Depth versus Breadth of Lexical Repertoire: Assessing Their Roles in EFL Students' Incidental Vocabulary Acquisition

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This study explores the roles of depth and breadth of lexical repertoire in L2 lexical inferencing success and incidental vocabulary acquisition through reading. Students read a graded reader containing 13 pseudo-words and attempted to infer the meanings of underlined target words. The Word Associates Test (WAT, Read, 2004) and the Vocabulary Levels Test (Schmitt, Schmitt, & Clapham, 2001) were administered to measure depth and breadth of lexical repertoire respectively. To rate retention of inferred meanings, I administered the Vocabulary Knowledge Scale (VKS, Paribakht & Wesche, 1996, 1997) with a repeated measure design. The results indicated that (a) both breadth and depth of lexical knowledge correlated positively with long-term retention of inferred word meanings. However, depth of vocabulary knowledge indicated a higher correlation; and (b) scores on both breadth and depth of vocabulary knowledge had a significant positive correlation with success of lexical inferencing through reading, but depth of vocabulary knowledge was a stronger predictor of inferencing success.

Cette étude porte sur les rôles de la profondeur et l'étendue du répertoire lexical dans la production d'inférences lexicales en L2 et l'acquisition imprévue du vocabulaire pendant la lecture. Les élèves ont lu un livre de lecture contenant 13 pseudo-mots et ont essayé d'inférer le sens de mots cibles soulignés. On a fait passer un test sur les mots associés (Word Associates Test Read, 2004) et un test qui mesure la richesse du vocabulaire (Schmitt, Schmitt, & Clapham, 2001) pour évaluer la profondeur et l'étendue du répertoire lexical. Pour mesurer la rétention des sens inférés, l'auteur a administré un test sur les connaissances lexicales, le Vocabulary Knowledge Scale (Paribakht & Wesche, 1996, 1997) selon une formule de mesures répétées. Les résultats indiquent (a) qu'il existe une corrélation positive entre la profondeur et l'étendue du vocabulaire d'une part et la rétention à long terme des sens inférés d'autre part mais que la corrélation était plus élevée avec la profondeur du vocabulaire, et (b) qu'il existe une corrélation positive entre la profondeur et l'étendue du vocabulaire d'une part et l'inférence du sens des mots d'autre part. a rétention à long terme des sens inférés mais que la profondeur du vocabulaire était un meilleur prédicteur de la justesse des inférences.

A number of teaching techniques and classroom activities that influence the learning of vocabulary have been identified. However, research (Herman et al., 1987; Hulstijn, 2003; Laufer, 2003; Nation, 2001; Paribakht & Wesche, 1997)

indicates that one of the controversial issues concerning L2 vocabulary-learning is whether L2 vocabulary should be taught through explicit vocabulary-teaching techniques (e.g., learning lists of words or analyzing explicitly the word-formation patterns) or whether it should be acquired in an implicit framework by simply engaging students in a variety of tasks (e.g., reading for meaning, inferencing word meanings from contextual and knowledge-based resources, or completing text-based vocabulary activities). The latter line of this dichotomy in L2 vocabulary learning is often referred to as incidental vocabulary acquisition.

Incidental Vocabulary Acquisition Through Reading

Incidental vocabulary acquisition is the learning that occurs without conscious focus on the object of vocabulary learning. Unlike intentional vocabulary learning, which occurs when the learner's attention is specifically focused by teachers or learners themselves on learning new words (Nation, 2001), incidental vocabulary learning refers to vocabulary acquisition when "learners' attention" (Hulstijn, 2003, p. 349) is on understanding the message of the text rather than on the goal of learning vocabulary. Incidental vocabulary acquisition should not be equated with an unconscious phenomenon. Ellis (1994) argues that the type of attention that students pay to lexical items is the characteristic that distinguishes between incidental and intentional learning.

Lexical researchers believe that most vocabulary in both L1 and L2 is acquired incidentally through repeated exposure during reading (Anderson & Freebody, 1983; Hulstijn, 2001, 2003; Jenkins, Stein, & Wysocki, 1984; Nagy, Anderson, & Herman, 1987). As the task of L2 vocabulary development is so burdensome that it cannot be achieved by instruction alone, inferring word meaning from context seems to be the only possible approach that would account for the vast amount of vocabulary-learning that takes place (Fraser, 1999; Nation, 2001).

Theoretical Framework

The basic assumption of the incidental learning hypothesis, according to Fraser (1999), is that "incidental vocabulary acquisition primarily occurs through the process of lexical inferencing" (p. 226). Haastrup (1987) defines lexical inferencing as the process of "making informed guesses as to the meaning of a word in light of all available linguistic cues in combination with the learners' general knowledge of the world, her awareness of context and her relevant linguistic knowledge" (p. 197).

According to schema theory (Rumelhart, 1981) and reader-response theory (Fish, 1980; Iser, 1980), the reader has an active role in inferring meaning from textual, contextual, and knowledge-based resources. Schema theory emphasizes the importance of internal organization and activation of knowl-

edge in inferring meaning from texts. Carrell and Eisterhold (1983) distinguish between formal and content schemata. Formal schemata refer to knowledge of organizational patterns and rhetorical conventions of texts, whereas content schemata have to do with topical knowledge, familiarity with real world events, and cultural notions.

Lexical inferencing, according to schema theory (Rumelhart, 1981), is seen as a process of using the relevant schemata in identifying the meaning of an unfamiliar word. In schema-based inferencing through reading, the activation and use of the relevant schemata allow for the organization of the information, anchoring and relating new lexical items to existing concepts. This relatability in a person's cognitive structure, according to Ausubel (1968), is the core of the subsumption process that leads to meaningful learning and subsequently an efficient learning outcome.

Depth versus Breadth Dimension of Lexical Repertoire

Lexical researchers have emphasized the complexity of diverse aspects of lexical repertoire and have noted that word knowledge is far beyond knowing a word's individual meaning in particular contexts (De Bot, Paribakht, & Wesche, 1997; Nassaji, 2004; Nation, 2001; Qian, 2002; Read, 1993; Richards, 1976). Richards proposed a set of principles to define aspects of lexical repertoire. He offered more aspects to earlier components of word knowledge (Cronbach, 1946, as cited in Nation) such as morpho-syntactic properties, derivation, association, frequency, and semantic features. In an attempt to scale the quality of lexical knowledge, Henriksen (1999) argues that vocabulary knowledge should consist of three dimensions, including (a) precision of knowledge, (b) depth of knowledge, and (c) receptive and productive knowledge. In research on lexical pedagogy, however, two dimensions of lexical repertoire, breadth versus depth of word knowledge, have been distinguished (Nassaji; Nation; Qian, 1999; Read; Wesche & Paribakht, 1996). Nation defines breadth of vocabulary knowledge as the quantity or number of words learners know at a particular level of language proficiency. On the other hand, in an attempt to characterize the other dimension of lexical repertoire, depth, Read believes that depth of vocabulary knowledge involves "a consideration of the quality of the learners' vocabulary knowledge" (p. 357, how well are particular words known?).

Research on the relationship between lexical knowledge and vocabulary development incidentally through reading (Nassaji, 2004; Pulido, 2007; Qian, 1999, 2002) prompts one to argue that there is a strong positive relationship between the two. Lexical knowledge is an important knowledge source that learners use in the process of lexical inferencing, and it is one of the best predictors of reading ability and of the ability to acquire new information from context (Bengeleil & Paribakht, 2004; Nassaji; Paribakht, 2005; Qian, 2002). At present, both dimensions of lexical repertoire, depth and breadth, con-

tinue to be an important area of focus in vocabulary research, but with less investigation into which aspect plays the prominent role in L2 lexical inferencing success and incidental vocabulary acquisition through reading. To this end, and given the important role currently attributed to depth and breadth of lexical knowledge in L2 lexical inferencing success and incidental vocabulary acquisition, in this study I address the following questions.

1. To what extent do depth and breadth of lexical repertoire relate to the immediate and long-term retention of inferred meanings in incidental vocabulary acquisition?
2. What are the correlations among L2 lexical inferencing success, depth and breadth of word knowledge? What is the strength of each relationship?
3. Which one of these two dimensions of lexical repertoire, depth or breadth, is a stronger predictor of L2 lexical inferencing success in incidental learning condition?

Method

Participants

The participants were 33 undergraduate university students who were selected and recruited from a larger population at Qaemshahr Azad University in Iran. A Test of English as a Foreign Language (TOEFL) test (paper-based test, Sharpe, 2001) was administered to students who voluntarily agreed to take part in the study. Of the 183 students who took the TOEFL test, only 33 whose scores ranged from 521 to 599 were invited to participate. According to their performance on the TOEFL, these were considered advanced language-learners. All the participants were native speakers of Farsi. Of the participants, 25 were female and eight were male, and none had lived in country where English is the official language.

Instruments

Three word knowledge tests were used in this study. To assess the participants' breadth and depth of vocabulary knowledge, I administered a validated version of the Vocabulary Levels Test (Schmitt, Schmitt, & Clapham, 2001) and the Word Associates Test (Read, 2004), respectively. Two weeks later, the Vocabulary Knowledge Scale (VKS) (Paribakht & Wesche, 1996, 1997) was also administered to measure incidental vocabulary acquisition through reading in three testing sessions immediately after inferencing (VKS1). This followed the inferencing task (VKS2), and was done one month after the experimental session (VKS3). The three word knowledge tests and the lexical inferencing task based on a graded reader, *Apollo 13*, were administered in paper-and-pencil format.

Vocabulary Size Test

The vocabulary size test used in this study was a revised and expanded ver-

sion of the Vocabulary Levels Tests (Schmitt et al., 2001). This validated test of vocabulary size has Version 1 and Version 2. The authors of the test claim that these two versions are equal in terms of difficulty. In this study, Version 2 of the test was administered (see Schmitt et al. for the test), which has five word frequency levels: the 2,000-word level, the 3,000-word level, the 5,000-word level, and the 10,000-word level. In addition, it includes a section for academic vocabulary. The Vocabulary Levels Test has been accepted by a number of lexical researchers as an appropriate measure of vocabulary size (Laufer & Paribakht, 1998; Nation, 2001; Qian, 1999, 2002).

The test format consists of matched words and short definitions. The test-taker is required to match three short definitions with three of the six words provided. According to the test scoring procedure, each word correctly chosen is awarded one point, the maximum possible score being 150 for the same number of words. All the levels of the test were administered in this study. Participants were provided with brief test instructions with examples in advance of the actual test session.

Depth of Vocabulary Knowledge Test

To measure depth of word knowledge, the Word Associates Test (WAT) was administered. This test was developed by Read (1993, 1998, 2004) and has a multiple-choice test format. It measures depth of vocabulary knowledge by means of word associations based on three relationships among words in the mental lexicon: paradigmatic (meaning), syntagmatic (collocation), and lexical progression (a process of lexical building). The WAT has been used in a number of lexical studies to measure depth of vocabulary knowledge (Nassaji, 2004; Qian, 1999, 2002). I used the 4.0 version of the WAT in this study.

The WAT contains 40 items, each of which comprises one adjective as a stimulus word followed by eight options, four of which associate with the stimulus word. In scoring, each option chosen correctly is awarded one point. The maximum possible score, therefore, is 160 for the 40 items. Because the structure of the test is not self-explanatory, test instructions and some example questions were provided to guide participants.

Vocabulary Knowledge Scale

The Vocabulary Knowledge Scale (VKS, Paribakht & Wesche, 1993, 1996, 1997; Wesche & Paribakht, 1996) was administered with a repeated measure design to assess the retention of inferred meanings. The test items reveal word knowledge, "ranging from total unfamiliarity, through recognition of the word and some idea of its meaning, to the ability to use the word with grammatical and semantic accuracy in a sentence" (Paribakht & Wesche, 1997, p. 179). Paribakht and Wesche claim that the VKS is highly practical and can be used with any set of words. They believe that the test should be viewed as a practical instrument to be used in studies of the initial recognition and use of new words.

According to Paribakht and Wesche (1996), the VKS scoring accepts self-reported answers of categories I and II for scores of 1 and 2, respectively. Wrong responses in categories III, IV/ or V/ are scored 2. A score of 3 indicates that an appropriate meaning was provided for categories III or IV/. A score of 4 is given if the word is used in a sentence demonstrating the learners' knowledge of its meaning in that context but with a wrong grammatical category. A score of 5 is awarded if the target word is used semantically and grammatically correctly in a sentence context.

All the test items were scored according to the VKS scoring procedure. As this study aims to probe the learners' long-term retention of the inferred target word meanings in incidental vocabulary acquisition, the 5-point VKS was then collapsed to a 3-point scale (i.e., categories , , and). The first two categories assess the participants' familiarity with and recognition of the target word form, and category III gauges whether students have an idea of the meaning of the target word. However, categories V/ and V/ measure the students' ability to produce the meanings of the target words and to use them in a sentence context. Thus in this study, I decided to use a collapsed version of the VKS test, including only categories I, II, and III, as categories I and II represent participants' receptive retention, and category III reveals their productive knowledge of the meaning of the target word (see Appendix A for the test).

The Graded Reader

In the text selection process, the simplified materials were preferred to the authentic ones because they compare favorably with the much more lexically dense literary originals (Horst, 2005). Similarly, Nation (2001) argues that simplification is a major technique in second-language learning. He believes that without simplification, the strands of meaning-focused input, meaning-focused output, and fluency development become impossible for most L2 learners except for advanced learners. As far as the role of graded readers in vocabulary development through reading is concerned, Nation and Wang (1999) argue that as the most accessible simplified texts, they offer effective ways of encountering most of the high-frequency words. Similarly, Wodinsky and Nation (1988) believe that graded readers provide learners with the opportunity to read an L2 text without encountering so many unknown words, and thus learners are able to read successfully and gain pleasure from their reading.

Among various graded readers examined for this study, I typed seven potential books into the computer program RANGE (Heatley, Nation, & Coxhead, 2002). Heatley et al. argue that the RANGE program can provide a lexical profile of the text and that it can also be used to find the coverage of a text using word lists. The RANGE program was thus run, and a list of all the various word types and word tokens of these seven books was generated. After a close examination of the data obtained from RANGE, *Apollo 13* was

selected for this study. This is a fictional story about three astronauts flying to the moon. I preferred fictional themes because they do not usually require background knowledge, unlike academic texts. Thus fictional texts are likely to represent some of the most favorable conditions for learning (Nation, 2001). *Apollo 13* is a level 2 graded reader for elementary learners. For the advanced learners in this study, the book would be easy to read and would introduce the target words into an easy co-text. According to the results of the text analysis operated by RANGE, the book has 8,223 words (word tokens) and 664 word families (word types). *Apollo 13* is a graded Penguin Reader published and distributed by Pearson Education.

The Target Words

Research indicates that at least 95% of word tokens should be known to participants if successful inferencing from context is to take place, and a minimum of this figure will lead to the transfer of reading strategies (including successful inferencing, Na & Nation, 1985; Nation, 2001). To reach the desired density of unfamiliar words in the text for successful inferencing to occur, 13 words were chosen as target words for which the participants were to infer meaning from context. The total number of occurrences of these 13 target words accounts for 97.99% coverage of the running words and 98.04% coverage of the word types. However, it was also expected that some other words in the text might not be known to all the participants. I assumed that the participants knew all the other words in the text, as the advanced learners in this study were to read an elementary graded reader. According to Waring and Takaki (2003), this is the best assumption that could be made without having the learners read the graded reader in a pre-testing session and asking them to underline every word unknown to them before reading the text. In this way it was reasonable to assume that the participants would read at an appropriate text density as recommended by Nation and Na and Nation.

To measure the success of lexical inferencing through reading, the pseudo-word method was adopted rather than the real-word approach. A pseudo-word is "an invented word constructed according to the orthographic and morphological rules of the target language" (Pulido, 2007, p. 73) and refers to an already known, common concept (Waring & Takaki, 2003). In inventing the pseudo-words, we tried to construct them to look like plausible English words. Two colleagues checked the pseudo-words for plausibility, and implausible words and words with difficult pronunciation were discarded (see Appendix B for the pseudo-words and their English equivalents). To ensure that the participants would pronounce the pseudo-words fairly well, three L2-learners of similar ability and background also checked the target words. These learners were not part of the study.

The 13 target words were replaced by pseudo-words. These were then underlined and fitted into the graded reader. The main advantage of pseudo-

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words was that they allowed us to control the learners' knowledge of the target words. By using the pseudo-words, we ensured that the participants would not know the target words before reading the text. A further reason for using the pseudo-word method was to ensure that the target words would not be encountered after the treatment session in the participants' normal studies. If this happened, it would affect the results of the VKS tests.

Lexical Inferencing Task

To explore learners' L2 lexical inferencing behavior through reading, I asked the participants to read the graded reader and attempt to infer the meanings of 13 target words. They were required to write an exact meaning or definition of each target word and also to use each in a sentence context. They were allowed to write their inferences in English or Farsi or even a mixture of both. This allowed them to "more accurately report their thinking processes than would requiring them to use one language or the other. It also allows them to compensate for memory lags in retrieving a word" (Paribakht, 2005, p. 733).

A three-point scale (0-2) was used to measure the range of lexical inferencing success. An unsuccessful attempt was scored as 0, a score of 1 was given to the partly successful inferencing, and a successful attempt was scored as 2. The unsuccessful attempts were answers that were semantically and grammatically deviant. Responses that were semantically appropriate but grammatically deviant, or vice versa, were considered partly successful. Attempts reflecting both semantically and grammatically correct answers were classified as successful attempts (see Table 1 for examples of unsuccessful, partly successful, and successful attempts). The total number of responses to all the target words was 429 (13 target words × 33 participants).

Table 1
Examples of Unsuccessful, Partly Successful, and Successful Attempts

Inferencing Attempts	Pseudo-word (English Word)	Inferred Meaning	Sentence
UA	Sind (Hit)	happy	he sind when he see boy
PA	Pertrugant (Astronaut/s)	a person travels to the space	Pertrugant is Controlled airplane.
SA	Pulark (Walk)	to walk	My father Pularks to work on foot every day.

Note. UA=Unsuccessful Attempt; PA=Partially Successful Attempt; SA=Successful Attempt.

Treatment Procedure

A quasi-experimental study with repeated measure design was conducted to gather quantitative data from 33 students. Data-collection was in paper-and-pen format administered in three testing sessions from November through December 2008. In the first testing session, the tests of depth and breadth of vocabulary knowledge, the lexical inferencing task through reading and the immediate cued-recall test (VKS1) were administered. At the beginning of this session, all the participants were oriented to the three vocabulary tests by receiving oral instruction and completing some practice exercises (the oral instruction was in Farsi to ensure that none of the participants would misunderstand what they were supposed to do). The participants were also instructed how to infer target words through reading. They were to write their inferences of the target words on a separate answer sheet. As I wished to make this experimental study as similar as possible to an incidental learning condition, I did not inform the participants of the existence of pseudo-words in the graded reader or of the two vocabulary post-tests following the first treatment session.

Two weeks later, the second treatment session was held, and the participants took the VKS test again. In the third testing session, which was held one month after the first, the VKS test was administered a third time. Both sessions 2 and 3 were unannounced, and the same procedure was followed for both. A colleague and I conducted all three testing sessions. We concluded the third testing session with a debriefing phase to inform the participants of the purpose of the study and the use of pseudo-words.

Data Analysis and Results

To examine the research questions, the quantitative data (i.e., scores of the three language tests and the participants' scores on lexical inferencing success) were used. A two-tailed Pearson correlation analysis was run to discover the relationship between depth and breadth of lexical repertoire and incidental

Table 2

Pearson Correlation (Two-Tailed) Among Scores on the Depth
and Breadth of Vocabulary Knowledge and VKS3 (N=33)

Test	VKS3	Depth	Breadth
VKS3	-	0.65**	0.50**
Depth	0.65**	-	0.93**
Breadth	0.50**	0.93**	-

**p<0.01.

vocabulary acquisition. In this phase of the analysis, scores on the depth and breadth of word knowledge and VKS3 were used. The results of the Pearson correlation analysis for each of the variables are shown in Table 2.

Intercorrelations among the scores of the three tests are all statistically significant. As Table 2 shows, the depth of word knowledge has a higher correlation with meaning retention (0.65) than does the breadth of word knowledge (0.50).

The fact that the depth of word knowledge has a higher correlation with incidental learning of words is consistent with the findings of earlier research (Nassaji, 2004; Qian, 1999) that support approaches to lexical learning behavior that emphasize the richness of the learners' conceptual system and depth of vocabulary knowledge.

The data for the VKS tests through the three test administrations are illustrated in Figure 1. As can be seen, the mean scores of the three VKS tests show a downward trend from immediate post-test to VKS3. From VKS1 to VKS2, mean scores show a dramatic drop, suggesting that a high percentage of participants forgot the inferred meanings during the first two weeks. Results also indicate that in the last two weeks of study (i.e., from VKS2 to VKS3), they forgot less quickly.

To answer the second research question and to assess the intercorrelations among L2 lexical inferencing success, depth and breadth of word knowledge, I conducted another Pearson correlation (two-tailed). The results of the correlational analysis are presented in Table 3.
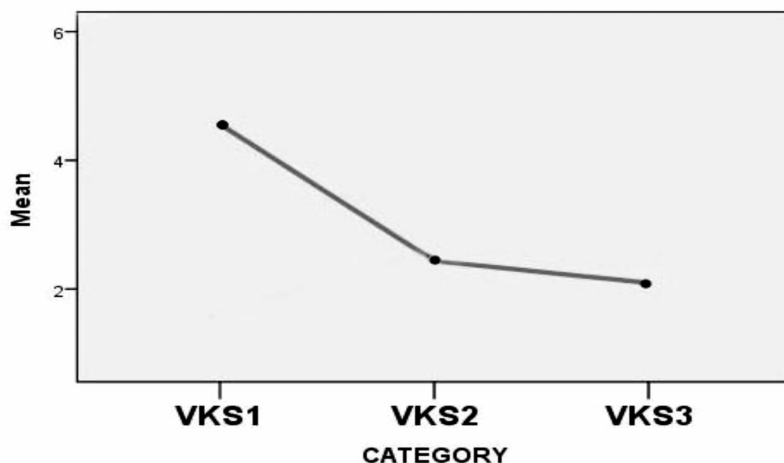

Figure 1. Mean scores of the VKS tests over the three test administrations.

Table 3
Pearson Correlation (Two-Tailed) between the Depth and Breadth of Vocabulary Knowledge and Lexical Inferencing Success (N=33)

Test	LIS	Depth	Breadth
LIS	-	0.89**	0.76**
Depth	0.89**	-	0.93**
Breadth	0.76**	-	0.93**

Note. LIS=Lexical Inferencing Success.
**p<0. 01.

As Table 3 illustrates, the intercorrelations among the three tests are both positive and significant. The correlation between the depth of vocabulary knowledge and L2 lexical inferencing success (r=0.89) is higher than that between the breadth of vocabulary knowledge and L2 lexical inferencing success (r=0.76). The correlation between the depth and breadth of vocabulary knowledge (r=0.93) is the highest.

To answer the third research question and to predict the range of L2 inferential success from the depth and breadth of word knowledge, I conducted multiple regression analyses. To determine the stronger predictor of lexical inferencing success, scores of the depth and breadth of word knowledge were taken as predictor (independent) variables and scores of lexical inferencing success as the criterion (dependent) variable. As Table 4 shows, one of the predictor variables, depth of vocabulary knowledge, was chosen to be entered first into the regression process.

Table 4
Multiple Regression Analyses of the Scores on Depth and Breadth of Vocabulary Knowledge

Step	Predictor Variable(s) Involved	R^2	Adjusted R^2	R^2 Change
(A)				
1	Depth	0.58**	0.58**	
2	Depth, Breadth	0.66**	0.65**	0.08
(B)				
1	Breadth	0.40**	0.41**	
2	Breadth, Depth	0.66**	0.65**	0.26

**p<0. 01.

The column labeled R^2 indicates the proportion of the total variance in the criterion variable (i.e., the range of lexical inferencing success in this case) accounted for by the predictor variables (i.e., depth and breadth of word knowledge in this case), and adjusted R^2 is an estimation of the population value. For the models of multiple regression analysis with more than one predictor variable, the adjusted R^2 value is developed to better fit with the population (SPSS, 1998). Reporting both R^2 and adjusted R^2 is important when there are a number of predictors and a small sample size. R^2 change, the difference between an R^2 value for the preceding predictor and an R^2 value for the predictor being entered, indicates the magnitude of the contribution of a variable at the point where it is entered into the regression equation.

The first section of Table 4 (labeled A) presents the results of the analysis where the depth of lexical repertoire was entered first into the equation, followed by the breadth of word knowledge. As it can be seen, the R^2 value and the adjusted R^2 value at this step were 0.58. The depth of word knowledge accounted for 58% (R^2=0.58) of the variance in the criterion variable, lexical inferencing success. Evidently, the depth of word knowledge as a predictor variable explained a significant amount of the success in lexical inferencing. By adding the breadth of word knowledge into the regression analysis at the second step, the R^2 value and the adjusted R^2 value changed to 0.66 and 0.65 respectively. The depth and breadth of word knowledge jointly accounted for 66% (R^2=0.66) of the total variance in lexical inferencing success. However, the breadth of vocabulary knowledge did not predict significantly over and above the depth of vocabulary knowledge (R^2 change=0.08). The entry of the breadth of word knowledge at the second step contributed only an additional 8% of the variance in lexical inferencing success.

To investigate further the contribution made by the breadth of vocabulary knowledge, I conducted another regression analysis. The second section of Table 4 (labeled B) displays the results when the breadth of vocabulary knowledge was entered first, followed by the depth of vocabulary knowledge. This time the R^2 value was 0.40, indicating that the breadth of vocabulary knowledge alone explained 40% of the variance in lexical inferencing success. In the next step, when the depth of vocabulary knowledge was added to the equation, the R^2 value increased to 0.66 (R^2 change=0.26). That is, the depth of lexical repertoire explained an additional 26% of the variance in the lexical inferencing success.

Discussion and Conclusion

The kinds of analyses and interpretation provided here are a modest representation of the importance of word knowledge and the aspect of lexical repertoire that matters most in L2 lexical inferencing success and incidental

vocabulary acquisition. As the results of two-tailed Pearson correlation analysis revealed, the correlation of the depth and breadth of lexical repertoire with long-term (i.e., VKS3-after a month) retention of the inferred target word meanings is positive and significant, but this correlation is stronger for depth of vocabulary knowledge ($r=0.65$) than for the breadth ($r=0.50$). These findings are consistent with those of Nassaji's (2004) study in which depth of word knowledge was strongly associated with vocabulary development in foreign-language learning.

As Table 3 and Figure 1 illustrate, scores on depth and breadth of vocabulary knowledge and L2 lexical inferencing success are positively correlated. According to the results obtained from the Pearson correlation analysis conducted to address the second research question, the correlation between the depth of vocabulary knowledge and L2 lexical inferencing success ($r=0.89$) is higher than that of the breadth of lexical knowledge and L2 inferential success ($r=0.76$).

The results of this study also indicate that depth and breadth of L2 lexical knowledge are highly correlated ($r=0.93$). Qian (2002) claims that the close correlation between the depth and breadth of word knowledge may be because the test of depth of vocabulary knowledge measures deeper aspects of knowledge, synonymy and polysemy, which the test of breadth of word knowledge also attempts to measure. Furthermore, individual word meaning may also affect the knowledge of collocation, which is also measured in some tests of depth of vocabulary knowledge. The close correlation between depth and breadth of word knowledge can also be attributed to the fact that a large vocabulary, that is, a higher breadth of vocabulary knowledge, results in a richer network of words in the mental lexicon, which thus contributes to a deeper level of word knowledge.

To determine whether depth or breadth of L2 vocabulary knowledge is a stronger predictor of lexical inferencing success, multiple regression analyses were conducted. As Table 4 shows, both depth and breadth contributed to the inferencing success. However, further analysis indicated that whereas depth of vocabulary knowledge alone accounted for 58% of the variance in the inferencing success, breadth of vocabulary knowledge accounted for only 40% of the variance. The depth and breadth of vocabulary knowledge together accounted for 66% of the variance in the lexical inferencing success, demonstrating the important role that word knowledge plays in inferential success and incidental vocabulary acquisition through reading. The findings of this experimental study also show that depth of vocabulary knowledge is a stronger predictor of lexical inferencing success through reading.

The results of this study revealed that the correlation between depth and breadth of vocabulary knowledge was highly significant and that depth of word knowledge had a stronger correlation with inferential success and incidental vocabulary acquisition. These findings support the influential role

that both depth and breadth of lexical repertoire play in L2 inferential success and incidental vocabulary acquisition through reading and suggest that a combination of depth and breadth of word knowledge correlates better with L2 lexical inferencing success.

Pedagogical Implications

This study provides empirical evidence to support the significant correlation between depth of lexical repertoire and L2 lexical inferencing success. It also shows a significant correlation between depth and breadth of word knowledge and the long-term retention of inferred meanings. In addition, the research findings show a close correlation between the two dimensions of lexical repertoire, that is, depth and breadth of word knowledge. As this study aimed to probe lexical inferencing strategy through reading, the findings of this research add to language-teachers' understanding of the nature of lexical inferencing behavior and its role in L2 vocabulary development through reading and the rate of retention of the inferred target word meaning. In regard to long-term retention of inferred meanings, Schouten-van Parreren (1985) argues that inferring the meaning of a word leads readers to invest greater mental effort than when the meaning is provided to them. He believes that the meanings acquired through lexical inferencing may later be recalled more successfully than meanings attained with less mental effort. Lexical inferencing as a central cognitive process in reading comprehension (Nassaji, 2004) should, therefore, receive some instructional focus in L2 reading classes. It is recommended that teachers make L2 learners aware of this strategy and encourage them to infer the meanings of unknown words through reading. In this regard, "formal instruction in lexical inferencing strategy" (Bengeleil & Paribakht, 2004, p. 242) can be effective in strengthening learners' ability to infer. Teachers should also make learners aware of diverse knowledge sources and contextual clues that they can use in the process of lexical inferencing through reading.

A further pedagogical implication concerns the importance of the depth of word knowledge in lexical inferencing success and vocabulary development through reading. Vocabulary instruction in both EFL and ESL contexts is often focused on enlarging learners' vocabularies (i.e., breadth of word knowledge). However, depth of vocabulary knowledge should also be considered. The notion of one-word-one-meaning correspondence may help improve learners' breadth of word knowledge, but it will not work well in establishing depth of vocabulary knowledge. Teachers in EFL and ESL contexts need, therefore, to communicate the importance of depth of word knowledge to their students and incorporate tasks that require deeper processing of the target words, which will lead to acquisition of varied aspects of word knowledge.

Acknowledgments

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Appendix A

Paribakht and Wesche's (1997) Vocabulary Knowledge Scale (VKS)

I   I do not remember having seen this word before.

II   I have seen this word before, but I do not know what it means.

III   I have seen this word before, and I think it means_____(synonym or translation).

IV   I know this word, it means_____(synonym or translation).

VI   I can use this word in a sentence_____(write a sentence).
(If you do this section, please also do section IV.)

Appendix B

List of Pseudo-Words and their English Equivalents

Pseudo words	English words
Pertrugant	Astronaut/s
Smort	Want/s/ed
Drinler	Computer/s
Nase	Use/ed
Lunic	Big
Ratpince	Window
Soramp	Stop
Sabrident	Different
Pulark	Walk
Snagert	Doctor
Gleap	Boat
Sind	Hit
Cawng	Large