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An Exploration of the Mental Lexicon of Korean EFL Learners

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Much research in second language (L2) word association has attempted to uncover the organization and development of the L2 mental lexicon. It has been suggested that the organization of words in the mental lexicon is dependent on links that facilitate the storage and retrieval of words (Wilks & Meara, 2002). Understanding these links and their properties can provide valuable information to L2 researchers and practitioners and inform L2 acquisition theory. Studies have shown that the type of word associations made by learners may be related to their L2 proficiency (Namei, 2004; Soderman, 1993; Zareva & Wolter, 2012). This study seeks to determine the lexico-semantic patterns of Korean EFL (English as a Foreign Language) learners of different proficiency levels through a word association test. The findings of this study show that a group of low level learners had the highest proportion of syntagmatic responses while a group of L2 learners at high level had greater paradigmatic responses. In comparison to native speakers of English, both groups of Korean EFL learners had greater syntagmatic responses. This may suggest that the higher the English language proficiency of the speaker, the greater or stronger the semantic links are in the mental lexicon. The pedagogical implications of these findings are discussed and areas of further research are suggested.

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Ⅰ. INTRODUCTION

In 1879, British psychologist Sir Francis Galton conducted the first Word Association Test (WAT) to explore the organization of words in the mind (Aitchison, 2003). Since the test's inception, researchers have continued to use WATs as a tool to gain further insight into the development of the L1 and L2 mental lexicons and the processes involved in the integration, storage and retrieval of words (Fitzpatrick & Izura, 2011; Nissen & Henriksen, 2006; Zareva & Wolter, 2012). Today, however, the understanding of these processes remains incomplete due to the complexities of the mental lexicon and the variation of experimental factors such as subjects' characteristics and methodology choices of researchers (Zareva & Wolter, 2012). Further research in word association and refinements to WAT methodology may provide a clearer picture of how connections between words are formed in the mental lexicon (Wolter, 2001). Exploring these links and their properties can greatly contribute to the understanding of second language acquisition (Nissen & Henriksen, 2006).

The present paper attempts to contribute to the research on word association by exploring learners' lexical development through a word association test based on the instructions of *Task 123* by McCarthy (1990). More specifically, the aim of this study is to examine, if any, differences between the lexico-semantic patterns of associative organization of the responses of low level (Korean middle school students), high level (Korean English language teachers), and native English speakers. Therefore, this study includes an examination of two main association types between words: paradigmatic (semantic relationships) and syntagmatic (collocational relationships) associations. It is hoped that the findings may shed further light on the mental links of learners. In this paper, we will first attempt to describe the organization of the mental lexicon and provide a summary of the major research on word association. This is followed by an outline of the methodology of the study before the test findings are presented. Later, we will discuss the findings and analyze them according to McCarthy (1990)'s three points of evaluation:

- Does such a word association test tell us anything about how learners are making mental links between words they have learnt?
- At learner levels, are phonological similarities playing an important role?
- Do the findings bear out the characteristic types of response of speakers of low and high proficiencies?

II. LITERATURE REVIEW

1. Organization of the mental lexicon

Aitchison (2003) describes mental lexicon as the 'mental dictionary' that consists of all the words in a person's mind. It is in a state of constant growth where new words encountered are continuously entered and organized. Sokmen (1997) stances on lexico-semantic theory contends that "humans acquire words first and then, as the number of words increases, the mind is forced to set up systems which keep the words well-organized for retrieval" (p. 241). McCarthy (1990) provides a visual explanation of these systems by presenting a model that depicts the organization of words in a web-like formation. In this formation, words make connections to each other based on semantic relations or the world knowledge a person has obtained through his or her experiences. His model also addresses the complexities attached to word storage by including connections to phonological, orthographical, word class and syntactic properties of words. What results is a multi-dimensional 'web of words' model with numerous links criss-crossing one another (Wilks & Meara, 2002).

For L2 learners, their lexicons may appear barren with few connections at first. Words that are unknown have no connections of any kind to the learners' lexicon, whereas those that are well-known have many (Meara, 1997). As learners acquire new words, new connections are formed and the web grows. Sokmen (1997) argues that learners access their background knowledge when they encounter a new word. Also he claims the following:

> (learners) connect the new word with already known words, the link

> is created, and learning takes place. In the process of deciding how the new word fits in, i.e. how it is similar to or different from words they already know, information about the word becomes more organized (p. 241)

These connections can be further explored through word association tests whereby association patterns produced by speakers may provide insight on the organization of the mental lexicon.

2. Word association studies

In past studies (Namei, 2004; Wolter, 2001), the majority of WAT findings have indicated that there are differences between the L2 learner and native speaker (NS) lexicons. In general, low-level L2 learner responses are less uniform and include more syntagmatic and clang associations resembling response patterns of native speaking children under the age of seven (Meara, 1983; Zareva & Wolter, 2012). On the other hand, most adult NSs have a tendency to produce paradigmatic responses in preference to syntagmatic ones (Carter, 1998). Furthermore, Aitchison (2003) reports that co-hyponyms and antonyms are the most common types of paradigmatic responses for NSs, whereas collocation is the most common syntagmatic response.

Meara (1983) describes learners' vocabularies as one in a state of flux and not fixed where the semantic links between words in the learner's mental lexicon are weak leading to less homogenous responses. In a study involving Swedish and Finnish ESL learners, however, it was found that the learners' responses became more paradigmatic as their proficiency improved (Soderman, 1993). These findings were replicated in a recent study by Zareva and Wolter (2012) who concluded that "there are no significant differences in the lexico-semantic pattern of NSs and L2 learners of advanced proficiency" (p. 59). According to Wolter (2001), most explanations for this syntagmatic-paradigmatic shift in word association found in L2 learners point to lexical or cognitive development. He also suggests that as words become more familiar and "better integrated into the mental lexicon,

the phonological connections lose their predominance and other more powerful ... semantic connections become stronger" (pp. 60-61).

However, some recent studies have yielded findings that contradict the research supporting the syntagmatic-paradigmatic shift (Billiris, 2011; Fitzpatrick, 2007; Higginbotham, 2010; Nissen & Henriksen, 2006). For example, Billiris (2011) finds that both low and high level adult Korean EFL learners made a greater number of syntagmatic responses than paradigmatic responses. In addition, the low-level learners had a higher percentage of paradigmatic responses than the high-level learners. In all these studies, when less frequent words were used as prompts, many of the NS subjects produced syntagmatic responses. Fitzpatrick and Izura (2011) contend that it may not be prudent to assume that "the processes of lexical acquisition, storage, and retrieval in a L2 will follow the same patterns, stages, and ultimate attainment as those in a L1" (p. 374). Thus, this discrepancy in the results may appear to indicate that further investigation is needed in understanding the development of the mental lexicon.

3. Critiques of Word Association Tests (WATs)

Despite the insights into the mental lexicon that WATs have provided, it may not be always suitable to consider WATs as the primary tool for such research. The lack of consensus and standards in WAT methodology (prompt word selection and response classification) in the field appears to impair the robustness of WATs leading to contradictory findings. Fitzpatrick (2007) reports that interest in word association has fallen after Kruse, Pankhurst and Sharwood (1987) completed a detailed study that contradicted the assumptions of earlier studies. Kruse et al. (1987) conclude that "word association tests do not show much promise for the specific role created for them in L2 research" (p. 153). Another critique of WATs is that results can be easily influenced by context and a subject's state of mind. For instance, in this present study, one test was conducted in a restaurant with a NS subject where the prompt word 'eat' elicited the response 'now'. It is possible that this response may have been influenced by the environment and his physical condition at that particular time. As Aitchison (2003) would contend, "if a

word's association can be changed so easily by context, then, it is possibly wrong to assume that we can ever lay down fixed and detailed pathways linking words in the mental lexicon" (p. 85).

However, recent studies in word association have continued the use of WATs but with alternative methodologies, for example analyzing data by using an individual profiling approach (Fitzpatrick, 2007; Fitzpatrick & Izura, 2011; Higginbotham, 2010). These researchers believe that learners are not homogenous in their response behaviour and should be considered as individuals as opposed to attempting to group them. Fitzpatrick (2007) found that when viewed as individuals, learners showed consistent responses between their L1 and L2 profiles. Furthermore, Fitzpatrick (2009) reports that L2 users of a language generally make similar kinds of associations as they do in their L1 as proficiency increase. More recently, another methodology employed by Fitzpatrick and Izura (2011) measures the response times of subjects in WATs. In their study of native Spanish speakers, their findings suggest that, in terms of category reaction time differences, "word association reaction time data might inform understanding of storage and activation in the bilingual lexicon" (p. 395). With further exploration in these approaches, perhaps a greater consensus can be reached in the understanding of the mental lexicon.

4. Word association patterns

Responses from word association tests fall into two main classes: paradigmatic choice and syntagmatic chain (Meara, 1983). Paradigmatic responses are those that belong in the same word class as the prompt word and have semantic relationships in the form of synonyms, antonyms, hyponyms or meronyms. For example, a prompt word such as 'dog' would elicit paradigmatic responses that include 'canine', 'cat', and 'poodle' which can be substituted for 'dog' in a grammatical sequence. In contrast, syntagmatic responses are usually of a different grammatical word class than the prompt word (Wolter, 2001). These responses have a collocational relationship with the prompt word. For example, possible syntagmatic responses to 'dog' include 'black', 'big', 'gentle' and other words that could

appear in a sequence with it. A third class of associations is concerned with phonological links between words and is referred to as 'clang' associations. Finally, responses that are related to a subject's knowledge of the world can be classified as 'encyclopaedic' responses.

1) Paradigmatic association: Synonymy, antonymy, and hyponymy

(1) Synonymy

Synonymy refers to 'sameness' or 'similarity' of meaning between words. For example, 'couch' and 'sofa' can replace each other in some contexts without any noticeable change in meaning. When two words have the same meaning in all contexts, they are defining synonyms. However, most synonyms are only synonymous in some specific contexts and are called specific synonyms (Fitzpatrick, 2007). For example, 'small' and 'little' are interchangeable in describing stones but not money. Since most synonyms have a 'loose' relationship, Coulthard, Knowles, Moon, and Deignan (2000) note that it is best to view synonymy in the same light.

(2) Antonymy

In contrast to synonymy, antonymy refers to 'oppositeness' of meaning between words. Antonymy can be subdivided into four categories: complementarity, gradable antonyms, converseness, and incompatibility. Complementarity represents a relationship where the existence of one lexical item excludes another (Singleton, 2000). For example, 'dead' and 'alive' form a mutually exclusive complementary pair. A person can be either dead or alive but not both. In contrast, gradable antonyms express 'oppositeness' that is gradable through the use of different lexical items or adverbs of degree (e.g. minuscule, small, somewhat small, medium, fairly big, big, gigantic). Relationships of converseness involve a sense of logical reciprocity (Carter, 1998). For instance, the sentence 'Vendors sell goods' can be reversed to produce the reciprocal sentence 'Customers buy goods'. Finally, incompatibility refers to relational contrasts between words from the same semantic field that cannot co-occur. For example, the sentence 'My birthday is in September' excludes the possibility of the birthday being on any other

month.

(3) Hyponymy

Hyponymy describes taxonomic hierarchical relationships between specific and general lexical items where the meaning of the specific item is included in the meaning of the general item (Carter, 1998). For example, the specific lexical item 'poodle' includes the meaning of the general lexical item 'dog'. Thus, ownership of a poodle entails ownership of a dog, but ownership of a dog does not entail ownership of a poodle (Singleton, 2000). According to Coulthard et al. (2000), there can be four hierarchical relationships described under hyponymyn, namely hypernymy (superordinate), hyponymy (subordinate), co-hyponymy (coordinate), and meronymy (partonomy). The superordinate 'dog' is the topic of a class of words which the hyponym 'poodle' belongs under. Since 'pug' shares the same superordinate with poodle, both items are labelled co-hyponyms along with other breeds of dogs. The meronyms 'leg' and 'tail' represent parts of the superordinate 'dog' and together illustrate a part-whole relation (Carter, 1998). Aitchison (2003) emphasizes the importance of this relation, meronymy, in the construction of links in learners' semantic network. Research in the properties of meronymy is still ongoing and may provide further insight on the lexical development of learners.

2) Syntagmatic association: Collocation, multi-word units

(1) Collocation

Collocation is concerned with the propensity of words to appear together repeatedly within a language. Patterns of collocation can be classified into two types: grammatical (colligation) and lexical. Grammatical collocation involves the co-occurrence of lexical and grammatical items as illustrated in the phrase 'give in'. It is also concerned with the syntactic relationship between lexical items and structures such as clauses and modals (Coulthard et al., 2000). Lexical collocation, on the other hand, covers co-occurrence of lexical items (e.g. 'white wine'). Relationships between collocates can be considered strong or weak depending on the frequency of the collocation where greater frequency indicates greater strength. Statistical data of

frequency can be obtained by referring to the 450-million-word Bank of English (BoE, 2013) corpus created by Collins Birmingham University International Language Database (COBUILD) at the University of Birmingham.

(2) Multi-word units

According to Moon (1997), when two or more words combine and form a single semantic unit, the result is a multi-word unit. Carter (1998) notes the term 'multi-word unit' is an umbrella term that includes compounds, idioms, phrasal verbs, fixed phrases and prefabricated routines. Compounds are words that can be separated, hyphenated, or fused together and most compounds have a high degree of fixedness (e.g. dining room, drive-in, wildlife). Idioms have high non-compositionality which may make it impossible to find their meanings from analyzing words individually (e.g. drop a bomb). Phrasal verbs are combinations of verbs and adverbs or prepositions and vary from high to low non-compositionality (e.g. come down, move on). Fixed phrases are mostly institutionalized (occur frequently) and strongly fixed (e.g. as a matter of fact) and also include proverbs and similes (e.g. Absence makes the heart grow fonder). Finally, prefabricated routines are pre-constructed phrases in discoursal situations that function as structuring devices (e.g. Guess what?, Once upon a time).

3) Phonological associations

Words in the mental lexicon can be organized phonologically and this originates from two phenomena: the *Bathtub Effect*, a term coined by Aitchison (2003), and the *Tip of the Tongue (TOT)* phenomenon. The *Bathtub Effect* states that the beginnings and endings of words are bettered remembered than the middle parts as demonstrated in the Brown and McNeill experiment in 1966. Research from TOT phenomenon suggests that people recognize the first and last syllable of words and focus on the number of syllables they contain. Thus, the sound pattern or general shape of a word is an important feature of the mental lexicon with relation to matching input to words stored in the mind and their retrieval (McCarthy, 1990). As mentioned above, responses that are phonologically similar to a prompt word but have

no semantic connection are known as clang associations (e.g. from – frog) (Meara, 1983; Namei, 2004).

4) Encyclopaedic associations

Learners' knowledge of the world through education or experience plays an important role in the connections they make between words in their lexicon. McCarthy (1990) refers to this as encyclopaedic knowledge where learners link "words to the world and bring in origins, causes effects histories and contexts" (p. 41). Having greater knowledge of the world can make learning new words an easier task when the learner is already familiar with the concept the word refers to. Research has shown that it is easier for L2 learners to learn new words for a familiar concept than for a new one (Nagy, Anderson, & Herman, 1987). For instance, learners familiar with the field of psychology would likely not have much difficulty learning vocabulary related to the human brain in their L2.

Ⅲ. METHOD

1. Participants

In this study, there were three groups of participants each representing a different level of English proficiency: low, high and native speaker levels. These three groups were included in this study to determine whether English language speakers of different proficiencies produce similar or different lexico-semantic patterns. The low level group consisted of forty-six Korean middle school students and the high level group included six Korean English middle school teachers. These two groups formed the non-native speaker (NNS) group and had lower proficiencies than the native speaker (NS) group. The NS group included seven native English speakers who were born and educated in English speaking countries.

2. Prompt word selection

Eight prompt words (Table 1) were selected following the guidelines of McCarthy (1990)'s task (Appendix A). The selections were made with two considerations taken into account: the proficiency of the low level learners and word frequency. First, to prevent a high number of blank responses, all words were selected from the students' course textbook to ensure that learners were familiar with them. Second, it has been reported that high frequency prompt words tend to elicit more predictable and homogenous responses (Fitzpatrick, 2007). Therefore prompt words with a wide range of frequencies, according to the BoE (2013), were selected from the textbook to prevent such responses. The main reason why we have used the BoE (2013) was due to its size (450 million words) and diversity (20 subcorpora that include written and spoken data of British, North American and Australian varieties of English).

Table 1. Prompt Words

Prompt Word	Word Class	Number of Occurrences in the BoE
from	preposition	1,920,773
them	pronoun	652,612
health	noun	109,355
computer	noun	55,755
quickly	adverb	48,080
eat	verb	29,187
tall	adjective	15,753
imagination	noun	10,977

3. Administering the test

The test was administered to each of the three groups using different formats. The low level group was tested in a classroom in one sitting, whereas subjects from the high level learner and NS groups were individually tested in person over a period of five days in different settings (e.g. school, restaurant, and home). The practical reason for the different test formats is

due to logistics. It was not possible to have all participants from the high level learner and NS groups tested in one sitting, for their schedules did not coincide. The test for the low level group was presented using a PowerPoint presentation on a large sixty-inch television. The instructions of the task were first given in English and then repeated in Korean by a Korean teacher (a non-participant in this study) to ensure students understood the task. Each prompt word, in English only, was displayed individually for ten seconds to allow students enough time to read the word and record their responses on their worksheets (Appendix B). It was important to keep the time allotted for each word to ten seconds to prevent students from mentally searching for the 'correct' answers. The rationale for displaying the words as oppose to announcing them was to minimize any incidents of input error (i.e. mishearing the words) since the students were low level learners. For the high level learners and native speakers, they did not require any accommodation due to their higher proficiency; thus, the test was administered individually by reading the prompt words to the subjects and recording their responses on the worksheet.

IV. FINDINGS and ANALYSIS

The responses of all three subject groups are presented in this section according to the four word association types. The results are also classified further into categories of paradigmatic and syntagmatic types.

1. Classification of results

The data was first classified into paradigmatic, syntagmatic, clang, and encyclopaedic response patterns as shown in Table 2. For polysemous responses such as 'dream' and 'exercise', subjects from the low level group were asked to specify the word class of their responses during brief individual meetings after the test, and subjects from the other two groups were asked for clarification during their individual tests. Responses that were in a different form of the prompt word ('health' → 'healthy') were classified as clang associations.

According to the results, the main response pattern for the Korean EFL learners was syntagmatic which accounted for 47.0% and 43.8% of responses respectively. However, this pattern was not replicated by the NS group where paradigmatic association was the dominant response type at 51.8%. For the Korean EFL learners, they produced fewer paradigmatic responses which accounted for 25.0% and 33.3% of their responses respectively.

Table 2. Overall Response Patterns

	Low Level Learners	High Level Learners	Native Speakers
Total Number of Responses	368	48	56
Paradigmatic	25.0%	33.3%	51.8%
Syntagmatic	47.0%	43.8%	37.5%
Clang	1.4%	2.1%	0.0%
Encyclopaedic	25.8%	20.8%	10.7%
No Response	0.8%	0.0%	0.0%

The paradigmatic responses were further classified as either synonymy, antonymy, co-hyponymy, hypernymy or meronymy (Table 3). The predominant paradigmatic response type for the low level learners was meronymy, which accounted for 51.1% of their paradigmatic responses. For the high level learners, meronymy and co-hyponymy were the most common types at 25.0% each, while antonymy was the predominant choice for NSs at 37.9%.

Table 3. Paradigmatic Responses

	Low Level Learners	High Level Learners	Native Speakers
Total Number of Paradigmatic Responses	92	16	29
Antonymy	16.3%	18.8%	37.9%
Co-hyponymy	6.5%	25.0%	24.2%
Synonymy	5.4%	12.5%	20.7%
Hypernymy	13.0%	12.5%	6.9%
Meronymy	51.1%	25.0%	6.9%
Hyponymy	4.6%	6.3%	3.4%

Syntagmatic responses were classified as either collocation or multi-word unit associations in Table 4 below. For each of the three study groups, collocation was the predominant syntagmatic association type accounting for over 92% of syntagmatic responses.

Table 4. Syntagmatic Responses

	Low Level Learners	Low Level Learners	Native Speakers
Total Number of Syntagmatic Responses	173	21	21
Collocation	92.5%	95.2%	95.2%
Multi-word Unit	7.5%	4.8%	4.8%

When the responses were classified according to word class, the results show that nouns were the preferred choice for all three groups (see Appendix C, D, and E). While 33.9% of NS responses were nouns, Korean EFL learners responded with nouns 75.3% and 68.8% of the time respectively. The word classes that received the fewest responses were prepositions for low level learners, determiners for high level learners and verbs for NSs.

2. Alternative analysis

There were difficulties encountered in the classification of responses due to the absence of a standard method of classification for lexico-semantic patterns in the research field. Consequently, classification was at the discretion of the researcher, which made it a subjective task (to some extent) particularly for responses that could be classified as either syntagmatic or paradigmatic. For example, the prompt word 'computer' elicited responses such as 'keyboard', 'mouse', 'monitor' and 'internet', which are in the same word class as 'computer' but can also be collocates according to their t-scores obtained from the BoE (2013). To increase objectivity in the classification process, t-scores were examined to determine the strength of the collocation. Responses with high t-scores

signalled high collocation strength with the prompt words and were identified as syntagmatic. Responses that were not overtly semantically related to the prompt words or did not have a t-score on the BoE (2013) collocation list were classified as encyclopaedic.

However, to illustrate a problem created by the absence of a classification consensus, when the 95 encyclopaedic responses were examined further, 67 of them belonged to a different word class than the prompt word and could be interpreted as syntagmatic. If an alternative method were employed where such responses were classified as syntagmatic instead of encyclopaedic, the results would show higher percentages of syntagmatic responses across all three study groups as shown in Table 5.

Table 5. Comparison Between Traditional and Alternative Classification Methods

	Method	Low Level Learners	High Level Learners	Native Speakers
Syntagmatic Responses	Traditional	47.0%	43.8%	37.5%
	Alternative	65.2%	54.2%	42.9%
Encyclopaedic Responses	Traditional	25.8%	20.8%	10.7%
	Alternative	7.6%	10.4%	5.4%

V. DISCUSSION

In this section, we will discuss the findings of the study with reference to the three evaluation points of McCarthy (1990)'s task. The discussion will attempt to provide further insight on these findings and their implications.

1. Does such a WAT tell you anything about how our learners are making mental links between words they have learnt?

The similarities between the results of this WAT and many previous studies indicate that perhaps there are patterns of organization that exist in the mental lexicon. The research findings suggest that as the proficiency of the speaker increases, the responses become less syntagmatic and more paradigmatic. Zareva and Wolter (2012) suggest that this developmental shift

in the mental lexicon of L2 learners is a result of "change in the saliency of the links, which includes the formation (and perhaps strengthening) of additional links rather than a process by which one type of link is abandoned in favor of another" (p. 63). Another trend that was observed in the findings was the increase in the number of encyclopaedic responses as proficiency decreased. As mentioned above by Meara (1983), the learners' lexicon might be in a state of constant flux and less stable which may explain the higher percentage of encyclopaedic responses by all learners when compared to the NS group. The higher degree of variability in learner responses may be attributed to differing levels of integration of individual words in the mental lexicon. Namei (2004) suggests that "the syntagmatic-paradigmatic shift is not an organizational characteristic of the whole mental lexicon, but rather a developmental feature of every individual word" (p. 383). If this idea is indeed true, it could partially explain the inconsistency of learners' responses in WATs.

2. At learner levels, are phonological similarities playing an important role?

The research findings suggest that phonological similarities did not play an important role in learners' responses due to the small number of clang responses. Table 6 shows that there were only six responses that appeared to be phonologically similar but non-semantically related to the prompt words.

Table 6. Clang Responses

Subject	Prompt Word	Response	Comment
Low Level	from	frog	Same beginning
Low Level	quickly	quack	Korean students' pronunciation of 'quick' is similar to 'quack'
Low Level	tall	towel	Korean students' pronunciation of 'towel' is similar to 'tall'
Low Level	imagination	magazine	Same stressed sylable 'ma' and ending 'n'
Low Level	health	house	'th' sound does not exist in the Korean language and is usually pronunced as an 's'
High Level	health	healthy	Different from of the same word

The small number of clang associations may indicate that the learners in the present study were somewhat familiar with the prompt words, which was expected since they were selected from the middle school English textbook. If this familiarity with the words was indeed a research evidence, then it is possible to assume that the prompt words were more highly integrated into their mental lexicons where paradigmatic and syntagmatic connections were more dominant than phonological ones. Upon further examination of the clang responses in this study, it was found that none were made by the NS group and all but one were made by low level learners, which lends support to previous research findings that less proficient learners are more likely to produce phonological associations (Brown & Berko, 1960; McCarthy, 1990; Meara, 1983) and that phonological connections are more salient in learners' L2 than L1 (Fitzpatrick & Izura, 2011).

3. Do the results bear out the characteristic types of responses of low and high level learners?

Aitchison (1987) reports that coordination (which includes both co-hyponymy and antonymy) is the commonest NS association response followed by collocation, superordination and synonymy. In this study, all of these response types were reflected in the findings. However, coordination was not the commonest association and synonymy was not the least common response for NSs. Instead, collocation was the most prevalent response and superordination the least common response for NSs as shown in Table 7. Nevertheless, coordination was the most common type of paradigmatic response for NSs where antonyms and co-hyponyms together accounted for 62.1% of paradigmatic responses (see Table 3).

Although the difference between collocation and coordination in NS responses is small, the most likely explanation for this discrepancy with the general findings in past studies can be attributable to the nature of the prompt words. Words such as 'computer', 'health' and 'imagination' may not have obvious co-hyponyms or antonyms leading both NSs and learners to produce other types of responses instead. A similar explanation could be applicable to the lower number of superordination responses where the

subjects may have difficulty in identifying the superordinates of the prompt words. Aitchison (2003, p. 96) suggests that superordinates are "not always readily available" and "may be quite rare" which may lead subjects to select other response types. Another possible explanation for the discrepancies in the findings is the small number of NS participants in the study. The use of a small sample size may have been a factor in the disparity in the response patterns between this study and those of previous studies. However, the results, on the whole, appear to be consistent rather than inconsistent with the general research on WATs.

Table 7. Characteristic Types of Response

	Low Level Learners	Low Level Learners	Native Speakers
Total Number of Responses	368	48	56
Collocation	43.5%	41.6%	35.7%
Coordination (Antonymy + Co-hyponymy)	5.7%	14.6%	32.1%
Superordination	3.3%	4.2%	3.6%
Synonymy	1.4%	4.2%	10.7%
Other	46.1%	35.4%	17.9%

VI. CONCLUSION

The aim of this paper was to investigate the relationship between word-association and the Korean EFL learners' lexical development. The findings of this study appear to support the general findings that 1) Korean EFL learners tend to produce a greater number of syntagmatic, encyclopaedic and clang associations than NSs; 2) Korean EFL learners appear to produce a higher proportion of paradigmatic responses than syntagmatic ones as their proficiency improves; and 3) as reported by Aitchison (1987), NSs tend to organize words in semantically-related groups. The scarcity of clang associations in this study indicates that phonological links most likely did not play a large role, and that the prompt words may have weak phonological links in the learners' mental lexicon. As the findings in this study indicate, between greater language proficiency and the formation of more salient

paradigmatic links in the mental lexicon, it may be beneficial for L2 researchers and practitioners to investigate and develop pedagogical methods that can strengthen such links to facilitate word acquisition.

Several limitations to this study need to be acknowledged. For instance, there was a disproportionate number or participants in the three study groups. In comparison to the low level group (which consisted of forty-six participants), the number of participants in the high level learner group (six) and NS group (seven) were significantly smaller, and consequently, these findings may be limited.

Further research is required as many questions about the mental lexicon remain unresolved. Studies of word association that involve WATs might only provide a glimpse into the complex processes and structure of the mental lexicon until further developments are made in WAT methodology, such as a consensus in the method of classification for lexico-semantic patterns and the analysis of individual learner profiles. In addition, WAT methodology may need to take into consideration learner characteristics, such as age, proficiency, L1, and familiarity with test prompt words, and alternative test methods before a greater understanding of the mental lexicon can be obtained through word association.

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APPENDIX A: *Task 123* (McCarthy, 1990, p. 152)

Aim

To explore the relationship between word-association and learners' lexical development.

Resources

A list of test items.

Procedure

1) Draw up a list of six to eight words to be used as stimuli in a simple word-association test. Try to vary the test items, to include:

- at least one grammar/function word (e.g. preposition, pronoun).
- one or two items from the everyday physical environment (e.g. 'table', 'car').
- a relatively uncommon or low-frequency word but one which your students will nonetheless know (this will depend upon the group's level: elementary-level students might require a word like 'drink', but an advanced group can probably cope with a word like 'surrender'; your own experience will tell you what is suitable).
- a mix of word-classes (e.g. noun, adjective, verb).

2) Deliver the test to the class, asking them to write down the very first word that occurs to them when each item is heard.

3) Gather in the results and see if any patterns emerge from the responses.

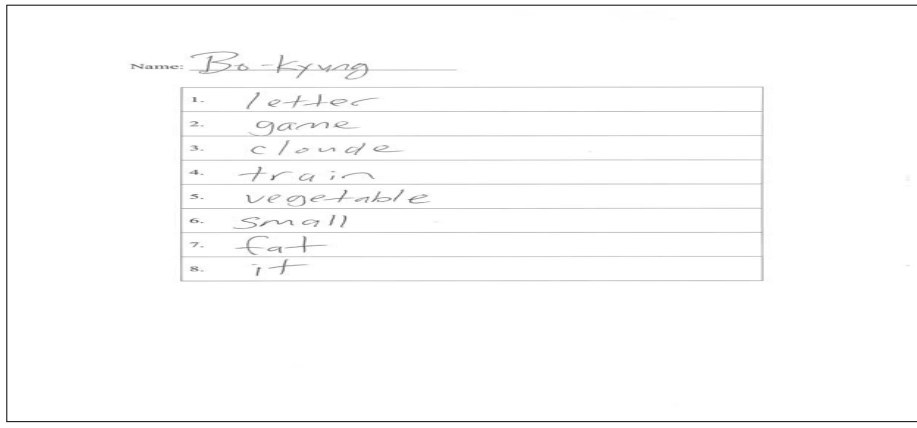
Evaluation

1) Does such a word-association test tell you anything about how your learners are making mental links between words they have learnt?

2) At lower levels, are phonological similarities playing an important role?

3) Do the results bear out the characteristic types of response discussed in 3.2?

APPENDIX B: Sample Response Sheet


Name: Bo-kyung

1. letter
2. game
3. clouds
4. train
5. vegetable
6. small
7. fat
8. it

APPENDIX C: Classification of Responses by Word Class (Low Level Learners)

	Word Class					
Prompt Word	Noun	Adjective	Verb	Pronoun	Adverb	Preposition
from (Preposition)	41		1			4
quickly (Adverb)	28	1	7		8	
eat (Verb)	38	8				
tall (Adjective)	31	10	1		3	
computer (Noun)	46					
health (Noun)	30	5	11			
imagination (Noun)	41		4			
them (Pronoun)	19	4	1	20	2	
Total	274 (75.3%)	28 (7.7%)	25 (6.9%)	20 (5.5%)	13 3.6%)	4 (1.1%)

APPENDIX D: Classification of Responses by Word Class (High Level Learners)

	Word Class						
Prompt Word	Noun	Adjective	Verb	Preposition	Adverb	Prononoun	Determiner
from (Preposition)	3			3			
quickly (Adverb)	4				2		
eat (Verb)	5		1				
tall (Adjective)	3	3					
computer (Noun)	6						
health (Noun)	4	1	1				
imagination (Noun)	5		1				
them (Pronoun)	3					2	1
Total	33 (68.8%)	4 (8.3%)	3 (6.3%)	3 (6.3%)	2 (4.2%)	2 (4.2%)	1 (2.1%)

APPENDIX E: Classification of Responses by Word Class (Native Speakers)

	Word Class					
Prompt Word	Noun	Adjective	Adverb	Pronoun	Preposition	Verb
from (Preposition)	1		1		5	
quickly (Adverb)	1		6			
eat (Verb)	1	2	1			3
tall (Adjective)	2	5				
computer (Noun)	6	1				
health (Noun)	4	2			1	1
imagination (Noun)	4	3				
them (Pronoun)				7		
Total	19 (33.9%)	13 (23.2%)	8 (14.3%)	7 (12.5%)	5 (8.9%)	4 (7.1%)

Key words: Word Association Test (WAT), Korean EFL learners' mental lexicon, Lexicon-semantic patterns, Word acquisition, 단어연상평가, 심상어휘집, 어휘습득

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