The relationship between vocabulary knowledge, linguistic intelligence and morphological awareness among EFL learners

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1. Introduction

Today’s frontier is knowledge. Brain has taken precedence over brawn; our physical struggle for existence has been replaced by intellectual struggle, and knowledge of words has become the most valuable tool for this struggle. Words are the very cornerstone of any language. With a good vocabulary, which indicates scope of knowledge, we can grasp the thoughts of others and be able to communicate our own thoughts to them. As Stahl (1999) argued, discussion of words is discussion of knowledge of the world, and knowledge of the world is knowledge of who we are and where we stand in the world. Also, the importance of words in foreign and second language learning is beyond question. Vocabulary knowledge is one of the language skills crucial for fluent language use (Nation, 1993). Vocabulary size is an indicator of how well the second language (L2) learners can perform academic language skills such as, reading, listening, and writing (Bear, Invernizzi, Templeton and Johnston, 2008; Treiman and Casar, 1996). Numerous studies have documented the strong and reciprocal relationship between vocabulary knowledge and reading comprehension (Baker, Simmons, & Kame’enui, 1995; Beck, McKeown, & Kucan, 2008; Graves, 2000; Stahl & Fairbanks, 1987;) as well as general reading ability (Stanovich, Cunningham, & West, 1998). Likewise, Saville-Troike, (1984) concluded that vocabulary knowledge is the single best predictor of students’ academic achievement across subject matter domains. Also, there is a strong agreement among researchers that promoting vocabulary growth is an important and often neglected component of a comprehensive reading program (Baumann & Kame’enui, 2004; National Reading Panel, 2000; Vaezi & Fallah, 2010).

According to Nation (1993), knowledge of around 3000 word families is the threshold needed for tapping other language skills. Without this threshold, learners encounter problems understanding the language they are exposed to (Alderson and Banerjee, 2002). Ellis (1997) argues that vocabulary knowledge is a predicator of learners’ discourse comprehension, which allows grammatical rules to be patterned in the learners’ mind. Having inadequate vocabulary hampers learners’ reading comprehension in a way that makes it more likely the learners will face difficulties in the path of academic achievement.

As such, vocabulary learning and teaching is a central activity in the L2 classroom. One way in which vocabulary learning can be fostered is through the use of learning strategies. These strategies are consciously or unconsciously learned techniques for processing information in order to enhance learning, comprehension and retention (O’Malley and Chamot, 1990).

One potential vocabulary learning strategy is the use of morphological awareness to learn novel vocabulary. Morphological awareness is defined as the ability to use the knowledge of word formation rules and the pairings between sounds and meanings (Kuo & Anderson, 2006). With morphological awareness, learners are able to learn morphemes and morphemic boundaries by disassembling complex words into meaningful parts (e.g. *childhoods* = *child* + *-hood* + *-s*), learning the meanings of roots, affixes (*child* = baby, *-hood* = the state of being, *-s* = to indicate plural nouns), and reassembling
the meaningful parts into new meanings (*motherhood, fatherhood, brotherhood*). The practice of this dissembling-reassembling method is called morphological analysis.

There is increasing interest in morphological awareness as a crucial dimension of vocabulary knowledge, especially in reading. In the first place, morphemes have semantic, phonological and syntactic properties (e.g. -s in the verb *rides* indicates that the action doer is only one person who does the action in the present time) (Singson, Mahony and Mann, 2000) that express the role of a given word in the reading context. For another thing, words are organized in the mental lexicon according to their phonological properties with morphological knowledge as a framework for storing words (Sandra, 1994). Moreover, morphological awareness makes the learner more aware of the writing system. With morphological knowledge, learners can perceive spelling and phonological irregularities (e.g. *sign-signature*) (Kuo and Anderson, 2006). The relationship between morphological awareness and reading may be reciprocal or directional (Chung and Hu, 2007; Kuo and Anderson, 2006). In the case the relationship being reciprocal, both reading and morphological awareness can contribute to the development of one another. In directional term, morphological awareness leads to reading proficiency, but not the other way around.

The task of learning new words as they are encountered is tremendous. Students encounter up to 100,000 different words during their academic readings at college level (Graves, 2004). Those 100,000 words include academic words. As learners make the transition from learning English for basic communication to learning academic English, they need to learn the academic words critical to vocabulary development and, therefore, learning success. In order to develop the needed vocabulary knowledge, learners should be exposed to various extensive readings, be taught individual words explicitly, and taught strategies to unlock word meaning, and have their word consciousness raised (according to Graves’, 2004, components of vocabulary instruction). One concern of the present study is the third component: vocabulary learning strategies, particularly those related to morphological awareness and the resulting morphological analysis (the realization of morphological awareness).

Another factor which may have an impact on language learners’ vocabulary knowledge is their linguistic intelligence. Gardner (1983) suggested that all individuals have personal intelligence profiles that consist of a combination of several different intelligence types, including linguistic intelligence. Gardner (1999) has described linguistic intelligence as sensitivity to spoken and written language and the ability to use language to accomplish goals, as well as, the ability to learn new languages. The effect of linguistic intelligence on language learning in general and vocabulary enhancement in particular becomes more apparent by considering Armstrong’s (2000) argument that linguistic intelligence is the ability to use words effectively, whether orally or in writing and this kind of intelligence includes the capacity to manipulate the syntax or structure of language, the phonology or sounds of language, the semantics or meanings of language, and the pragmatic dimensions or practical applications of language. Some of these uses include rhetoric (using language to convince others to take a specific course of action), mnemonics (using language to remember information), explanation (using language to inform), and metalanguage (using language to talk about itself).

Based on Gardner and Armstrong’s ideas on linguistic intelligence, it can be extrapolated that linguistically intelligent learners enjoy a deeper understanding of words, sensitivity to the literal and figurative meanings of words, highly developed oral and written communication skills and high word
concerning use of highly developed oral and written communication skills and high word
consciousness. All of these factors suggest that high levels of linguistic intelligence can be an asset for
learners in developing and enriching their vocabulary repertoires.

Nevertheless, a review of the related literature reveals that this logic has not received enough attention
in the realm of second/foreign language learning. Moreover, despite the recognized potential of
morphological awareness for vocabulary learning, little research to date has focused on morphological
awareness and its relationship to vocabulary size (Carlisle and Fleming, 2003; Singson, Mahony,
Mann, 2000). Definitely, the scarcity of research in these areas provides a convincing rationale to
undertake further investigation into examining the relationship between EFL learners’ vocabulary
knowledge, linguistic intelligence and morphological awareness. To bridge this lacuna, the present
study sets out to answer the following research questions (RQ):

1. What is the relationship between EFL learners’ vocabulary knowledge, morphological awareness
   and linguistic intelligence?

2. Which one of the morphological awareness and linguistic intelligence can significantly contribute
to the prediction of vocabulary knowledge among EFL learners?

2. Methodology

2.1. Participants

The participants in this study included (at the first phase) 111 MS and BS engineering students at Iran
University of Science and Technology (IUST). These students were chosen from different colleges of
IUST (e.g., Mechanics, Railway, Chemistry, Computer …). They were all attending preparatory classes
for IBT TOEFL test. Their ages ranged from 19 to 30 years old (M = 24. 47, SD = 4.56). Among these
students, 73 students (51 Ms and 22 BS) were selected as advanced learners for the next phase of the
study.

2.2. Instruments

Three instruments were used in this study. The revised version of Nation’s 2000 Word Level Test
(Schmitt, Clapham, & Schmitt, 2001) was used to establish the appropriate level of the learners. The
second, the Linguistic Intelligence Questionnaire, was a part of Multiple Intelligences of Gardner’s nine
domains Test. The last questionnaire was the Morphological awareness test adapted from Mc-Bride-
Chang, Wagner, Muse, Chow and Shu (2005).

2.2.1. The Nation’s Vocabulary Level Test

Nation’s Levels Tests (2001) were used to gauge students’ receptive and productive vocabulary levels.
The receptive vocabulary levels tests consist of four general vocabulary tests establishing vocabulary
levels of 2000, 3000, 5000 and 10,000 words each, and of a special vocabulary test, the test of the
Academic Word List (AWL), determining knowledge of words used frequently in academic writing
beyond the first 2000 words (Coxhead, 2000).The receptive tests involve word-definition matching.
Test takers are required to match the words to the definitions. The five general vocabulary tests consist
of 60 words and 30 definitions, in group of six and three respectively. The internal consistency of the
test was $\alpha = 0.86$. 
2.2.2. Linguistic Intelligence Test

This Linguistic Intelligence test was a part of Nail’s Multiple Intelligences Test of Ned production intelligences inventory (Walker McKenzie, 1999). This questionnaire contained 10 items with Five-Likert Scale ranging from (1= this is not like me at all, to 5= definitely I am always like this). In this study the English version of the test was utilized, and its internal consistency was $\alpha = 0.59$.

2.2.3. Morphological Awareness Test

The Morphological awareness test was adapted from McBride-Change et al. (2005), and was utilized to test students’ ability to reflect and manipulate morphemic units in English. This test is of interest to the researcher as it encompasses both the analytical and synthetic aspects of word formation rules. Some of items of the test are created by the researcher, and others are taken from McBride-Chang’s et al. (2005) test. The test is divided in two sections: Morpheme Identification and Morphological Structure. The Morpheme Identification Test measures students’ ability to analyze and break down complex words into smaller meanings. It is compromised of 14 test items. These items diverge from the items used in original Morpheme Identification Test to better suit the students’ age and level. In the original morpheme identification test as devised by McBride-Chang and her colleagues, each item includes two orally labeled pictures that are presented simultaneously. The children are then given a word or phrase containing the target morpheme, and are asked to select the most appropriate picture that matches the word/phrase. In this study, the participants are given a set of complex words out of context, and are asked to segment them into as many smaller meanings as they can identify in each word.

The Morphological Structure Test measures students’ morphological productivity, which is the ability to synthesize morphemes to create new meanings. The test consists of 14 items. Some of the items are created by the researcher. The items have 9 inflectional affixes, 3 derivational affixes and 23 stems. All of items are embedded in a sentence frame so as to examine whether the participants can derive different forms of the base word rapidly and accurately when being primed with that base form in sentence context have.

The reliability estimates were $\alpha = 0.74$ and $\alpha = 0.71$ for Morpheme Identification Test and Morphological Structure Test respectively.

3. Results

111 participants voluntarily participated in the study. With the passing rate of 90 percent, 89.3% of the students passed the receptive 2000 test; 87.21% the AWL; 71.21% the receptive 3000 test; and 65.76% the receptive 5000. Therefore, 73 students were assigned advanced level, and these learners were included in the study.

Table 1

Mean, Standard Deviation and Range of Morphological awareness, LI and different levels

Vocabulary
<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 word level</td>
<td>95</td>
<td>17.29</td>
<td>53-100</td>
</tr>
<tr>
<td>3000 word level</td>
<td>87.34</td>
<td>17.11</td>
<td>38-100</td>
</tr>
<tr>
<td>5000 word level</td>
<td>86.12</td>
<td>15.07</td>
<td>28-100</td>
</tr>
<tr>
<td>10000 word level</td>
<td>83.03</td>
<td>13.32</td>
<td>22-100</td>
</tr>
<tr>
<td>Academic word level</td>
<td>85.54</td>
<td>16.78</td>
<td>33-100</td>
</tr>
<tr>
<td>Morphological awareness</td>
<td>43.77</td>
<td>5.85</td>
<td>23-50</td>
</tr>
<tr>
<td>Linguistic Intelligence</td>
<td>41.11</td>
<td>4.81</td>
<td>27-47</td>
</tr>
</tbody>
</table>

3.1. RQ1:

To test the relationship between Vocabulary knowledge, linguistic intelligence and morphological awareness, a series of correlation analyses was conducted. The results indicated that there was significant positive correlation between vocabulary knowledge and morphological awareness (r = .57, p < .01), vocabulary knowledge and linguistic intelligence (r = .41, p < .01), and morphological awareness and linguistic intelligence (r = .30, p < .01) (table 2).

Table 2

Correlation between Vocabulary knowledge, Morphological awareness and Linguistic Intelligence

<table>
<thead>
<tr>
<th></th>
<th>Vocabulary</th>
<th>Morphology</th>
<th>LI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vocabulary</td>
<td>-</td>
<td>.57**</td>
<td>.41**</td>
</tr>
<tr>
<td>Morphology</td>
<td></td>
<td>-</td>
<td>.30**</td>
</tr>
<tr>
<td>LI</td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

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

3.2. RQ2

To investigate which one of the independent variables of linguistic intelligence and morphological awareness could contribute to the prediction of vocabulary knowledge in EFL learners, a multiple regression analysis was conducted. In this analysis, Adjusted $R^2 = .37$, $F (2,71) = 22.60$ and $p < .001$, indicating that 37 % of the variance in vocabulary knowledge was explained by the combination of the
independent variables, namely, LI and morphological awareness (see table 3).

According to the results displayed in table 3 below, each of the independent variables made significant individual contributions to the prediction of vocabulary knowledge as follows: morphological awareness ($\beta = .49, t = 5.07, p < .001$) and linguistic intelligence ($\beta = .26, t = 2.65, p < .05$). Although the two variables made significant relative contribution to the prediction of vocabulary knowledge, morphological awareness was more potent in predicting vocabulary knowledge in the EFL learners.

**Table 3: Regression analysis summary for LI and morphological awareness variables predicting vocabulary knowledge**

<table>
<thead>
<tr>
<th>Predictors</th>
<th>R</th>
<th>R²</th>
<th>adj R²</th>
<th>F(2, 71)</th>
<th>B</th>
<th>SEE</th>
<th>Beta (β)</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphological Awareness</td>
<td>.50</td>
<td>3.08</td>
<td>.49</td>
<td>5.07***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LI</td>
<td>-.29</td>
<td>.11</td>
<td>.26</td>
<td>2.65*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, ***p < .001

4. Discussion

The present study sought to investigate the relationship between EFL learners’ vocabulary knowledge, morphological awareness and linguistic intelligence. In addition the relative effects of the last two variables on learners’ vocabulary knowledge were investigated. The results showed that there was a significant positive relationship between learners’ vocabulary knowledge, their linguistic intelligence and morphological awareness. The results also revealed that linguistic intelligence and morphological awareness either collectively or separately were potent predictors of learners’ vocabulary knowledge. However, it was shown that linguistic intelligence was a better predictor of vocabulary knowledge among the participants.

These results are not surprising since, by the nature of linguistic intelligence, learners’ sensitivity to words, using different strategies (e.g., using mnemonic words), attention to different meanings of words and pragmatic uses of words, word consciousness and reading extensively through literature will improve their vocabulary knowledge. Linguistically intelligent learners can more easily expand and deepen their word knowledge since they have ample exposure to the written and spoken language.

The results of the current study are consistent with McBride-Chang’s *et al.* (2005) indicting that the two variables, vocabulary size and morphological awareness have significant positive correlation. The findings are also in line with those of a few other studies. In order to investigate the role of morphological awareness in developing vocabulary for L2 learners, Morin (2003) studied Spanish classes to examine the acquisition of derivational morphology – the use of suffixes that can change the
part of speech and cause variations in meaning – by native English-speaking learners of Spanish. In this study the main questions were: (1) Do beginning L2 learners who focus on Spanish derivational morphology learn more vocabulary than learners who do not, (2) can they apply morphological knowledge receptively and productively, and (3) does their success depend on their L2 proficiency level. The results indicate that the strategy for building vocabulary by consistently focusing on Spanish derivational morphology may yield immediate benefits in the area of production, at least among one experimental group, the second-semester learners, who were introduced to Spanish morphology. There is also a suggestion that, for second-semester learners, there may be benefits or effects of such knowledge of derivational morphology with respect to their receptive morphological knowledge. In addition, the second-semester experimental group demonstrated a significantly greater knowledge of productive Spanish derivational morphology than any of the other groups studied. In her conclusion, Morin (2003) emphasized that the results of her study could not make specific claims to all L2 learners generally. However, it does indicate a positive trend in the effectiveness of morphological knowledge as a tool for building vocabulary knowledge.

Bertram, Laine and Virkkala (2000) examined the role that morphology plays in vocabulary acquisition in L1 Finnish. Systematically, they investigated the role that affix frequency and productivity might play in the development of the children's knowledge of words. The results showed that the Finnish elementary school children benefit significantly from utilizing morphology in determining word meanings. Finally, Michael and Lesaux (2007) reported that a learner who understands how words are formed, by combining prefixes, suffixes, and roots, tends to have larger vocabularies and better reading comprehension.

5. Conclusion

In essence, the yielded results of the current study lead to the conclusion that enhancing EFL learners’ linguistic intelligence and morphological awareness tend to ameliorate their vocabulary knowledge. This in turn may lead to better academic achievements. Such research findings can help researchers, teachers and education programs in implementing practical strategies and programs for increasing morphological awareness among EFL learners. Promoting students’ morphological awareness should be seen as a metalinguistic tool for word consciousness (i.e. the knowledge and characteristics essential for learners to use words effectively) (Scott and Nagy, 2004). Concurrently, the students are more likely to approximate the meaning from morphological units (Carlisle and Stone, 2003; Gordon, 1989), boosting their vocabulary repertoire.

Teaching affixes would promote students’ vocabulary size (e.g. Baumann et al., 2003; White et al., 2002). As such, vocabulary programs should follow the general guidelines provided by Graves (2004) to build the students’ vocabulary knowledge (engaging students in extensive reading and multiple exposures to words), teaching individual words (via both direct and indirect vocabulary instruction), teaching word- learning strategies and fostering word consciousness). Promoting students’ vocabulary knowledge and morphological knowledge predicated their academic success (Beck, McKeown, and Kucan, 2002) in the sense that they move from learning to read to reading to learn independently.

Since multiple intelligences including linguistic intelligence can be developed (Gardner, 1983), a serious of educational programs should be planned in order to enhance EFL learners’ linguistic intelligence. In this connection, Armstrong (2000) believed that, among all multiple intelligences, linguistic intelligence is the easiest one to teach. Also he pointed out brainstorming, journal writing,
tape recording and storytelling as the most important techniques for enhancing learners’ linguistic intelligence.

It is important to bear in mind that the present study was a small-scale study, and that statistical power is an issue. Due to limited availability of time, the study was carried out in only one day. This also affected the students’ performance. However, despite the limited results, it would be interesting to replicate this study after a vocabulary intervention program is introduced.

It is advisable to administer morphological awareness test and linguistic intelligence test in one day and vocabulary level test in another day to minimize cognitive load on the learners. It might also be useful for that the present study, with some modifications, to be carried out in the other colleges or EFL institutions.

References


VN:R_U [1.9.11_1134]