

Korean EFL Learners' Lexical Development: Evidence from a Word Association Test

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The present study aims at exploring Korean EFL learners' lexical structure and its development by analyzing their response patterns in a word association test. Studies on word association have shown that native English children go through a series of lexical restructuring, including the syntagmatic-paradigmatic shift. In order to see if Korean EFL learners' mental lexicon also goes through the same restructuring and if their mental lexicon is affected by their L1, the present study conducted a word association test and a word familiarity measurement. Fifty adult Korean learners of English at different proficiency levels and eleven native English speakers participated in the experiment. The results showed that Korean learners produced much less paradigmatic and syntagmatic responses compared with the native speakers. The proportion of L2 learners' paradigmatic and syntagmatic responses increased, with the increase in proficiency and word familiarity. However, no clear sign of syntagmatic-paradigmatic shift was found. Paradigmatic responses were predominant from noun prompts, whereas syntagmatic responses were predominant from verb prompts. The learners' lexicon was also found to be affected by their L1. The findings suggest that Korean learners' mental lexicon is structured differently from that of English native speakers.

[mental lexicon/word association/syntagmatic/paradigmatic/cross-linguistic influence/
/ / / /]

I. INTRODUCTION

Lexical knowledge is probably the most fundamental component of language ability. Recent surge in the studies on L2 vocabulary attests to the critical role of lexical knowledge in developing language skills (Cook & Newson, 1996; Lewis, 1993; Nation, 1993, 2008; Singleton, 1999; Wilkins, 1972).

Studies on the mental lexicon have shown that the mental lexicon is far more than the

summation of individual words or phrases. While different models of mental lexicon have been posited, it is unequivocal that L1 mental lexicon is a complex system with semantic, phonological, and syntactic network (Foster, 1976; Levelt, Roelofs, & Meyer, 1999; Marslen-Wilson, 1987; Morton, 1961). According to the findings, individual words are associated with other words in the mental lexicon phonologically, semantically, and grammatically. Experiments also revealed that words are not stored randomly but hierarchically in the memory, with words with higher order concepts and those with lower order concepts closely related with each other. Thus, when a word is activated in memory, it also activates other words that are associated with it. This neural network plays an important role in language processing. In listening or reading, for example, a word that has been activated prompts other words that are highly likely to co-occur with that word in the text, which contributes to substantially reducing the processing time for upcoming words. On the other hand, if the word associates that have been activated do not match well with the upcoming words in the discourse, it will slow down the processing speed and even lead to misinterpretation. Therefore, well-structured mental lexicon is a precondition to fluent and efficient language processing, both in L1 and L2.

Recently, there have been a growing number of studies exploring the nature of L2 mental lexicon, centering on the questions of whether L2 mental lexicon is structured in the same way as L1 mental lexicon and whether L2 mental lexicon develops in the similar manner as L1 lexicon does (Channell, 1990; Meara, 1984, 1987; Piper & Leicester, 1980, Schoonen & Verhallen, 2008; Singleton, 1999; Wolter, 2001). While quite a few studies on vocabulary have been conducted in the Korean EFL context as well, there has been little research on the Korean learners' English mental lexicon per se, in terms of how it is structured and developed. The present study aims to address the questions of how Korean EFL learners' mental lexicon is structured and how it develops over time. In doing so, it attempts to reveal differences between learner lexicon and native English speaker lexicon.

II. THEORETICAL BACKGROUND

1. The Development of L1 Mental Lexicon

Research on native speakers' lexicon have found evidence that children's mental lexicon is differently structured from that of older children and adults (Brown & Berko, 1960; Cronin, 2002; Ervin, 1961). The evidence is mostly from free word association experiments. Word association, a widely-used tool with a long history (McNeill, 1966; Schoonen & Verhallen, 2008; Woodrow & Lowell, 1916), is an experimental technique that requires a subject to provide the word that first comes to mind upon listening to or

reading a prompt word.

Word association tests typically elicit several different types of responses—paradigmatic responses, syntagmatic responses, and phonologically related responses, among others. Paradigmatic responses to a stimulus word include coordinates (apple→orange), superordinates (apple→fruit), subordinate (fruit→apple), synonyms (close→shut), and antonyms (close→open). They are from the same word class as the prompt word, and can alternate with the prompt in the same position of the sentence. By contrast, syntagmatic responses are words that frequently co-occur with the prompt word (e.g., open→door, apple→eat, sit→chair). As syntagmatic responses are in sequential or collocational relationship with the prompt, they usually belong to a different word classes from the prompt. A third type of responses is phonologically related responses—or “clang” responses—which are only phonologically similar to the stimulus word (e.g., beer→bean, beer→tear, opponent→opportunity).

Word association studies have found that children in their early lexical stage tend to provide lots of clang responses, as well as a high proportion of mediated responses and completely unrelated words, before they move on to more semantically-oriented stage (Singleton, 1999; Söderman, 1993). In addition, young children were found to provide more syntagmatic responses than paradigmatic responses, whereas adults tended to give more paradigmatic responses. This developmental change from more syntagmatic to paradigmatic responses is referred to as the “syntagmatic-paradigmatic” shift (the s-p shift, henceforth). The s-p shift is known to begin around age 5-6 and reach completion by age 10 (Cronin, 2002; Singleton, 1999).

Researchers attribute the s-p shift to two main changes occurring around this period: cognitive and linguistic. Singleton (1999) suggested that the shift is an indication of emerging syntactic categories, while Cronin (2002) ascribed it to the development of conceptual categories side by side with the increase of word knowledge via reading. Nelson (1977) proposed that the change coincides with the cognitive shift from pre-operational thought to concrete operations. She also related it to the development of coordinated concepts during early school years. Similarly, Anglin (1970) ascribed the shift to the development of hierarchical relations. To summarize, studies on L1 mental lexicon suggest that L1 lexical development proceeds from the stage of clang and unclassifiable responses, through the stage where syntagmatic responses are predominant, to the stage where paradigmatic responses are predominant.

2. Research on L2 Mental Lexicon

The findings above on L1 mental lexicon cannot be automatically extended to L2, for several reasons. First, a majority of L2 learners are cognitively mature: they have

established coordinate and superordinate concepts; and they have passed the preoperational stage. From a linguistic viewpoint, they have already established syntactic categories (noun, verb, adjective, etc.) in their L1. Also, it is possible that the learners' L1 lexicon and L1 system can interfere with their L2 lexicon. As such, L2 studies have focused on uncovering similarities and differences between L1 and L2 mental lexicon.

Some researchers claimed that L2 learners' lexicon is fundamentally different from native speakers' (Channell, 1990; Meara, 1984, 1987). Meara, a pioneer researcher of L2 internal lexicon, claimed that L2 lexicon is "quite different" from that of a native speaker (Meara, 1984, p. 233-234). To be specific, Maera claimed that words in L2 mental lexicon are organized around phonologically associated network while L1 lexicon is more paradigmatically oriented.

Singleton (1999), on the other hand, argued that "the proportion of phonologically motivated responses reflects level of proficiency" rather than fundamental difference (p. 135). Piper and Leicester (1980) also proposed that response patterns are affected by proficiency. They compared beginner level Japanese learners of English with advanced learners and native English speakers, and found that the native speaker group produced a higher proportion of paradigmatic responses than the advanced learner group, who, in turn, provided a higher proportion of paradigmatic responses than the beginner group. A similar tendency was also reported by Söderman (1993), who compared Finnish and Swedish learners of English with English native speakers. Söderman found that paradigmatic responses tended to positively correlate with proficiency, while clang responses tended to negatively correlate with proficiency.

On the other hand, some researchers reported that proficiency was not correlated with response types (Kruse, Pankhurst, & Sharwood Smaith, 1987; Wolter, 2001). Wolter (2001) suggested that the discrepancy in L1 and L2 response patterns is a function of familiarity, or depth of word knowledge, rather than mere proficiency. Wolter (2001) measured the correlation between the participants' familiarity with individual words and their response pattern, in his word association experiment on L1 and L2 mental lexicon. He included extremely low frequency words in the test items so that even native speakers might rate some of the items as unfamiliar. The results showed that adult native speakers also displayed "nonnative-like" response patterns upon hearing unfamiliar words, producing a high proportion of phonologically-oriented and other unclassifiable words.

Another confounding factor that comes into play is the learner's L1. In some languages like Japanese, children are known not to go through the s-p shift. Accordingly, adult Japanese speakers' responses are predominantly syntagmatic (Moran & Murakawa, 1968; Yasutake, 1985). If this is the case, it can be hypothesized that the response pattern in L1 Japanese can be transferred to their L2 response pattern. A few studies addressed this question. Leicester (1981) found that Japanese learners of English did not copy their L1

response pattern in a word association test but followed the English pattern, producing more paradigmatic responses as English proficiency improved. On the other hand, Yasutake (1985), who replicated Leicester (1981) with children in different grades, found that grade 1 English-learning children generally performed paradigmatically, while grade 5 children produced more syntagmatic responses, following their L1 response pattern. This suggests that mental lexical structure can be influenced by how the learners' L1 interact with age. As Korean and Japanese share morphological cognates as well as syntactic properties to a large extent, the same cross-linguistic influence can affect the L2 mental lexicon of Korean learners of English, especially adults.

At a more local level, L1 lexical items can interfere with L2 items. In word association tests, Meara (1984) found that English speakers' responses to some L2 French prompts were influenced by their L1 vocabulary. For example, the French stimulus *semelle* ('sole') which has a formal resemblance to English word *smell* elicited "odeur ('smell')." Likewise, French word *email* ('enamel') elicited "lettre ('letter')." Similar findings on L1 mediation were reported in other studies (Spivey & Marian, 1999; Sunderman & Kroll, 2006).

These L1-oriented responses are due to L1 cognates or false-cognates of the L2 word prompts, or otherwise phonetically/graphically similar L1 words to the target words. Thus, L1-mediated associates like the above are likely to occur when the two languages in question share a substantial amount of cognates—or at least formally similar words—as in English and French. Given that cognates and formal similarities are responsible for L1-mediated responses, Korean learners are likely to provide few such responses, as Korean and English hardly share cognates. Still, the question remains as to whether there are other ways that L1 lexicon can interfere with L2 lexical acquisition. While research on the role of L1 mental lexicon in the acquisition of L2 lexicon is sparse in the Korean EFL context, S. O. Kweon (2005) explored the role of L1 translation as a mediating factor. In her response-time measurement, she found that Korean learners of English responded faster to the word pairs that shared the same L1 translation, which led her to propose that L2 lexical specification is mapped onto existing L1 concepts.

Finally, there is evidence that the response pattern is sensitive to the word class of a prompt. Piper and Leicester (1980), for example, found that the proportion of paradigmatic responses were correlated with proficiency only when the stimuli were verbs or adjectives; no significant difference between levels was found with respect to nouns, which indicates that the s-p shift occurs in nouns at an earlier stage than in predicates. Although there has been little serious discussion as to why the shift is delayed in verbs or adjectives, a speculation is that it is related with thematic structure. Predicates have thematic argument structures (for example, the verb "kick" requires an agent such as "the boy" and a patient such as "the ball"), and a large portion of verbs require an obligatory complement (*The boy kicked). Seen from this angle, it is highly likely that transitive verbs elicit more

syntagmatic responses, especially when they have a typical object as in “kick the ball” and “open the door.”

To sum up, L2 learners’ lexical structure—and the response pattern in a word association test—can vary depending on various factors such as proficiency, depth of word knowledge, the learner’s L1, the learner’s age, as well as the syntactic category of the prompt word. While English children’s mental lexicon goes through restructuring from phonologically-oriented, to syntagmatically-oriented, and finally to paradigmatically-oriented mental lexicon, it remains controversial whether the same shift occurs in L2 mental lexicon. Little is known about how the mental lexicon of Korean EFL learners is structured and developed. Thus the present study raised the following research questions in the word association context:

1. Do Korean EFL learners go through a syntagmatic-paradigmatic shift in their L2 mental lexicon?
2. Does Korean EFL learners’ response pattern vary depending on their proficiency level?
3. Does Korean EFL learners’ response pattern vary depending on their familiarity with individual words?
4. Does Korean EFL learners’ response pattern vary depending on the syntactic category of a word?
5. Are there L2-specific responses due to cross-linguistic differences between Korean and English?

III. METHOD

1. Participants

Fifty Korean university students majoring in English at a university in an urban area participated in the experiment as Korean L2 learners. The Korean students were in their twenties and belonged to different years at the university. Their English ability measured in terms of their TOEIC scores was in the range of 365-905, which ensures that we included a wide range of learners with different proficiency. For later analyses, the learners were divided into three proficiency groups: Levels 1, 2, and 3, as shown in Table 1.

TABLE 1
L2 Participants' English Proficiency¹

Groups by level	TOEIC scores
Level 1 (N=12)	300-500
Level 2 (N=20)	500-700
Level 3 (N=17)	700-900

In addition to the learner group, eleven native English speakers (NSs) from English-speaking countries (the U.S., U.K., Canada, and Australia) were also invited to the experiment as a control group. The NSs were English instructors of the university.

2. Materials and Instruments

The two major tasks used in this experiment were a written word association task and a familiarity rating task. The present study adopted the written-written word association mode because reading is the major source of language input in the Korean EFL context (C. Chin, 2004). It was thus assumed that the mental representation of English words involve orthographic information as well as auditory information.

The words used as stimuli in the experiment were selected from the Freiburg-Brown Corpus of American English Corpus (henceforth the Frown corpus), a database with roughly one million words from 500 texts published in America. Frequency analyses for the corpus were run using MonoConc Pro-2, to ensure that (i) words with diverse frequency can be included in the test and (ii) the list does not include too many extremely infrequent words that might result in proliferation of clangs and unclassifiable responses. Based on the frequency analyses, a total of 48 items—24 nouns and 24 verbs were selected. Table 2 below presents the final sets of word stimuli, together with their frequency range in the Frown Corpus. The frequency range in parentheses refers to the number of occurrence in the corpus. For example, the low-frequency words listed above are those words that occurred in the frequency between ten and twenty. Caution was paid to ensure that the initial letters of the stimuli were evenly distributed.

1) Word Association Test

In the word association test, the participants were asked to write the first word that

¹ One participant did not submit his TOEIC score, so his data were excluded when analyzing the role of proficiency. One student who scored 905 was placed in Level 3.

comes to mind upon reading each word presented on the screen. The word stimuli were presented in a written form, one word at a time. Each word stimulus appeared at the center of the computer screen and stayed on the screen only for ten seconds, after which a new stimulus was introduced with a click sound. The participants were asked to write the responses as soon as possible, before a new word appears on the screen, and not to erase or change the answers. The participants were given two practice trial opportunities before the actual test. The test started after ensuring that the participants clearly understood the instruction. The experiment took about 9.5 minutes to complete.

TABLE 2
Word Stimuli for the Word Association Test

Frequency (range)	Nouns	Verbs
High (300-500)	<i>door, water, student, job, ideas, money, fact, business</i>	<i>read, hear, follow, lose, believe, grow, meet, understand</i>
Mid (100-200)	<i>budget, opportunity, disease, image, vehicle, industry energy, justice</i>	<i>improve, stare, prepare, relate, conduct, establish, avoid, decide</i>
Low (10-20)	<i>petition, liver, closet, organ, obstacle, opponent, hart, fatigue</i>	<i>confine, accumulate, erect, inherit, vanish, prevail, frustrate, disclose</i>

2) Word Familiarity Measurement

After the word association test was finished, the participants were asked to rate each of the above test items in terms of how familiar they are with each of the words, on a 5-point Likert Scale (where 1 = “not familiar at all”, and 5 = “very familiar”). In addition, the learners were asked to write a translation equivalent for each word, to gather further information of the depth of their word knowledge.

3. Data Analysis

The responses in the word association tasks were categorized into four response types: paradigmatic, syntagmatic, clang, and unclassifiable, following the categorization criteria suggested by Wolter (2001). Examples in the parentheses have been taken from the actual responses by our participants.

- (1) Paradigmatic: A response was classified as paradigmatic if they were synonyms, antonyms, coordinates, superordinates, or subordinates of the word stimulus so that

they alternate with the word stimulus in the same slot of the sentence (e.g., stare-look, lose-win, obstacle-barrier, liver-organ)

- (2) Syntagmatic: A response was classified as syntagmatic if they were in a collocational relationship and frequently co-occur with the word stimulus (e.g., read-book, sit-down, sit-chair)
- (3) Clang: A response was classified as clang if they were only related with the stimulus phonologically (e.g., opponent-opportunity, confine-define, erect-direct) or orthographically (e.g., accumulate-accelerate, heart-hatred)
- (4) Unclassifiable: A response was classified as unclassifiable if the response words were unclassifiable (fatigue-gun, industry-fact), or only minimally associated with the stimulus word (e.g., improve-good, job-adult, accumulate-plus).

To increase the reliability of the coding, the responses were coded by two raters. The ratings between the two raters agreed 86.2% across the items, the highest being 98.4% and the lowest 65.6%. Items that received less than 80% agreement (4 items: *disclose*, *avoid*, *fact*, *obstacle*) were eliminated from the analysis. With these items eliminated, the inter-rater agreement rate rose to 91.5%.

After the coding, the participant's response pattern was analyzed in terms of frequency and distribution of the different response types. First, the overall response pattern of the learner group and the native speaker group were compared in terms of their provision of paradigmatic, syntagmatic, clang, and unclassifiable responses. The response pattern was also compared among different proficiency groups to see if the s-p shift is born out as proficiency improves. Correlation analyses were run to see if the response pattern is affected by the familiarity with individual words. Response patterns for nouns and verbs were separately analyzed to see if response tendencies are sensitive to word classes. In addition, the analyses included the examination of the data that provide evidence of the learners' L1-mediated responses.

IV. RESULTS

1. The Overall Response Patterns: L2 Learners vs. NS

The analysis of the responses revealed that the native speakers provided much higher ratio of both paradigmatic and syntagmatic responses compared with the learners, as can be seen in Table 3 and Figure 1. A series of t-test results revealed that the learner group provided a significantly lower rate of paradigmatic responses ($t=-3.245$, $df=59$, $p<.01$), as well as a significantly lower rate of syntagmatic responses ($t=-2.969$, $df=59$, $p<.01$) than

the NS group. By contrast, in the “unclassifiable” category, the learners produced a significantly more frequent responses ($t=5.493$, $p<.001$). The difference between the learner group and the NS group in clang responses was only marginal ($t=1.780$, $p=.082$), probably due to the small number of clang responses in both the L2 and NS groups.

TABLE 3
Overall Response Patterns: L2 Learners vs. NS

	L2 learners		NS	
	Tokens	(%)	Tokens	(%)
Paradigmatic	529	(24.1)	185	(38.2%)
Syntagmatic	564	(25.6)	175	(36.2%)
Clang	117	(5.3)	6	(1.2%)
Unclassifiable	990	(45.0)	118	(24.4%)
Total	2200	(100)	484	(100%)

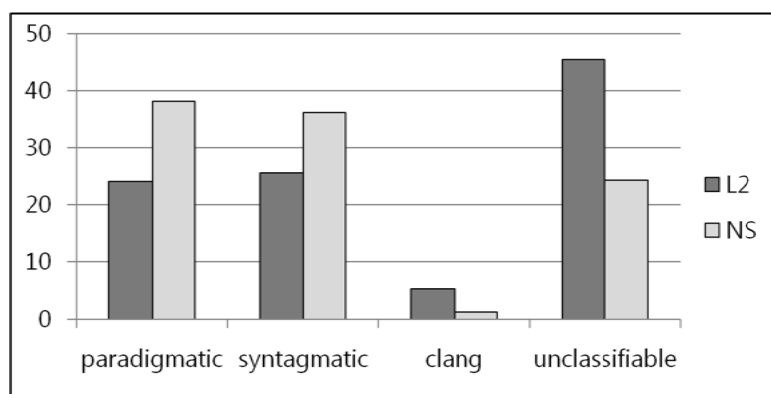


FIGURE 1 L2-NS Comparison by Response Type

As for the within-group comparisons, the learner group provided a slightly higher proportion of syntagmatic responses (25.6%) than paradigmatic responses (24.1%). Their clang responses accounted for only 5.3% of the total responses, which will be further discussed later in this section. Meanwhile, responses that belonged to the “unclassifiable” category accounted for as high as 45%. A repeated measures ANOVA yielded a statistically significant difference in ratio among the different response types ($F=100.630$, $df=3$, $p<.001$). A Scheffé post hoc test revealed that the difference was significant between paradigmatic and clang responses, paradigmatic and unclassifiable responses ($p<.001$), syntagmatic and clang responses ($p<.001$), and syntagmatic and unclassifiable responses ($p<.001$). In other words, the difference in ratio is attributable to a low proportion of clang

responses on the one hand, and a high proportion of responses in the “unclassifiable” category. Meanwhile, no statistically significant difference in ratio was found between the learners' paradigmatic and syntagmatic responses.

The NS group ratio of paradigmatic responses (38.2%) was slightly higher than that of syntagmatic responses (36.2%). However, the difference between the two groups was not significant. Together, the paradigmatic and syntagmatic responses accounted for as high as 74.4% of the NS group's total responses. Their clang responses were minimal (1.2%). A repeated measures analysis yielded a statistically significant difference in ratio among the response types ($F=14.385$, $df=3$, $p<.001$). A Scheffé post hoc test revealed that the difference was due to an exceptionally small size of clang responses. The difference in ratio between paradigmatic and syntagmatic responses was not significant.

To sum up, the overall picture thus far provides no firm support to a syntagmatic-paradigmatic shift even in the NS data: the NS responses did not show any such dominance of paradigmatic responses over syntagmatic responses as reported in previous studies mentioned above. What we found instead was the NS group's overall higher proportion of paradigmatic and syntagmatic responses than that of the learner group. What characterized the L2 group was an overall low proportion of both paradigmatic and syntagmatic responses rather than their preference for syntagmatic responses over paradigmatic responses. However, as our learner participants constitute a mixed-proficiency group, we need to see whether learner response patterns vary according to their proficiency level, and whether the learners provide more paradigmatically-oriented responses as proficiency increases. The next section covers this issue.

2. L2 Proficiency and Response Patterns

The L2 learners' proficiency was found to positively correlate with the proportion of paradigmatic responses ($r=.494$, $p<.01$), but not with the proportion of syntagmatic responses ($r=.261$). The ratio of unclassifiable responses decreased with proficiency, showing a strong negative correlation with proficiency ($r=-.630$, $p<.01$). While clang responses reduced in frequency as proficiency improved, the correlation was not significant, due to the small size of the data ($r=-.087$).

As Figure 2 shows, the Level 1 learners (TOEIC scores lower than 500) provided more syntagmatic responses (22.3%) than paradigmatic responses (13.1%), and the difference was significant ($t=5.356$, $p<.05$). The tendency reversed at Level 2 (TOEIC score range between 500s-700s): the proportion of paradigmatic responses was slightly larger (26.1%) than that of syntagmatic responses (25.0%), although the difference was not significant ($t=.088$, $p=.770$). The response pattern of the Level 3 group (TOEIC scores higher than 700) can be described as even higher ratios of both paradigmatic and syntagmatic responses and

the resulting low rate of unclassifiable responses. However, the predominance of paradigmatic responses was not observed in this group ($t=.053, p=.820$). In fact, this group provided a slightly more syntagmatic responses (29.5%) than paradigmatic responses (28.6%). Therefore, while the ratio of paradigmatic response increased with the increase of proficiency, no clear sign of syntagmatic-paradigmatic shift was found as an indicator of the increase in proficiency.

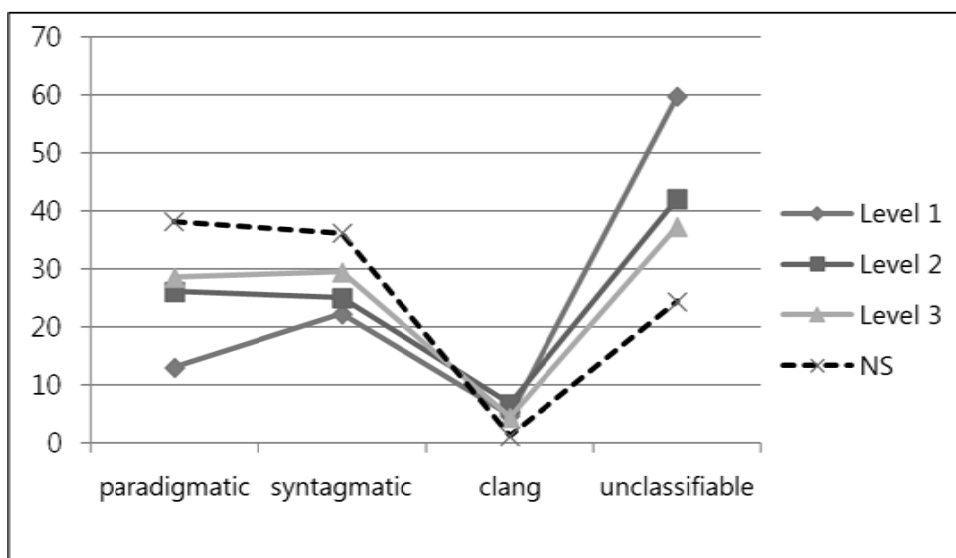


FIGURE 2 Proficiency and Response Patterns

3. Word Familiarity and Response Patterns

The L2 learners' familiarity rating of individual prompt words varied from 1.85 (prompt word=*petition*) to 5.0 (prompt words=*door, water, student, understand*). The mean familiarity was 4.28, which indicates that the learners were fairly familiar with the prompt words. The accuracy in translation ranged from 10.4% (*hart*: 10.4%, *petition*: 20.8%, *disclose*: 20.8%, *confine*: 25%) to 100% (*door, decide, water, improve, job, read, student, hear, follow, money, idea, believe, grow, meet, understand, business, energy*). The mean accuracy amounted to 82.5%, which shows that the learners generally have a fairly good knowledge of the prompts. The learners' word familiarity and the accuracy of their translation were strongly correlated ($r=.927, p<.001$), suggesting that both constitute proper indicators of depth of word knowledge (Wolter, 2001).

In order to see if high familiarity words prompt more paradigmatic responses than syntagmatic responses, and if low familiarity words prompt more phonologically-

associated responses, we compared the response patterns across different familiarity levels. Figure 3 shows how the learner's response pattern changed according to their word familiarity. From Figure 3, we can extract some major patterns. First, both paradigmatic and syntagmatic responses increased in ratio as word familiarity increased. While both types of responses increased with familiarity, only the ratio of syntagmatic responses was strongly correlated with familiarity ($r=.525, p<.01$); the correlation between familiarity and the ratio of paradigmatic responses did not reach significance ($r=.275, p=.071$).

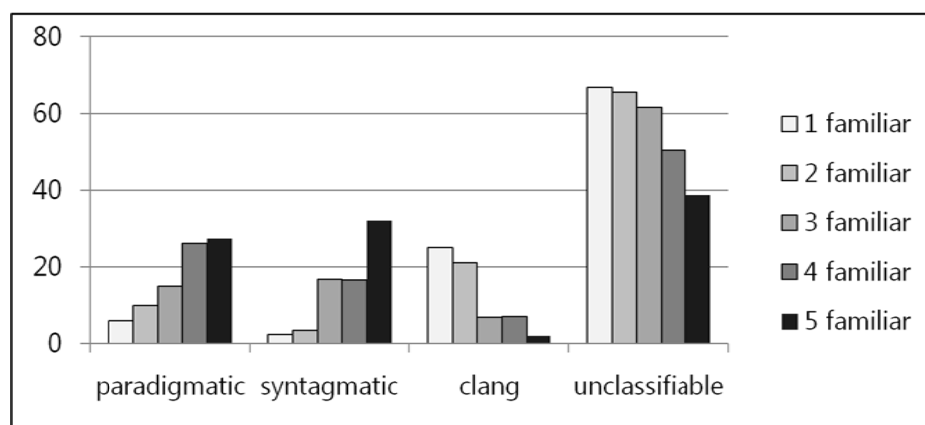


FIGURE 3 Word Familiarity and Response Patterns

In addition, the proportion of paradigmatic responses to syntagmatic responses tended to decrease as the level of familiarity increased. Table 4 presents the ratios of paradigmatic responses to syntagmatic responses (p-s ratio henceforth) across different familiarity levels.

TABLE 4

Proportion of Paradigmatic Responses to Syntagmatic Responses (P-s Ratio)

Familiarity rating	1 familiar	2 familiar	3 familiar	4 familiar	5 familiar
P-s ratio	2.50	2.83	0.89	1.58	0.86

Second, unfamiliar words prompted more phonologically-related responses. Clang responses accounted for 25% and 21.1% of the responses for “1 familiar” and “2 familiar” words, respectively. The proportion of clang responses and word familiarity showed a strong negative correlation ($r=-.819, p<.001$), clearly indicating that less familiar words elicit more clang responses. From this, we can deduce that the reason why we did not find a statistically significant proficiency-group difference in clang responses was because the clang responses were concentrated on the small number of low familiarity words. Also interesting to note is that even native speakers provided a high proportion of clang

responses for one stimulus word *hart*, which received only 3.0 on a 5-point Likert scale of familiarity. Only five out of the eleven native speakers provided paradigmatic responses such as “deer” or syntagmatic responses such as “hunt”. One NS participant provided “harp” in phonological/orthographic association with *hart*, and the others provided responses such as “beat” and “red” in association with “heart”, which is itself a clang response to the word prompt.

Third, the proportion of unclassifiable responses decreased with the increase in word familiarity, showing a strong negative correlation between them ($r=-.495, p<.01$). To sum up, word familiarity is found to affect rating patterns. Highly familiar words tend to prompt paradigmatic or syntagmatic responses, but the s-p ratio did not consistently increase with the increase in familiarity. Thus our results do not lend support to the claim that the p-s shift is a function of word familiarity.

4. Response to Nouns and Verbs

When the response patterns for nouns and verbs were separately examined, we found that the L2 group responded differently to nouns and verbs. As shown in Figure 4, the learners produced a significantly more paradigmatic responses (29.5%) than syntagmatic responses (18.7%) when the stimuli were nouns ($t=4.844, p<.01$). Conversely, when the stimuli were verbs, they provided a significantly higher rate of syntagmatic responses (32.5%) than paradigmatic responses (18.6%) ($t=-3.356, p<.01$). There was a significant interaction between word category and response type ($F_{(1,40)}=33.075, p<.001$).

The NS group provided more paradigmatic responses (36.8%) than syntagmatic responses (32.6%) for nouns, but the difference was not significant ($t=.370, df=10, p=.719$). The native speakers provided equal amount of paradigmatic and syntagmatic responses for verbs, showing no difference in the ratio between them.

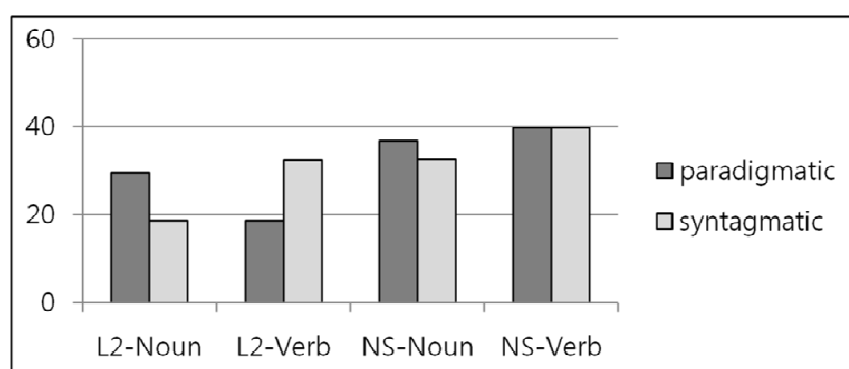


FIGURE 4 Paradigmatic & Syntagmatic Responses (%): N vs. V

So far, we have seen that learners tend to provide more paradigmatic responses to nouns and more syntagmatic responses to verbs, whereas the native speakers were not affected by the word category. If this difference is attributable to language proficiency, it is construed that proficient learners might have performed in a similar way to the NS group. So we further analyzed the response patterns of different proficiency levels in nouns and verbs, separately. Figure 5 and Figure 6 display level differences in the noun category and the verb category, respectively.

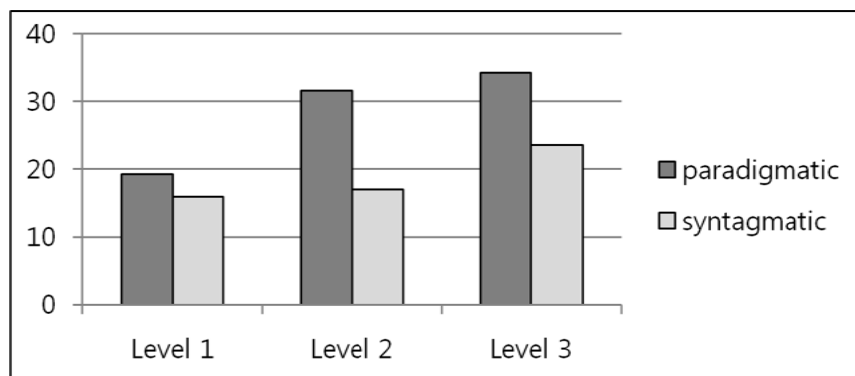


FIGURE 5 Paradigmatic & Syntagmatic Responses by Level (%): Nouns

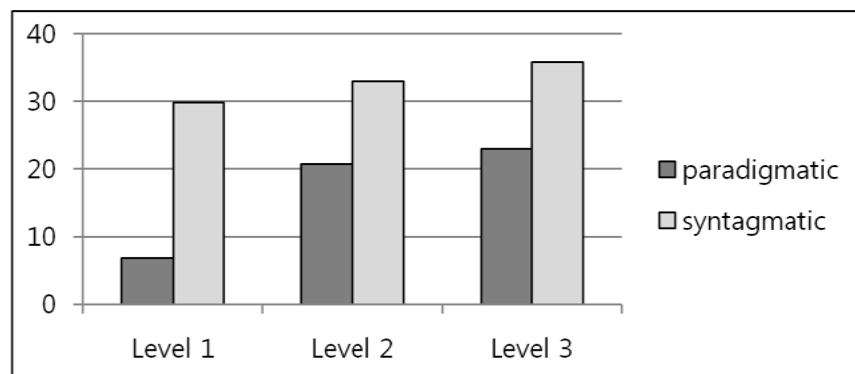


FIGURE 6 Paradigmatic & Syntagmatic Responses by Level (%): Verbs

In nouns, paradigmatic responses were consistently more frequent in all levels. The difference in ratio between paradigmatic and syntagmatic responses were not significant at Level 1 ($t=.694$, $df=11$, $p=.502$), but the difference was significant at Level 2 ($t=4.313$, $df=19$, $p<.001$) and Level 3 ($t=3.542$, $df=16$, $p<.01$).

As for verbs, syntagmatic responses prevailed even in Level 3. Yet, the syntagmatic dominance gradually weakened, and the gap between paradigmatic and syntagmatic

responses became less significant. The difference was significant in the Level 1 group ($t=-4.954$, $df=11$, $p<.001$), but less significant in the Level 2 group ($t=-1.894$, $df=19$, $p=.074$), and the Level 3 group ($t=-1.793$, $df=16$, $p=.092$). This suggests that even in the verb category, paradigmatic responses increase as proficiency improves, although syntagmatic responses continue to prevail.

The p-s ratio showed an increase only in verbs, as can be seen in Table 5, but the p-s ratio was almost equal in the Level 2 and Level 3 groups, failing to provide evidence for an s-p shift. The p-s ratio in nouns was higher than 1.0 at all levels, so it is not certain whether the mental lexicon went through the s-p shift earlier, or whether paradigmatic responses have been dominant from the beginning.

TABLE 5

Proportion of Paradigmatic Responses to Syntagmatic Responses by Level: N vs. V

		Level 1	Level 2	Level 3
P-s ratio	N	1.21	1.86	1.45
	V	0.23	0.63	0.64

To combine our analyses of the learners' response patterns for noun stimuli and verb stimuli, the learners produced a significantly higher amount of paradigmatic responses for nouns, while they produced a significantly higher amount of syntagmatic responses for verbs. The frequency of paradigmatic responses increased both in nouns and verbs as proficiency increased, although there was no clear hint for the s-p shift.

5. The Role of Cross-Linguistic Influence

We have seen that a large proportion of unclassifiable responses were one of the characteristics of the L2 group responses. We further coded the unclassifiable responses into subtypes, and sorted responses that were related to their L1 in various ways.

1) Phonological/Orthographic Confusion

Some learners were found to be affected by phonological confusion mediated by their L1. For example, the learners' difficulty with sound differentiation between /r/ and /l/ was found to cause orthographic confusion. Especially, two prompt words—*liver* and *erect*—elicited responses associated with their sound neighbors, i.e., *river* and *elect*, respectively. For example, the stimulus word *liver* prompted responses such as “water”, “stream”, and “bay”, which are associates of *river*. Likewise, *erect* prompted responses such as “vote”

and “president”, which are associates of *elect*. The learners’ translation of these words provides additional evidence that these learners actually confused *liver* with *river*, and *erect* with *elect*. It is interesting to note that both cases involve the confusion between /l/ and /r/: the learners took “l” for “r” in the case of *liver*, while they took “r” for “l” in the case of *erect*. It has been widely known that Korean learners tend to mispronounce /l/ and /r/, sometimes pronouncing /l/ for /r/, and other times pronouncing /r/ for /l/. However, there has not been much discussion as to whether this confusion extends to orthography. The present study suggests that the phonological confusion is linked to orthographic problems.

Our data show that orthographic confusion leads to incorrect word recognition, which in turn activates wrong word associates. So, in reading, when the learners misrecognize a target written word, it further activates word associates which are irrelevant to the original text, interfering with textual processing on the one hand, and suppressing desired associates needed for efficient textual processing on the other hand. None of this type of phonologically/orthographically oriented confusion was observed in the native speakers’ responses. The following is some examples of L2 responses attributable to phonological/orthographic confusion (with the students’ pseudonyms in parentheses).

liver (via ‘river’): water (S1, S13, S16, S22, S23, S27, S42), sea (S34), stream (S12), fluid (S48), bay (S15), sky (S21), summer (S32)
erect (via ‘elect’): president (S14, S34, S38), mayor (S37), vote (S9), ballot (S3)
vanish (via ‘banish’): Romeo (S18, S40: The two students took a course entitled “Shakespearean Plays”, where they covered “Romeo and Juliette” and came across the word “banish” as they read the part where Romeo is banished after murdering Mercutio).

2) Unnatural Collocation and Translation-Mediated Association

Another response type unique to the learner group concerns nonnative-like collocation. For example, eight learners wrote “building” upon reading the prompt *establish*. While *establish* shares a core meaning with—and is sometimes exchangeable with—*build*, *establish* is more restricted in meaning, denoting “to create something” or “to cause something to be widely known and accepted. It hardly collocates with physical entities such as a “building”. Considering that both *build* and *establish* can be translated as “sei-uw-ta” in Korean, it is highly likely that the L1 translation mediated the semantic processing of L2 lexical items. Note that the NS syntagmatic responses to *establish* were of a more abstract nature (e.g., “foundation” or “society”).

A more extreme case of L1 translation at work can be seen in a learner’s response

“definition” for the prompt word *justice*. “Justice” and “definition” hardly share anything in common, except for the fact that their Korean translation equivalents are both “ceng-ui”. Although small in size, these examples are resonant of S. O. Kweon’s (2005) claim that L1 translation is a mediating factor.

V. CONCLUSION AND PEDAGOGICAL IMPLICATIONS

The present study has attempted to probe into the question of how Korean EFL learners’ mental lexicon is structured and developed, by analyzing their responses in a word association task. We found several important patterns in the learners’ responses to prompt words. First, the learners provided much lower proportion of paradigmatic and syntagmatic responses compared with the native speakers. Second, the learners’ paradigmatic and syntagmatic responses increased with proficiency. However, no clear evidence of syntagmatic-paradigmatic shift was observed when we analyzed the whole set of responses. Third, when the response pattern for nouns and that for verbs were compared, we found that learners tend to provide significantly higher proportion paradigmatic responses to noun prompts, and significantly higher proportion of syntagmatic responses to verb prompts. However, no clear sign of s-p shift was evidenced. Fourth, while both paradigmatic and syntagmatic responses increased with the increase of familiarity, no clear evidence of the s-p shift was found, regardless of the word class. Overall, our findings fail to provide evidence that the mental lexicon of Korean EFL learners—especially adults—goes through the s-p shift found in English native children. The only clear finding is that both paradigmatic and syntagmatic responses increase with the increase in proficiency and word familiarity. In order to fully interpret our results, however, more in-depth discussion on the nature of L1-L2 structural differences seems to be a prerequisite.

We also found that cross-linguistic influence is pervasive in the mental lexicon of Korean learners of English. First, the result of our word association test showed that L1-related orthographic confusion caused Korean learners to activate semantically irrelevant words. We found that the phonological confusion is linked to orthographic confusion, resulting in the blurring of the distinctions between the graphemes. Secondly, EFL learners provided inappropriate syntagmatic responses due to the lack of proper collocational knowledge.

The above findings have some pedagogical implications. First, the increase of paradigmatic and syntagmatic responses indicates that L2 learners are “increasingly engaged in meaning as the internalization of a word progresses (Singleton, 1999, p. 154).” Teachers should facilitate this restructuring process by providing lexical items in meaningful context. Activities using a word map—a graphic organizer that links related

words and concepts—might help learners build paradigmatic associations between words.

Second, our findings strongly suggest that orthographic confusion due to cross-linguistic difference can influence memory and recognition of words, and that inaccurate word recognition activates wrong word associates. In order to minimize the confusion, teachers should devise phonological/orthographic awareness activities, through which learners are led to discern the phonologically/orthographically confusing words in meaningful communicative context.

Finally, Korean EFL learners' inappropriate syntagmatic responses are attributable to lack of collocational knowledge. Memorizing words as isolated items and lack of exposure to naturally-occurring word combinations in context might be responsible for the problem. Learners should be able get acquainted with unfamiliar word in context that provide semantic-pragmatic clues (Bialystok, 1983; Dupuy & Krashen, 1993; Nation, 1993; Singleton, 1999). Teachers should also help learners develop sensitivity to subtle semantic and grammatical differences, especially between verbs that share similar semantic components such as *build* and *establish*. Grammar consciousness-raising activities that draw learners' attention to the otherwise unnoticed distinction between lexical items might help. One example suggested by Rutherford (1987) was an activity, where the learners were forced to choose among a set of semantically similar verbs such as *deny*, *prevent*, *forbid*, *keep*, and *avoid* within a meaningful context. A similar awareness-raising activity could be designed for sensitizing learners to word collocations that are semantically and pragmatically acceptable.

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Examples in: English**Applicable Languages: English****Applicable Levels: All levels**

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