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Receptive and Productive Vocabulary Knowledge of Negative Prefixes by EFL Students

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EFL学習者の英語形容詞の否定接頭辞における受容語彙知識と産出語彙知識

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ABSTRACT

This study intends to examine English as a Foreign Language (hereafter EFL) learners' knowledge of negational prefixes in English adjectives in both the receptive and productive aspects. Although negative prefixes demand much working memory from EFL learners and have a crucial impact on the meaning of the sentence, not much research has attempted to analyze their awareness of negative prefixes systematically. Influenced by studies on native speakers' (hereafter NSs) knowledge of negative prefixes, an experiment was conducted to reveal EFL learners' understanding and the usage of English negative prefixes. To serve this purpose, six high school students in Korea participated in a self-paced reading and fill-in-the blank test. The results showed that Korean EFL students are not sensitive to the correctness of the forms of the prefixes to the bases. However, they demonstrated intuition over etymological differences. They dichotomized *un-* to native English word and *IN-(in-, im-,ir-, il-)* to the Latinate origin word more severely than NSs. The results also revealed that *un-* is the most favored negational prefix among the EFL learners and they rely heavily on orthographical information when producing it. These findings hopefully make contribution to developing more effective vocabulary teaching methods in EFL classrooms.

Receptive and Productive Vocabulary Knowledge of Negative Prefixes by EFL Students

Derivation is a morphologically complex process since it does not depend entirely on etymology, phonology, or semantics (Katamba, 2006). Among many affixes, as negational prefixes affect the meaning of the given sentence significantly (Sherman, 1973), the explicit teaching of prefixal negation in English

is highly recommended. However, EFL learners with limited exposure to the target language are prone to simply memorize them separately. This requires double workload for EFL learners considering the capacity of working memory to process the vocabulary in a psycholinguistic aspect (Linck et al., 2009; Segalowitz & Hulstjin, 2009). There also exists a gap between EFL learners' awareness of prefix and the actual frequency of NSs' use of it (Mochizuki & Aizawa, 2000). Thus, as teachers, we need to not only lighten their heavy workload in acquiring vocabulary when expanding their vocabulary size but also help them learn authentic use of English.

Morphological awareness, which can be defined as an "awareness of morphemic structures of words and the ability to reflect on and manipulate that structure" (Carlisle & Feldman, 1995, p.194) contributes to learners' reading ability (Ramirez et al., 2011). Before employing any methodological teaching techniques, there is a prerequisite to diagnose the current status of EFL learners' awareness and understanding of English negative prefixes. Thus, this paper investigates the awareness of Korean EFL learners on prefixal negation of English adjectives— how sensitive they are to the negational prefix—and their preferences in production.

Literature Review

Prefixal negation in English adjectives: NSs and ESL/EFL learners

The interest in the English negative prefix has generated many studies by historical linguists, morphologists, and researchers in the second language acquisition field (Aronoff, 1976; Baldi et al., 1985; Nagy & Herman, 1987; Mochizuki & Aizawa, 2000; Bowers & Kirby, 2010).

Among them, Baldi et al. (1985) is prominent in that they examined prefixal negation of English adjectives in psycholinguistic dimensions of productivity. They conducted two tests: a production test (fill-in-the blank) and a preference test (multiple choice). In the production test, with carefully coined 60 pseudo-words, 30 of which were etymologically similar to Latin/ French, and the other half which resembled words of solely English origin, the researchers asked participants to add a negative prefix before each pseudo-word (p.37). This would empirically verify the difference in productivity of the negative prefixes among *un-, IN- (in-, im-, ir-, il-)*, *non-*, and *dis-*. Etymologically, *un-* used to be attached only to the native English origin. It has always been the strongest "ousting *IN-* more and more" throughout English history (p.34). In the preference test, participants were asked to decide the best and the second-best negative prefix of the root with 90 genuine words and 60 pseudo adjectives used in the first test. The result of the production test proved that NSs are not only able to make use of etymological information about bases, but also keep the phonological assimilation rule for *IN-* prefixation. However, they did not strictly follow the distinction. They rather productively and creatively applied their intuition of etymology and phonology, when attaching prefixes. Meanwhile, the result of the preference tests demonstrated that *un-* is the most productive negativizing prefix and *non-* is the second most favored choice among NSs.

There are not many studies on EFL learners' prefixal negation knowledge except for a few works dealing with their understanding of affixes in general. Mochizuki and Aizawa (2000) revealed that Japanese students' knowledge of English affixes was correlated with their vocabulary size and there was

a stable acquisition order as in *re*>*un*>*pre*>*non*>*anti*>*semi*>*ex*>*en*>*post*>*inter*>*counter*>*in*>*ante*. This order appears to align with the results of Baldi et al. (1985)'s productivity and preference tests when only negative prefixes are sorted out. However, it is inconclusive that the acquisition order reflects prefix productivity in EFL learners. Moreover, the subjects were half correct in the affixes knowledge test, for example 7.24 out of 13 points on the average in the prefix section (Mochizuki & Aizawa, 2000). This indicates that EFL learners have a relatively low understanding of prefixes in English.

Double workload on EFL learners' working memory

Many psycholinguistic studies have addressed second language learners' working memory in their performance. As working memory is strictly limited in capacity (Gathercole & Baddeley, 1993), ESL/EFL learners tend to choose the best place to direct their attention to, when they face with heavy tasks. Taking this into account, to memorize base words and derived negative forms independently requires double workload in learners' working memory to process them. This is not the most efficient way for learners to expand their vocabulary size. In fact, affix knowledge, especially derivative knowledge, bestows learners' ability to read new words and infer their meanings (Nagy et al., 1993). L1 learners' dramatic expansion of their vocabulary size from the fourth grade is attributed to incidental vocabulary acquisition and increased knowledge of affixed words (Nagy & Herman, 1987; Mochizuki & Aizawa, 2000).

It has been attested by many researchers that morphological knowledge had an influence on efficient acquisition of vocabulary, word recognition, and even reading comprehension (Laufer, 1990; Qian, 1999; Bowers & Kirby, 2010).

Psychological Analysis on Bilingual Lexical Selection: the Bilingual Interactive Activation Model, and the Revised Hierarchical Model

A precise mechanism of how L2 orthographic forms are activated in a learner's cognition is well explained through the Bilingual Interactive Activation (hereafter BIA) model by Dijkstra and Van Heuven (1998). The BIA model specifically tries to reveal the word formation process in bilingualism (Kroll & Tokowicz, 2005). It is based on the interactive activation model, which claims that comprehension processing is initiated by visual input from the text, taking a bottom up approach, from letter to letter to form a word. Then, language nodes are applied to decide whether the L1 or L2 will be selected in the opposite approach, top-down way. This theory explains that both L1 and L2 lexicon are integrated and the lexical access is nonselective (Dijkstra & Van Heuven, 2002). According to the BIA model, EFL learners should respond sensitively to the derived word with prefixed letter(s). It is because their lexicon is activated in both L1 and L2 so that they are able to access the meaning of the derived word once they recognize the letter attached to the base. How elaborately and sensitively they react to the letter(s) has not been yet researched systematically.

Another psycholinguistic model considered as complementation for the pitfalls of previous models (Potter et al., 1984) is the Revised Hierarchical Model (Kroll & Stewart, 1994, hereafter RHM). The RHM is meant to explain the development of lexical and conceptual representation in the second language. This model describes that L2 has links to both L1 and concepts but the strength of the association is

different. While lexical connections of L2 to L1 are stronger, the links of L2 to concepts are weaker and their bonding gets robust as the proficiency level of a learner improves (Kroll & Tokowicz, 2005). The implication of this sequence of development allows teachers to predict that beginner and intermediate level of EFL students may access the input superficially by drawing their attention to the orthographic or phonological features while advanced learners would be more deeply involved in meaning aspects, making use of semantic information.

Psycholinguistic tools to measure EFL learners' comprehension and production

Types of tasks require language users to take different approaches to vocabulary processing. For example, comprehension initiates with word recognition, stimulated by properties of input and advances towards the concepts the word conveys, while production behaves in the opposite way. It starts with the concepts and receives feedback from semantics and embodies the meaning into a word form (Kroll & Dijkstra, 2002; Hermans, 2000). Thus, the time language selection occurs is also different. In comprehension, language nodes are not activated until relatively late while language cue in production is encoded as part of the conceptual representation of the event (Kroll & Tokowicz, 2005).

Commonly traditional cross-modal priming and masked priming tasks are used to observe morphological processing in psycholinguistic dimensions. These methods are to measure the time spent on a participant's word recognition when a visual target word is presented with auditory priming stimulus or vice versa (Roberts, 2013; Ahn et al., 2009). However, they are not appropriate to investigate learners' sensitivity toward the markedness of ill-formed prefixed derivations as they presuppose the priming effect. On the other hand, a self-paced reading (hereafter SPR) has been adopted to examine the place where cognitive difficulty arises in learners' language processing though it usually deals with syntactic structure (Jegerski & Van Patten, 2013). The longer time a subject spends on a certain word, the more difficulty is assumed to be raised. This basic assumption is well applicable to measure EFL learners' cognitive process in comprehension.

Recently, on-line measurement for production has the limelight instead of off-line tests. It is believed to plainly reflect what happens in learners' cognition and production process (Miller et al., 2008; Van Patten, 2013). EFL learners, however, feel pressured by on-line tasks because they have hardly been in the situation to be forced to produce L2 on the spot, and therefore, to measure their genuine competence, production tasks need to be modified according to the characteristics and learning environment of the participants (Newton & Nation, 2020; Panahzadeh & Asadi, 2019; Yuan & Ellis, 2003).

Purpose of the Study

Based on the studies and available research tools described in the previous chapter, this study seeks to examine actual EFL learners' receptive and productive knowledge on negational prefix in English adjectives. It has the purpose of developing concrete teaching techniques to lessen the burden of EFL learners' working memory in expanding their vocabulary. Accordingly, this paper attempts to address the following questions:

1. To what extent are EFL learners aware of the relations between the negational prefixes and their

bases?

2. Which negational prefix do EFL learners produce the most when they encounter a new base?

Methods

Participants

The participants were six of the first grade students at a public high school in Seoul, Korea. In terms of proficiency, two were in beginner, two in intermediate, and two in advanced level. This division was based on the first semester English grades at the school and the vocabulary test designed for SPR. In this prerequisite vocabulary test, the beginner level students' average scores were in the range from 30 to 40 out of 100, those of the intermediate level students were in between 50 and 60, and the advanced level students' average scores were in between 80 and 100. Each group consisted of one male, and one female and all of them did not have any experience of living in the countries where English is the dominant language.

Materials

Self-paced Reading Sentences

To observe how quickly and accurately the participants respond to the well-formed and ill-formed prefixes in the Self-paced Reading (SPR) test, 14 English adjectives with negative prefixes were selected, with two words for each of seven categories of negational prefix, *un- ,IN- (in-, ir-, im-, il-), dis-, non-*. They were chosen after cross-checking COCA (Corpus of Contemporary American English) with frequency ranged from 1106 to 5535 and 2067 essential vocabulary recommended for high school students by the Korean Ministry of Education. Then using these 14 adjectives, 14 simple sentences were prepared (without embedded clauses), and another 14 sentences with only prefixes replaced with ill-forms were also prepared. In addition, 10 fillers, which did not include any negative were also prepared. All the sentences were excerpted from the examples in the electronic dictionary and carefully modified to avoid any syntactic ambiguity as below (Appendix 1 in detail).

e.g. ir-adjective 1a. He visited his parents at *irregular* intervals.

ir-adjective 1b. *He visited his parents at *unregular* intervals.

Fill-in-the-blank Test Questions

The fill-in-the blank test questions were devised to investigate the participants' preferences among negative prefixes and their accuracy when they attached the prefixes to the given bases, especially in relation to etymological information and phonological assimilation. Thirty adjectives were chosen to generate the test. Twenty were from cross checking the above essential vocabulary and the words used in Baldi et al. (1985)'s classification (Two for each category : *Native un-, Latin un-, Latin in-, im-, ir-, il-* with four *non*-adjective, and four *dis*-adjective). Ten were from the list of 60 pseudo-adjectives in the same research. Among them, five were Latinate pseudo-word and the other half were native-pseudo word. These five words from each group fulfilled phonological conditions of five categories in the previous study: vowel, neutral consonant, /l/, labial (/m/ or /p/), and /r/ as follows (Appendix 2 in detail).

e.g. pseudo Latinate with /l/ condition : limoral
pseudo native with /l/ condition : loofish

Procedures

Preparation (Prerequisite Vocabulary Test)

All six students took the vocabulary test about the words they would encounter in the SPR test. In this prior test, 12 target base forms were used. Among 14 bases explained in the above section, 'stop' and 'popular' were excluded since 'stop' belonged to the elementary level essential vocabulary by the Korean Ministry of Education and 'popular' was introduced in every middle school textbook and covered in the lesson when the experiment was conducted. The test guaranteed that participants had little knowledge about the target words or derived form of them in their lexicon. They were also given the list of the vocabulary to prevent any difficulty in understanding the meanings of the sentences in the SPR test. However, this list was comprised of all the base forms without prefixes. Participants were told that they were going to read sentences containing those words in the SPR test and given three days to memorize them if needed.

Self-paced Reading Test

The students took the SPR test, with non-cumulative linear display of word by word, followed by a Yes/No comprehension check-up question about the sentence shown, such as "The room is inadequate for our large group," followed by the question, "The room was too small for a group." (Yes/ No). Either well-formed or ill-formed word was chosen randomly from the pair-sentences by Linger program, a self-paced reading software, and presented to each student so that each student encountered 24 sentences (14 target sentences with 10 fillers).

Fill-in-the-blank Test

The participants were asked to write down a negative counterpart of the given word by adding an appropriate prefix. If they already knew the prefixal negation form of the given adjective, they had to tick in the check box next to the question. It was to rule out the case that they already memorized a prefixed negation adjective as an independent word in their lexicon.

In Depth Interview

After the SPR test and fill-in-the-blank test, each student had a five to seven- minute-long interview session. They were asked how they had felt in the SPR test and why they had chosen a certain negational prefix over others in the fill-in-the blank test. All interviews were voice-recorded with the participants' consents.

Data Treatment

For the SPR test, all data was collected regardless of the correctness of the answer to the comprehension question following the sentence. Then the mean time and standard deviation (hereafter SD) of well-/ill-formed words were calculated and compared across participants' proficiency. The mean

time and SD per each type of prefixes was also calculated by using the automatic function of Microsoft Excel program. In the fill-in-the blank test, the proportion of each prefix that participants used was calculated. This was to sort out the most preferred negational prefix among Korean EFL learners. With pseudo-words of Latinate and native English, each student's answer was collected and categorized based on etymological grounds as in Baldi, etc. (1985). The proportion was also calculated to compare with the data of NSs.

Results

Self-paced Reading Test (Comprehension Test)

The mean time in Table 1 shows that slightly longer time was spent on ill-formed adjectives than well-formed. However, the ill-formed SD value in total is almost as double as that of well-formed adjectives. This was caused by the intermediate level participants lingering on incorrect adjectives in a wide range depending on the items.

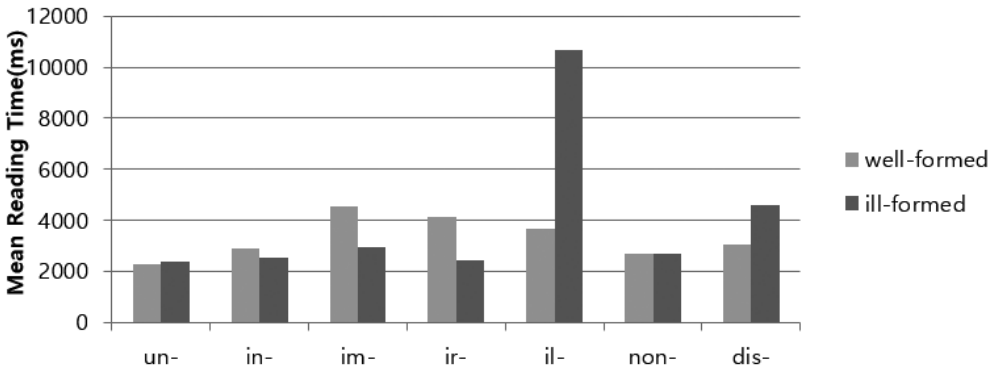
Table 1
Mean(M) and Standard Deviation(SD) of Reading Time on Target Adjectives

	M		SD	
	Well-formed	Ill-formed	Well-formed	Ill-formed
Advanced	1465.93	1509.14	658.58	659.64
Intermediate	5054.13	6974.25	5152.87	12137.28
Basic	4134.47	3581.55	3711.57	3175.44
Total	3598.9	3897.73	3947.30	7305.8

Note. The measurement of the time is millisecond(ms)

Figure 1 and Table 2 demonstrate the mean reading time spent on the negated adjectives depending on types of prefixes While the result shows differences across proficiency levels, participants lingered on well-formed words, except the cases of *un-, il-* and *dis-*.

Figure 1
Average Reading Time on Target Adjective per Types of Prefix



Among the exceptions, learners spent much more time on the wrong use of *il-* prefix. It is easy to

attribute this prominence partially to the limited condition of *il-* which should be followed by only '*l*' starting base. However, *ir-*, which also imposes high constraint on the onset of the base shows the completely opposite result.

Table 2
Mean Reading Time(ms) on Target Adjectives per Types of Prefix

Types of Prefix	Markedness	Advanced	Intermediate	Basic	Total
un-	well-formed	1012	1714.5	4124	2283.5
	ill-formed	1042.5	2707.5	3444	2398
in-	well-formed	1371	5403	1859	2877.16
	ill-formed	1046.5	4519	1630	2560.5
im-	well-formed	1672.5	6051.3	4994.3	4560.2
	ill-formed	1232	1473	7891	2948
ir-	well-formed	1127.5	8752.5	2536	4137.16
	ill-formed	910.5	3792.5	2531	2411.3
il-	well-formed	1506	7457.5	2014	3659.16
	ill-formed	2330	22956	6716	10667.3
non-	well-formed	2232.5	1823	3623.3	2711.5
	ill-formed	920.5	4712.5	1446	2670.4
dis-	well-formed	1790.5	3678.5	3724.5	3064.5
	ill-formed	1311.5	4789	10691	4578.4

Note. The measurement of the time is millisecond(ms)

Fill- in-the Blank Test (Production Test)

Out of the 20 genuine adjectives, advanced participants showed 50% of accuracy in attaching a prefix to the base correctly and both intermediate and basic level reached 30% of accuracy. According to Table 3, the preference of the prefix *un-* was revealed regardless of the participants' proficiency levels (average 38%). This result conforms with the result of NSs in Baldi et al. (1985).

Table 3
Proportion of the Use of Each Prefix

	un-	in-	im-	ir-	il-	non-	dis-
Advanced	45%	10%	7 %	7 %	8 %	5 %	18%
Intermediate	37%	20%	10%	5 %	10%	8 %	10%
Basic	33%	13%	12%	5 %	10%	13%	13%
Total	38%	14%	9 %	6 %	9 %	9 %	14%

Note. All data was rounded off to the nearest tenth, which resulted in 99% total in the basic group.

However, in contrast to the second strongest choice of *non-* by NSs, the participants used more *dis-* and *in-* prefixation than *non-*. The rest of the prefixes such as *im-*, *ir-*, and *il-* were distributed almost evenly although *ir-* was the least favored.

Table 4 consists of the actual prefixes that participants attached to the pseudo words with certain

phonological conditions. All the participants prefixed *il-* to Latinate pseudo word with /l/ sound. They also showed the strong tendency to attach *un-* to the native English origin words. However, the participants did not strictly follow the phonological assimilation rules as they generated words such as *inrepuliant, nonmonarial, dismonarial,* or *unplankity.*

Table 4
Participants' use of Prefix to the Pseudo-word

	Pseudo-Latinate				
phonological condition	vowel	Netural consonant	/l/	labial /m/, /p/	/r/
Words	exliar	Sempient	Limoral	monarial	repuliant
Advanced	in	Un	Il	im	in
Advanced	un	In	Il	im	ir
Intermediate	Il	Non	Il	non	un
Intermediate	im	Im	Il	im	ir
Basic	dis	Dis	Il	im	ir
Basic	Ir	Il	Il	dis	in

	Pseudo-Native(un-)				
phonological condition	vowel	netural consonant	/l/	labial /m/, /p/	/r/
Words	arnful	Finkled	loofish	plnkity	rimbled
Advanced	in	Dis	Un	Un	dis
Advanced	dis	Dis	Un	Un	ir
Intermediate	un	Dis	Il	Im	un
Intermediate	dis	Ir	Non	Un	il
Basic	ir	In	Un	Un	un
Basic	un	Un	Dis	Un	un

Discussion

Receptive Vocabulary Knowledge on Negational Prefix

The mean reading time spent on well- and ill forms in total did not show meaningful implication due to the huge SD value (Table 1, Table 2 and Figure 1). In other words, L2 learners reacted differently to each prefix. They stayed longer on well-formed adjectives except *un-, il-,* and *dis-*. They were expected to stay longer on ill-formed adjectives, because they would unconsciously feel oddness when reading the sentences, if they had sensitivity toward correctness of the form for each base. Through this it can be interpreted that L2 learners do not have sensitivity to the appropriateness of the prefix to the base. For the exception of *un-,* and *dis-,* participants explained in the interview that they felt more familiar with *un-* and *dis-* prefix to others. This is presumably because of its frequency in the textbook used in the classroom. Regarding *il-,* the students showed particular sensitivity to the markedness of ill-formed words (Figure 1). At first, it was assumed to be due to the constraint of '*l*' starting root. However, they hardly reacted to the ill-forms of *ir-* which requires the 'r' onset condition as well. Several students answered in the interview that they depended on orthographical features to determine the adequate

prefix, and they believed that "l" is visually prominent in contrast to many of other "short" characters such as *m-, r-* or *n-*. They thought that the prefix *il-* should be harmonious with "tall" letter *l*.

Still, the participants correctly understood the meaning of the prefixed adjective with little regard for types of prefix. The moment they realized that it referred to the opposite meaning of the base, their focus moved to the semantic property of the word as the goal of their activity was to answer the following comprehension question. They reacted to the stimulus but not in an extremely elaborate way. In other words, EFL learners firstly recognized the letter, a type of negational prefix, but failed to judge the grammatical appropriateness of affixation, and just processed the meaning of the prefixed adjective. Through this operation, EFL learners can process the information to serve the purpose (answering comprehension check-up questions) as efficiently as possible.

Productive Vocabulary Knowledge on Negational Prefix

Un- was the most productive and favored negational prefix among the participants in this study. The second most favored prefix was *dis-* (Table 3). The results are very much related to the frequency of exposure to each prefix. In fact, *un-* is the strongest productive prefix used by English native speakers as well. Its usage has been expanded to the loan words throughout English history so that it naturally attaches to both native English and Latinate words. The vocabulary in the textbook that Korean EFL students are using can be said to accurately reflect the current prefix status in English-spoken countries. The usage of *non-* showed some differences between EFL learners and NSs. According to Baldi et al. (1985), NSs use *non-* as much as *IN-*. They explain that it is partially attributed to *non-*'s questionable status as a prefix and to the easiness of attaching, because *non-* is neither involved in phonological assimilation process nor affected by etymology. For Korean EFL learners, however, *non-* is hardly a productive prefix. In fact, it was the least favored prefix among them if *in-,im-,il-,* and *ir-* were categorized as *IN-* prefix. In the interview, it was revealed that they hardly regarded *non-* as a type of negative prefix as NSs. They rather conceived it as a word, so that they felt reluctant to generate derivatives by attaching *non-* to the base.

Surprisingly, the test using pseudo vocabulary affirmed Korean EFL learners' sensitivity toward etymological information about bases. They even dichotomized *un-* and *IN-* (*in, im-, ir-, il-*) more severely than NSs. Table 5 shows the prefix selection of pseudo words by Korean EFL learners in comparison with NSs based on the data from Baldi et al. (1985).

Table 5
Percentage of prefix selection of pseudo words in the production

	Korean EFL Learners		Native Speakers	
	Native	Latin	Native	Latine
un-	47%	7 %	48%	35%
correct IN	7 %	53%	14%	23%
incorrect IN	17%	20%	1.5%	2.3%
non-	3 %	7 %	12%	19%
dis-	23%	10%	13%	10%
Other	0 %	0 %	11%	10%

Incorrect *IN-* refers to the violation of phonological assimilation condition such as *inrepuliant** instead of *irrepuliant*. The proportion of incorrect *IN-* is much higher in Korean EFL learners than that of NSs. However, Table 5 demonstrates that Korean EFL learners are prone to attach *un-*to the native English words and *IN-* (especially *in-* morph) to Latinate origin words exclusively. Fifty-three percent of their answers were correct *IN-* in contrast to NSs' mixed use of *un-* and *in-* to Latinate pseudo words. In addition, the same tendency was observed concerning the usage of *non-* in pseudo words prefixation. The participants frequently used *dis-* prefix and the least favored *non-* whereas NSs produced *non-* as much as *IN-*.

With the follow-up in depth interview, the participants were proved to orthographically distinguish native English words from Latinate words and limited the range of the prefix *un-*'s usage to only native English words. It is probable that they can use etymological information when generating prefixed adjectives although this clear-cut division may prevent learners from attaching negational prefix as flexibly as NSs do.

Their heavy reliance on orthographic features of the base can be explained by the RHM proposed by Kroll and Stewart (1994). All pseudo words used in this study had been developed by Baldi et al. (1985) on the ground of numbers of syllables (e.g.Latin-polysyllabic), suffixes, spelling and consonant peculiarities. Thus, the difference between native and Latinate words was easily spotted visually so that EFL learners were able to precisely identify which base belonged to which origin. Moreover, the interview revealed that all levels of participants indeed took advantage of orthographical information. This is conformable to the RHM, explaining L2 has strong connection with L1 in lexical level, but not with concepts. The participants' dichotomization may reflect that the conception of L2 prefixed negation does not exist in lexicon. Therefore, it is assumed that they conceive the word in an only surface level – orthographical features not the meaning the word embodies, unless they are required to do comprehension tasks.

The differences across proficiency are worthwhile to be addressed. Based on their results in the production test, advanced learners were found to successfully link L2 and concept directly. It indicates that high proficiency learners conceive a well formed negational adjective as a word and store it as it is in their lexicon. This tendency of development is also aligned with the RHM, arguing that developmental sequence of bilingual lexicon is from reliance on translation equivalents between L1 and L2 to direct concept mediation.

Conclusion

Summary

Korean EFL participants in this experiment were not fully equipped with sensitivity to the appropriateness of negative prefix for each base. Once they recognized any negational prefix attached to the base and if they were ready to process the meaning, they showed little effort to judge the appropriateness of the prefix usage.

Due to the frequency of exposure, Korean EFL participants favored and produced *un-* prefix, and their second choice was *dis-*. They also proved to have clear sensitivity to etymologically Latinate and native English words distinction on the ground of primarily orthographical features. Evidence in this empirical

data contradicts to participants' assertion of their morphological interlanguage rules, that is to say, reliance on phonological assimilation. Although they argued that they relied heavily on phonological features, all levels of participants made use of orthographical information, so-called spelling of the onset of the base.

One of the interesting differences across proficiency levels is that advanced learners were able to access information from various sources such as phonology, syntax, and semantics along with morphological knowledge. The RHM endorses this outcome with the developmental sequence of forming stronger connection between L2 and concept in a learner's lexicon as his/her proficiency improves.

Pedagogical Implication and Limitation

It is an undeniable fact that explicit morphological vocabulary teaching has been excluded since consciousness-raising and noticing took center of the stage in SLA. Moreover, current vocabulary teaching seems to disapprove morphological mention either in explicitly or implicitly in EFL classroom. This absence of morphology teaching in high school leaves learners responsible for memorizing a great deal of vocabulary. The results of this study revealed that learners have difficulty in memorizing the base and its prefixed form separately, and their accuracy in matching the correct negative prefix to the base drops significantly. Thus, to reduce the burden of the working memory and mend its inefficiency, vocabulary teaching based on morphology should not be discarded.

This study discovered that Korean EFL learners have intuition on etymological information of Latin/ French word and native English word. It also found that the criterion they count on is basically orthographic features. These advantages can be maximized by drawing their attention to the orthographic characteristic of the prefix explicitly with rich context provided. At the same time, for productive skills, practitioners should make efforts to blur the division between *un-* and *IN-*, as NSs allow *un-* attachment to not only native English words but also Latinate originated words. Teachers should focus on the productive negational prefixes, such as *un-* or *non-* to help learners not to refrain themselves from using one-to-one match for affixation. Practitioners can discuss more effective and efficient ways of teaching vocabulary in morphological aspect to minimize the redundant consumption of EFL learners' working memory

The limitation of this study is the small number of participants, which brings a generalizability issue. In addition, as most education research entails as its limitation, the result of the study does not provide evidence to easily apply to or account for vocabulary learning process of EFL learners as this was conducted in a specific context as well. A further study could expand the number of participants to provide more general discussion, and more psycholinguistic tools and theories would be implemented to validate the findings of this study.

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Appendix A

Self-paced Reading Test

1. It was a painful and (un/*in) popular decision.
2. She was (un/*in) fortunate to lose her husband.
3. The room is (in/*un) adequate for our large group.
4. He wants the power to fire (in/*un) competent employees.
5. There is nothing (im/*in) moral about wanting to earn more money.
6. It seems (im/*in) probable that the current situation will continue.
7. He visited his parents at (ir/*un) regular intervals.
8. Many people consider politics (ir/*un) relevant to their lives.
9. He once was (il/*un) literate but now he knows how to read.
10. All parties regarded the treaty as (il/*un) legitimate.
11. I think it has rained (non/*un) stop since Friday afternoon.
12. Hygiene was (non/*un) existent no running water no bathroom.
13. I would rather be poor than get money by (dis/*in) honest ways.
14. There have been many cases of students being (dis/*ir) respectful to teachers.

Appendix B

Fill-in-the blank Test

Filling-in-the-Blank Activity

※Choose one appropriate prefix among the <Options> and attach it to each given word to generate the word with the opposite meaning. (If you already know the derived from of the opposite meaning, please check (√) in the box.)

〈Options〉 *un-, in- , ir- , im- , il- , non- , dis-*

1. similar	☐	16. arnful	☐
2. patient	☐	17. selfish	☐
3. logical	☐	18. natural	☐
4. responsible	☐	19. limoral	☐
5. accurate	☐	20. resistable	☐
6. exliar	☐	21. trustful	☐
7. dairy	☐	22. smoking	☐
8. loofish	☐	23. rimbled	☐
9. expected	☐	24. aware	☐
10. standard	☐	25. plinkity	☐
11. monarial	☐	26. sempient	☐
12. composed	☐	27. white	☐
13. finkled	☐	28. agreeable	☐
14. tolerant	☐	29. repuliant	☐
15. measurable	☐	30. legal	☐

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