L2 processing of tense/aspect agreement violations*

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[Abstract]

This study investigated how advanced Korean L2 learners of English process two types of verb tenses (past simple and present perfect). Specifically, it examined whether the participants are sensitive to tense/aspect violations, replicating Roberts and Liszka's (2013) study with single target sentences (e.g., *Three days ago, Tom has felt unwell.*). The Korean L2 learners of English with a competent level of explicit knowledge distinguished the morphological usage of the past simple form from the present perfect form of verbs in the fill-in-the-blanks task. Their possession of the explicit knowledge was again confirmed by an off-line acceptability judgment task; as demonstrated by the native speakers of English, the advanced L2 learners evaluated the mismatch items far less acceptable than the match items in both the past simple and the present perfect constructions. In the self-paced reading task conducted to test the participants' ability to reflect their judgments in on-line processing (i.e., implicit knowledge), however, L2 learners were slower than native speakers of English and they, in particular, revealed the marginal sensitivity to tense/aspect agreement violations for the present perfect type. The results were

discussed in terms of L2 learners' selective integration (Jiang 2004, 2007).

Key Words: L2 processing, tense, aspect, acceptability judgment, self-paced reading

1. Introduction

In second language (L2) research, few scholars would argue against the position that in the attainment course of the second language, the acquisition of tense and aspect is challenging yet fundamental for L2 learners to master. This topic has been investigated intensively in the field of L2 research (see Bardovi-Harlig 2000 for overviews; Slabakova 2002). Roberts and Liszka (2013) reported that we know much about learners' production of tense/aspect distinctions and of tense/aspect morphology at early and at more advanced stages of L2 acquisition, and how L2 learners interpret target language tense/aspect distinctions in general. However, little is known about how such knowledge is displayed automatically in real-time comprehension. Acquiring a second language requires both explicit knowledge and the ability to employ this in real-time. This study aims to investigate how advanced Korean L2 learners of English display their explicit knowledge toward the use of the two tenses (i.e., past simple and present perfect) and their ability to reflect this knowledge in real-time comprehension.

Sohn (1995) argued that there are only two tenses in Korean: past and nonpast. Korean temporal system is often described in terms of aspect (Nahm 1978), such as perfective vs. imperfective or prior vs. non prior, rather than in terms of tense. Aspect is generally defined in terms of the beginning, duration, completion,

repetition, resulting, etc. of a verb and without reference to its position in time (Sohn 1995). In Korean, although ambiguity may be present (Sohn 1995), perfect tense is established with suffixes such as *-ess* and *-ass* with given temporal adverbial. Therefore, contrast to English, aspect is not strictly grammaticized in Korean and this dissimilarity may impact Korean learners' L2 processing as described by the Aspect Hypothesis (AH) in the 1980s. The AH claims that "first and second language learners will initially be influenced by the inherent semantic aspect of verbs or predicates in the acquisition of tense and aspect markers associated with or affixed to these verbs" (Anderson and Shirai, 1994, 133). Thus, with the learners' first language (i.e., Korean) as a possible influential factor, this study examined the on-line comprehension of Korean L2 learners, and their ability to utilize the explicit knowledge of tense/aspect agreement violations, which is measured and confirmed by two off-line production tasks, as it has been assumed that L1 elements might provide divergence or difficulties faced by L2 learners (Chung 2019; Hawkins and Chan 1997).

2. Literature Review

Tense generally places an event on the timeline relevant to the time of the utterance, making it a temporal deixis; the relation of an event or a situation to a reference time (Comrie 1976). According to Comrie (1976), tense places an event in time but aspect refers to how an event unfolds in time, whether it is ongoing or has already been completed. Aspect, as defined by Smith (1997), is a universal property and common to all human languages. Salaberry (2008) divided aspect into two types: 1) situation (inherent) aspect which refers to the inherent semantic property of the verb

phrase, and 2) viewpoint (grammatical) aspect which is encoded in verbal inflectional morphology and related grammatical means such as perfective/imperfective. Although situation and viewpoint aspect are claimed to be universal properties common to all human languages cross-linguistically, languages differ in the way that they realize them (Alruwaili 2014).

To examine tense/aspect processing of L2 learners with different first language (L1) backgrounds, Roberts and Liszka (2013) conducted a self-paced reading experiment and analyzed the on-line reading time (RT) data from advanced German and French L2 learners of English. They found that for both the past simple and the present perfect structures, all three groups (native, German, French) evaluated the mismatch items to be less acceptable than the match items. However, some variances were noticed between French L2 learners and German L2 learners. The French L2 learners were able to reflect their explicit knowledge from the acceptability tasks in the on-time processing as they showed more strain in processing the mismatch items than the match items for both the past simple and the present perfect structures. The German L2 learners did not demonstrate any processing cost in both structures. One striking finding of their study is that the native speakers of English showed a processing cost only for the mismatch condition in the present perfect sentences (e.g., *A year ago, William has met his best friend after work every Friday.*), although both types of mismatch conditions (of the past simple and present perfect) have been assessed as significantly less acceptable than the match conditions in the off-line acceptability task. Roberts and Liszka (2013) suggested that this phenomenon may be related to the time of the utterance included in the sentences. For the present perfect constructions, the phrase *has met* represents the time being talked about which includes the time of the utterance. Therefore, one cannot use an adverbial that singles out a specific time in the past (e.g., *last year*, *yesterday*, *at five*) (Roberts and Liszka

2013). Such adverbial makes the sentence completely ungrammatical as the time of the utterance would be excluded and entails. Thus, processing cost in the mismatch item of the present perfect construction was observed. For the past simple constructions, it would obviously be unnatural to have an adverbial which includes the time of the utterance (*for months now*, *since last year*), however, since the topic time is situated prior to the time of utterance, the time span indicated by the adverbial at least may include the past time (*Since last year*, *Jill wanted...*). This approach may have influenced toward the judgment that the mismatch items of the past simple construction may not be completely ungrammatical.

L2 learners' on-line and off-line performance are associated to their implicit and explicit knowledge of the target structure, tense/aspect violation. Implicit knowledge refers to knowledge that is intuitive and accessible for automatic processing and explicit knowledge is knowledge that is consciously available through controlled processing (e.g., Ellis et al., 2006; Hulstijn 2005). To exploit the participants' explicit knowledge, experimental tasks such as off-line grammaticality judgment tasks (GJTs) are generally accepted to be conducive (e.g., Ellis 2005; Tokowicz and MacWhinney 2005). On the other hand, on-line tasks such as real-time spontaneous oral production tasks (e.g., Ellis 2005) and event-related potential (ERP) responses in sentence comprehension tasks (e.g., Tokowicz and MacWhinney 2005) are commonly considered suitable for the purpose of measuring implicit knowledge (e.g., Ellis 2005).

Jiang's (2004) study involving the English plural morpheme ¬s (e.g., *The key to the cabinet was/*were rusty from many years of disuse.*) and the verb subcategorization (e.g., *John encouraged/*supported me to go.*) concluded that the native speakers were sensitive to all grammatical violations yet the non-native speakers (i.e., Chinese L2 learners of English) were only sensitive to violations

involving verb subcategorization, not the plural morpheme. Regarding the measurement of the implicit knowledge, his revisited study in 2007 exploited a time-pressured self-paced reading experiment and tested the selective integration of specific structures emphasizing the minimization of explicit knowledge involvement. Jiang's (2004, 2007) studies claimed that, selective integration is in effect as the non-native speakers demonstrated much slower RT while reading ungrammatical sentences involving verb subcategorization but not involving the plural sentences.

Thus, implementing both the on-line self-paced reading task and the off-line GJT in the experiment, this study examined how learners use their explicit and implicit knowledge during comprehension. The target materials were adapted from Roberts and Liszka's (2013) study of tense/aspect agreement violations of French and German L2 learners of English with minor modifications (see Appendix 1). All of the original materials developed by Roberts and Liszka (2013) comprised two sentences (e.g., *Last week/Since the summer, James went/has gone swimming every day. Now he's getting bored of it.*). The comprehension questions that followed targeted the contents of the latter sentences only (e.g., *Is James bored of swimming?*) and it appears highly possible that the participants may develop a strategy whereby they did not fully process the critical parts of the experimental items (e.g., *Last week/Since the summer, James went/has gone swimming every day.*). For this current experiment, such perceptible limitation was supplemented by using only the single target sentence in all experimental items (e.g., *Last week/Since the summer, James went/has gone swimming every day.*) followed by comprehension questions that targeted the general semantical/pragmatical assumption generated by the critical sentence (e.g., for *Does James like swimming?* "yes" would be the logical response), but carefully tailored not to associate it to tense/aspect matter.

3. Method

1. Participants

Forty Korean (mean age 19.6; range 18-29) L2 learners of English voluntarily participated in the experiment with a control group of 32 native English speakers (mean age 36.2; range 31-51). The 40 Korean participants were selected from a pool of 122 who were all Korean university students with at least 10 years of public English education background. Prior to selection, 122 Korean L2 learners of English (mean age 20.3; range 18-33) participated in the off-line fill-in-the-blanks test, specifically designed to test their ability to distinguish the use of the verb tense (i.e., past simple, present continuous, present perfect). The 122 test takers were provided 30 verbs in infinitival forms with their dictionary definitions (from Collins English dictionary) next to each verb. They were asked to read 30 sentences with each sentence missing the verb (e.g., *I still find it very difficult to teach students even though I (   ) for 26 years.*), then to choose the appropriate verb from the verbs list provided to insert it in the blank in its correct morphological form (e.g., *taught*) (see the examples in Appendix 2). The mean score of the 122 test takers was 73.85% (SD 18.29). Based on the scores, top 40 students were selected as the participants of the current experiment. The mean score of the 40 selected participants was 89.4% (SD 6.7). Considering the data collected, the group is to be assumed and classed as "advanced" L2 learners of English for the purpose of this study. As for the control group, 32 native speakers of English were gathered from Amazon Mechanical Turk. The native English speakers were each compensated $2 for their participation. The Korean participants received no compensation for their participation in the current experiment.

2. Materials

The materials were taken from Roberts and Liszka's (2013) study of tense/aspect agreement violations of French and German L2 learners of English with minor modifications (see Appendix 2). A set of 24 experimental items were used with each item stipulated 2 x 2 conditions (past simple vs. present perfect and match vs. mismatch) as shown in (1) and (2). The tense/aspect violation was demonstrated by having the immediately following verb either match in temporal features with the adverb (1a, 2a) or not (1b, 2b) (Roberts and Liszka 2013).

(1) Past simple
a. A year ago, William met his best friend after work every Friday.
b. *For a year now, William met his best friend after work every Friday.

(2) Present perfect
a. For a year now, William has met his best friend after work every Friday.
b. *A year ago, William has met his best friend after work every Friday.

3. Procedure

Two tasks were undertaken for the L2 learners: an on-line self-paced reading (SPR) experiment to assess the implicit knowledge and an off-line acceptability judgment task to confirm the explicit knowledge. The two tasks were separated with sufficient break (one week) in order to lessen any possibility of participants noticing the similarities of types within the materials. Materials used in both tasks are identical and pseudorandomly provided along with 48 fillers of different forms. The participants were assigned to one of four counterbalanced experimental lists

randomly.

The self-paced reading experiment was conducted by the on-line IBEX platform (Drummond 2013). Participants were sent a web-link to the main experiment where they first begin by filling in a consent form and a language background questionnaire to gather biographical information. The SPR experiment lasted 45-60 minutes, but no guideline to time or expectancy was provided. The beginning of each trial was informed to the participants by a message on the screen. They pressed the "space bar" on the keyboard to begin the session. Then, the screen displayed a number of underlines horizontally matching the number of words in the sentence to be presented (e.g., There are 12 underlines prior to displaying *A year ago, William met his best friend after work every day.*). Each sentence was presented word by word. The participants pressed the "space bar" on the keyboard to bring up the first word of the sentence above the first underline and continued to press it to bring up the subsequent word. When a new word appears above the subsequent underline, the former word disappears simultaneously. Upon the final segment of the sentence, the participants were to press the "space bar" to end the reading session to bring up the comprehension question. Five practice trials were conducted prior to the main experiment to allow the participants to get familiar with the experiment procedures. All the experimental items and fillers were followed by a close-ended (yes/no) comprehension question as shown in (3b).

> (3) Material sample
> a. Target item
> A year ago/For a year, William met / has met his best friend after work every
> Friday.
> b. Comprehension question
> Does William have a best friend?

Participants pressed the "y" key on the keyboard to indicate a "yes" and the "n" key a "no" response, which corresponded to a visual prompt on the screen. They were also able to click either the "yes" or "no" box on the screen using the mouse. The purpose of these comprehension questions is to make sure the participants are paying a close attention to the contents of presented items. The comprehension questions are developed not to indicate any tense/aspect violation or experimental manipulation but rather in very general context as shown in (3).

A week after the self-paced reading (SPR) tasks, the Korean L2 learner group was gathered in a dedicated room to complete the acceptability judgment task. For this off-line acceptability judgment task, participants were to read 72 sentences (24 experimental items and 48 fillers) and assess their acceptability on a scale of one (least acceptable) to six (most acceptable). Verbal and written instructions were provided, and participants were encouraged to use any standards/criteria in assessing the sentence materials. Participants were given no time limit for this task as it was not time-pressured, but most have completed it within 30 minutes.

4. Analyses

For the off-line acceptability judgment task, 2 (group: native English speakers vs. Korean L2 learners) x 2 (condition: match vs. mismatch) repeated measures of ANOVAs were conducted to examine the acceptability differences depending on the math/mismatch conditions between the native English speakers and the L2 learners for each construction type of the sentence (past simple vs. present perfect).

For analyzing accuracy and the reading times data from the SPR task, mixed-effect models were used through the lme4 package (Bates, Maechler, Bolker, and Walker 2014) in the R 3.5.3 environment (R Core Team 2019). Separate models

were applied for each dependent variable (accuracy and reading times), and each factor such as group (natives and L2 learners) and match (match and mismatch) were treated as fixed effects of each model. Then all fixed effects were centered to reduce collinearity in the models, and the random effect structure included participants and items.

4. Results

As can be seen in Table 1, for the two groups' mean responses on the acceptability task for the past simple and present perfect items, both groups judged the match conditions more acceptable than the mismatch conditions. For the past simple items, there was a significant main effect of group, $F(1,453) = 8.66$, $p < .01$, and main effect of type, $F(1, 453) = 350.28$, $p < .001$ but no interaction between them. For the present perfect items, as similarly recorded in the past simple items, both groups assessed the match condition items more acceptable than the mismatch condition items. There were significant main effects of group ($F(1,453) = 4.02$, $p < .05$) and type ($F(1, 453) = 288.25$, $p < 0.001$), but no interaction between them.

Table 1. Results of Average (out of 6) Acceptability Judgments (SD in parentheses)

	Past simple		Present perfect	
	Match	Mismatch	Match	Mismatch
Native	5.83 (0.8)	3.82 (1.5)	5.93 (1.4)	2.65 (1.2)
L2	5.87 (1.0)	3.01 (1.7)	5.21 (1.3)	2.69 (1.8)

In sum, the results of the acceptability judgment task indicated that both groups (native English speakers and advanced Korean L2 learners) judged the mismatch conditions significantly less acceptable than the match conditions for both the past simple and the present perfect constructions. This implies that the L2 learners have the explicit knowledge of the English past simple and present perfect constructions, as measured by this acceptability judgment task.

For the accuracy data from the comprehension questions, there was no effect of the group and match factors, indicating that both native and L2 participants paid attention to the target sentences. For the RT data, prior to analyses, 6.8% of all data were removed due to incorrect responses to the comprehension questions. Among the remaining set of data, 6.4% of data that have reading time below 200 milliseconds and exceeding 2,000 milliseconds were removed prior to analyses.

Figure 1 illustrates the results of average RT for the past simple construction items (critical: *went*, spillover 1: *swimming* in the example *Last week/*Since last week, James went swimming every day.*).

Figure 1. RTs for the past construction items
(critical region, spillover region)
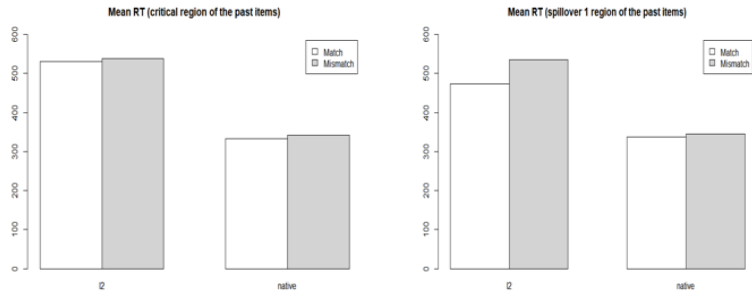
The results of the Linear Mixed Effect (LME) models for the past simple items showed that there was a significant main effect of group (*estimate*=.3969, *SE*=.0609, *t*=6.511, *p*<0.001) for the critical region and (*estimate*=.3044, *SE*=.0552, *t*=5.515, *p*<0.001) for the spillover 1 region, but no main effect of match and no interaction between group and match.

Figure 2 illustrates the results of average RT for the present perfect items (critical: *has*, spillover 1: *gone*, spillover 2: *swimming* in the example *Since last week/*Last week, James has gone swimming every day.*).

Figure 2. RTs for the present perfect items
(critical region, spillover regions 1 & 2).
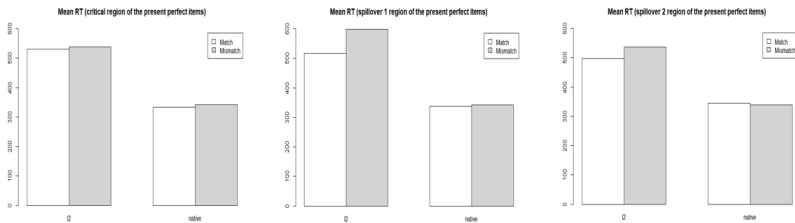
For the present perfect items, the results of LME models showed that there was a significant main effect of group for the critical region (*estimate*=.2959, *SE*=.0551, *t*=5.367, *p*<0.001), for the spillover region 1 (*estimate*=.3733, *SE*=.0659, *t*=5.515, *p*<0.001), and for the spillover region 2 (*estimate*=.3337, *SE*=.0566, *t*=5.900, *p*<0.001), but no main effect found for match conditions. However, a marginal significance of interaction between group and match was recorded for the spillover 1 region (i.e., past participle) of the present perfect item (*estimate*=.0881, *SE*=.0515, *t*=1.711, *p*=0.0897). This indicates that compared to native speakers of English, the L2 learners demonstrated a slower RT for the mismatch items contrast to the match

items in the spillover 1 region of the present perfect items (e.g., *A year ago, William has <u>met</u> his best friend after work every Friday*.).

5. Discussion and Conclusion

In this current research, two main tasks were conducted to investigate the implicit and explicit knowledge of tense/aspect violations of L2 learners of English: an on-line self-paced reading task and an off-line acceptability task. In the process of measuring the explicit knowledge, the Korean L2 learners were successfully able to point out the violations, rating the mismatch items far less acceptable than the match items in both the past simple and the present perfect structures.

In investigating the implicit knowledge, the L2 learners overall demonstrated a slower RT across all regions for both the past simple and the present perfect items compared to the native speakers. However, no significant effects of match and its interaction with group were found in the RT analyses for all regions. Interestingly, however, a marginal significance was found for the spillover 1 region of the present perfect items (i.e., past participle). This indicates that the L2 learners demonstrated a slower RT for mismatch items than match items in this region compared to the native speakers of English, revealing that the Korean L2 learners demonstrated a processing cost in the mismatch condition of the present perfect construction. While in this research, the native speakers did not show any processing cost in this region in contrast to those native participants of Roberts and Liszka's (2013) experiment. However, the observation of the processing cost by the L2 learners shows a similar pattern with the native speakers' results from Roberts and Liszka's (2013) experiment. All the native speaking participants of this research were collected from

Amazon Mechanical Turk, which cannot be controlled, contrary to an experimental setting. The native participants also had a wider variance in age range than the L2 participants. To overcome such limitations, more participants seem to be required to fully validate this irregular phenomenon.

The findings of the L2 processing cost only in the certain construction (i.e., mismatch condition in the present perfect construction) posits the Jiang's (2007) argument that the development of second language automatic competence or integrated knowledge is selective. He defined automaticity as the ability to perform without conscious awareness or while utilizing minimum attentional resources. He suggests that L2 learners can be more effective in learning distinct structures. Jiang (2004) also noted that Chinese L2 learners of English were not sensitive to subject-verb agreement violations in their on-line L2 processing, despite their competency demonstrated in an off-line forced choice task. This view is in line with the results found in the current research and the one from Roberts and Liszka (2013) as the L2 participants all were able to demonstrate the explicit knowledge in the acceptability task. However, Jiang also notes that it is very unlikely for adult learners to reach native-like proficiency which suggests that the integration of linguistic knowledge seems to be selective. In the current research, a tendency to integrate linguistic knowledge was found only in the spillover 1 region (i.e., past participle) of the present perfect structure. Because the L2 group demonstrated their explicit knowledge toward both the past simple and the present perfect structures, such outcome is to be associated with selective integration of automatic competence.

Previous studies showed how L1 can influence L2 learners of English in real-time processing. Roberts and Liszka (2013) found that French L2 learners were sensitive to English tense/aspect violations, while German L2 learners were not. They suspected that it is due to their L1 influence that in French, in which aspect is

grammaticized like English whereas in German, it is not. The findings of the current study may have been resulted due to the L1 influence. For instance, the English past simple and present perfect constructions can vividly be translated to natural Korean. Temporal adverbial in Korean plays a role in determining the tense specifically between perfectiveness and nonperfectiveness (Sohn 1995) with a suffix −*ess*. It is also possible that the participants had enough English background (as demonstrated in the pre-test and the acceptability task) that they were "trained" to be sensitive to mismatch items provided in a test-like environments. Future research is needed to answer this question more in details.

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Appendix 1
Experimental materials

1. At first/Since he met them, Joe liked / has liked Mary's old school-friends.

2. Initially/Since last week, the cate ate / has eaten only fish.

3. Yesterday/Since we moved in, my old neighbor visited / has visited our house.

4. When he saw her/Since he first saw her, Sam thought / has thought Jenny was beautiful.

5. Last week/Since the summer, James went / has gone swimming every day.

6. When she was ten years old/Since she was ten years old, Brenda wanted / has wanted to be an actress.

7. Last Friday/Since last Friday, Mark saw the film / has seen the same film three times.

8. A year ago/For a year now, William met / has met his best friend after work every Friday.

9. Once many years ago/Since he was twenty, Matt was / has been a successful businessman.

10. Before her baby was born/Since her baby was born, Jenny wanted / has wanted to escape from her life.

11. Three days ago/For the last three days, Tom felt / has felt very unwell.

12. Last year/Since last year, Kate studied / has studied French in her spare time.

13. When she first started her job/Since she first started her job, Emma loved / has loved the work very much.

14. Initially/Since the beginning, the band was / has been very successful.

15. Last spring/Since spring, Bert planted / has planted many roses in the garden.

16. At Christmas/Since Christmas, Barbara spent / has spent too much money.

17. On his birthday/Since his birthday, Paul met / has met two lovely women.

18. May years ago/For many years now, Judith though / has thought about joining the army.

19. When he first started cooking/Since he first started cooking, Alan enjoyed / has enjoyed making pasta most of all.

20. When he finished university/Since he finished university, Jerry thought / has thought about starting a business.

21. Last month/For the last month, Sandra felt / has felt unhappy at work.

22. At first/For months now, Christine wanted / has wanted to marry Gary.

23. In February/Since February, Ben crashed / has crashed his car four time.

24. Last year/Since the summer, Michael learned / has learned to play poker. He now wants to become a professional.

Appendix 2
Examples from pre-experiment test

Listen - If you listen to someone who is talking or to a sound, you give your attention to them or it.

Wear - When you wear something such as clothes, shoes, or jewellery, you have them on your body or on part of your body.

Send - When you send someone something, you arrange for it to be taken and delivered to them, for example by post

Graduate - In the United States, when a student graduates, they complete their studies successfully and leave their school or university.

Watch - If you watch someone or something, you look at them, usually for a period of time, and pay attention to what is happening.

1. Don't get any vision correction surgery. He got one about 10 years and now he (   ) glasses.

2. Yesterday, James (   ) an email to Mary to inform her about her new assignment.

3. It was such an honor to be able to speak directly to the president. Since one o'clock, he (   ) to our opinions very attentively and responded with kindness.

4. I still find it very difficult to teach students even though I (   ) for 26 years.

5. Last night, Jennifer (   ) the same movie twice. She still couldn't understand the mysteries in the movie.

국문초록

시제/상 일치 위반의 제2 언어 처리

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본 연구는 영어학습자들이 동사의 두 시제 (과거형, 현재완료형)를 어떻게 이해하고 처리하는지에 대하여 연구하였다. 구체적으로, Roberts & Liszka(2013)의 시제와 상에 대한 연구에서 사용된 문장을 수정하여 영어학습자들이 문장의 시제와 상의 위반에 민감하게 반응하는지를 알아보았다. 본 연구에 참여한 한국인 영어학습자들은 문장 내 올바른 동사의 형태를 맞히는 과제와 시제와 상의 바른 형태와 위반된 형태의 문장 수용성 과제를 통해 영어 동사의 과거형과 현재완료형의 의미와 쓰임새를 구분할 수 있었다. 영어학습자들은 자기조절읽기과제(self-paced reading task)를 통해 영어학습자들은 원어민에 비해 긴 반응(reading time)을 보였고, 특히 현재완료형의 위반에 대해 유의미한 민감성을 보이는 경향이 있었다. 이러한 결과는 제2 언어 처리에 있어서 선택적 통합(Jiang 2004, 2007)으로 설명될 수 있다.

주제어: 제2언어 처리, 시제, 상, 수용성 판단, 자기조절읽기

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