On-line Processing of Aspectual Coercion by Korean Learners of English

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1. Background Studies

1.1 Aspectual Coercion

The aspect of a proposition can undergo changes with a combination of modifiers such as tenses, temporal adverbials, and aspectual auxiliaries (Moens and Steedman, 1988). For example, *the baby hiccupped,* which occurs for a very short amount of time, is often argued to be interpreted as an iterative event when modified by a durative adverbial as in *the baby hiccupped for an hour.* This is because there is an aspectual mismatch between the semelfactive verb *hiccup* and the modifier *for an hour.* In order to resolve this mismatch, readers reinterpret the event as occurring several times during the assigned duration, which process is referred to as aspectual coercion.

According to Brennan and Pylkkanen (2008), there are four hypotheses as to how aspectual coercion takes place. Iterative coercion, which argues for the punctual meaning inherent in the verb, is divided into two different approaches; according to the first approach, the semantic shift occurs within the compositional system because the punctual meaning of the verb and the durational meaning of the adverb are im-

possible to be combined in the first place. In the other approach, the verb and the adverb can compose in the semantic stage but the composition does not make sense. The meaning shift occurs in the pragmatic stage. A third proposal, called Punctual coercion, applies aspectual coercion in the opposite direction. Instead of posing punctual meaning to the verb, this proposal states that the verb such as *jump* has a repetitive meaning but is coerced into instantaneous one in certain contexts (e.g. *at 3 o'clock, the clown jumped.*) (Rothstein, 2004). Finally, the aspect of the verb could be undetermined until it is combined with temporal modifiers. For example, the verb *jump* can represent both punctual and durative events. This approach is called Underspecification. According to Underspecification, there will be no additional cost in processing sentences such as *the baby hiccupped for an hour* where the verb is modified by a durative adverb compared with *the baby hiccupped an hour ago.* On the other hand, the mismatch between the punctual verb *hiccup* and the adverb *for an hour* should result in increased processing times if Iterative coercion is correct.

Empirical studies so far have yielded mixed results regarding the distinction between Underspecification and Iterative coercion. Piñango et al. (1999, 2006) reported an increased time for lexical decision task after participants listed to sentences that contained aspectual mismatch. Likewise, reading times for such sentences were significantly longer than control sentences in Todorova et al (2000). Conversely, Pickering et al. (2006) did not find any evidence for the increased cost for aspectual coercion in both self-paced reading and eye-tracking experiments. A more recent study by Brennan and Pylkkänen (2008) used magneto-encephalography (MEG) as well as a self-paced reading task comparing sentences 1a and 1b; 1a contains an aspectual mismatch where the verb *sneeze* is modified with a durative adverb *throughout the day* in contrast to 1b where the verb is modified with a punctual adverb *after twenty min-*

utes.

    1. a. Throughout the day the student sneezed in the back of the
          classroom.
       b. After twenty minutes the student sneezed in the back of the
          classroom.

In line with Iterative coercion and Piñango et al. (1999, 2006) and Todorova et al. (2000), participants in the study read sentences as 1a longer than their counterparts. They also elicited increased activity in the anterior midline field (AMF), which has previously been reported to be related to complement coercion.

1.2 L2 studies of Aspectual Coercion

As far as I am concerned, there exist two studies that investigated on-line processing of aspectual coercion by non-native speakers (Chan, 2013; Park & Na, 2012). Chan (2013) compared performance of native English speakers with nonnative English speakers from different L1 backgrounds (Chinese, Korean and German) in a self-paced reading task. While a clear evidence of processing cost for aspectual coercion was observed in the native group, none of the nonnative group showed such effect. To be specific, Chinese learners performed in the opposite direction to the prediction; they read aspectual coercion sentences faster than control sentences. Korean learners, on the other hand, showed a trend of aspectual coercion but the difference did not reach significance. German learners read sentences across all conditions at a comparable pace. The author suggests that such varying tendency across different language groups is due to their L1s. For example, the combination of semelfactive verbs such as *cough* and durational adverbs is more common in Chinese than in English. Hence, the Chinese participants might have drawn

their L1 specific aspectual bias into English processing. On the other hand, the author attributes the results of Korean and German participants to a lack of grammatical aspect in their L1s. For verification of such L1 transfer, however, a processing experiment in participants' L1 is needed.

Park and Na (2012) conducted an ERP study with Korean learners of English using materials adopted from Brennan and Pylkkänen (2008). Unlike native participants in Brennan and Pylkkänen (2008), Korean participants elicited a P600 effect but not an N400 effect. The authors interpret this result as indicating Korean L2 learners resolve the aspectual mismatch within syntactic components instead of semantic components.

What remains unclear from these two studies is whether semantic coercion is a distinct phenomenon that exists only in English or not. In other words, neither of the studies have tested whether semantically coerced sentences yield an additional processing cost in the participants' L1. As Chan (2013) has mentioned, a study in participants' L1 will provide a better picture in exploring L1 influence in processing English aspectual coercion.

1.3 Semelfactive verbs in Korean

Regarding semelfactive verbs in Korean, Ju (2014) investigated whether they can be classified as the same verb type as English semelfactive verbs. Following Van Valin (2005)'s test on semelfactive verbs, she examined if Korean semelfactive verbs are comparable to English semelfactive verbs. In Van Valin's classification of verbs, semelfactive verbs are [+dynamic], [-stative], [+atelic], and [+punctual]. The six criteria that are presented in Table 1 were used to check whether a specific verb have these four semantic properties. If the verb cannot co-occur with certain expressions stated in the criteria, it is classified as a semel

Table 1. Van Valin's test on semelfactive verbs in Korean

	Criteria	Example

1	Can the predicates occur with the progressive aspect?	A semelfactive verb, $gongeul_{ACC}$ *chada* (kick a ball), cannot co-occur with a progressive marker *-go iss-*. e.g. ?* Cheolsuga$_{NOM}$ gongeul$_{ACC}$ chago
		     Cheolsu the ball kicking
		     issda$_{DEC.}$
		       is
		   '?* Cheolsu is kicking the ball.'

2	Does the predicate occur with dynamic adverbs like *vigorously* or *violently*?	The [+dynamic] feature of the semelfactive verb *ttael-ida* allows it to occur with a dynamic adverb *sechage*. e.g. *geu*neun*$_{TOP}$*geunyeowa*$_{CONJ}$
		     he with her
		   nun*eul*$_{ACC}$ himchage
		     eyes vigorously
		   majchueoss*da*$_{DEC.}$
		     looked
		    '*He looked eyes with her vigorously.'

3	Does the predicate occur comfortably with slow pace adverbs like *slowly, gradually*?	e.g.?*geu*neun*$_{TOP}$ cheoncheonhi
		       he slowly
		   kichimhaessda$_{DEC.}$
		     coughed.
		    '?*He coughed slowly.'

4	Can the predicate occur with phrases of time duration e.g. *for an hour*?	A semelfactive verb can occur with durational adverbs only in the case of iterative interpretation. e.g.?*Cheolsu*neun*$_{TOP}$*han sigan dongan*
		       Cheolsu for an
		   hourgong*eul*$_{ACC}$ chass*da*$_{DEC.}$
		   a ball kicked
		    '?*Cheolsu kicked ball for an hour.'

5	Can the verb occur with phrases indicating an endpoint, e.g. *in an hour*?	e.g.?* byeoli$_{NOM}$ il bun mane
		       star in one minute
		   kkambaghaessda$_{DEC.}$
		     twinkled
		    '?*Star twinkled in one minute.'

6	Does the verb have a derived adjective representing a terminal state?	Only semelfactive verbs and activity verbs cannot be used as a derived adjective. e.g. *banjjain[1] bulbich '*(the) flashed light

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1) *banjjain* is derived from the semelfactive verb *banjjagida* (=*flash*)

factive verb.

Table 1 shows that Korean semelfactive verbs satisfy Van Valin's tests and hence can be treated as a distinct verb class as in English. In particular, note that the fourth criteria is related to the focus of the current study. Ju (2014) states that the combination of a semelfactive verb and durational modifiers in Korean is acceptable if the event is interpreted as being repetitive. If this is correct, then it can be hypothesized that Korean aspectual coercion would be processed similarly to English aspectual coercion.

In summary, although studies showing an additional processing cost for aspectual coercion are dominant, the result is still inconsistent. Especially for one to investigate L2 acquisition of English aspectual coercion, a comparable study in learners' L1 is needed. Starting from these questions, this study attempts to explore 1) whether Korean aspectual mismatch causes an additional processing cost and 2) whether Korean learners of English process aspectual mismatch in the same way as English native speakers. To this end, a self-paced reading task was conducted in Korean that compared reading times for semantically coerced sentences and control sentences. An acceptability judgment task followed to get a picture of participants' offline impression for the sentences. Then the same procedure was duplicated in English with different groups of participants. Section 2 reports the results for the Korean experiments and section 3 reports the results for the English experiments.

2. Experiment 1

2.1 Method

2.1.1 Participants

Twenty five Korean native speakers participated in the self-paced reading task. Twenty of them were females and five were males. Their

mean age was 24.36 (range: 19-33). Twenty of the participants reported that they spoke a standard dialect of Korean while four spoke Kyong-sang dialect and one spoke Jeolla dialect. All participants were paid a small fee for participation.

Of the twenty five participants, seventeen participants participated in the acceptability judgment task after three weeks of period. All of them were females with a mean age of 24.42 (range: 20-33). Thirteen of them spoke a standard dialect of Korean, three spoke Kyongsang dialect and one spoke Jeolla dialect. The participants were paid an additional fee for participating in the acceptability judgment task.

2.1.2 Materials

Target sentences were adopted from Brennan and Pylkkanen (2008) and translated into Korean. In order to control for animacy of the subjects, sentences with nonanimated subjects were removed and replaced with those with animate subjects. Sentences that used the same semelfactive verbs as prior sentences were also removed. Van Valin (2005)'s test for semelfactive verbs was used to ensure all the verbs are classified as semelfactive verbs in Korean. A total of 24 pairs of sentences were used for the study.

Each sentence was manipulated so that the semelfactive verb always comes at the fifth place. The verb was preceded by a locational adverbial phrase and a temporal adverbial phrase each of which consisted of two words. For coerced sentences, durational modifiers such as *achim naenae* (all morning long) were used whereas for control sentences, punctual modifiers such as *10si jeonggage* (at 10 o'clock) were used. An example is given below. (See Appendix A for a complete list of materials.)

2. a. 오래된 담벼락에 10시 정각에 부딪친 소년이 많이 다쳤
다. [control]

    Oraedoen dambyeorage 10si jeonggage buditchin sonyeoni

    Old   wall   at 10 o'clock bumped boy

    manhi dachyeotda.

    severely injured.

    'A boy who bumped into an old wall at 10 o'clock was severely

    injured.'

  b. 오래된 담벼락에 아침 내내 부딪친 소년이 많이 다
쳤다. [coerced]

    Oraedoen dambyeorage achim naenae buditchin sonyeoni

    Old   wall   morning long bumped boy

    manhi dachyeotda.

    severely injured.

    'A boy who bumped into an old wall all morning long was severe-

    ly injured.'

2.1.3 Procedure

A self-paced reading task was conducted in the Ibex web interface. Participants were assigned to one of the two presentation lists randomly and tested individually. They first filled in personal information and had a practice session of ten sentences. This was to help them get used to self-paced reading before the experiment began. Then they read each sentence word by word for comprehension at their own pace. They first saw a series of dashes on a white monitor. The dash was replaced by a word every time they pressed a space bar. The previous word was hidden by a dash once the next word appeared. A comprehension question appeared on the monitor after the last word of each sentence. The participants were instructed to select the correct answer for each question. Their reading times and answers were recorded. The experiment lasted approximately twenty minutes.

After three weeks of the self-paced reading task, a post test was conducted that asked participants to judge acceptability of each sentence

used in the experiment. Twenty four sentences were randomly selected from materials used in the self-paced reading task with the equal number for each condition and were mixed with another twenty four filler sentences. Participants were instructed to rate the sentences on a scale from 1 to 7 (1: very unnatural, 7: very natural).

2.1.4 Data Analysis

Accuracy rates for comprehension questions were calculated for each participant. As all participants' accuracy rates were above 80% (mean: 96%; 90-100%), no participant was excluded from analysis. For target sentences, the accuracy rates were slightly higher (mean: 99%; 95-100%).

Reading times (RTs) above 3,000ms and below 200ms were considered as outliers and removed, which accounted for 5.6% of the whole data. Responses with a wrong answer for comprehension questions were also removed, which accounted for 0.7% of the whole data. For the purpose of data analysis, three regions from each sentence were selected as target regions (Table 2). They were i) the critical word where the semelfactive verb appears and the next two words from the critical word, ii) spillover1 and iii) spillover2. Then residual RTs for each region were calculated to control for word length effect. A generalized linear mixed effects model was used at each target region with Type (Coerced vs. Control) as a fixed factor and subjects and items as random factors. The whole process was done using the lme4 library in the R program (version 3.4.0).

As for the acceptability judgment task, a Wilcoxon Mann-Whitney test was conducted to examine the difference between coerced sentences and control sentences.

Table 2. Target regions for analysis

	Pre-critical	Critical word	Spillover1	Spillover2	···
Coerced/ Control	정각에 jeonggage o'clock	쾅 부딪친 kwang budijhin bumped	소년이 sonyeoniTOP boy	많이 manhi severely	

Table 3. Mean RTs for coerced and control sentences

	Critical word	Spillover1	Spillover2
Coerced	455.40 (348.82)	524.44 (479.96)	440.77 (232.17)
Control	476.00 (293.26)	566.35 (590.66)	437.63 (228.18)

note: SD in parenthesis

Table 4. The main effect of Type at each region for residual RTs

	Estimate Std.	*SE*	*df*	*t*	*p*
Critical word	11.20	14.81	531.70	0.76	0.45
Spillover1	17.75	16.65	507.50	1.07	0.29
Spillover2	-1.49	11.84	535.10	-0.13	0.90

note: * $p < .05$, ** $p < .01$, *** $p < .001$

2.2 Result

2.2.1 Self-paced reading

Table 3 presents raw RTs of Korean participants at the three target regions for coerced and control sentences. The result of linear regression with Type as the main effect is given in Table 4. The reading times were rather longer for control sentences compared to coerced sentences in the critical word and spillover1 regions but the difference was not significant.

2.2.2 Acceptability Judgment Task

As in Table 5, the mean rate of acceptability was lower for coerced sentences compared to control sentences. The difference was significant in the Wilcoxon Mann-Whitney test ($p < 0.000$).

Table 5. Mean rates of acceptability for coerced and control sentences

	Coerced	Control
Mean	4.04 (1.48)	4.74 (1.40)

note: SD in parenthesis

3. Experiment 2

3.1 Method

3.1.1 Participants

11 English native speakers and 29 Korean learners of English participated in the study. Both groups voluntarily participated in the experiment. Among the native participants, eight were males and three were females. Their mean age was 36 (range: 28-51). The Korean participants consisted of three males and twenty six females. Their mean age was 19 (range: 18-29). They were first exposed to English when they were two to nine years old. All but four Korean participants had no experience of living in English speaking countries, indicating that most of the participants' English education took place in an EFL environment.

Participants' L2 proficiency was assessed by two measures. First, a written form of pretest was given to participants to test their explicit knowledge of English tense and aspect. The test had 30 sentences with a blank for the participants to fill in with the proper tense of English verbs. The list of the verbs was given in an infinitival form with their dictionary definitions. Participants' mean score was 26.82 out of 30 (89.4%). Hence, they were considered to have a sufficient amount of explicit knowledge of English tense and aspect. (See Appendix C for a sample of the pretest.) They also rated their English proficiency in terms of reading, writing, speaking and listening on a Likert-scale between 1 (very bad) and 10 (very good). A summary of the result is given in Table 6.

Table 6. Summary of nonnative participants' background information

	Age of onset	Residence in English speaking countries (yrs.)	Self-rate	Pretest (30)
Mean	6.89	0.15	5.821	26.82
(range)	(2-9)	(0-3)	(3.5-7.8)	(24-30)
SD	1.73	0.56	1.163	2.03

All of the participants took part in the self-paced reading task and the acceptability judgment task.

3.1.2 Materials

The same set of materials as in Experiment 1 were used but in a different language. All sentences started with temporal adverbials that consisted of three words followed by *the* and an animate noun. The sixth word was always a semelfactive verb after which came locational adverbials. Below is an example of a control sentence and a semantically coerced sentence. As in Experiment 1, the contrast between the two conditions was made by different types of temporal adverbs, i.e. *at ten o'clock* and *all morning long*. A full list is presented in Appendix B.

> 3. a. At ten o'clock, the boy bumped into the cramped store wall.
>   [control]
>   b. All morning long, the boy bumped into the cramped store wall.
>   [coerced]

3.1.3 Procedure

The procedure was the same as in Experiment 1 except for the time between the self-paced reading task and the acceptability judgment task. In Experiment 2, the acceptability judgment task was conducted after two weeks the participants finished the self-paced reading task because it was considered long enough to minimize participants' noticing the similarity within the materials.

Table 7. Target regions for analysis

	Pre-critical	Critical word	Spillover1	Spillover2	...
Coerced/ Control	the	boy	bumped	into	the

3.1.4 Data analysis

Accuracy rates for comprehension questions were calculated for each participant. As all participants' accuracy rates were above 80% (mean: 93%; 84%-100%), no participant was excluded from analysis. The mean accuracy rate for the native participants was 95.3% (84%-100%) and the mean accuracy rate for the nonnative participants was 92.7% (84%-98.6%).

Reading times (RTs) above 3,000ms and below 200ms were considered as outliers and removed, which accounted for 3.14% of the whole data. Responses with a wrong answer for comprehension questions were also removed, which accounted for 8.75% of the whole data. As in Experiment 1, three regions from each sentence were selected as test regions (Table 6) i.e., i) critical word, ii) spillover1 and iii) spillover2. Then residual RTs for each region were calculated to control for word length effect. A generalized linear mixed effects model was used at each target region for residual RTs with Type (Coerced vs. Control) and Language group (Native vs. Nonnative) as fixed factors and subjects and items as random factors. The whole process was done using the lme4 library in the R program (version 3.4.0).

3.2 Result

3.2.1 Self-paced reading

In Table 7 are given mean RTs of native and nonnative participants at the three target regions for coerced and control sentences. According to the linear regression mixed effects model, the interaction of type and

Table 8. Mean RTs of native and nonnative participants for coerced and control sentences

Native speakers

	Critical word	Spillover1	Spillover2
Coerced	535.39 (338.71)	492.65 (273.11)	444.57 (240.85)
Control	519.12 (308.21)	492.93 (273.31)	414.42 (182.67)

Nonnative speakers

	Critical word	Spillover1	Spillover2
Coerced	745.60 (478.35)	592.60 (378.89)	485.97 (243.01)
Control	721.39 (437.29)	568.99 (374.84)	468.01 (229.84)

note: SD in parenthesis

Table 9. The main effect of Type at each region for residual RTs

		Estimate	*SE*	*df*	*t*	*p*
Native speakers	Critical word	-10.44	33.34	249.34	-0.31	0.75
	Spillover1	32.03	29.60	50.47	1.08	0.28
	Spillover2	-14.64	24.53	51.30	-0.59	0.55
Nonnative speakers	Critical word	4.53	44.09	41.28	0.10	0.91
	Spillover1	8.27	43.00	36.86	0.19	0.84
	Spillover2	-5.00	18.95	45.36	-0.26	0.79

note: * $p < .05$, ** $p < .01$, *** $p < .001$

language group (native vs. nonnative) was not significant at all three regions ($p > 0.05$). The effect of language group was significant at the critical word region ($p < 0.01$), which means that native speakers read the verbs faster than nonnative speakers both in the coerced and control sentences. An additional statistical analysis was conducted for the two groups separately, with Type as a fixed factor and items and subjects as random factors (Table 8). No significant difference in residual RTs between coerced and control sentences was observed in both groups.

3.2.2 Acceptability Judgment Task

The mean rate of acceptability was lower for coerced sentences com-

Table 10. Mean rates of acceptability for coerced and control sentences

	Native speakers		Nonnative speakers	
	Coerced	Control	Coerced	Control
mean	5.47 (1.57)	6.06 (1.05)	4.25 (1.60)	5.43 (1.25)

note: SD in parenthesis

pared to control sentences both in the native and the nonnative group (Table 10). The Wilcoxon Mann-Whitney test validated the significance of the differential rates in both groups (p=0.008 for the native group and p=0.000 for the nonnative group).

4. Discussion

This study examined the processing of aspectual coercion in Korean and English with the means of a self-paced reading task and a post acceptability judgment task. In the Korean experiments, coerced sentences did not yield any additional processing cost among Korean native participants. However, Korean participants rated coerced sentences significantly lower than control sentences in the acceptability judgment task. The same trend was found in the English experiments among both the English native speakers and Korean learners of English. While there was no significant difference in reading times between coerced sentences and control sentences in the self-paced reading task, both groups perceived coerced sentences more awkward and unnatural in the offline judgment task. The null result for English aspectual coercion in the self-paced reading task is incongruent with previous studies that supported Iterative Coercion approach, which argues that the reanalysis of verb meaning from punctual to iterative causes an additional reading time (Brennan & Pylkkänen, 2008; Piñango et al.,1999; Todorova et al., 2000). Instead, this study is in line with Pickering et al. (2006), which also failed to show any processing difficulty for aspectual coercion.

Pickering et al. (2006) interpret their result as indicating incomplete commitment of readers, which may also apply to this study. Frazier and Rayner (1990) introduces two contrasting hypotheses regarding semantic processing: the *Immediate complete interpretation hypothesis* and the *Immediate partial interpretation hypothesis*. The Immediate complete interpretation hypothesis posits readers' full commitment to meaning as they read sentences. For instance, readers immediately identify referents for referential phrases or a new discourse entity upon facing the relevant phrase. On the other hand, according to the Immediate partial interpretation hypothesis, readers delay some aspects of meaning unless this results in a failure in assigning semantic value to a word or a phrase or in a maintenance of multiple incompatible values for a word or a phrase. The partial or incomplete commitment is most likely to occur when two options overlap. When readers read a sentence "John hit the wall," they may assign an agent role to *John* but the value for [+/-intentional] remains undecided until additional information is provided. The results for aspectual coercion in Pickering et al. (2006) and this study are compatible with this account. The similar reading times for coerced sentences and control sentences indicate readers may have underspecified aspectual properties of expressions when they were reading for comprehension. Knowing that semelfactive verbs have two options of interpretation, i.e., instantaneous and iterative, they would leave it open which option to assign rather than interpreting the verbs as instantaneous by default.

Then why did other studies (Brennan & Pylkkänen, 2008; Piñango et al., 1999, 2006; Todorova et al., 2000) yield different results? As several researchers have pointed out, the secondary task participants were engaged in might be the reason (Brennan & Pylkkänen, 2008; Chan, 2013; Pickering et al., 2006). On the contrary to Pickering et al. (2006) and this study where participants answered simple comprehension ques-

tions after reading the materials, the tasks in the three studies had a high possibility to induce participants to focus on the plausibility of the materials. In Todorova et al. (2000) and Brennan and Pylkkänen (2008), participants were directly instructed to judge whether each sentence made sense. Todorova et al. (2000) employed a self-paced, makes-sense judgment task in which participants were to evaluate whether a text region "made sense" as they read sentences word by word at their own pace. Brennan and Pylkkänen (2008) asked participants to rate sentences on their acceptability immediately after reading each sentence. Finally, in Piñango et al. (1999, 2006), participants performed a lexical decision task while listening to sentences. Such additional tasks would have prompted participants to fully compute aspectual properties of the materials compared to when they were just given comprehension questions. This also explains why participants in the current study showed a strong preference for control sentences over coerced sentences in the following acceptability judgment. Although readers show a trend of incomplete commitment in online processing, their performance differs when they are encouraged to focus on the aspectual mismatch within a sufficient amount of time.

The self-paced reading task and the acceptability judgment task that were conducted with Korean materials suggest that Korean aspectual coercion is processed in a similar way as English aspectual coercion. As found in English experiments, Korean coerced sentences were not necessarily read slowly compared to control sentences in the self-paced reading task. Still, Korean participants rated the coerced sentences as less acceptable than control sentences. This incongruence between online and offline tasks again suggests the different processing mechanisms readers may employ in different types of tasks. In other words, the awkwardness of coerced sentences does not influence the reading behavior of Korean readers in online processing but it does in an offline task.

Another focus of this study was to investigate whether nonnative speakers of English can acquire semantic properties of English. Comparing their performance with that of native speakers, the two groups exhibited a similar pattern in both online and offline tasks on aspectual coercion except for the relatively slow reading speed of nonnative participants at the critical word region. This is not surprising when one considers the fact the nonnative participants in the study were those who achieved a high score (mean: 26.82/30; range: 24-30) in the pretest. This means that they have fairly good knowledge of English tense and are able to use it properly. There is compelling evidence that advanced learners can successfully process semantic features of their L2 (Gabriele, 2008; Kim, 2016; Ko, 2008; Oh, 2015). In Gabriele (2008), Japanese learners of English at advanced level could use morphosyntactic cues to determine whether a verb phrase could encode telicity. Oh (2015) examined the acquisition of English telicity by Korean learners by means of an acceptability judgment task. The advanced learner group could distinguish telic and atelic meanings of verbs while the intermediate group was subject to L1 transfer effects. Ko (2008) found that Korean advanced learners of English, but not beginning learners could compute subcategorization of English verbs even when they had different structures from learners' L1. Lastly, Kim (2016) also reported a target-like processing and production of English aspectual *–ing* by Korean advanced learners. The results in the current study also suggest the possibility of Korean learners' successful acquisition of English aspectual system, although another explanation that their nativelike performance was possible because of a comparable phenomenon in their L1 cannot be ruled out.

5. Conclusion

The current study investigated how aspectual coercion is processed in Korean. Then a successive experiment was conducted in English in replication of Brennan & Pylkkänen (2008). The two experiments found null results for aspectual coercion in the online task but a significant difference in the offline task, indicating a discontinuity of online and offline processing of aspectual mismatch. However, a direct comparison between Korean and English aspectual coercion may not be plausible for several reasons. First, the sentence structures of Korean and English materials were different owing to the different word order of the two languages. Second, the number of fillers (48 sentences in Korean tasks and 96 sentences in English tasks) and the position of the semelfactive verbs (region 5 in Korean and region 6 in English) in the Korean and English tasks were different. These factors could have influenced the results of this study. Moreover, future studies with other languages are desirable in order to draw any conclusion on L1 transfer effects in processing aspectual coercion, since the current study only used Korean materials.

References

Brennan, J., & Pylkkänen, L. (2008). Processing events: Behavioral and Neuromagnetic Correlates of Aspectual Coercion. *Brain and language, 106(2),* 132-143.

Chan, H. L. (2013). Aspectual Coercion in Non-native Speakers of English. In *Proceedings of the Annual Meeting of the Cognitive Science Society, 35.*

Frazier, R. & Rayner, K. (1990). Taking on Semantic Commitments: Processing Multiple Meanings vs. Multiple Senses. *Journal of Memory and*

Language, 29(2), 181-200.

Gabriele, A. (2008). Calculating Telicity in Native and Non-native English. In R. Slabakova et al. (Eds.), *Proceedings of the 9ᵗʰ Generative Approaches to Second Language Acquisition Conference* (pp. 37-46), Somerville, MA: Cascadilla Proceedings Project.

Ju, M. (2014). Semelfactive Verbs in English and Korean. *Studies in Modern Grammar, 2014(81),* 113-137.

Kim, H. J. (2016). Acquiring the Semantics of Aspectual *-ing* in L2: Evidence from Production and

Processing. In D. Stringer et al. (Eds.), *Proceedings of the 13th Generative Approaches to Second Language Acquisition Conference* (GASLA 2015) (pp. 72-79). Somerville, MA: Cascadilla Proceedings Project.

Ko, H. (2008). Different sentence processing by native English speakers and Korean bilinguals. *English Teaching, 63*(1), 71-99.

Moens, M., & Steedman, M. (1988). Temporal Ontology and Temporal Reference. *Computational linguistics, 14(2),* 15-28.

Oh, E. J. (2015). The Acquisition and Interpretation of English Telicity by Korean Speakers. *English Language and Linguistics, 21*, 79-101.

Park, M., & Na, Y., (2012). An ERP Study of Semantic Coercion: the Brain Responses to the Semantic Coercion Construction by Korean Learners of English. *Studies in Generative Grammar, 22 (1)*, 157-183.

Pickering, M. J., McElree, B., Frisson, S., Chen, L., & Traxler, M. J. (2006). Underspecification and Aspectual Coercion. *Discourse Processes, 42(2),* 131-155.

Piñango, M. M., Winnick, A., Ullah, R., & Zurif, E. (2006). Time-course of Semantic Composition: The Case of Aspectual Coercion. *Journal of Psycholinguistic Research, 35(3),* 233-244.

Piñango, M. M., Zurif, E., & Jackendoff, R. (1999). Real-Time Processing Implications of Enriched Composition at the Syntax-Semantics Interface, *Journal of Psycholinguistic Research, 28(4),* 395-414.

Rothstein, S. (2004). The syntactic forms of predication. In *Predicates and*

Their Subjects (pp. 100-129). Dordrecht, Zuid-Holland: Springer.

Todorova, M., Straub, K., Badecker, W., & Frank, R. (2000). Aspectual coercion and the online computation of sentential aspect. In *Proceedings of the Cognitive Science Society, 22.*

Traxler, M. J., Pickering, M. J., & McElree, B. (2002). Coercion in sentence processing: Evidence from eye-movements and self-paced reading. *Journal of Memory and Language, 47(4),* 530-547.

Van Valin Jr., R.D. (2005). *Exploring the Syntax-Semantics Interface.* Cambridge: Cambridge University Press.

Appendix A. Korean sentences used for the self-paced reading task and the acceptability task (a: control sentences, b: coerced sentences)

1a. 오래된 담벼락에 10시 정각에 쾅 부딪친 소년이 많이 다쳤다.

1b. 오래된 담벼락에 아침 내내 쾅 부딪친 소년이 많이 다쳤다.

2a. 어두운 계단에서 5분 동안 눈을 깜박거린 소방관은 직장으로 향했다.

2b. 어두운 계단에서 오전 7시에 눈을 깜박거린 소방관은 직장으로 향했다.

3a. 조용한 사무실에서 아침 내내 트림을 한 관리인은 항상 좋았다.

3b. 조용한 사무실에서 조금 전에 트림을 한 관리인은 항상 좋았다.

4a. 어수선한 연구실에서 10분 동안 전화를 건 교수는 수업하러 갔다.

4b. 어수선한 연구실에서 1시간 전에 전화를 건 교수는 수업하러 갔다.

5a. 교실 앞에서 하루 종일 기침을 한 교사는 감기에 걸렸다.

5b. 교실 앞에서 10분 후에 기침을 한 교사는 감기에 걸렸다.

6a. 손님들 앞에서 저녁 내내 인사를 한 집주인은 지쳐 잠들었다.

6b. 손님들 앞에서 저녁 9시에 인사를 한 집주인은 지쳐 잠들었다.

7a. 거대한 수영장에서 저녁 내내 다이빙을 한 개는 매우 건강했다.

7b. 거대한 수영장에서 12시 정각에 다이빙을 한 개는 매우 건강했다.

8a. 호수 옆에서 40분 동안 총을 쏜 탐험가는 매우 용감했다.

8b. 호수 옆에서 40분 전에 총을 쏜 탐험가는 매우 용감했다.

9a. 창문 밖을 20분 동안 흘끗 본 아버지는 아들을 돌아보았다.

9b. 창문 밖을 1시 정각에 흘끗 본 아버지는 아들을 돌아보았다.

10a. 시끄러운 놀이터에서 15분 동안 점프를 한 아이는 꽤나 들떠있었다.

10b. 시끄러운 놀이터에서 오후 7시에 점프를 한 아이는 꽤나 들떠있었다.

11a. 트램플린 위에서 30분 동안 뛰어오른 곡예사는 실력이 좋았다.

11b. 트램플린 위에서 2시 정각에 뛰어오른 곡예사는 실력이 좋았다.

12a. 교실 뒤에서 하루 종일 재채기를 한 학생은 공부를 시작했다.

12b. 교실 뒤에서 20분 전에 재채기를 한 학생은 공부를 시작했다.

13a. 좁은 스튜디오에서 아침 내내 코를 훌쩍인 디자이너는 상을 받았다.

13b. 좁은 스튜디오에서 12시 정각 코를 훌쩍인 디자이너는 상을 받았다.

14a. 무성한 초원에서 밤 동안 힝힝거린 코끼리는 병에 걸렸다.

14b. 무성한 초원에서 5분 전에 힝힝거린 코끼리는 병에 걸렸다.

15a. 비좁은 거실에서 1시간 동안 찍찍거린 쥐는 먹이를 찾았다.

15b. 비좁은 거실에서 4시간 전에 찍찍거린 쥐는 먹이를 찾았다.

16a. 혼잡한 아파트에서 밤 동안 발을 헛디딘 작가는 소설을 썼다.

16b. 혼잡한 아파트에서 12시 정각 발을 헛디딘 작가는 소설을 썼다.

17a. 강둑 위에서 2시간 동안 침을 쏜 벌은 독성이 강했다.

17b. 강둑 위에서 2시간 전에 침을 쏜 벌은 독성이 강했다.

18a. 강의실 뒤에서 30분 동안 킥킥거린 학생은 장난을 좋아했다.

18b. 강의실 뒤에서 30분 전에 킥킥거린 학생은 장난을 좋아했다.

19a. 눈덮인 스키장에서 오후 내내 넘어진 소녀는 무릎이 까졌다.

19b. 눈덮인 스키장에서 1시간 전에 넘어진 소녀는 무릎이 까졌다.

20a. 관중들 앞에서 오후 내내 윙크를 한 정치가는 인기가 많았다.

20b. 관중들 앞에서 연설 끝에 윙크를 한 정치가는 인기가 많았다.

21a. 얕은 연못을 2시간 동안 뛰어넘은 개구리는 색깔이 예뻤다.

21b. 얕은 연못을 10초 전에 뛰어넘은 개구리는 색깔이 예뻤다.

22a. 골대를 향해서 50분 동안 공을 찬 축구선수는 승리를 확신했다.

22b. 골대를 향해서 5분 전에 공을 찬 축구선수는 승리를 확신했다.

23a. 병원 화장실에서 20분 동안 문을 두드린 환자는 중병에 걸렸다.

23b. 병원 화장실에서 조금 전에 문을 두드린 환자는 중병에 걸렸다.

24a. 자동차 뒷좌석에서 10분 동안 딸꾹질을 한 아기는 배가 고팠다.

24b. 자동차 뒷좌석에서 10분 전에 딸꾹질을 한 아기는 배가 고팠다.

Appendix B. English sentences used for the self-paced reading task and the acceptability task (a: control sentences, b: coerced sentences)

1a. At ten o'clock, the boy bumped into the cramped store wall.
1b. All morning long, the boy bumped into the cramped store wall.
2a. At one o'clock, the firefighter panicked in the dark stairwell.
2b. For five minutes, the firefighter panicked in the dark stairwell.
3a. A minute ago, the officer vomited on the empty sidewalk.
3b. All morning long, the officer vomited on the empty sidewalk.
4a. After an hour, the professor called from the abandoned office.
4b. For ten minutes, the professor called from the abandoned office.
5a. After several minutes, the instructor coughed in front of the class.
5b. All day long, the instructor coughed in front of the class.
6a. At nine o'clock, the host bowed to the guests.
6b. All night long, the host bowed to the guests.
7a. At twelve o'clock, the dog dived in the Olympic-sized pool.
7b. All afternoon long, the dog dived in the Olympic-sized pool.
8a. After a minute, the explorer shot the gun beside the big blue lake.
8b. For several seconds, the explorer shot the gun beside the big blue lake.
9a. At one o'clock, the father glanced out of the small window.
9b. For twenty minutes, the father glanced out of the small window.
10a. At seven o'clock, the kid jumped in the noisy playground.
10b. For thirty minutes, the kid jumped in the noisy playground.
11a. For fifteen minutes, the acrobat hopped on the bouncy trampoline.
11b. Throughout the day, the acrobat hopped on the bouncy trampoline.
12a. Right at two o'clock, the student sneezed in the back of the classroom.
12b. During the morning, the student sneezed in the back of the classroom.
13a. After twenty minutes, the designer sniffed in the newly painted studio.
13b. All night long, the designer sniffed in the newly painted studio.
14a. At twelve o'clock, the elephant snorted in the grassy savannah.
14b. For an hour, the elephant snorted in the grassy savannah.
15a. After five minutes, the mouse squeaked in the cramped living room.
15b. For four hours, the mouse squeaked in the cramped living room.
16a. After four hours, the writer stumbled in the crowded apartment.
16b. During the night, the writer stumbled in the crowded apartment.
17a. At twelve o'clock, the bee stung passersby over the muddy riverbank.
17b. For two hours, the bee stung passersby over the muddy riverbank.

18a. After thirty minutes, the student giggled in the classroom.

18b. For thirty minutes, the student giggled in the classroom.

19a. After an hour, the girl fell in the snowy field.

19b. Throughout the afternoon, the girl fell in the snowy field.

20a. At the end, the politician winked in front of the audience.

20b. All afternoon long, the politician winked in front of the audience.

21a. After ten seconds, the frog leaped across the shallow pond.

21b. For two hours, the frog leaped across the shallow pond.

22a. After five minutes, the player kicked the ball toward the goalie.

22b. For fifty minutes, the player kicked the ball toward the goalie.

23a. After several minutes, the patient knocked on the door.

23b. For twenty minutes, the patient knocked on the door.

24a. After ten minutes, the toddler burped in the back seat.

24b. For ten minutes, the toddler burped in the back seat.

Appendix C. Pretest for Korean participants

This is simply for a research purpose. This has NO influence on your grade in any way.

Name in Korean:
Student number:
Birth year:
Email address (please write clearly):

There are 30 verbs listed below with their dictionary definitions. Using the proper tense of each verb, fill in the blanks accordingly.

CRASH   If something crashes somewhere, it hits something else violently.

GROW   When you grow plants, you put seeds into the ground and take care of them as they develop.

FLY   When something flies, it travels through the air.

TAKE   If you take something you remove it from its place.

THINK   If you think that something is true, you believe it to be true, but you are not sure.

WALK   When you walk, you move along by putting one foot in front of the other on the ground.

SHOP   When you shop, you go to shops and buy things.

DRINK   When you drink a liquid, you take it into your mouth and swallow it.

PLAY   When children, animals, or perhaps adults play, they spend time doing enjoyable things, such as using toys and taking part in games.

WAIT   When you wait for something or someone, you spend some time doing very little, because you cannot act until that thing happens or that person arrives.

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

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

BRUSH   If you brush something or brush something such as dirt off it, you clean it or tidy it using a brush.

EAT   When you eat something, you put it into your mouth, chew it, and swallow

it.

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

LIVE   If someone lives in a particular place or with a particular person, their
              home is in that place or with that person.

SEND   When you send someone something, you arrange for it to be taken and de-
              livered to them, for example by post.

PLANT   When you plant a seed, plant, or young tree, you put it into the ground so
              that it will grow there.

WASH   If you wash something, you clean it using water and usually a substance
              such as soap or detergent.

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

CROSS   If you cross something such as a room, a road, or an area of land or water,
              you move or travel to the other side of it.

ARRIVE   When a person or vehicle arrives at a place, they come to it at the end of a
              journey.

SPEND   If you spend a period of time in a place, you stay there for a period of time.

CREATE   When someone creates a new product or process, they invent it or design
              it.

CALCULATE   If you calculate a number or amount, you discover it from information that
              you already have, by using arithmetic, mathematics, or a special machine.

BORROW   If you borrow something that belongs to someone else, you take it or use it
              for a period of time, usually with their permission.

SLEEP   Sleep is the natural state of rest in which your eyes are closed, your body
              is inactive, and your mind does not think.

BOTHER   If something bothers you, or if you bother about it, it worries, annoys, or
              upsets you.

TEACH   If you teach someone something, you give them instructions so that they
              know about it or how to do it.

FILL IN THE BLANK

1. Adam's eyes were closed, so Jill (   ) he was asleep. But he wasn't!

2. Should I tell my mother that I (   ) her car into a lamp post last night? It's going to be expensive to repair.

3. Now that my uncle (   ) his own vegetables for the last 5 years, he refuses to buy them from supermarkets.

4. Dad, can I (   ) some money out of your wallet, in case the bank is closed?

5. Jane always (   ) to work, even in the winter.

6. Don't be afraid of airplanes. Remember that they (   ) safely for many kilometers since the Wright brothers invented the first one in 1903.

7. I have been (   ) new recipes for years now. People seem to be enjoying new styles of home cooking methods.

8. Since I (   ) from college, I have been thinking about going abroad to study more.

9. Hey, would it be possible to (   ) some money from you? I'm short on this month's rent.

10. Initially, I wanted to complete my homework but my little brother (   ) me all morning. I could not focus on my homework.

11. I (   ) in Korea since 2009. My favorite place in Korea is Kyeongbokgung.

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

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

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

15. I (   ) the dishes yesterday, but have not had the time yet to do it today.

16. Well, but my friend Lucy called when I (   ) at the station.

17. Since the birth of my daughter last year, I (   ) for baby things in so many department stores.

18. Last summer, I (   ) three weeks in Bangkok and we went back to Australia.

19. Initially, as a mathematician, I (   ) the ratio between two subject groups surveyed.

20. Since the beginning of this semester, Lily (   ) through almost every class. Her friends were always busy waking her up!

21. This is getting out of control! I (   ) in the line for over 3 hours to get on this roller coaster!

22. For decades, Rome has been considered one of the most popular cities to visit in Europe. When I was there in 2008, I remember (   ) so many cups of Italian espresso.

23. For a year now, Bill (   ) computer games every night after work. His wife is unhappy about it.

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

25. Since Thanksgiving, Julie (   ) many roses in her garden. They are beautiful to watch.

26. Remember to always (   ) your teeth after a meal or you'll end up with cavities.

27. 10 years ago I only (   ) vegetable. I was a vegetarian. Now I'm not.

28. Nowadays, I see so many people (   ) the street with their eyes on smartphones. Some countries have started prohibiting this as a law.

29. Everyone knows that last year's exam was very difficult. But I (   ) from a professor in his class that this year's will be much easier.

30. It was such an honor to be able to speak directly to the president. For two hours, he (   ) to our opinions very attentively and responded.

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ABSTRACT

On-line Processing of Aspectual Coercion by Korean Learners of English

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Cho, Jeonghwa. 2017. On-line Processing of Aspectual Coercion by Korean Learners of English. It has been argued that the combination of semelfactive verbs and durational modifiers such as in *the baby hiccupped for an hour* causes an aspectual mismatch and therefore an additional processing time is necessary to reanalyze the event as an iterative one (Brennan & Pylkkänen, 2008; Piñango et al., 1999, 2006; Todorova et al., 2000). This process of reinterpretation is called an aspectual coercion. Experiment 1 attempted to investigate how aspectually coerced sentences are processed in Korean with online and offline measures. Twenty five Korean participants did not show any processing difficulties in the self-paced reading task but gave lower acceptability ratings for the coerced conditions in the acceptability judgment task. Experiment 2 investigated the same structure in English with Korean learners of English and English native speakers. The same trend as in the Korean experiments was observed in both groups. This study proposes that readers do not fully engage in semantic components in online processing of aspectual coercion in both Korean and English.

Key Words　　aspect, coercion, online processing, language learning