Iranian Journal of Applied Linguistics (IJAL), Vol. 15, No. 1, March 2012, 97-122

On the Relationship between Metacognitive Awareness and Two Aspects of Vocabulary Knowledge

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Received 4 July 2011; revised 3 November 2011; accepted 10 January 2012

Abstract

This study explores the relationship between metacognitive awareness and 2 aspects of vocabulary knowledge (i.e., declarative versus skill) in "more explicit" and "less explicit" language learning groups. Also, it investigates whether declarative aspect, operationalized in vocabulary size, and skill aspect, operationalized in the productive use of vocabulary, differ in the more explicit and less explicit language learning groups. To these ends, 80 Iranian EFL learners, majoring in English Translation at Shahrekord and Esfahan Payam-e-Noor Universities were selected through Oxford Placement Test. Schraw's (1994) Metacognitive Awareness Test was used to measure the participants' degree of the explicit knowledge; Nation's (1990) Vocabulary Levels Test and Laufer and Nation's (1999) Productive Vocabulary Levels Test were also used to measure their skill and declarative knowledge, respectively. Correlational statistics indicated a significant and positive correlation between metacognitive awareness and declarative knowledge, but a significant and negative correlation between

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metacognitive awareness and skill aspect of vocabulary. Moreover, *t* tests indicated that the more explicit group was better in the declarative aspect whereas the less explicit one was better in the skill aspect of vocabulary knowledge. The findings shed light on the cognitive dimension of vocabulary learning.

Keywords: Vocabulary; Metacognitive awareness; Skill and declarative aspects

Introduction

The process of mastering a second language (L2) is undoubtedly a complex one, involving a dynamic interplay of language skills and components. Vocabulary is one component which is central to language learning and critical to L2 learners. However, as Dörnyei (2009) points out, L2 teaching has not been responsive to problems in this area, and L2 teachers have not fully recognized the great communicative advantage in developing an extensive vocabulary. According to Ellis (2005), during vocabulary learning/acquisition, there are many processes at work, but the secret possibly lies in the various cognitive processes and conditions which shape language learners' progression towards mastering L2 vocabulary learning. Also, cognitive researchers such as Dörnyei (2009) believe that certain cognitive processes in language learners' minds make learning possible. As Vygotsky (1962, cited in Guo & Roehrig, 2011) states, perhaps learning a foreign language is "conscious and deliberate from the start" (p. 46). Thus, it is important to examine the cognitive dimension of lexical retrieval processes and issues related to vocabulary learning.

Highlighting the role of the cognitive dimension, Pressley and Ghatala (1990) state that understanding the role of metacognitive awareness in language learning is central to vocabulary learning. Coutinho (2007) considers metacognition as a strong predictor of learning. Metacognition is defined as "knowledge about cognitive states and abilities that can be shared among individuals" (Paris & Winograd, 1990, p. 15) and metacognitive awareness is the knowledge of the mental processes which involves focusing on conscious knowledge about learning (Yore & Treagust, 2006). At the metacognitive level, as Wenden (2002) points out, language learners plan behavior, analyze the situation they find themselves in, and evaluate their own progress towards learning. The point which both L2 researchers and teachers should take into account is how the metacognitive awareness/knowledge would affect the quality of vocabulary learning in the context of foreign language learning.

According to many researchers (e.g., Ellis, 1994; McCarthy, 1990; Meara, 1996; Nation, 1990), the goal of vocabulary learning should include both declarative knowledge and skill aspect of vocabulary. Declarative vocabulary knowledge refers to knowledge of word meaning (Nation, 2001). In Henriksen's (1999, 2008) terms, it includes remembering and retrieving words by conscious and deliberate effort in much the same way as explicit knowledge. The skill aspect of vocabulary refers to the levels of accessibility of learners to their overall vocabulary knowledge or the ability of learners to use words. In sum, as Gu (2003) asserts, the ultimate goal of vocabulary learning should include both declarative and procedural knowledge. This can be realized through "remembering words and the ability to use them automatically in a wide range of language contexts when the need arises" (McCarthy, 1984, p. 12).

In addition, Dekeyser (2007) proposes that language learning knowledge can be either retrieved implicitly as procedural knowledge or explicitly as declarative knowledge. Declarative and procedural (i.e., skill) knowledge might relate to explicit and implicit learning. But the gap in L2 research studies concerns with the reflection of explicit/implicit language learning processes on declarative and skill knowledge (Ellis, 1994). Although the theoretical significance of declarative and skill (i.e., procedural) aspects of language has been well documented in L2 literature (e.g., DeKeyser, 2007; Ellis, 2005; Ellis et al., 2009; Segalowitz, 2007), as DeKeyser (2003) and Ellis (2009b) point out, few empirical studies have been conducted to relate these two aspects to metacognitive awareness (i.e.,. conscious knowledge of mental processes) and the issue of explicit-implicit learning (i.e., the relative consciousness of language learners of their own learning processes). Filling the gap, this study seeks to explore the relationship between metacognitive awareness and two aspects of vocabulary knowledge (i.e., declarative and skill) among English as foreign language (EFL) learners. In addition, it tries to compare the performance of two groups (i.e., those EFL learners who are more conscious of their own learning processes and those who are less conscious of their own learning processes or strategies) in terms of the declarative and skill aspects of vocabulary knowledge. Investigating the relationship between metacognitive awareness and these two aspects of vocabulary knowledge in the two aforementioned groups separately can give us a clearer picture and help us to better draw out the pedagogical implications for L2 learners who would go through the process of developing each aspect to eventually become autonomous. The present study has made a start in the realm of the relationship between the abovementioned

variables and, the present researchers hope to add empirical findings to this realm of inquiry.

Literature Review

There are competing positions in explaining the development of the skill aspect of L2 learning. DeKeyser (2001) reviews Anderson's adoptive control of thought (ACT) theory, which assumes mechanisms that become routinized with practice. The ACT theory assumes that skill acquisition involves a transition from a stage characterized by declarative knowledge to one characterized by procedural knowledge. Another position in describing the development of skill aspect is explained in the theory of 'building up parallel procedural knowledge' (see Hulstijn, 2002; Paradis, 2004; Ullman, 2005). According to Paradis (2004), this position maintains that declarative and procedural knowledge are neuroanatomically independent. The essence of the process in this position is the replacement of the controlled application of explicit rules by the automatic use of implicit procedures.

Another theoretical stance that has been influential in psycholinguistic explanations of automaticity is Logan's (1988, 2005) instance theory. According to Logan (1988), automatization is described as "the acquisition of a domain-specific knowledge base, formed of separate representations, instances, of each exposure to the task" (p. 492). Initially, a person executes an action following explicit rules. However, on every subsequent occasion the person is engaged in performing the specific skill, a new memory trace is formed which corresponds to the action performed and, thus, practice results in the storage of an increasing number of these memorized instances. In sum, as to the aspects of vocabulary learning, the above claims suggest that skill acquisition/learning follows the patterns documented in cognitive and experimental psychology. As Anderson (1993) points out, the transition from declarative knowledge to procedural knowledge involves moving from a cognitive stage where rules are so explicit, through an associative phase where rules are applied repeatedly, to an autonomous stage where the rules are no longer explicit.

As to the metacognition, the concept has been taken from cognitive psychology of one's thinking and learning (Smith, 1982). Metacognition was introduced by Ann Brown and John Flavell in the 1970s. They described it as "one's knowledge concerning one's own cognitive processes and outcomes or anything related to them" (Iwai, 2011, p. 152). In the early 1990s, three books were published

applying metacognition theory in L2 learning (O'Malley & Chamot, 1990; Oxford, 1990; Wenden, 1991). At the same time, some research (e.g., Garner & Alexander, 1989) showed that learners with higher levels of metacognition performed better than those with lower levels of metacognition. Recent researchers (e.g., Dörnyei 2009; Ellis et al., 2009) tend to highlight the significance of metacognitive awareness/skills with the focus on the explicit learning processes in L2 learning. This issue, though theoretically supported by researchers such as Dörnyei recently, has not been the subject of empirical investigation. Generally, there are quite a few empirical studies on the relationship between metacognitive awareness and vocabulary learning.

In an experimental study, Çubukcu (2008) investigated the effectiveness of systematic direct instruction of multiple metacognitive strategies on reading and vocabulary learning among 130 third-year teacher trainees in the English language department in Dokuz Eylul University. Using a control group pretest-posttest design, she found out that metacognitive strategy instruction could facilitate vocabulary learning. In a correlational study, Guo and Roehrig (2011) investigated the relationship between metacognitive awareness of reading strategies and English vocabulary knowledge among 278 undergraduate Chinese students of English Education. They also examined whether the relationship between L2 vocabulary learning, L2 syntactic awareness and metacognitive awareness to L2 reading would differ across poor and good L2 readers. The participants were identified as less skilled versus more skilled in reading ability on the basis of scores on the Test of English as a Foreign Language (TOEFL) reading comprehension test. Two tests of vocabulary knowledge were administered to assess the breadth and depth vocabulary knowledge: Vocabulary Levels Test (Nation, 1990) and Vocabulary Knowledge Measure (Qian & Schell, 2004). Also, Syntactic Awareness Questionnaire (Layton, Robinson, & Lawson, 1998) was used to assess high-level syntactic awareness. The results of the study showed that all correlations among the measures of vocabulary knowledge, syntactic awareness, metacognitive awareness and reading comprehension were significant except the correlations between the measures of syntactic awareness and those of metacognitive awareness. Besides, the association between L2 knowledge and metacognitive awareness was the same across the poor-reader and good-reader groups of the study.

In another correlational study, Mokhtar, Rawian, Hussain, and Mohamed (2011) examined the relationship between metacognitive regulation and the learning of passive vocabulary knowledge among 360 adult EFL learners in Malaysia. Metacognitive regulation was used to describe "the process of decisions about planning, monitoring and evaluating the best ways to acquire English vocabulary" (p. 174). It included "selective attention" and "self-initiation" components. Selective attention consisted of activities such as making notes of words which seemed to be important to the learners, and self-initiation consisted of activities such as reading other English reading materials besides textbooks to expand their own vocabulary knowledge. The metacognitive regulation was measured through a questionnaire and their passive vocabulary knowledge was assessed through Nations' Vocabulary Levels Test. Results showed that the metacognitive regulation positively and significantly correlated with the declarative (i.e., passive) vocabulary knowledge. Also, the selective attention and self-initiation components positively correlate with the passive vocabulary knowledge.

Given the theoretical support given by researchers such as Dekeyser (2007) and Ellis et al. (2009), relating the degree of metacognitive awareness to varied language performance and describing implicit and explicit learning by reference to two aspects of vocabulary, and motivated by the existing lack of empirical research on the relationship between metacognitive awareness and two aspects of vocabulary knowledge, as noted by Ellis (2009b) and Ellis et al. (2009), this study intended to explore the aforementioned relationship as regards the issue of implicitness/explicitness. That is, it relies on the issue of consciousness/awareness to examine the performance of EFL learners on the declarative and skill aspects of vocabulary knowledge. This might be illuminating for the first attempt as several researchers (e.g., Kihlstorm, Dorfman, & Park, 2007) approve the importance of metacognitive awareness in planning and developing language learning processes, in general, and the vital role of vocabulary enhancement in overall language ability.

Following several studies (e.g., Guo & Roehrig, 2011; Laufer, 1998; Mokhtar, Rawian, Hussain, & Mohamed, 2011), declarative vocabulary knowledge has been defined in terms of vocabulary size. But, to the best of the present researchers' knowledge, no specific measure has been used in the literature about the skill aspect of vocabulary so far. However, as Hulstijn (2005, p. 137) points out, "if we continue to focus on the conceptual and speculative aspects of theory construction, neglecting measurement issues, theories [and our speculations] . . . will not

survive." One cannot hope to address the two aspects of vocabulary knowledge properly unless he or she has instruments that provide him or her with valid measure of the products of those aspects. Given that the skill aspect involves a collection of production processes to realize the appropriacy and accuracy of words in the context, the present study relied on a cued sentence-based test of productive vocabulary to operationalize the skill aspect of vocabulary. It is believed that through such production tests, those language learners who have the requisite declarative knowledge, triggered by cues in the sentences, can move to proceduralizing that vocabulary knowledge and, accordingly, have a target-like production under a time constraint; that is, they can reflect their skill aspect of vocabulary knowledge, mirroring language use rather than passive knowledge of recognizing words. Thus, in an attempt to investigate the objectives, this study seeks to answer the following research questions:

1. Is there any significant relationship between EFL learners' metacognitive awareness and declarative vocabulary knowledge (i.e., vocabulary size) and skill aspect of vocabulary learning (i.e., productive use of vocabulary) in both "more explicit" and "less explicit" language learning groups?

2. Do "more explicit" and "less explicit" language learning groups differ in the declarative vocabulary knowledge and the skill aspect of vocabulary knowledge?

Method

Participants

The participants in this study included 80 EFL sophomore students (39 male and 41 female students) majoring in English translation at Shahrekord and Esfahan Payame Noor Universities. They were selected from a larger sample of 112 EFL students (87 sophomores and 25 juniors), with an average age of 22. The rationale for this selection was to have a homogenous sample which would be the representative of the population.

Instruments

This study made use of the following instruments for data collection:

Oxford Placement Test (OPT)

In order to make sure that all participants in the study enjoyed the same level of language ability, Allen's (1992) version of Oxford Placement Test (OPT) was

used. This test includes two sections: grammar and listening items. Each section consists of 100 items. The OPT provides a reliable and efficient means of placing students at different levels of language ability. According to Kassaian and Esmae'li (2011), the test has been calibrated against the levels system provided by the Common European Framework of Reference for languages (CEFR), which has been adopted by the Association of the Language Testers in Europe (ALTE) as well as by major institutions throughout Europe. Different versions of the OPTs have been calibrated against a range of major international language examinations (Kassaian & Esmae'li, 2011). It should be noted that the scores on the OPT correlate with the scores obtained from several valid tests such as Nelson English Language Proficiency Test (NELP), and Michigan English Placement Test (MEPT), which include a vocabulary section and are used for placement purposes (see Khosravi, 2010). In scoring, each item of the OPT was awarded one point for the correct answer. Thus, the possible score could range from 0-200.

Metacognitive Awareness Test (MAT)

This study used Schraw's (1994) Metacognitive Awareness Test (MAT) to explore the extent to which the participants were aware of their won learning processes. It included four parts: *knowing what* (factual or declarative knowledge), *knowing when and why* (conditional or contextual knowledge) and *knowing how* (procedural or methodological knowledge). This self-report questionnaire was a Likert-type scale coded on a 5-point scale ranging from 1 to 5. The test consists of statements describing the process of learning in general. The participants were asked to indicate the extent to which they agreed or disagreed with each statement (see Appendix). This test was validated by Schraw (1994). The internal consistency of this test, measured through Cronbach's alpha, was found to be 0.94.

Vocabulary Levels Test (VLT)

Nation's (1990) vocabulary size test was used to measure the participants' declarative vocabulary knowledge, which was defined in terms of declarative vocabulary size. The Vocabulary Levels Test (VLT) has been widely used to assess the size of vocabulary knowledge, that is, "the number of words for which the person knows at least some of the significant aspects of meaning" (Anderson & Freebody, 1981, p. 93). The format of this test is similar to matching vocabulary tests. It consisted of 50 sets of six words and three definitions, as shown in the following example:

Example 1:

1. business
2. clock _____ part of a house
3. horse _____ animal with four legs
4. pencil _____ something for writing
5. shoe
6. wall

This test could estimate the participants' basic knowledge of common word meanings at different word levels (i.e., 2,000, 3,000, 5,000, University Word List and 10,000 word levels). The VLT tested only content words rather than function words. In scoring, each word correctly chosen was awarded one point. Since there were 5 levels, and each level included 30 correct choices, the maximum score would be 150. However, because of the difficulty of the specialized low-frequency words for the EFL participants at the 10,000 word level, which was also confirmed by the results of a pilot study, that level (i.e., the level beyond the University Word Level) was not used in this study. A careful look at the related literature (e.g., Kassaian & Esmae'li, 2011; Laufer & Ravenhorst-Kalovski, 2010; Mokhtar et al., 2011; Nemati, 2010) also shows that the 10,000 word level, appropriate for those who have near native-like proficiency, is seldom used in EFL contexts. Therefore, the maximum possible score was 120 in this study. The validity and reliability of several versions of the VLT have been verified (Beglar & Hunt, 1999; Laufer, 1998; Read, 2000; Schmitt, Schmitt, & Clapham, 2001). The reliability score of the whole test (r = 0.96) and various levels were found to be above 0.84 (Beglar & Hunt, 1999; Nation, 1990). Meanwhile, the internal consistency reliability of the standard version, used in this study, was found to be 0.88.

Productive Vocabulary Levels Test (PVLT)

Laufer and Nation's (1999) Productive Vocabulary Levels Test (PVLT) was used to assess the skill aspect of vocabulary knowledge. Its format was similar to a C-test, in which half of the target word was provided. As the following example shows, it required the participants to produce the words rather than to simply recognize them. As the skill aspect of vocabulary concerns the use of vocabulary in a range of language contexts, it is believed that production triggered by half of the words can realistically mirror natural L2 use and reflect a stronger command of the

target words. As Zimmerman (2004) states, it stands out in terms of its format because it requires test takers to produce the word as they were speaking or writing. When the productive knowledge is being tested, words have to be elicited in an efficient way. Controlled productive knowledge tests like the PVLT can do so since they target predetermined test items through a sentence context (Laufer & Nation, 1999). As Fitzpatrick and Clenton (2010) point out, "free productive tasks are problematic… with a lot of language being produced which is superfluous to the measure being used" (p. 539). The productive levels tests, however, as Nation (2001) argues, require additional aspects of productive knowledge, such as the knowledge of grammatical position, function and collocation, as well as the passive knowledge of the items. This may add to the validity of this frequency-based test for its use and interpretation in the present study.

> *Example 2:* In order to be accepted into the university, he had to impr_____ his grades.

Each of the five frequency levels of the PVLT is represented by 18 items on the test, making up 90 questions in total. Because the words are taken from a leveled sampling, test scores provide a rough estimate of test takers' vocabulary size. For instance, if a student tested at the 2,000 word level receives 9 out of the 18 items correct, it can be assumed that he or she knows roughly 500 out of the 1,000 word families from that level. As four levels of the VLT were used in this study, only 2,000, 3,000, 5,000 and academic word levels of the PVLT were used. Thus, the maximum possible score of the test was 72. Meanwhile, Laufer and Nation (1999) demonstrated that the PLVT was valid and highly reliable (r = .86). The reliability of the PVLT, measured through Cronbach's alph on 72 items of the test, was found to be high (r = 0.93).

Procedures

Prior to the data collection for the main study, a pilot study was conducted. The purpose of the pilot study was threefold: first, to ensure the comprehensibility of the tests to be used in the main study; second, to examine the reliability of the tests; and third, to check the appropriacy of instructions, wordings and procedures for administrating the tests. For this purpose, a sample of 37 participants, studying English Translation in Esfahan Payame-Noor University, was selected. They were similar in age, major of study and proficiency to the participants of the main study. Based upon the results of the pilot study, the spellings of a few words were

changed from the British to the American English and an example was included after the instruction in the PVLT. Besides, the four frequency levels of the VLT proved to be appropriate for the participants in the main study.

In the main study, the OPT was given to 112 EFL sophomore and junior participants to ensure they were homogenous in terms of the language ability. The mean score was 85.5 and standard deviation was 12.2. The distribution of scores on the OPT were not normal. About 71% of scores fell between 80 and 85 (i.e., below the mean score) and about 29% of scores fell between 86 and 140 (i.e., above the mean score). That is, all junior (n = 25) and seven sophomore students, making up 29% of scores, positively skewed the scores and caused the variation to be high. That was the main reason for excluding them from the next stage of data collection to have a sample (n = 80) almost at the same level of ability. Meanwhile, the vocabulary size and productive use scores of these 80 EFL participants were above 2,000 word level when the VLT and PVLT were later administered to them. This was important in the current study. As Adolphs and Schmitt (2004) estimate, at least 2,000 word forms have to be mastered in order to understand around 90% and 94% of spoken discourse in different contexts; only a small amount of the words are above the 2,000 word level (Yamamoto, 2011). Also, according to Nation (1993), having command of the 2,000-3,000 most frequent words is vital for language learners to communicate in written form in an L2 (Nation, 1993). Thereby, if any participants had scored below 2,000 word level, he or she would have been excluded from further analysis. In sum, although this study had a correlational design, three measures in the study intended to reduce the variability in terms of vocabulary knowledge and support the homogeneity of the sample more: All the participants in the main study were sophomores; none of them scored below 2,000 word level; and it was reported that the scores on the OPT would correlate highly with the scores obtained from several valid proficiency tests, including a vocabulary section (Khosravi, 2010).

In order to collect data about EFL learners' relative awareness of learning processes, Schraw's (1994) MAT was used in a separate session. The participants were asked to report the extent to which they agree or disagree with each description provided in metacognitive awareness test. Moreover, to divide the participants into "more explicit" and "less explicit" language learning group, the metacognitive awareness test, which indicated the participants' degree of explicit knowledge about the realization of their learning processes, was used. The

normality of the MAT scores was investigated by the significance value of Kolmogorov-Smirnov test. But, the assumption of normality of scores in the MAT test was rejected. Therefore, the median of the participants' MAT scores were used to divide the sample into two main groups: Those who had scored above the MAT median were considered as "more explicit" (henceforth ME) and those who had scored below the MAT median were considered as "less explicit" (henceforth LE) language learning groups.

In order to assess the declarative and skill aspects of vocabulary knowledge, the VLT and PVLT were administered in two sessions. Finally, Pearson product moment correlation procedure and independent sample *t*-tests were conducted through SPSS to address the research questions of the study.

Results

Before addressing the research questions of the study, it was important to make sure that the distribution of MAT, PVLT and VLT scores in both ME and LE groups would not violate the assumption of normality. The normality of scores was investigated by the significance value of Kolmogrov-Smirnov test in the ME and LE groups. The normality assumption in both ME and LE groups was not rejected at 0.01. The above result also shows that using median for dividing the sample into ME and LE groups was appropriate since each group enjoyed the normal distribution of MAT scores after the sample had been divided into two groups.

Table 1 shows descriptive statistics of metacognitive awareness, declarative vocabulary size and skill aspect tests in both ME and LE language learning groups. According to Table 1, the MAT and VLT mean scores in the ME group (138.36 and 55.38, respectively) were higher than the MAT and VLT mean scores in the LE (110.66 and 35.41 respectively), indicating that the ME language learning group enjoyed higher level of metacognitive awareness and greater vocabulary size. But the PVLT mean score in the ME group (55.85) was lower than the mean score in the LE group (81.00), indicating that the LE group had higher level of productive use of vocabulary. Also, the MAT, VLT and PVLT scores in the LE group were less widely spread out since standard deviations in the LE group were smaller than the standard deviations in the ME group. This was expected because the distribution of the MAT scores before dividing the sample into the ME and LE groups was not mesokurtic, so using the median instead of mean as a cut-off point (i.e., the point for dividing the sample) provided more information and put the

scores far apart in the separate groups. In addition, the amount of variability for the VLT and PVLT scores was smaller than that of the MAT scores, which supported the credibility of sampling.

Table 1

Descriptive statistics of MAT, VLT and PVLT tests in the ME and LE groups

Groups	Variables	N	Mean	SD
ME Group	MAT	39	138.36	11.04
	VLT	39	55.38	7.89
	PVLT	39	55.85	7.51
LE Group	MAT	41	110.66	4.52
	VLT	41	35.41	6.80
	PVLT	41	81.00	5.23

As to the first research question, the focus was on the relationship between the EFL learners' metacognitive awareness and the two aspects of vocabulary learning (i.e., declarative and skill) in both ME and LE groups. To explore this relationship, the Pearson product-moment correlation coefficients between the scores on the MAT, on the one hand, and VLT and PVLT, on the other, were obtained in each group after checking the assumptions (i.e., linearity and homoscedasticity) for conducting the Pearson correlational procedures. The results of correlation are reported in Table 2.

Table 2

Correlation between the MAT and VLT and PVLT scores in the ME and LE groups

Groups		VLT	PVLT
ME Group (N = 39)	MAT	**.75 (.000)	**-.89 (.000)
LE Group (N = 41)	MAT	**.87 (.000)	**-.71 (.000)

**. Correlation is significant at the 0.01 level (2-tailed).

According to Table 2, there was a significant and positive correlation between the MAT and VLT scores in both ME and LE groups, r (38) = .75, *p < .01 and r (40) = .87,* p < .01 respectively. Following guidelines given by Cohen (1988, pp. 79-88), the size of these coefficients was found to be large in both groups (i.e., above 0.50), but the strength of relationship in the LE group was even larger than that of the ME group. Unlike the above correlation between the MAT and VLT scores, a negative correlation between the MAT and PVLT scores in both ME, r (38) = -.89, *p < .01, and LE, r (40) = -.71 *p < .01, groups was found. The degree of correlation was above 0.50 in both groups, suggesting a high relationship between the metacognitive awareness and the skill aspect of vocabulary knowledge. Moreover, the strength of the relationship in the ME group was greater than that of the LE group.

To compare the participants' performance on the declarative and skill aspects of vocabulary knowledge between the ME and LE groups, which was the concern of the second research question, the mean scores on the VLT and PVLT tests were compared through independent t tests. The results are reported in Tables 3 and 4 when equal variance was assumed across both groups at 0.01. As reported before (see Table 1), the VLT mean score of the ME group was 55.38 and that of the LE was 35.41. That is, the ME had a larger mean score. As displayed in Table 3, the mean difference of the VLT scores between the ME and LE groups was large (19.96). According to the results of the t test, the t value was also found to be great, t(78) = 12.10, *p < .01, meaning that mean difference of the VLT scores between the two groups was significant. That is, the performance of the ME and LE groups on the VLT test was significantly different.

As reported before (see Table 1), the PVLT mean scores in the ME and LE groups were 55.85 and 81.00, respectively. That is, the PVLT mean score in the LE was larger. The results of t-test in Table 4 showed that the mean difference between the two groups (i.e., 25.15) was statistically significant, t (78) = -17.72, *p < .01. The t value was found to be great, indicating that the performance of the ME and LE groups on the PVLT test were also significantly different:

Table 3
T-test on the VLT Scores between the ME and LE groups

	Levene's Test for Equality of Variances		*t* Test for Equality of Means				
	F	*Sig.*	Mean Difference	Std. Error Difference	*t*	*df*	*Sig.*
Equal variances assumed	12	.267	19.967	1.64	12.14	78	.000

Table 4
T-test on the PVLT scores between the ME and LE groups

	Levene's Test for Equality of Variances		*t* Test for Equality of Means				
	F	*Sig.*	Mean Difference	Std. Error Difference	*t*	*df*	*Sig.*
Equal variances assumed	6.35	.014	25.15	1.45	-17.72	78	.000

Discussion

The first research question concerned the matacognitive awareness and the two aspects of vocabulary knowledge. The knowledge of declarative aspect in vocabulary learning received a strong and significant relationship with higher levels of metacognitive awareness. The aforementioned result can suggest the role of consciousness in developing declarative vocabulary knowledge. Metacognition, in general, has two parts, namely metacognitive knowledge/awareness and metacognitive experiences/regulation of cognition. According to Schraw and Dennison (1994), metacognitive knowledge includes knowledge about self and strategies and knowing when and why to use strategies, so consciousness and declarative knowledge can be the integral parts of metacognitive knowledge/awareness. Along the same lines, Anderson (1983) claims that declarative knowledge is consciously held information/skill relevant knowledge that is describable, so awareness plays a part in the knowledge development of the declarative aspect of vocabulary, too. This issue highlights the bidirectional

relationship between the two. In addition, as Doughty and Long (2005) argue, awareness is the defining feature used in the L2 literature on implicit and explicit learning. Explicit learning is characterized by language learners' conscious and deliberate attempts to master materials. The effectiveness of explicit learning can be attributed to the elaborateness, manifested in larger vocabulary size (Ellis, 2005). Thus, it can be assumed that higher degrees of metacognitive awareness are associated with higher degrees of explicitness incorporated in the declarative aspect of vocabulary knowledge. That might be a reason why a stronger correlation between metacognitive awareness and declarative aspect of vocabulary was observed. Meanwhile, the above result supports the results obtained by Guo and Roehrig (2011), who reported a positive relationship between metacognitive awareness of reading strategies and English vocabulary knowledge among Chinese learners of English, as well as Mokhtar et al. (2011), who found a positive and significant correlation between metacognition and declarative vocabulary knowledge.

Furthermore, the results of the present study showed a negative relationship between the EFL learners' metacognitive awareness and their capability in the skill aspect of vocabulary in the language learning groups: Higher scores on the metacognitive awareness test were associated with the lower scores on the skill aspect of vocabulary. This relationship might be due to the nature of cognitive processes which are involved in the skill aspect of vocabulary learning among the language learners. It is assumed that the skill aspect (i.e., productive use of vocabulary) involves acquiring procedural knowledge. This kind of knowledge, as Anderson (1983) argues, is the knowledge which is evident in a learner's behavior, but the learner is not consciously aware of. This feature (i.e., the low level or lack of awareness) might account for its negative correlation with the metacognitive awareness, which relies on consciousness. Moreover, the above issue is further supported by the higher scores on the skill aspect of vocabulary (i.e., the PVLT scores) and lower variance obtained in the less explicit group of the study, compared with the more explicit learning group. As Ellis (2009b) states, "the test[s] of implicit knowledge result in lower standard deviations than the tests of explicit knowledge" (p. 55).

Furthermore, the mean scores of the ME and LE groups on the VLT and PLVT tests were significantly different. The ME had a better performance on the VLT test (i.e., the declarative vocabulary knowledge) and the LE had a better performance

on the PVLT test (i.e., the skill aspect of vocabulary knowledge). In line with the above discussion, one plausible interpretation might be that the learning of declarative vocabulary knowledge relies on the explicit learning processes which occur in the presence of awareness, mostly in initial stages of learning. Naturally, this is manifested better in more explicit learning groups. In contrast, the skill acquisition of vocabulary (i.e., productive use of words) mainly relies on implicit learning processes which occur unintentionally and in the absence of awareness. Naturally, this is manifested better in less explicit learning groups. This difference in the performance of the two groups on the declarative and skill aspects tests of the present study can support the claim made by Krashen. According to Krashen (2003), language learners are different in terms of the degree to which they draw on their explicitly *learnt* knowledge and implicitly *acquired* knowledge for actual communication. According to Krashen, *learning* (i.e. explicit learning) acts as a conscious monitor and is distinct from natural *acquisition*. The processes involved in *acquisition* (i.e., implicit learning) are responsible for the skill aspect of knowledge such as natural production and fluency in speaking. Thus, to use Krashen's terms, the more explicit and less explicit groups of the present study were different in terms of the degree to which they drew upon more explicitly *learnt* knowledge (i.e., declarative) and implicitly acquired knowledge (i.e., skill). In addition, according to the proponents of noninterface position (e.g., Ellis, 2005, 2009a), explicit and implicit learning are independent language attainment mechanisms, and the resulting sets of language knowledge are stored in different parts of the brain. As Gu (2003) argues, acquiring the declarative aspect of knowledge necessitates more conscious memory and explicit learning mechanisms in the brain, whereas acquiring the skill aspect of knowledge mostly involves implicit memory. Thus, it is not illogical to expect that more explicit and less explicit learning groups have different performances on the tests assessing different aspects of vocabulary knowledge (i.e., the declarative and skill aspects). That is, as the above results of the current study have demonstrated, the better performance on one aspect of vocabulary knowledge does not *necessarily* mean the better performance on the other aspect of vocabulary knowledge.

Conclusion

For the sake of vocabulary enhancement, it seems necessary to consider the cognitive dimension of lexical processes. It is believed that different aspects of vocabulary learning are involved in different cognitive processes. The most important area of contention in this study was related to the nature of the mental

lexicon, particularly the debate on the relationship between the degree of metacognitive awareness and the performance of EFL learners on the declarative and skill aspects of vocabulary knowledge. In the context of this study, declarative knowledge was measured in terms of vocabulary size and skill aspect of vocabulary learning was measured in terms of accuracy of words produced in the context of a controlled test. There existed a positive correlation between metacognitive awareness and declarative vocabulary size, but a negative correlation between metacognitive awareness and skill aspect of vocabulary in both more explicit and less explicit language learning groups. These findings can stress the role of explicit and implicit learning patterns, centered on the key issue of consciousness, in developing different aspects of vocabulary knowledge. Skill aspect mainly relies on implicit learning, but the meaning and mediational aspect of vocabulary learning mostly involves conscious learning processes. In addition, results indicated that the EFL learners with higher levels of metacognitive awareness in the ME group acted better than the LE group in terms of their declarative vocabulary repertoire, but this development did not necessarily enhance their ability in the productive use of vocabulary. Thus, the possibility of explicit knowledge transforming directly into implicit knowledge as well as the possibility of implicit knowledge becoming explicit might not be *indisputably* true. This study might be a good starting point for further investigations on the reflection of different cognitive processes in acquiring different aspects of L2 vocabulary.

Pedagogical Implications and Limitations

The positive relationship obtained between metacognitive awareness and declarative vocabulary size implies that students with higher levels of metacognitive awareness can be more successful in declarative vocabulary size to act more efficiently. As Suchanova (2006) states, "students' ability to use their metacognitive skills help them to become autonomous in enriching new vocabulary of a foreign language" (p. 156). By implications, EFL students need some time for the group discussion and reflection activities in the classroom, promoting metacognitive skills, despite the pressures exerted by their curricula. Along the same lines, EFL teachers should both discuss their cognition (i.e., how to perform a vocabulary learning task) and model their metacognition (i.e., how they think about and monitor a vocabulary learning task) for their students. Accordingly, there appears to be a need for the material developers to incorporate metacognitive skill instructions in L2 materials to assist L2 learners in vocabulary knowledge development.

Metacognitive skills instructions and explicit teaching of vocabulary can definitely be useful in teaching/learning EFL. However, as the results of the present study have indicated, there might be a gap between the developments of the two aspects of vocabulary knowledge among EFL learners. As Hulstijn (2007) states, fluent use of words does not involve the application of explicit rules serially; productive fluency can come from a form of implicit cognition which might not be open to conscious inspection at all. Thus, another major trust of the above findings is to make use of implicit context-based exercises and output-oriented tasks as well to develop the skill aspect of vocabulary knowledge. Moreover, EFL learners (like the more explicit and the less explicit language learning groups of the current study) draw on the explicitly learnt and implicitly acquired vocabulary knowledge to different degrees. As Melka (1997, cited in Yamamoto, 2011) points out, this gap between the receptive and productive vocabulary takes some time to be reduced; both practice and conscious effort need to be made on the part of EFL learners.

This study was just a step in the process of reflecting on cognitive processes in acquiring two aspects of vocabulary knowledge. This study remains in the camp of trait-theory tests. As Bachman (1990) asserts, we should acknowledge the limitation of indeterminacy in specifying traits in social sciences. According to Bachman, "in the face of complexity and interrelationships among the factors that affect test performance on language tests, we are forced to make certain simplifying assumptions or to *underspecify*, both in designing language tests and in interpreting test scores" (p. 31). The above interpretations are limited, but by no means invalid, because our observations of performance are indirect and relative. Using a cued sentence-based production test and a self-report metacognitive awareness questionnaire used in this study might not entirely reflect the processes and analyses involved in learning the two aspects of vocabulary. The fact that the wide generalizations arise from analysis of the results obtained from just two tests and a small sample size may suggest that the study was biased. Caution about generalizing the findings is sufficient to suggest further research with different types of data collection procedures (e.g., using introspective techniques) as well as larger samples of various proficiency levels.

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Appendix

Metacognitive Awareness Test (MAT)

Instruction: *Please answer the extent to which you agree or disagree with each of the statements listed below using the following scale:*

(1)	*Strongly Disagree*	SD
(2)	*Disagree*	D
(3)	*Neutral*	N
(4)	*Agree*	A
(5)	*Strongly Agree*	SA

1. I understand my intellectual strengths and weaknesses.

(1)	(2)	(3)	(4)	(5)

2. I am good at organizing information.
3. I am good at remembering information.
4. I am a good judge of how well I understand something.
5. I tried to use strategies that had worked in the past on the test.
6. I had a specific purpose for each strategy I used on the test.
7. I set specific goals before I began the test.
8. I thought of several ways to solve a problem on the test and chose the best one.
9. I asked myself questions about the test material before I began.
10. I read the test instructions carefully before I began taking the test.
11. I organized my time to complete the test.
12. I slowed down when I encountered important information on the test.
13. I consciously focused my attention on important information on the test.
14. I created my own examples to make information more meaningful on the test.
15. I focused on the meaning and significance of important information on the test.
16. I drew pictures or diagrams to help me understand while taking the test.
17. I focused on overall meaning instead of specifics on the test.
18. I asked myself if what I was reading on the test was related to what I already knew.
19. I tried to translate new information on the test into my own words.
20. I asked myself periodically if I was meeting my goals on the test.
21. I considered several alternatives to a problem on the test before answering.
22. Supervisors are willing to adapt their supervisory style in response to changes resulting from the move to community policing.
23. I found myself pausing regularly to check my comprehension.

24. I asked myself if I had considered all of the options when solving a problem.
25. I periodically reviewed during the test to help me understand important relationships.
26. I ask others for help when I don't understand something.
27. I changed strategies when I failed to understand something on the test.
28. I reevaluated my assumptions when I got confused on the test.
29. I stopped and went back over new information on the test that was not clear.
30. I stopped and reread a test item when I got confused.
31. I knew how well I did once I finish a test.
32. I asked myself if there was an easier way to do things after I finished the test.
33. I asked myself how well I accomplished my goals once I was finished with the test.
34. I asked myself if I had considered all options after I solved a problem on the test.