L1 Korean Transfer in Processing L2 English Passive Sentences

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1. Introduction

A number of previous second language (L2) studies have investigated first language (L1) transfer by analyzing comprehension tests or L2 production data. These studies have focused on errors (e.g., production of SOV word order English sentences by Korean learners of L2 English) and claimed to find traces of L1 transfer based on those errors. However, they often fall short when attempting to explain L1 transfer when L2 learners do not make errors. A substantial body of research has confirmed that error analysis does not provide a complete picture of L1 transfer because of factors such as avoidance (Schachter, 1974; Dagut & Laufer, 1985; Hulstijn & Marchena, 1989; Laufer & Eliasson, 1993) and underuse (Jarvis & Odlin, 2000; Granger, Hung, & Petch-Tyson, 2002). That is, the lack of errors does not guarantee the lack of L1 transfer. In the current study, we attempt to reveal L1 transfer in L2 processing without depending on error analysis.

We investigate whether native Korean-speaking L2 learners (L2ers) of English show L1 transfer in processing L2 English passive sentences. Although almost all English transitive verbs can be made passive, this is not the case in Korean: To carry passive meaning, some transitive verbs use a passive marker *ki* (e.g., *ccoch-ki* 'chase-passive marker') or attach another active verb (e.g., *salang-pat* 'love-receive'). There are, however, other transitive verbs that do not allow passive meaning (e.g., *ttalaka* 'follow') and therefore cannot be passivized. In this paper, we use the terms "Type 1 verbs" for English verbs (e.g., *chase*, *love*) whose Korean translation equivalents (e.g., *ccoch-ki*, *salang-pat*) allow passive meaning and "Type 2 verbs" for English verbs (e.g., *follow*) whose Korean translation equivalents (e.g., *ttalaka*) do not allow passive meaning.

The influential Full Transfer/Full Access model (Schwartz & Sprouse, 1994, 1996) proposes that L1 lexicon (minus phonetic features) comprises the initial state of L2 acquisition. Based on this model, it can be predicted that when learners process L2 sentences, they activate properties of their L1 that are relevant for the L2 sentences. Supportive evidence in favor of this prediction emerges from Dussias and Scaltz's (2008) findings that Spanish adult L2 learners of English recruited both L1 and L2 subcategorization as information while reading L2 English. In the current study, we predict that (earlier) Korean L2ers will implicitly activate relevant L1 properties when processing L2 English passive sentences. We hypothesize that (earlier) Korean L2ers will have more difficulty when processing English passive sentences with Type 2 verbs than when processing those with Type 1 verbs because their L1's properties only feed the processing of English passive sentences with Type 1 verbs.

This paper begins with a brief description of previous studies on processing English passive sentences. It then goes on to discuss the role of L1 in L2 processing, and explores the difference in how passive meaning is carried in English and Korean. Subsequently, the paper presents a study with a novel research design to test for L1 Korean transfer in processing L2 English passive sentences, and then reports and discusses the results.

1.1. Processing English passive sentences

It has been reported that the atypical theme-agent order in the verbal passives in English is more difficult and marked in terms of processing than the prototypical agent-theme order in verbal actives.

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Ferreira (2003) showed that passives (e.g., *the man was bitten by the dog*) have a greater processing load than actives (e.g., *the dog bit the man*) or subject-clefts (e.g., *it was the dog that bit the man*). Participants in Ferreira's study listened to experimental sentences and after the end of a sentence they were asked to identify the thematic roles of the sentence as quickly as possible (e.g., "who is the doer?"). The participants showed lower accuracy and longer response times (RTs) with passive sentences than with active or subject-cleft sentences. Ferreira suggests that the difficulty of passives is not due to their infrequent occurrence but to their atypical patient-agent order. Note that both subject-clefts and passives are infrequent and tightly discourse-constrained, but that passives are more difficult. According to Ferreira, the distinction lies in the fact that the thematic roles of subject-clefts are in a typical order whereas those of passives are in an atypical order.

The difficulty of passive sentences is also reported in Dabrowska and Street (2005). In this study, four participant groups (i.e., highly educated native and non-native English speakers and less educated native and non-native English speakers) were asked to identify the agent in four types of sentences: plausible active, implausible active, plausible passive, and implausible passive. A noteworthy finding is that less educated native speakers performed at ceiling on the plausible sentences, but had difficulty with implausible actives (65% correct) and even more difficulty with implausible passives (36% correct). This low accuracy rate in the implausible passive condition suggests that passives can be complex even for native English speakers.

Studies on language acquisition also support the difficulty of English passive constructions. It is interesting to note that L1 children continue to make errors in the comprehension and production of passives until the age of six (Borer & Wexler, 1987) though a large part of morpho-syntax is acquired by the age of four (Guasti, 2002).

1.2. L1 transfer in L2 processing

The role of the L1 in L2 acquisition has received particular attention. Although there is a view that argues for a lack of L1 transfer in L2 acquisition (Epstein, Flynn, & Martohardjono, 1996), the more dominant view is that the L1 plays an important role as an initial state of L2 acquisition, either by full L1 transfer including abstract L1 features (Schwartz, 1998; Schwartz & Sprouse, 1996; Sprouse, 2006) or by partial transfer, missing only abstract L1 features (Eubank, 1993/1994, 1994; Vainikka & Young-Scholten, 1994, 1996a, 1996b). Evidence in favor of this L1 transfer view comes from L2 production. For example, it has been reported that Korean beginning learners of English erroneously produced SOV word order in English sentences (e.g., *Elmo apples eat*), following their L1 Korean word order (Hahn, 2000).

However, only a handful of studies to date have examined L1 transfer in L2 processing, and the findings of these studies are not consistent with each other. A group of studies has reported that processing strategies from the L1 were not transferred to the L2. Felser, Roberts, Marinis, and Gross (2003) showed that L2 learners lack any clear attachment preferences for relative clauses preceded by complex genitive NPs, irrespective of the preferences found in the target language or in the learners' L1. For an experimental sentence with complex genitive NPs like *The dean liked the secretary of the professor who was reading a letter*, English native speakers have NP2 (*professor*) preference whereas Greek or German speakers have NP1 (*secretary*) preference. However, the L2 learners of English with Greek or German as their first language did not show any preference.

Likewise, Marinis, Roberts, Felser, and Clahsen (2005) reported that their four L2 groups (with L1s Chinese, Japanese, German, and Greek) uniformly failed to show trace-reactivation effects in *wh*-movement, regardless of whether the L1s have overt *wh*-movement (German and Greek) or not (Chinese and Japanese). See the following experimental sentences divided into six segments.

1. a. (1) The nurse who$_i$ (2) the doctor argued (3) e$_i$ that (4) the rude patient (5) had angered e$_i$ (6) is refusing to work late.
   b. (1) The nurse thought (2) the doctor argued (3) that (4) the rude patient (5) had angered (6) the staff at the hospital.

In (1a), segments (3) and (5) were regarded as relevant for determining whether intermediate syntactic gaps were postulated during processing. The authors predicted longer RTs in segment (3) for the

reactivation of filler *who*, but shorter RTs in segment (5) because filler integration was facilitated by the presence of an intermediate gap when compared with segments (3) and (5) in the non-extraction sentence shown in (1b). However, they showed that none of the L2 learner groups appeared to postulate any intermediate gaps during the real-time processing, whereas native speakers did. Here, we point out that to argue for the inapplicability of the L1 transfer effect, it would have been better if Marinis et al. had shown that German and Greek native speakers demonstrate the intermediate gap effect when processing equivalent L1 sentences.

In contrast to Felser et al. (2003), Frenck-Mestre (2002) showed that L1 transfer of relative clause attachment preferences appeared in native French-speaking, low-proficiency L2 English learners, but target-like preferences appeared at higher proficiency levels. Frenck-Mestre had two control groups, French and English native speakers, and found similarities between low-proficiency learners and French native speakers and between high proficiency learners and English native speakers in terms of their relative clause attachment preferences. By focusing on this connection between L2 proficiency and L1 transfer, Frenck-Mestre argues that proficient L2 learners can do native-like processing and decrease the L1 transfer effect.

More compelling evidence for the L1 effect is provided by Dussias and Scaltz (2008). Dussias and Scaltz showed that their Spanish adult L2ers of English recruited both L1 and L2 subcategorization as information during self-paced reading tasks. For example, the learners showed longer reading times when the subcategory information of the target English verbs was different from that of their native language, Spanish. Dussias and Scaltz interpreted these results as showing that the L2ers attempted to compensate for their relative lack of L2 linguistic knowledge by applying L1 grammar.

1.3. Carrying passive meaning in English and Korean

The English and Korean languages differ from each other with respect to how they carry passive meaning. Although almost all English transitive verbs can be made passive, this is not the case in Korean. There are some verbs in the Korean language that cannot carry passive meaning (e.g., *ttalaka* 'follow'). For the verbs that can, there are three ways to carry passive meaning (Kwon, 2006): (a) by attaching an affix (e.g., *i*, *hi*, *li*, *ki*) to a root verb; (b) by attaching an auxiliary (e.g., *e-ci)* to a root verb; and (c) by attaching a lexical word (e.g., *pat* 'receive', *tangha* 'suffer', *toy* 'become', *tut* 'catch', *mac* 'be subject to') to a root verb.[1] The particular type is chosen depending on the nature of the verb. For example, a productive word formation pattern consisting of an abstract NP + *ha* 'do' cannot combine with the passive suffixes (Song, 1993) but must depend on a lexical word. See the examples below.

2. a. David-nun Mary-eykey cha-**i**-ess-ta.
   David-TOP Mary-DAT kick-AFFIX-PAST-DEC
   'David was kicked by Mary.'
   b. Mary-uy-mal-i David-eke mit.**e-ci**-ess-ta.
   Mary-GEN-word-NOM David-DAT believe-AUXILIARY-PAST-DEC
   'Mary's words were believed by David.'
   c. David-nun Mary-eykey salang-**pat**-ass-ta.
   David-TOP Mary-DAT love-receive-PAST-DEC
   'David is loved by Mary.'

In (2a), the affix *i* is attached to the root verb *cha* 'kick' to carry the passive meaning. In (2b), the auxiliary *e-ci* is used for the passive meaning. In (2c), the root of the lexical verb *pat* 'receive' is used to carry the passive meaning.

1.4. Prediction

If L1 feeds L2 processing, Korean learners of English will feel more comfortable when processing English passive sentences with Type 1 verbs than those with Type 2 verbs. This is because L1 Korean

[1] Lee (1993) proposes that there is a meaning difference between the affix passive and the auxiliary passive. He argued that the affix passive denotes a spontaneous process, whereas the auxiliary passive denotes a non-spontaneous process.

properties support the processing of English passive sentences with Type 1 verbs but not those with Type 2 verbs. An online self-paced reading task was used to test this prediction.

2. Method

2.1. Participants

We recruited a total of 75 Korean learners of English as participants, of which 25 are from a public high school and 50 are from a renowned foreign language high school[2] in Seoul, Korea (age = 18). The participants completed a cloze test to measure their English proficiency (Brown, 1980). We divided the 75 participants into three groups in terms of the cloze test results, 25 low level L2ers (M = 4.92, SD = 1.50), 25 medium level L2ers (M = 25.12, SD = 4.95) and 25 high level L2ers (M = 38.24, SD = 3.79). Actually, all students from the public school were in the low level group, and all students from the foreign language high school were in the medium or high level groups. This grouping is based on the possibility that lower level L2ers are more likely to show L1 transfer in L2 processing, following Frenck-Mestre's (2002) report that less proficient L2ers show L1 effect whereas more proficient L2ers do native-like processing, decreasing the L1 effect. Additional information gathered on the participants, such as their iBT TOEFL scores and their length of residence in English-speaking countries, also support that the two groups are distinct in terms of English proficiency. The average iBT TOEFL score was 100.22 for the medium level group and 110.00 for the high level group. The average length of their residencies in English-speaking countries (in years) was 0 for the low level group, 0.56 for the medium level group and 1.46 for the high level group. In addition to the Korean participants, we recruited 13 University of Hawai'i students as a control group. They are all native speakers of English. Their average score on the cloze test was 46.38 (range = 43–49; SD = 2.50). See Table 1 for more details.

Table 1
Information on English proficiency of participants

Group	N	Cloze test score (max = 50)			iBT TOEFL Score (max = 120)			Time in years spent in English-speaking countries		
		M	SD	Range	M	SD	Range	M	SD	Range
Low	25	4.92	1.50	3–7	N/A	N/A	N/A	0.08	0.28	0–1
Medium	25	25.12	4.95	17–31	100.22	6.62	91–111	0.56	0.92	0–3
High	25	38.24	3.79	32–44	110.00	6.26	102–119	1.46	0.88	0–3
English natives	13	46.38	2.50	43–49	N/A	N/A	N/A	N/A	N/A	N/A

2.2. Materials

2.2.1. Norming test

To verify that Korean L2ers perceive the difference between Type 1 and Type 2 verbs, a norming test was conducted one month prior to the main experiment. We predicted that when Korean L2ers of English were asked to translate English passive sentences into Korean and to judge the translated Korean sentences in terms of naturalness, they would judge the translated passive sentences with Type 1 verbs as natural but passive sentences with Type 2 verbs as unnatural. A total of 152 Korean students from the two high schools, including the participants of the main experiment, were asked to perform the translation task with acceptability judgments. The data from 18 participants were excluded for being incomplete. Sixteen English transitive verbs were used in both active sentences (k = 16) and passive sentences (k = 16). These verbs were selected from the fundamental English words designated by the Ministry of Education in Korea, which suggests that the verbs are frequently used in English textbooks in Korea. An additional restriction was that we selected only regular verbs in which *–ed* is attached to

[2] We included students from this foreign language high school in order to have advanced Korean L2ers of English. The students in this high school are regarded as the best students in Korea in terms of English proficiency. One of the requirements for admission is English proficiency above the intermediate level. Eighty percent of the students have TOEFL scores higher than 100 (max = 120).

the passivized verb in order to avoid any effect from the distinction between regular verbs and irregular verbs in the main experiment. Also, we used only symmetrically reversible verbs and non-lexical alphabet letters (e.g., A, B) for noun positions instead of lexical nouns. Thus, an example sentence looks like *A is followed by B*. This use of symmetrical verbs and alphabet letters was aimed at making the participants depend only on syntactic information in processing the English passive sentences. With an English sentence that includes an asymmetrical verb and lexical nouns such as *An apple is eaten by John*, it is possible that participants would infer the sentence meaning from the semantic relation between *apple* and *John*, not from the passivized verb (i.e., *is eaten*). As Dabrowska and Street (2005) reported in the study mentioned above, native English speakers prefer to process English passive sentences based on plausibility of information.

In this norming test, the participants were asked to translate the 32 English sentences (16 passive and 16 active sentences) into Korean quite quickly and then rate the naturalness of the translated sentences on a five-point Likert scale (from 1: sounds bad to 5: sounds okay).

The results from the norming test are summarized in Table 2. Based on these results, we chose eight verbs as Type 1 (*invite*, *protect*, *help*, *kick*, *love*, *chase*, *cheer*, *push*) and eight verbs as Type 2 (*ask*, *answer*, *hate*, *watch*, *visit*, *dislike*, *follow*, *like*). A paired sample *t*-test confirmed that Type 1 verbs sound significantly more natural than Type 2 verbs when used in passive sentences, $t(133) = 14.961$, $p < .001$ (2-tailed). In addition, the lowest naturalness score in the Type 1 verb group (for *push*) was considerably higher than the highest naturalness score in the Type 2 verb group (for *ask*), $t(133) = 1.841$, $p = .068$.

Table 2
Results of the Norming Test

Type 1			**Type 2**		
Word	Active	Passive	Word	Active	Passive
Invite	4.82 (0.57)	4.22 (1.15)	Ask	4.58 (0.87)	3.21 (1.50)
Protect	4.82 (0.60)	4.20 (1.05)	Answer	4.57 (0.82)	3.11 (1.51)
Help	4.86 (0.48)	4.07 (1.24)	Hate	4.79 (0.58)	3.02 (1.51)
Kick	4.75 (0.65)	3.82 (1.37)	Watch	4.81 (0.56)	3.02 (1.51)
Love	4.91 (0.36)	3.69 (1.45)	Visit	4.71 (0.76)	2.70 (1.52)
Chase	4.71 (0.77)	3.67 (1.50)	Dislike	4.67 (0.77)	2.69 (1.54)
Cheer	4.63 (0.83)	3.65 (1.46)	Follow	4.77 (0.64)	2.61 (1.51)
Push	4.88 (0.41)	3.50 (1.45)	Like	4.84 (0.47)	2.26 (1.50)
Average	4.80 (0.61)	3.85 (1.36)		4.72 (0.70)	2.83 (1.54)

Note. Numbers in parentheses refer to the standard deviation.

2.2.2. Stimuli

Fifty-six English sentences were used as stimuli for the main experiment: passive sentences with Type 1 verbs ($k = 8$) and with Type 2 verbs ($k = 8$). We also used control sentences, i.e., active sentences with Type 1 verbs ($k = 8$) and with Type 2 verbs ($k = 8$). The use of active sentences was intended to confirm that both Type 1 and Type 2 verbs are equally difficult for participants. It is possible that longer reading times (RTs) and answering times for comprehension questions on passive sentences with Type 2 verbs would be merely because Type 2 verbs are inherently more difficult than Type 1 verbs. We can control for any such effect by demonstrating that students take almost the same amount of time to process both Type 1 and Type 2 active sentences.

In addition, 24 filler items were used to distract participants' attention from repeated exposure to the similar sentence types in the experimental items. The ratio of experimental passive sentences to other types of sentences was 1:2.5 (16:40). This ratio is expected to prevent participants from realizing the purpose of the task. There were practice items ($k = 4$), as well, to familiarize the participants with the test. The practice items were presented before the main experiment. All items in the main experiment were presented to the participants in random order.

All the sentences were manipulated to begin with a complex clause, "A is the one who," as illustrated in Table 3, instead of a simple clause. This manipulation was not only to avoid a short sentence but also to make the participants focus on the critical regions in the sentence: Verb + *by* + *B*. Each sentence was followed by a comprehension question (e.g., "Is A loved?") with the two options of a yes/no answer. The expected answer types, i.e., yes or no, were counterbalanced. Each sentence contained nine words and each word was assigned a region from 1 to 9. The main focus of the experiment is on the processing time for passive sentences from region 7 to region 9 and the comprehension questions. We hypothesize that if there is an L1 effect, participants will read more slowly at the critical regions (i.e., R7, R8, R9) and spend more time answering the subsequent question when the passive sentences include Type 2 verbs.

Table 3
Examples of Sentences with Each Verb Type

Passive sentence with each verb type	Example								
	R1	R2	R3	R4	R5	R6	R7	R8	R9
passive + Type 1 verb	A	is	the	one	who	is	chased	by	B
passive + Type 2 verb	A	is	the	one	who	is	followed	by	B
Active sentence with each verb type	Example								
	R1	R2	R3	R4	R5	R6	R7		
active + Type 1 verb	A	is	the	one	who	chases	B		
active + Type 2 verb	A	is	the	one	who	follows	B		

2.3. Procedure

In the experiment, the participants went through two separate sessions. Session 1 was the main experiment, the self-paced online reading task. After session 1, session 2 proceeded with a paper-and-pencil proficiency test (i.e., a cloze test). Each of these two sessions took approximately 30 minutes.

The self-paced online reading task started off with four practice items to allow participants to familiarize themselves with the task. In the main task, items were presented in random order. Participants were instructed to read at a normal, comfortable pace and asked to answer the comprehension questions. English sentences were presented in a self-paced moving-window procedure, using a PC running Linger software. Each trial began with a series of dashes on the computer screen in place of the letters in the words. The first press of the space bar replaced the first set of dashes with the first word in the sentence. With subsequent space-bar presses, the next set of dashes was replaced by the next word, and the preceding word reverted to dashes. Then, each sentence was followed by a comprehension question with two options (yes/no) for the answer. The computer recorded the processing time of each word, that is, the time between bar presses, as well as the time that participants took for each comprehension question.

3. Results

First, we analyzed the accuracy rates in the comprehension questions that followed each experimental sentence in order to detect potential outliers of the test. A significantly low accuracy on comprehension questions is assumed to fall short of providing clear predictions on participants' parsing patterns, since it suggests that participants did not pay much attention to the sentence meaning, and therefore, such data should be excluded as outliers. Across all proficiency groups, a total of three participants (one from the low level L2 group and two from the high level L2 group) showed accuracy rates of less than 70% in the comprehension questions, and thus were eliminated as outliers. With the same reasoning, we removed the data in which the answer to the comprehension question was wrong. As shown in Table 4, except for the three participants whose data were eliminated, all participants showed high accuracy rates in answering comprehension questions, suggesting that they consistently paid attention to the experimental sentences.

Table 4
Accuracy Rates in Comprehension Questions

Group	Passive sentences with Type 1	Passive sentences with Type 2	Others
Low level L2ers (n = 24)	89%	85%	95%
Medium level L2ers (n = 25)	96%	95%	97%
High level L2ers (n = 23)	93%	93%	95%
English natives (n = 13)	97%	97%	95%

We now turn to the online RT results. We followed a two-step data-trimming procedure on the experimental sentences. First, at the regions of the experimental sentences and questions, RTs longer than 5000ms were removed; this removal point was determined by plotting all the raw RTs, from shortest to longest. Next, we calculated the mean RT and standard deviation for each segment region by each group. For each segment region of each group, any RTs longer or shorter than ±2.5 standard deviations were also removed. The amount of data affected through this procedure was 2.7% in the low group, 2.8% in the medium group, 2.4% in the high group, and 1.3% in the native group.

With the trimmed data, we first analyzed how participants read active sentences. A repeated measures *t*-test was used to compare the RTs of critical regions between active sentences with Type 1 verbs and those with Type 2 verbs. We found only one region that shows significant differences across the groups in RTs between sentences with Type 1 verbs and sentences with Type 2 verbs: In the low level L2 group, at region 6 (verb), the participants read Type 1 verbs slower than Type 2 verbs, $t(23) = 2.089$, $p = .048$. This significance does not undermine our hypothesis, because it was not Type 2 verbs that took longer reading times. A similar pattern of taking longer to read Type 1 verbs than Type 2 verbs was also found in the medium group, with a marginal significance: $t(24) = 1.791$, $p = .086$. Otherwise, no significant differences were found: at region 6 (V), $t(12) = -.857$, $p = .408$ in English natives; and $t(22) = -.594$, $p = .559$ in high level L2ers; at region 7 (*B*), $t(12) = -.874$, $p = .399$ in English natives; $t(23) = -.379$, $p = .708$ in low level L2ers; $t(24) = -1.131$, $p = .269$ in medium level L2ers; and $t(22) = .047$, $p = .963$ in high level L2ers. As for the time for answering the questions, again there were no significant differences: $t(12) = -1.565$, $p = .144$ in English natives; $t(23) = .677$, $p = .505$ in low level L2ers; $t(24) = -.425$, $p = .674$ in medium level L2ers; and $t(22) = -1.271$, $p = .217$ in high level L2ers. These results provide support for the argument that Type 2 verbs are not harder than Type 1 verbs across the four groups. Hence, any hypothetical slowness in processing Type 2 verbs compared to Type 1 verbs in equivalent passive sentences cannot be attributed to the inherent difficulty of the Type 2 verbs. See Figure 1 for RTs for each region and Figure 2 for answering times for subsequent questions across the four groups.[3]

[3] Figure 2 shows that the medium and high level L2ers in this experiment spent shorter times processing at the question region than English native speakers. This result may look odd because of our intuition that L2 learners are slower than native speakers in terms of sentence processing. However, it should be noted that these L2ers had been trained and well oriented to answer comprehension questions in the shortest possible time while preparing for English proficiency tests such as TOEFL iBT.

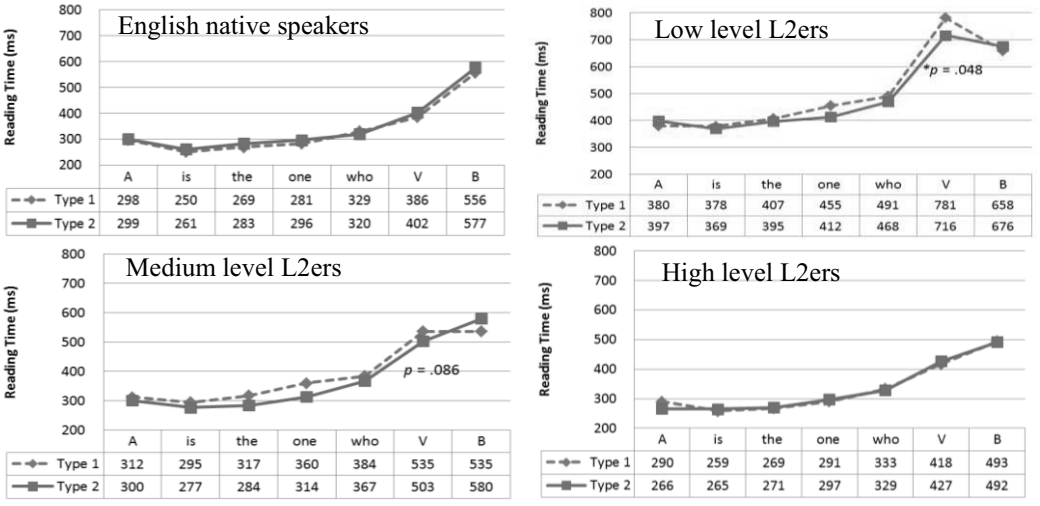


Figure 1. Participants' RT profile for active sentences: All four groups

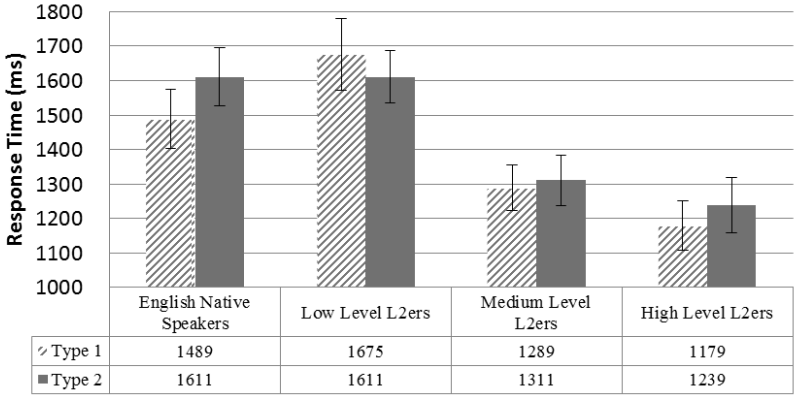


Figure 2. Participants' answering times for questions: All four groups

Then, we analyzed each group's RT data in passive sentences. The data were analyzed for RTs on region 7, region 8, region 9 (the regions of V-*ed*, *by*, and *B*), and the subsequent question in each group. Again, repeated measures *t*-tests were conducted to find any significance in RTs between Type 1 verb passive sentences and Type 2 verb passive sentences across the four groups. At region 7 (V-*ed*), we did not find any significance across the four groups: $t(12) = .332$, $p = .746$ in English natives, $t(23) = -.983$, $p = .336$ in low level L2ers; $t(24) = 1.145$, $p = .264$ in medium level L2ers; and $t(22) = .535$, $p = .598$ in high level L2ers. At region 8 (*by*), we found marginal significance only from the low level L2ers, $t(23) = -1.720$, $p = .099$, but not from the other groups, $t(12) = 1.214$, $p = .248$ in English natives; $t(24) = -.719$, $p = .479$ in medium level L2ers; and $t(22) = -.930$, $p = .363$ in high level L2ers. At region 9 (*B*), we found significance again from the low level L2ers, $t(23) = -2.482$, $p = .021$, but not from the other groups, $t(12) = .800$, $p = .439$ in English natives; $t(24) = -1.174$, $p = .252$ in medium level L2ers; and $t(22) = -.265$, $p = .794$ in high level L2ers. As for the time for answering the questions, we found significant differences in RTs for the two verb types from the low level L2ers, $t(23) = -2.432$, $p = .023$, and from the medium level group, $t(24) = -3.964$, $p = .001$; but not from the native speaker group, $t(12) = -.013$, $p = .990$, or the high level group, $t(22) = -1.696$, $p = .104$. Figure 3 shows RT profiles for passive sentences and Figure 4 displays answering times for the subsequent questions.

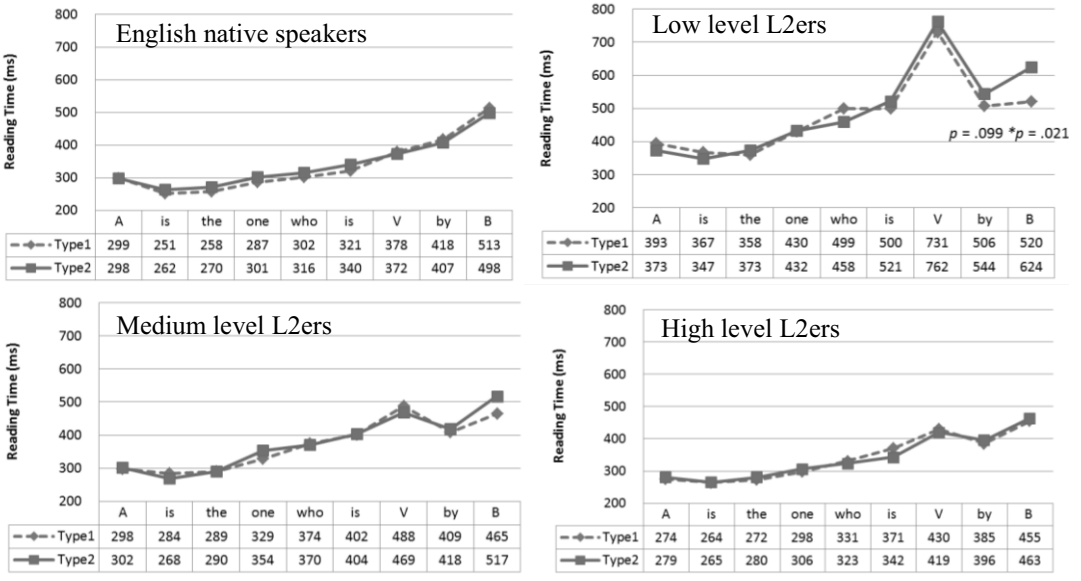


Figure 3. Participants' RT profile for passive sentences: All four groups

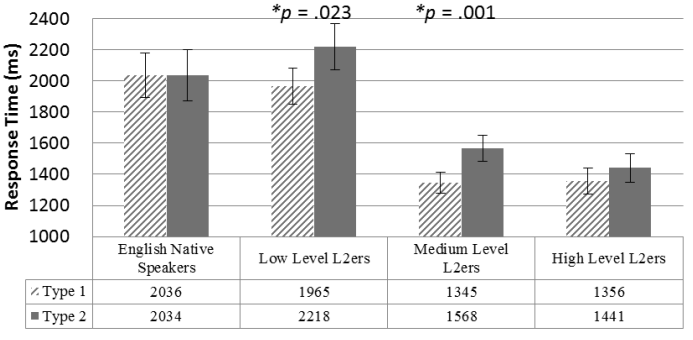
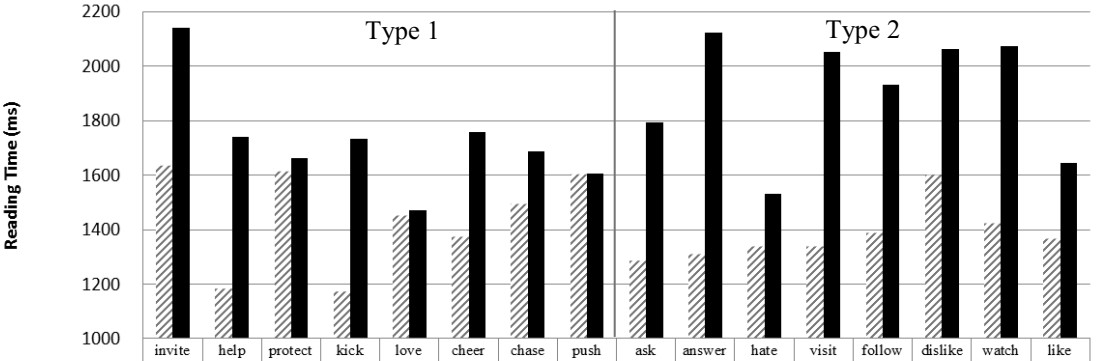


Figure 4. Participants' answering times for questions: All four groups

Now, we move on to the by-item analysis. Unlike the previous analysis, which compared how each participant processed Type 1 and Type 2 conditions, this analysis focuses on how each type of condition was processed by all participants in each group. Thus, simple *t*-tests were used across the four groups. For both active and passive sentences, we found no significant difference in RTs or answering times for questions between Type 1 verbs and Type 2 verbs in any participant group.

Unlike the by-participant analysis, which found significant differences in the regions for *by* and *B* from the low level group, the by-item analysis showed no significant difference between Type 1 and Type 2 verbs for all the regions and all groups. One possible explanation for this disparity is that the results from the by-item analysis are due to a low degree of freedom ($df = 14$), because we used only eight verbs for each verb group. A more likely explanation is that Type 1 verbs may be slightly more difficult than Type 2 verbs. Recall the fact, shown in Figure 1, that the low level group read Type 1 verbs significantly more slowly than Type 2 verbs in active sentences. See Figure 5 as an example of the item analysis: It shows the low level L2ers' combined RTs for critical regions, i.e., region 7 (V-*ed*), region 8 (*by*), and region 9 (*B*) in each passive sentence and region 6 (V) and region 7 (*B*) in each active sentence.



	invite	help	protect	kick	love	cheer	chase	push	ask	answer	hate	visit	follow	dislike	watch	like
Active (V+B)	1638	1182	1615	1173	1454	1376	1494	1605	1285	1311	1338	1339	1390	1602	1426	1369
Passive (V+by+B)	2140	1740	1663	1732	1470	1757	1688	1606	1793	2122	1532	2051	1932	2064	2072	1646

Figure 5. Item analysis for combined critical regions in active and passive sentences: Low level L2ers

Several aspects of these results can be submitted to further testing. For example, frequency matters. Note that the low level L2ers were fast in reading passive sentences that included *hate* and *like* (Type 2). These are the most frequently used among the 16 verbs, according to a BNC corpus analysis. In contrast, the low level L2ers read slowly on the passive sentence with *invite* (Type 1), a verb that may not be as frequently used as the other verbs in these participants' experience. Note that in the active sentences, they read the critical area with *invite* (i.e., *invite* + *B*) the most slowly among all the verbs. Therefore, as a way of avoiding this effect, we calculated the differences in RTs between the critical areas in passive sentences (V-*ed* + *by* + *B*) and the critical areas in active sentences (*V* + *B*). The newly manipulated data showed a marginal significance between the differences in Type 1 and the differences in Type 2, $t(14) = -2.073$, $p = .057$.

4. Conclusion

The results show the intervention of L1 properties for lower level Korean L2ers of English when they are processing L2 English passive sentences. In the by-participant analysis, we found that the low level L2ers read passive sentences with Type 2 verbs more slowly than those with Type 1 verbs. In addition, we found that the low level and the medium level L2ers showed longer answering times for the comprehension questions about the passive sentences with Type 2 verbs than for those about the passive sentences with Type 1 verbs. On the other hand, we found hardly any L1 transfer in the high level L2ers group. This tendency is compatible with the finding of Frenck-Mestre (2002), who reported that high L2 proficiency decreases L1 dependence in L2 processing. Theoretically, the finding in the current study – the transfer of L1 properties in the processing of L2 passive sentences by the lower level L2ers – partly supports the Full Transfer/Full Access model (Schwartz & Sprouse, 1994, 1996), which states that L1 lexicon (minus phonetic features) comprises the initial state of L2 acquisition.

The weak results in the by-item analysis suggest that there are more factors than L1 effect in L2ers' processing of English passive sentences. For example, it may be that a more frequently used verb (e.g., *like*) is processed fast when participants read a passive sentence with the verb. A further study needs to be conducted to test other factors in processing L2 English passive sentences.

As mentioned earlier, previous studies have focused mainly on L2 errors to investigate L1 transfer. In our study, the L2 learners showed very high accuracy in the end-of-trial comprehension test. However, further investigation uncovered that the lower level L2ers accessed L1 properties when processing L2 English passive sentences. Gruter and Conradie (2006, p. 90) argue that "the *absence of evidence* in production does not constitute *evidence of absence* of the corresponding (L2) syntactic representations." Likewise, it is our view that *the absence of evidence* in production does not constitute *evidence of absence* of the corresponding L1 properties' intervention.

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