-dimensional construct (Chapelle, 1998; Henriksen, 1999; Nation, 2001), and is generally understood in terms of vocabulary breath and vocabulary depth (Nation, 2001), with the former referring to the total number of words for which a person knows at least some of the significant aspects of meaning, and the latter the quality of such understanding. While there has not been much debate on the definition of vocabulary breadth, which is generally

operationalized as vocabulary size, three distinct lines to conceptualize vocabulary depth can be identified in the literature (Read, 2004):

1) Precision of meaning: in this perspective, the knowledge of a word progresses from being unfamiliar to being familiar enough for production, and is operationalized by the Vocabulary Knowledge Scale (Wesche & Paribakht, 1996);

2) Comprehensive word knowledge: this line of thinking is reflected by the word-knowledge framework which sees the knowledge of a word as encompassing a wide spectrum of information relating to form, meaning, and use (Nation, 2001);

3) Lexical network knowledge: this perspective emphasizes vocabulary depth as the degrees of integration of individual words into the mental lexicon. Words are represented as nodes in the lexical network, whose different sense relations are interconnected by two types of fundamental relationships: paradigmatic (antonymy, synonymy, hyponymy, gradation) and syntagmatic (collocational restrictions). The lexical network knowledge can be measured by the Word Association Test (Read, 1993, 1998).

Vocabulary depth has been found to bear a close relationship with vocabulary breadth, but for learners at different proficiency levels, the relationships tend to fluctuate (Cui & Wang, 2006; Li, 2007; Nurweni & Read, 1999). In the meantime, morphological knowledge, meaning knowledge and word association knowledge are also closely related with vocabulary breadth (Schmitt, 1998; Schmitt & Meara, 1997). On the other hand, vocabulary depth can effectively predict comprehensive language ability (Li, 2007), and it also makes a unique contribution to reading comprehension (Qian, 1999, 2002).

It has been found that different aspects of vocabulary depth may develop in an asymmetrical and asynchronous manner. Some studies conducted under the comprehensive word knowledge framework revealed that there seemed to

exist a sequence in the acquisition of spelling, part of speech, derivatives and word association knowledge (Liu, 2001; Wu & Chen, 2000); knowledge of meaning senses had a certain degree of inertia and was difficult to show obvious progress (Schmitt, 1998). Similarly, studies aligning with the lexical network approach to vocabulary depth found unbalanced development of the paradigmatic and syntagmatic aspects of the bulk of knowledge: advanced-level EFL learners demonstrated stronger paradigmatic knowledge than syntagmatic knowledge when they completed the word association test (Greidanus, Becks, & Wakely, 2005; Greidanus & Nienhuis, 2001). Arnaud and Savignon (1997) also found that although most of the advanced EFL learners who participated in their study seemed to have attained native-like competence with low-frequency words, their knowledge of lexical collocations remained rather inadequate.

A range of studies on Chinese EFL learners reported similar findings. For example, Dong and Zhou (2003) found that frequent exposure to collocations could effectively enhance the subjects' receptive understanding of the meaning senses of the target words. Mo and Sun (2004) investigated Chinese EFL learners' acquisition of six high-frequency verbs, and found that the acquisition rate of the primary meaning sense was significantly higher than other periphery ones, and the acquisition of verbal collocations lagged behind. A cross-sectional study on another group of Chinese EFL learners' adjective-noun collocation acquisition (W. Z. Zhang & Chen, 2006) showed that the collocation knowledge did not grow in accordance with the growth of general language proficiency or of vocabulary size. Two important implications emerge from these findings: the paradigmatic and syntagmatic aspects of vocabulary depth probably develop differently; regarding Chinese EFL learners, their paradigmatic meaning knowledge tended to develop faster and more easily than the syntagmatic collocation knowledge.

## L1 INFLUENCE

L2 lexical progression is fundamentally different from L1 lexical development due to the presence of an already established L1 lexicon for L2 learners. In this light, the possible linkage between L1 influence and L2 vocabulary depth knowledge calls for some in-depth understanding. From the psycholinguistic perspective, it was suggested that the L1 may interfere with the development of meaning senses in a far more covert way. For example, by using on-line semantic relatedness judgment tasks, Jiang (2002, 2004b) found that L2 learners, even at an advanced level of proficiency, continued to mediate their L2 vocabulary understanding and use through the L1 meaning specifications. In addition, when they were required to choose from pairs of L2 words sharing the same L1 translation in a sentence completion task, they were significantly weaker in distinguishing same-translation L2 word-pairs compared to L1 speakers, indicating the lingering influence of their L1 on L2 vocabulary development (Chiu, 2009; Jiang, 2004a). Situated in the Chinese EFL context, Mo and Sun's (2004) study demonstrated that Chinese learners were more inclined to acquire high-frequency English verbs through Chinese conceptual representations. Alternatively, L1 influence has also been identified in a number of free word association studies conducted in the Chinese EFL context (Bai, 2005; Zhang, 2006). For example, Bai (2005) found that the free word association responses produced by Chinese EFL learners were heavily influenced by their Chinese cultural and historical background. The subjects associated "liberate" with "dark" and associated "water" with "mountain." These responses seemed understandable to Chinese L1 speakers, whereas they were quite incomprehensible to English native-speaking raters. All the above findings suggest possible L1 influence on the paradigmatic aspect of L2 vocabulary depth.

Some other researchers who are interested in L2 learners' use of collocations also unveiled the presence of L1 influence. For example, it was found that L2 learners frequently used those collocations that were "lexically congruent" (Bahns, 1993), that is, having direct translation equivalents in

their L1, whereas they tended to use only a limited number of non-congruent collocations (Granger, 1998); whether the combination of two L2 words was congruent with the L1 translation equivalent had a far greater influence on the acceptability of the combination the learner produced (Nessenhauf, 2003). Given that collocational restrictions represent a major type of syntagmatic relations, it seems that learners' L1 may also have some impact on the syntagmatic aspect of L2 vocabulary depth.

There has been little discussion explicitly addressing L1 influence on paradigmatic and syntagmatic structures of the L2 mental lexicon. Nevertheless, Wolter (2006) posited that, owing to the potential cultural overlap between different languages and commonalities in human experiences, the meaning hierarchies which are already lexicalized in a given L1 may become recyclable with only minimal adjustment in the L2. So long as L2 learners were able to map the L2 form to its L1 meaning, they could transfer the paradigmatic structure already present in the L1 to the L2 with relative ease. Therefore, "the process of building a paradigmatic L2 network is simply a matter of learning new words" (Wolter, 2006, p. 746). Conversely, syntagmatic relations may involve conceptual modification and thus cannot be conveniently transferred from the L1, so the establishment of a syntagmatic L2 network may require adjustment and restructuring. Taking Japanese EFL learners as example, Wolter observed that they usually used "narrow room" to refer to "small room" in English on the grounds that the size of a room is usually described in terms of "narrow" in Japanese. However, the role of L1 influence in the paradigmatic and syntagmatic aspects of L2 vocabulary depth has seldom been empirically investigated, especially in the Chinese EFL context. What remains unanswered is that whether the L1 exerts equivalent influence on the paradigmatic and syntagmatic aspects or not.


## THE STUDY

To address the research gaps, the present study was set out to investigate

possible L1 influence on a group of postsecondary Chinese EFL learners' vocabulary depth knowledge. Vocabulary depth was operationalized as the lexical network knowledge, divided into the paradigmatic aspect (including multiple meaning senses) and syntagmatic aspect (including collocations). Two research questions were formulated to achieve the aim:

1)  How were the paradigmatic knowledge and syntagmatic knowledge related in the L2 vocabulary depth? With the increase of the learners' vocabulary size, did the participants' vocabulary depth, paradigmatic knowledge, and syntagmatic knowledge also increase?

2)  What influence did the participants' L1 (Chinese) exert upon the paradigmatic and syntagmatic aspects of their L2 (English) vocabulary depth? Did the L1 influence change as the vocabulary size changed?

## Participants

The participants of the study were 87 postsecondary students who were attending an English enhancement program in an English training center in Shanghai, China during the time of the study. Their average age was 19.7 years old. Their L1 was unanimously Chinese, and they all received formal English instruction in the school setting for an average of 8.2 years. They came from different schools and universities with various majors of study, and they came to Shanghai for English training from different parts of China for the time being. In this sense, the participants could be regarded as representative of a wide range of EFL vocabulary knowledge.

## Instruments

*Vocabulary Depth Test (VDT)*

The Vocabulary Depth Test (VDT) used in the present study was based on the Word Association Test (WAT) designed by Read (1998). The original

WAT included 40 high-frequency English adjectives, and the reliability of the test was reported to range from .88 to .93 (Qian, 1999, 2002; Read, 1998). However, the test did not set out to investigate cross-linguistic influence, so the role of L1 influence could not be clearly detected. With the aim to probe into possible L1 influence on L2 vocabulary depth knowledge in a more detailed and systematic manner, I decided to tailor the test for Chinese-speaking learners of English in the following three steps:

Step 1: I extracted ten adjectives from Read's 1993 WAT (Read, 1993) and added them to the 1998 WAT to make it a 50-item test.

Step 2: I, a native speaker of Chinese, closely examined each English target item and wrote down the corresponding Chinese translations. I next identified instances where the target English word did not completely overlap with its Chinese equivalent in meaning senses and/or collocations. Based on the paradigmatic/syntagmatic dissimilarities, I designed 45 distractors that might be a paradigmatic or syntagmatic associate of the L2 target word's Chinese translation but not of the target word itself[1].

Step 3: To ensure that the distractors were truly inappropriate associates and did not cause confusion, I checked each syntagmatic distractor against two major corpora in English—the British National Corpus and the COBUILD Concordance and Collocation Sampler—and confirmed that there was not a single case of the target item collocated with the distractor in both corpora. Then, given that paradigmatic distractors were difficult to check against corpus data which might not completely reflect real life language usage, I asked 15 college-level native speakers of English from four English-speaking countries (Australia, Canada, UK, and US) to complete the test. Their responses showed that native speakers of English, regardless of the variety of English they spoke, generated very similar responses and their average accuracy rate reached around 95% with a mean score of around 190 points. More importantly, they did not appear to be distracted by the Chinese-related

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[1] I also asked another Chinese-speaking colleague to double check the distractors.

distractors. However, it also occurred that some intended distractors were chosen by most native speakers. These words were consequently discarded.

The revision work resulted in the current form of Vocabulary Depth Test, which consisted of 50 target items and 30 distractors (10 paradigmatic distractors and 20 syntagmatic distractors). Sample items of the VDT test were provided in Appendix A. For each target item, there were four correct associates, and the total score was 200 points. Under each item were two boxes, each containing four options. The box on the left contained words that were semantically related to the target word. Correct answers could be synonyms of the target word, or they represented one aspect of its meaning sense, thus paradigmatically related to it. The box on the right contained answers that might collocate with the target word and thus bear syntagmatic relationship. There were always four correct answers for each item, but the answers were unevenly distributed in the two boxes. Three scenarios were possible: 1) one answer from the left box and three from the right box; 2) two answers from the left box and two from the right; 3) three answers from the left box and one from the right. It is impossible that all four answers came from the same box. This arrangement was designed to reduce the potential for successful guessing, and proved to be effective (Qian, 1999, 2000; Read, 1998). The following is an example:

| sensitive | | | | | | |
|---|---|---|---|---|---|---|
| **feeling** | interesting | forceful | clothes | **instrument** | **skin** | **topic** |
| *weak* | | | | | | |

**FIGURE 1**
**Example of Vocabulary Depth Test**

In the above example, the paradigmatic associate of the target word "sensitive" is supposed to be "feeling," and the syntagmatic associates are "instrument," "skin," and "topic." "Weak" was designed as a paradigmatic distractor. The L1 influence revealed by the distractor will be discussed in

further detail in the later section.

*Vocabulary Levels Test (VLT)*

The second instrument is the Vocabulary Levels Test (VLT) (Schmitt, 2000), taking the form of definition matching, in order to determine the participants' vocabulary size. A total of 300 words were selected from five frequency bands: 2,000-level, 3,000-level, 5,000-level, Academic Words Level, and the 10,000-level with a total of 150 short definitions to match. An example is given below:

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1. accumulation
2. edition
3. guarantee      1   collecting things over time
4. media          3   promise to repair a broken product
5. motivation     5   feeling a strong reason or need to do something
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**FIGURE 2**
**Example of Vocabulary Levels Test**

## Procedure, Scoring and Data Analysis

The two instruments were administered to the 87 participants during their class period. They were given 30 minutes to finish the VLT first, and another 30 minutes to complete the revised VDT. After the test results were collected, they were marked accordingly. For the VLT, each correctly matched definition was given 1 point, and the maximum was 150 points. For the revised WAT, each correctly chosen associate was given 1 point. There were a total of 200 correct associates with 100 paradigmatic associates and 100 syntagmatic associates, so the maximum score for VDT was 200, for the paradigmatic section was 100 and for the syntagmatic section was 100 points. Selecting distractors would not subtract any point from the total score of the

VDT, but one point would be recorded if a participant chose one distractor. The maximum score selection of distractors was 30 points as there were 30 distractors in total (10 paradigmatic distractors and 20 syntagmatic distractors). SPSS 17.0 was used to analyze the data.

## RESULTS

### L2 Vocabulary Depth Knowledge

Findings of the study showed that the self-designed Vocabulary Depth Test was a reliable instrument, and its Cronbach Alpha reliability reached .90 (N=87). All the scores were normally distributed. The average mean was 150.84, and the mean score for the paradigmatic section (mean=76.07) was slightly higher than the mean score for the syntagmatic section (mean=74.47). Paired t-tests were conducted, but the difference was not significant (t (86)=1.661, p=ns). It seems that the participants did not demonstrate significantly stronger knowledge in either the paradigmatic or syntagmatic section. Table 1 summarizes the scores of the participants' VLT and VDT.

**TABLE 1**
**Means, Range, Standard Deviations of the VDT, VDT-paradigmatic,**
**VDT-syntagmatic Scores and the VLT Scores (N=87)**

|  | Minimum | Maximum | Mean | SD |
|---|---|---|---|---|
| VDT-total (max=200) | 96 | 176 | 150.84 | 15.499 |
| VDT-paradigmatic (max= 100) | 45 | 93 | 76.07 | 9.382 |
| VDT-syntagmatic (max=100) | 46 | 91 | 74.74 | 7.724 |
| VLT (max=150) | 66 | 137 | 111.99 | 14.073 |

In order to explore the correlations between the paradigmatic aspect, the syntagmatic aspect, and vocabulary size, Pearson correlation test was performed (Table 2).

**TABLE 2**
**Pearson Correlations between VDT-paradigmatic, VDT-syntagmatic and VLT (N=87)**

|  | VLT | VDT-paradigmatic |
|---|---|---|
| VDT-paradigmatic | .247* | |
| VDT-syntagmatic | .226* | .632** |

*p<.05, **p<.01

Table 2 shows that the paradigmatic and syntagmatic aspects were only moderately correlated with vocabulary size (r=.247, p<.05; r=.226, p<.05), which indicates that vocabulary depth and vocabulary size/breadth are two different constructs. However, the paradigmatic and syntagmatic aspects were highly correlated (r=.632, p<.01).

In order to see if the increase of vocabulary size was accompanied by the increase of vocabulary depth knowledge, the 87 participants were ranked according to their VLT scores. The bottom 20 participants were categorized as the group with small vocabulary sizes (SVZ) and the top 20 participants as the group with large vocabulary sizes (LVZ). Table 3 presents their VLT and VDT scores respectively. Independent T-tests were performed to test if the differences between these two groups were statistically significant.

**TABLE 3**
**Means, Standard Deviation of the Revised VDT-total, VDT-paradigmatic, VDT-syntagmatic, and VLT Scores of SVZ Group (N=20) and LVZ Group (N=20)**

|  | VLT (max=150) | | VDT-total (max=200) | | VDT-paradigmatic (max=100) | | VDT-syntagmatic (max=100) | |
|---|---|---|---|---|---|---|---|---|
|  | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| SVZ | 98.50 | 5.34 | 145.60 | 13.41 | 72.80 | 7.92 | 72.80 | 7.01 |
| LVZ | 129.45 | 3.80 | 155.10 | 15.43 | 78.65 | 10.04 | 76.30 | 6.87 |
| Independent T-test | t=-21.121 p=.000 | | t=-2.078 p=.045 | | t=-2.046 p=.048 | | t=-1.595 p=.119 (NS) | |

Note: SVZ: the group with small vocabulary size; LVZ: the group with large vocabulary size.

It can be seen from Table 3 that the VDT total scores, paradigmatic scores and syntagmatic scores of the LVZ group were all higher than the SVZ group. However, only the differences between the VDT total scores and the paradigmatic scores reached statistical significance, whereas the difference in the syntagmatic section was not statistically significant. This result suggests that the vocabulary depth knowledge increased as the vocabulary size increased, but the growth may largely be confined to the improvement in the paradigmatic aspect. The syntagmatic aspect of the vocabulary depth was clearly not the case. In other words, collocational knowledge may be more difficult to grow compared to meaning sense knowledge.

## L1 Influence on Vocabulary Depth

One of the objectives of the present study was to explicitly address the possible linkage between the participants' L1 and their L2 vocabulary depth. To this end, the participants' respective selection of the 30 intended distractors were recorded and summarized (Figure 3). Results showed that the distractors indeed served their intended purpose as most participants were distracted, mistaking them as correct associates for the target items. In particular, two paradigmatic distractors were chosen by more than 50% of the participants, and four were chosen by fewer than 25% of the participants. The most frequently chosen paradigmatic distractor was "violent" (72.62%) corresponding to the target item "crude." Syntagmatic distractors were chosen with higher frequencies: only one was chosen by fewer than 25% of the participants, and 10 were chosen by more than 50%. Specifically, 83.33% of them inaccurately chose "view" as a syntagmatic associate of the target item "natural." A total of 12 distractors were chosen by more than 50% of the participants, among which 10 were syntagmatic distractors and only two were paradigmatic distractors. The respective frequencies of each distractor being selected by the participants were reported in Appendix B.
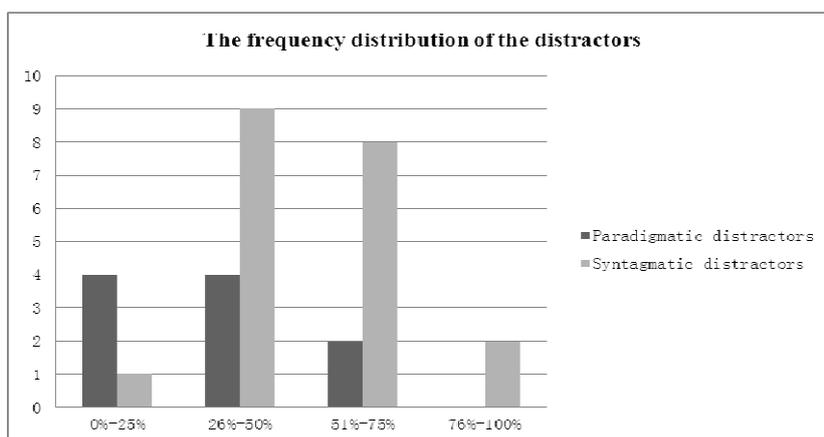
**FIGURE 3**
**The Frequency Distribution of the Paradigmatic Distractors (N=10) and the Syntagmatic Distractors (N=20) Selected by the Participants (N=87)**

Furthermore, participants' selection of paradigmatic and syntagmatic distractors was also calculated and compared (Table 4). The data showed that every participant chose an average of 13 distractors out of the total 30. The percentage of syntagmatic distractors chosen by the participants (47.70%) was also higher than that of paradigmatic distractors (34.83%). Paired-sample t-tests confirmed that the difference was highly significant (t=-6.389, p=.000). This finding suggests that the participants were more likely to choose syntagmatic distractors and to selected unconventional word combinations.

**TABLE 4**
**Means, Standard Deviation, Percentages of Total Distractors, Paradigmatic Distractors, and Syntagmatic Distractors Chosen by the Participants (N=87)**

|  | Mean | SD | Percentage |
|---|---|---|---|
| D-total (max=30) | 13.01 | 2.687 | 43.37% |
| D-paradigmatic (max=10) | 3.48 | 1.554 | 34.83% |
| D-syntagmatic (max=20) | 9.53 | 2.167 | 47.70% |

Now it has been shown the participants were more susceptible to syntagmatic distractors, it is interesting to see if the degree of susceptibility was affected by their vocabulary size. To this end, the selections of paradigmatic and syntagmatic distractors were compared and contrasted between the SVZ and LVZ group (Table 5).

**TABLE 5**
**Means, Standard Deviations, Percentages of Total Distractors,**
**Paradigmatic Distractors, Syntagmatic Distractors of SVZ Group (N=20)**
**and LVZ Group (N=20), and Independent T-test Results**

|  | D-total (max=30) | | D-paradigmatic (max=10) | | D-syntagmatic (max=20) | |
|---|---|---|---|---|---|---|
|  | Mean (%) | SD | Mean (%) | SD | Mean (%) | SD |
| SVZ | 13.70 (45.67) | 2.98 | 3.65 (36.50) | 14.24 | 10.05 (50.25) | 11.41 |
| LVZ | 12.40 (41.33) | 2.60 | 3.55 (35.50) | 16.38 | 8.85 (44.25) | 11.15 |
| Independent T-test | t=1.470 p=.150 (NS) | | t=-5.502 p=.618 (NS) | | t=1.752 p=.085 (NS) | |

Note: SVZ: the group with small vocabulary sizes; LVZ: the group with large vocabulary sizes.

The results showed that the LVZ group selected slightly fewer distractors in total (mean=12.40) than did the SVZ group (mean=13.70), and the former also selected fewer paradigmatic and syntagmatic distractors. However, independent t-test results showed that all the differences were not statistically significant. In this sense, although the LVZ possessed comparatively large vocabulary sizes and strong vocabulary breadth knowledge, the ability to detect cross-linguistic differences did not seem to have significantly advanced. To put another way, the L1-L2 cross-linguistic awareness did not grow with the development of vocabulary breadth or vocabulary depth.

## DISCUSSION

The findings suggested that the self-designed Vocabulary Depth Test was a reliable instrument in tapping L2 vocabulary depth knowledge, with the reliability figure (Cronbach Alpha=.90) compatible to those generated by other studies using the same format (Qian, 1999, 2002; Read, 1998). Generally speaking, there was still room for improvement for the participants' L2 vocabulary depth knowledge, especially in view of the mean of 150.84 (SD=15.499) they achieved, especially when we consider the mean of 190 obtained by 15 native speakers[2] during the pilot stage and the fact that the adjectives used in the test are all of high frequency. The participants' L2 mental lexicon, at least for the adjectives, is yet to be established. The following discussion will revolve around two important issues: the inequivalent L1 influence on the paradigmatic and syntagmatic aspects of L2 vocabulary depth, and syntagmatic stabilization in L2 vocabulary development.

### Differentiating L1 Influence

One particular feature of the study was the inclusion of L1-related distractors in the Vocabulary Depth Test with the aim to elicit evidence of L1 influence on the paradigmatic and syntagmatic aspects of L2 vocabulary depth. Findings suggested that the participants were more susceptible to syntagmatic distractors than paradigmatic distractors, and were more prone to selecting unconventional combinations. In particular, a close look at the 12 distractors chosen by more than 50% of the participants reveals that it is the L1 lexical knowledge that has misled the participants. Among the 12 distractors, 10 are in one way or another syntagmatically related to the target item. If we translate all the target items and distractors into Chinese, the

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[2] It needs to be noted here that I have no intention to use native speakers as the benchmark to judge the proficiency of the group of L2 learners involved in the study. However, for practical reasons, native speakers are referred to here as proficient and successful users of the English language.

combinations or collocations actually make perfect sense. For instance, the most frequently chosen syntagmatic distractor, by 83.33% of the participants, is "view" corresponding to "natural." The L1 translation equivalent of "natural," *Zi4ran2* (自然), and that of "view," *Jing3se4* (景色), actually can form an appropriate collocation in Chinese, whereas the more legitimate one in English expressing the same concept should be "natural scenery." It then can be speculated that the common conceptual image underlying the two languages, probably a picturesque landscape in this case, may have been evoked in the mind of the participants, but just mapped to the wrong string of words, a process misled by the assumptions made through their L1 lexical network. Under this circumstance, the existing L1 lexical system does not suffice to inform correct lexical choice in forming correct syntagmatic combinations in the L2, largely due to the divergence between the two languages. Other cases of the same type included "fresh cotton," "broad room," just to name a few. Most interestingly, 63% of the participants erroneously chose the combination "convenient beef." The participants later explained, through personal communication, that they were thinking of "instant noodles" (方便面), literally "convenient noodles" if translated verbatim from Chinese. Consequently, they thought "convenient beef" referred to the beef that could be easily cooked. All these instances reveal that when a certain combination makes sense in the learners' L1, they automatically assume the appropriateness of this combination in the L2 regardless its actually collocational co-occurrence in real L2 use, which provides further evidence for the L1 congruence effect documented in the literature (Granger, 1998; Nesselhauf, 2003).

In contrast, among the 12 distractors only two were paradigmatic distractors: D18. "violent" to the target item "crude" and D.23 "weak" to "sensitive." In the "crude-violent" case, it may be because one of the Chinese translations for "crude" is *Cu1ye3* (粗野), which shares the same lexical element of "ye3" (野) with the Chinese translation of "violent" *Ye3man2* (野蛮). It seems that the participants may have transferred the common element shared by the Chinese translations of "crude" and "violent" to their

understanding of the two words in English, although in fact the English definition of the particular meaning sense of "crude" (i.e., lacking tact or taste, blunt or offensive[3]) does not have any overt link with "violent." However, the pair of "sensitive" and "weak" is slightly different, because the translation equivalents for these two words, *Min3gan3* (敏感) and *Cui4ruo4* (脆弱) respectively, do not have anything in common. But in fact, they do occur together quite often when used to describe delicate personality in Chinese literature, probably more often than in English. The participants' faulty assumption of the synonymous relationship between "weak" and "sensitive" may, therefore, result from the co-occurrence effect of the two Chinese equivalents that has been unconsciously transferred to their English understanding.

Except for these two instances, however, the participants did not appear to be easily misled by the rest of the paradigmatic distractors, suggesting that paradigmatic connections are not as vulnerable to L1 influence as syntagmatic connections. This finding, at least partly, lends evidence to Wolter's (2006) assumption that the common human experiences and shared cognition of the physical world make paradigmatic connections very similar in different languages, and rarely involve conceptual modification and thus easily accommodated with the learner's existing L1 lexical network (Wolter, 2006). It is reasonable that the recognition of meaning of a L2 word may enable the learner to conveniently fit the L2 word into the paradigmatic network that has already been acquired in the L1. It is probably one reason why the participants chose fewer paradigmatic distractors than syntagmatic ones in the present study. To put another way, the L1 may actually exert differentiating influence upon the paradigmatic and syntagmatic aspects of the L2 vocabulary depth. It also explains that, at least to some extent, the finding that the group with large vocabulary sizes only performed

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[3] Crude. (n.d.). *The American Heritage® Dictionary of the English Language, Fourth Edition*. Retrieved May 06, 2008, from Dictionary.com website: http://dictionary.reference.com/browse/crude. In addition, none of the native-speaking participants in the pilot study assumed a synonymous relationship between "crude" and "violent."

significantly better than the group with small vocabulary sizes in the paradigmatic section but not in the syntagmatic section. The particular observation leads to another important issue worth some discussion: possible stabilization in the syntagmatic aspect of vocabulary depth.

## Syntagmatic Stabilization

One of the most interesting findings in this study is that the group with larger vocabulary size did not demonstrate significantly stronger syntagmatic knowledge or ability to discern cross-linguistic differences than did the group with relatively small vocabulary sizes. The finding suggests that despite the increase in the vocabulary size, stabilization may have taken place in the semantic structuring of the L2 mental lexicon, at least for the syntagmatic aspect. When stabilization occurs, aspects of the interlanguage are far from the target language norm, and the learner does not seem to progress even they continue to be exposed to the target language (Gass & Selinker, 2001). This finding aligns with previous findings on L2 learners' relatively weak collocational knowledge (Arnaud & Savignon, 1997; Mo & Sun, 2004; W. Z. Zhang & Chen, 2006). It was further revealed in the present study that in L2 vocabulary development, vocabulary size and paradigmatic/meaning-sense knowledge might continue to grow whereas the syntagmatic/collocational knowledge was more difficult to show obvious improvement. It implicates that stabilization may be partly due to the asymmetrical L1 influence on paradigmatic and syntagmatic knowledge. The possibility of paradigmatic connections benefiting from the existing L1 lexical system and the overlap between the L1 and L2 makes stabilization in this regard not easily discerned. But since syntagmatic connections require lexical restructuring and possibly conceptual modification, L2 learners may encounter greater difficulty in this regard. Without a strong pushing force readily available (such as certain training seeking to enhance learners' cross-linguistic awareness), syntagmatic stabilization may occur.

However, it needs to be conceded that the more salient L1 influence on

syntagmatic knowledge may not be the only factor to account for the participants' high susceptibility to L1 congruence effect. The lack of adequate syntagmatic knowledge to express a certain concept in the L2 probably may also assume an important role. Through personal communication after the tests, I learned that some participants realized certain syntagmatic associates they chose were problematic, but they simply did not have any alternative to resort to. A typical example is that 67.86% of the participants erroneously chose "need" as a syntagmatic associate to "tight" to form the combination of "tight need." It turned out that they wanted to express the concept of "pressing need," but not knowing that "pressing" was a more legitimate candidate in this case, they resorted to their L1 lexicon to fill the gap, as the L1 equivalent of 'tight' *Jin3de* (紧的) can form a common collocation with 'need' *Xu1qiu2* (需求). Of course, it is difficult to further determine the intricate relationship between L1 influence and insufficient L2 knowledge at the current stage, but what needs to be pointed out is that if the participants had sufficient syntagmatic knowledge in the L2, they might have been able to avoid the mistake. Secondly, the acquisition process of syntagmatic connections including collocations and formulaic chunks is probably different from that of meaning acquisition, as the former may depend more on the learners' active participation in the target-language community (Dörnyei, Durow, & Zahran, 2004). But in a tutored setting, such as the EFL context in China and other Asian countries, an English-speaking community is not easily accessible and extensive exposure to the L2 is not readily available. These may serve as the contextual factors that deter continuous development of syntagmatic/collocational knowledge. In addition, as far as the Chinese context is concerned, EFL vocabulary teaching is primarily focused on form-meaning mapping while syntagmatic knowledge such as collocations is largely left out of the scene (Zheng, 2010). Collocational awareness has not yet been fully established in either learners or teachers. All these factors combined may have compounded L1 influence and eventually led to the observed syntagmatic stabilization reported in the present paper.

# IMPLICATIONS FOR EFL VOCABULARY TEACHING

The present study set out to explore postsecondary Chinese EFL learners' L2 vocabulary depth knowledge with an emphasis on the possible role of their L1-Chinese. The findings showed that the participants' vocabulary depth knowledge was inadequate. What was particular weak was their ability to discern cross-linguistic differences, which did not seem to improve even when their vocabulary size grew larger. More importantly, the results highlighted that L1 influence on the paradigmatic and syntagmatic aspects of vocabulary depth may be quite different; the L2 learners may benefit from positive L1 influence in paradigmatic learning whereas suffer from negative L2 influence in syntagmatic learning. When a sufficient degree of cross-linguistic awareness is absent, compounded with a wide range of contextual factors, the syntagmatic aspect of their vocabulary depth will probably stop growing.

The findings of the study have several pedagogical implications for EFL vocabulary teaching. Of course, I have no intention to generalize the results of the present study carried in the Chinese EFL context to learners in other Asian countries. Nevertheless, teachers engaged in EFL teaching may find similarities between what they encounter and what has been described here, and therefore find the following suggestions helpful.

Firstly, the study suggests that vocabulary breadth development is not automatically accompanied by development in vocabulary depth; nor is paradigmatic development naturally followed by syntagmatic development. Learners can continue to grow their knowledge about a word's meaning senses, but still do not know the collocational behavior of the particular word. Since the collocational co-occurrence is derived from real language data and is more concerned with how to put words into real use, the overlook of syntagmatic learning may actually hinder the smooth conversion of a word from the receptive to the productive end. Put another way, the learner simply does not know how to use the word even if he/she knows its meaning very well. In this sense, it is suggested that both learners and teachers should be

made keenly aware of the significance of collocation learning/teaching. Although the lexical approach (Lewis, 2000) was proposed more than ten years ago, its extensive implementation in EFL vocabulary teaching, especially in the Asian context, is yet to be expected.

The findings also suggested that the existing L1 lexical system can be a double-edged sword: On the one hand, it proves a resource pool for the learners to transfer existing paradigmatic knowledge to learning new L2 words; on the other, it sometimes provides misleading information on syntagmatic connections when the L1 expression does not completely overlap with the L2 one even if they are mapped to the same conceptual image. Natural exposure alone does not suffice to provide enough impetus for L2 learners to overcome syntagmatic stabilization caused by negative L1 transfer (Jiang, 2000). Therefore, explicit instruction should intervene. Careful and focused instruction that clarifies these discrepancies can inform learners of how similar concepts can be lexicalized differently in different languages and ultimately motivate conscious lexical restructuring and conceptual modification. Laufer and Girsai (2008) recently demonstrated that contrastive analysis was an effective method for collocation teaching.

Admittedly, the study is subject to some limitations. The sample size is relatively small, and the number of paradigmatic and syntagmatic distractors were not equal due to the difficulty of designing paradigmatic distractors. These methodological weaknesses should be overcome in future studies. Moreover, a combined use of the VDT form and free word association or other elicitation methods, together with more serious consideration of L1 influence, may help to construct a full picture of L2 learners' vocabulary depth knowledge and overall vocabulary development. In addition, the present study only adopted the quantitative research design. But it can be very useful to integrate follow-up interviews to elicit the participants' perceptions to further support the test data obtained by the VDT, which points to another future research direction. Despite the limitations, findings of the present study cast some new light on the L1 influence on L2 vocabulary depth. The asynchronous and asymmetrical development of paradigmatic and

syntagmatic connections can probably be ascribed to the varying L1 influence. One of the consequences is the stabilization in the development of the lexical network building, at least for the syntagmatic aspect, even if the learners may appear to progress fast in enlarging their vocabulary size and establishing paradigmatic connections. In order to overcome the negative L1 influence on syntagmatic connections, explicit instruction to enhance cross-linguistic awareness and collocational awareness is earnestly called for.

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# APPENDIX A
## Sample Items from the Vocabulary Depth Knowledge Test

1. beautiful
   __enjoyable __expensive __pleasant __loud | __education __face __music __paper

2. bright
   __clever __famous __happy __shining | __color __hand __poem __animal

3. calm
   __open __quiet __smooth __tired | __cloth __day __rice __sea

4. natural
   __expected __helpful __real __short | __leader __view __parents __songs

5. fresh
   __another __cool __ugly __raw | __cotton __heat __education __water

6. general
   __closed __different __usual __whole | __people __idea __reader __street

7. bare
   __empty __heavy __uncovered __useful | __cupboard __feet __school __promise

8. acute
   __hidden __often __rich __sharp | __angle __hearing __illness __stones

9. common
   __complete __light __ordinary __shared | __boundary __circle __name __party

10. complex
   __sad          __difficult      | __argument      __passengers
   __necessary    __complicated    | __patterns      __branches

## APPENDIX B:
## Distractors, Corresponding Target Items, and Frequencies of Being Chosen by the Participants (N=87)

Paradigmatic Section

| Target items | Distractors | Number of participants who selected the distractor (%) |
|---|---|---|
| 25. crude | D18. violent | 61 (72.62) |
| 32. sensitive | D23. weak | 46 (54.76) |
| 47.deliberate | D29. black-hearted | 39 (46.43) |
| 50. explicit | D30.analytical | 37 (44.05) |
| 34. critical | D24. unkind | 36 (42.86) |
| 22. violent | D16.unlucky | 24 (28.57) |
| 41. abstract | D26. empty | 20 (23.81) |
| 30.independent | D21. equal | 19 (22.62) |
| 21a. tight | D14. fast | 11 (13.10) |
| 19. favorable | D12. cheap | 10 (11.90) |

Syntagmatic Section

| Target items | Distractors | Number of participants who selected the distractor (%) | Target items | Distractors | Number of participants who selected the distractor (%) |
|---|---|---|---|---|---|
| 4. natural | D2. view | 70 (83.33) | 42. finite | D27.respon-sibility | 41 (48.81) |

| | | | | | |
|---|---|---|---|---|---|
| 5. fresh | D3.cotton | 66 (78.57) | 26.domestic | D19. reserve | 37 (44.05) |
| 21b.tight | D15. need | 57 (67.86) | 14. dense | D10. eyebrows | 53 (41.67) |
| 11. broad | D8. room | 56 (66.67) | 8. acute | D6. stones | 33 (39.29) |
| 6. general | D4.people | 55 (65.48) | 24.compact | D17. rope | 29 (34.52) |
| 13.convenient | D9. beef | 53 (63.10) | 20. secure | D13.meat | 28 (33.33) |
| 10.complex | D7.branches | 52 (61.90) | 44. valid | D28. day | 24 (28.57) |
| 7. bare | D5.promise | 49 (58.33) | 18. direct | D11. hair | 22 (26.19) |
| 40. ample | D25. feelings | 44 (52.38) | 27.profound | D20. eyes | 22 (26.19) |
| 31.original | D22. sight | 43 (51.19) | 3. calm | D1. cloth | 13 (15.48) |