

Morpho-syntactic processing of Korean case-marking and case drop*

Eun Seon Chung · Eun-Kyung Lee
(University of Seoul · Yonsei University)

Chung, Eun Seon and Eun-Kyung Lee. 2017. Morpho-syntactic processing of Korean case-marking and case drop. *Linguistic Research* 34(2), 191-204. This study examines whether the mental representation of sentences contains a morphological representation of case marking, using a priming technique. Thirty-six native Korean speakers listened to and repeated spoken prime sentences and described visually presented target pictures. The prime sentences were manipulated for the presence of an accusative case-marker *-lul/-ul*. To investigate whether the previously reported animacy effects on case drop generalizes to a different task, animacy of the direct object was also manipulated. The results showed that there was a stronger bias to produce the accusative case-marker when the direct object was animate than when the direct object was inanimate, replicating the previously reported animacy effects on accusative case drop (Lee 2006a, 2006b; Chung 2013) in a syntactic priming task. Furthermore, case marking on inanimate direct objects was influenced by whether or not the accusative case marker was produced earlier in the prime, providing evidence for the presence of an abstract representation of case marking. (University of Seoul · Yonsei University)

Keywords structural priming, Korean case drop, case-marking, morphological representation, animacy effects

1. Introduction

Morphological processing in psycholinguistic research has primarily centered on the question of how morphologically complex words are represented in the mental lexicon and whether abstract morphemes are represented as distinct elements in lexical processing. Much research conducted in this area has focused on the debate between

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the Decomposition model (Marslen-Wilson 2007; Pinker and Ullman 2002), in which an inflected word is processed by decomposing the word into its stem and affix, and the Full-listing model (McClelland and Patterson 2002) in which inflected words are processed as an unanalyzed whole. Using a priming paradigm, numerous studies have investigated the status of regular and irregular inflectional nominal and verbal morphology in English (Fowler, Napps, and Feldman 1985; Marslen-Wilson *et al.* 1994; among others) as well as in other languages such as Italian (Albright 2002), Portuguese (Verissimo and Clahsen 2009), and German (Sonnenstuhl, Eisenbeiss, and Clahsen 1999) and have found that while irregular forms are generally represented and processed as an unanalyzed whole, decomposition of regular forms is an early process that is “one of the highest priorities” (Marslen-Wilson 2007; 189) of the system. In addition to such findings, questions about autonomous morphological representations have also gained interest. While there is compelling evidence for autonomous syntactic representations that do not depend on the repetition of function words (Bock 1989), similarity of or changes in event roles (Bock and Loebell 1990), prosody (Bock and Loebell 1990), or basic semantic features of words (Bock *et al.* 1992), the findings have been mixed as to whether morphological markers are planned separately from syntactic representations. Santesteban, Pickering, and Branigan (2015) found that the magnitude of priming effects was not modulated by whether or not the arguments of prime sentences were case-marked in Basque. While this result suggests that case markers were processed separately from syntactic processing, Yamashita, Chang, and Hirose (2005) found a close association between case-markers and syntactic structure in Japanese: Priming effects were stronger as a function of case marking in the prime sentence. These conflicting findings make it unclear whether there is a separate representation of morphological markers. The present study thus examines this question more directly by testing whether a morphological marker itself can be primed. By investigating priming effects in the choice between case marking and case drop in Korean, we attempt to provide evidence for an abstract representation of case-markers.

Previous studies on morphological processing of Korean case-markers have mostly examined processing at the lexical level: Ahn and colleagues (Ahn, An, and Choi 2011; Ahn *et al.* 2014) investigated how native and non-native speakers of Korean represent the nominal case-marker *-ka* in Korean using a priming paradigm combined with a lexical decision task. Native Korean speakers showed either no or just partial

priming effects of the nominal case-marker, suggesting that the Korean nominal marker is not represented separately from the stem during lexical processing. However, given that the use of nominal case markers is tied to other syntactic elements such as the matrix verb and subject/object of a sentence, it is unclear whether the results of the earlier study using isolated words reflect real-world language processing. Therefore, this study attempts to better understand how nominal case markers are represented by examining the phenomenon of Korean case drop in sentence context.

In Korean, the nominative case (*-ka/-i*) on subjects and accusative case (*-lul/-ul*) on objects can be dropped without resulting in ungrammaticality. This optionality of case-markers allows us to manipulate the presence or absence of a case marker in a prime sentence and to test whether the choice between case marking and case drop in the prime sentence generalizes to a target sentence. Korean case drop occurs primarily in informal casual speech and is seemingly optional, but native speakers generally agree on the contexts of suppliance and ellipsis and are aware of the subtle differences in pragmatics and information structure. Chung (2013) examined priming of Korean case markers using a written elicited production task in which participants had to complete a sentence by choosing between a case-marked noun phrase and a bare (i.e., case-dropped) noun phrase. The finding showed that the status (case-marked vs. bare) of the nominal case marker in the preceding utterance affected the participants' choice between case-marking and case drop for a given sentence. Bare noun phrases were chosen more frequently when the previous utterance contained a bare noun phrase than when it contained a case-marked noun phrase. However, in Chung (2013)'s study, priming of case markers was not tested for the production of a complete sentence. The results were also confounded by many other factors such as animacy, definiteness, focus, and verb type.

The current study thus investigates whether there is an abstract representation of Korean nominal case-markers independent of syntactic representation using a cross-modal priming technique, which is thought to tap directly into the level of central representation that is relatively independent of low-level form properties (Marslen-Wilson 2007). We had participants hear auditory (rather than written) primes and describe visually presented target pictures in a complete sentence. Given that the phenomenon of case drop occurs primarily in informal casual speech, informal style sentences were used for both the prime and target sentences. The prime sentences

were manipulated for the presence or absence of the accusative case-marker *-lul/-ul* rather than the nominative case-marker *-ka/-i* for two reasons. First, there has been a debate on the syntactic and topical status of bare subjects in the literature (Kwon and Zribi-Hertz 2008, Ahn and Cho 2007; Kuno 1972; Kanno 1996). Second, objects are more likely to undergo case drop than subjects (Kim and Kwon 2004) and thus, bare objects are deemed more felicitous than bare subjects in general (Chung 2013). Some researchers indeed argue that subject noun phrases cannot undergo case drop (Kanno 1996) and offer a different structural analysis for bare subjects and bare objects (Ahn and Cho 2007).

Another goal of the present study is to investigate whether the previously reported animacy effects on case drop (Lee 2006a, 2006b; Chung 2013) can generalize to an online production task. Previous research has shown that case drop is affected by various factors such as formality of the extralinguistic context, familiarity among interlocutors (Ko 2000; Lee and Thompson 1989), idiomatic, figurative, or metaphorical meanings (Lee 2006), discourse/semantic factors such as specificity and definiteness (Kim 1993), animacy (Lee 2006a; Chung 2013), and information structure status of nominal (Kwon and Zribi-Hertz 2008; Ko 2000), morpho-phonological or syntactical weight of the noun phrase (Mori and Givon 1987), and length of NPs (Kim 2008; Ono *et al.* 2000). Among these many factors, the animacy of a direct object was found to have a robust effect on accusative case drop. According to Aissen's (2003) animacy hierarchy in Optimality Theory, a prototypical inanimate object is predicted to be more prone to drop case than that which is animate or human, which many studies have confirmed. Native Korean speakers judged case drop as being felicitous/acceptable more frequently when the noun phrase was inanimate than when it is animate (Lee 2006a, 2006b; Chung 2013), and such finding has been reported and replicated by numerous corpus or untimed offline experimental studies in which written responses were elicited in paper-and-pencil tests or online surveys (Lee 2006a, 2006b; Lee 2010). In this study, we test whether such animacy effects can also be found in an online production task by manipulating animacy of object nouns while controlling for other factors such as the length and definiteness of a noun phrase, which might potentially affect the choice between case marking and case drop.

If the mental representation of sentences contains an abstract representation of the accusative case-marker, case drop should be primed. That is, participants would drop the accusative case marker more frequently in the target sentence when the prime

sentence has a bare noun phrase in object position than when it has a case-marked object noun phrase. If the previously found animacy effect on case drop generalizes to an online production task, the choice between case marking and case drop would be modulated by the animacy of objects: Participants would be more likely to produce the accusative case marker after animate objects than after inanimate objects (Lee 2006a, 2006b; Chung 2013).

2. Method

2.1 Participants

Thirty-six adult native speakers of Korean participated in the study. All participants were undergraduate students at a university in Seoul whose length of stay in a foreign country before the age of 15 did not exceed 6 months.

2.2 Materials

The primary materials for the experiment consisted of 70 spoken sentences and 50 pictures (simple pictures of objects and locations with verbs given in the written form). There were 20 priming sentences, each consisting of a subject noun phrase, a prepositional phrase (i.e., location), a transitive verb phrase, and a direct-object noun phrase. The presence or absence of the case-marker was manipulated in these priming sentences: half of them contained the accusative case-marker *-ul/-lul* on the object, and the other half were bare objects. Each of these sentences was followed by one of 20 experimental pictures, all of which depicted a subject, a direct object, and a location/event in simple clipart pictures as well as a transitive verb in the written form.

To examine animacy effects on case drop, half of the direct objects in the experimental materials were inanimate and the other half were animate. The subject of the sentence was always animate, referring to one of the main characters (Minsu or Mina). The length and definiteness of the critical noun phrases were controlled. Given the nature of the task in which isolated sentences are presented out of context, object noun phrases were always indefinite, and all target object NPs were two syllables in length.

Another set of 30 pictures and 30 sentences with intransitive verbs and no objects served as fillers. 20 spoken sentences that were either correct or incorrect recurrence of the filler items served as foil sentences that comprised the recognition (memory) task. To distract the participants from the purpose of the study, we had them engage in a recognition task (yes/no) for a selected number of items while listening to and repeating spoken sentences and describing visually presented pictures. The recognition task was a cover memory test that required the participants to detect recurrences of sentences. There was a total of 120 items including the recurring materials. Each trial consisted of two pictures and three sentences which were presented in the order shown in Table 1. Two experimental lists were created, and participants were randomly assigned to one of the lists.

2.3 Procedure

The experiment was conducted in a quiet room with a laptop and a headset. At the beginning of the experiment, the experimenter explained to the participant that he/she would listen to and talk about what had previously happened to two characters, Minsu and Mina, who were the main subjects of all sentences and pictures. Participants were instructed to repeat sentences that they have heard out loud and to press the space bar to advance to the next item. Whenever they saw the words "Yes or NO?" on the computer screen, they had to press "Y" or "N" to indicate whether the sentence that they have just heard was a repetition of a previously encountered item or not, instead of repeating it. The next item appeared upon response or after five seconds if no action was taken. For picture items, participants had to describe the picture in natural informal speech as if recounting a past event to a close friend. After describing the picture, they had to press the space bar to move onto the next item. Six practice trials were given at the beginning of the experiment, and the entire experiment took about 20 minutes to complete. All stimuli were presented using E-prime software version 2.0 (Psychology Software Tools, Inc., Pittsburgh, PA; www.pstnet.com). Participants' repetition of sentences, descriptions of pictures, and their responses to the recognition task were all recorded for analysis.

Table 1. A sample trial procedure

1	Filler Picture  속삭이다 “민수가 기내에서 승무원에게 속삭였어.” (<i>describe picture</i>) Minsu-ka ki-nay-eyse sungmuwen-eykey soksak-yess-e Minsu-NOM plane-inside-LOC flight.attendant-DAT whisper-PST-DECL "Minsu whispered to the flight attendant in the plane"
2	Filler Sentence “민수가 광화문에서 형사와 마주쳤어.” (<i>listen</i>) Minsu-ka Kwanghwamun-eyse hyengsa-wa macuchye-sse. Minsu-NOM Kwanghwamun-LOC detective-COM run.into-PST-DECL "Minsu ran into the detective at Kwanghwamun." (<i>repeat sentence</i>)
3	PRIME Sentence “민수가 휴지통에 종이를/종아-ㄴ 버렸어.” (<i>listen</i>) Minsu-ka hyucithong-ey cong-i-lul/congi-ㄴ pelyess-e. Minsu-NOM waste.basket-ALL paper-ACC/paper-ㄴ throw.away-PST-DECL. "Minsu threw away the paper into the waste basket." (<i>repeat sentence</i>)
4	TARGET Picture  붙이다 “민아가 봉투에 우표를/우표-ㄴ 붙였어.” (<i>describe picture</i>) Mina-ka pongthu-ey wupho-lul/wupho-ㄴ puthey-ss-e. Mina-NOM envelope-ALL stamp-ACC/stamp-ㄴ attach-PST-DECL. "Mina glued the stamp onto the envelope."
5	Foil Sentence “민수가 찜질방에서 돌아다녔어” (<i>listen and respond YES or NO</i>) Minsu-ka ccimcilpang-eyse tolatanyu-ss-e. Minsu-NOM Korean.dry.sauna-LOC wander.around-PST-DECL. "Mintu wandered around the Korean dry sauna"

3. Results

On 3.75% of the data, participants' responses were removed from analysis due to technical difficulties in recording or because of inept responses that were unintelligible or missing altogether. For the remaining data, the responses were coded as '1' when the object noun phrase was accompanied by a case marker and '0' when the noun phrase was bare. The binomial data were analyzed using mixed effects logistic regression with prime type (case marking vs. case drop), animacy (animate vs. inanimate), and their interaction as fixed effects. The model also included random intercepts for participants and items. None of the random slopes improved the fit of the model. Figure 1 displays the proportion of case marking as a function of prime type and animacy.

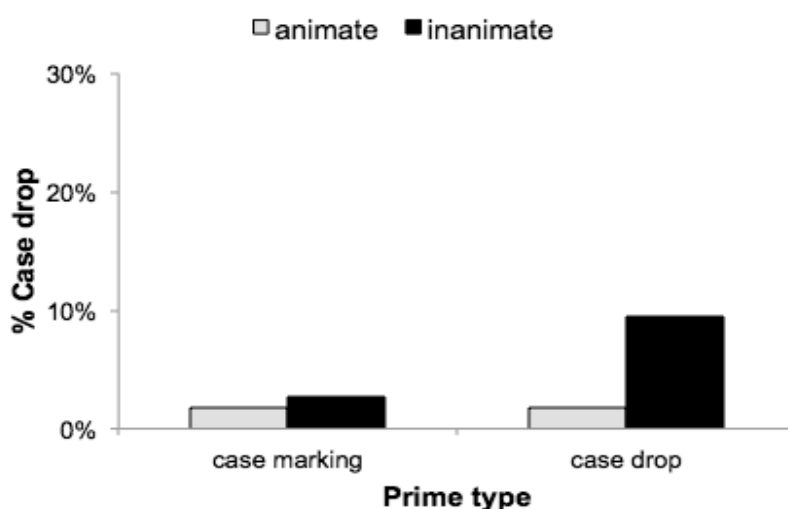


Figure 1. Mean percentage of case drop as a function of prime type and animacy

As illustrated in Figure 1, participants were more likely to drop the accusative case marker when the direct object was inanimate (6.1%) than when it was animate (1.8%) ($\beta=-4.3$, $SE=1.8$, $Z=-2.4$, $p<.05$), consistent with previous findings (Lee H 2006a, 2006b; Chung 2013). There was no main effect of prime type ($\beta=1.3$, $SE=1.0$, $Z=1.3$, $p>.1$). However, the interaction between prime type and animacy was significant ($\beta=4.9$, $SE=2.4$, $Z=2.0$, $p<.05$), indicating that the effect of prime type

varied between the animate and inanimate conditions. When the direct object was inanimate, participants' choice between case marking and case drop in the target description was significantly modulated by whether the prime sentence had a bare or case-marked noun phrase ($\beta=3.6$, $SE=1.3$, $Z=2.8$, $p<.01$): Case drop was more frequent when the accusative case marker was omitted in the prime sentence (9.4%) than when it was not (2.8%). When the direct object was animate, there was no effect of prime type on participants' choice between case marking and case drop in a later production, due presumably to a strong bias for case marking on animate objects ($p>.1$). Such strong bias also surfaced in speakers' repetition of prime sentences. Participants were asked to repeat the prime sentences verbatim out loud, and although most repetitions (95%) were accurate, there were incorrect repetitions (5%) in which speakers provided case-marked objects despite having just listened to prime sentences with bare objects. None of the errors were in the other direction; that is, none of the speakers erroneously dropped case when the object in the prime sentence was case-marked. Out of 39 inaccurate repetitions of prime sentences, 28 (72%) were with human objects while 11 (18%) were with inanimate objects. The repetition errors revealed speakers' tendency to avoid case drop with human objects, which is consistent with the animacy effects found in their responses to the critical items.

4. Discussion

The present study used a syntactic priming paradigm to investigate (1) whether the mental representation of sentences contains an abstract representation of case marking, and (2) whether animacy effects on case drop that were observed in untimed offline experimental studies are generalizable to an online production task. We found a significant interaction between animacy and prime type as well as a main effect of animacy. Participants' choice between case marking and case drop in target sentences was modulated by whether prime sentences had a case-marked noun phrase or not only when the object noun phrase was inanimate. For the sentences with animate objects, there was a strong bias towards case marking, which may have masked priming effects. Although the effect of prime type was limited to inanimate objects, the presence of a priming effect provides evidence for the presence of an abstract representation of the accusative case-marker *-ul/-lul* in Korean.

This finding has implications for processes involved in language production. Models of language production propose that stages of speech production occur incrementally (Bock and Levelt 1994): A conceptual representation (i.e., message) is first chosen and converted into a linguistic representation via grammatical encoding that selects lexical items and syntactic structures. This is then followed by morphological encoding (in which arguments in the sentence receive case-marking), and subsequent phonological processing results in the articulated utterance itself. In line with such serial processing accounts of speech production, the present results that point to an abstract morphological representation for case-marking suggest that functional morphology may be specified during an independent stage of processing. Furthermore, the finding that priming effects of case markers varied by an object noun phrase' animacy suggests that there may be a certain degree of interactivity between the lexical and morphological levels: Semantic features of the noun phrase (i.e., animacy) interact with morphological encoding of case markers.

We also replicated the previously reported animacy effects on Korean case drop (Lee 2006a, 2006b; Chung 2013) in an online processing task. Moreover, the morphological reconstruction of the accusative case-marker in erroneous repetition of the prime sentences suggests that integration of semantic features of the noun phrase, which is often known to be a later process that follows morphological parsing (Meunier and Longtin 2007; Beyersmann *et al.* 2014), can override the initial morpho-syntactic construction and lead to reconstruction of case markers in native processing of Korean case drop. That is, integration of semantic information in the later stages of morphological processing can possibly lead one to construct and produce a morphological marker that is absent in the original sentence. As such, the present results highlight the role played by animacy and allude to the significant impact of semantic integration in native processing of Korean case drop.

In the current study, participants were strongly biased to produce the accusative case marker for both animate and inanimate objects. Such a strong bias may have been due to the nature of the task we used. On each target trial, participants had to describe three pictures, each illustrating one of the components of a target sentence (e.g., subject NP, prepositional/adverbial phrase, object NP), sequentially to construct a sentence. This nature of the task may have led participants to plan names for these pictures one at a time with no prior apprehension of an event. Previous studies have shown that speakers are more likely to produce optional function words such as the

English complementizer *that* (Ferreira and Dell 2000; Jaeger 2010; Jaeger and Wasow 2006) when upcoming material is delayed for production, and in a similar vein, participants may have preferred to produce case-markers to buy more time for planning the next component. Moreover, the subject noun phrase in the stimuli was always accompanied by a case-marker, which might have induced a more formal register in which case-markers are considered obligatory. Despite an overall bias towards case-marking, our findings show that the choice between case marking and case drop is primeable, providing evidence that the mental representation of sentences contains an abstract representation of case marking.

The current results also have implications for language learning and educational practices. The finding that there was a priming effect in native processing of the accusative case-marker suggests that a complex phenomenon like Korean case drop may potentially be acquired through sufficient exposure to primed input. Structural priming has been previously found to be a useful tool for language learners to implicitly learn the complex properties of numerous other phenomena. Similarly, priming of the choice between case marking and case drop may be helpful in acquiring Korean case drop. Further research with children and bilinguals must be conducted in the future to yield further insights into language learning and the mechanisms underlying the acquisition of the linguistic phenomenon in question.

5. Conclusion

The present study examined whether an abstract representation of Korean accusative case marker *-lul/-ul* is contained in the mental representations of sentences and whether previously reported animacy effects on Korean case drop can generalize to an online production task. Participants' production of case-marked or case-dropped direct objects was modulated by whether or not the case marker was produced earlier in the prime only when the object noun phrase was inanimate. This finding provides evidence for the presence of an abstract morphological representation. It also confirms the strong effect of animacy in Korean case drop.

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Eun Seon Chung

Division of General English
University of Seoul
163 Seoulsiripdaero, Dongdaemun-gu, Seoul 02504, Korea
E-mail: prolingesc@gmail.com

Eun-Kyung Lee

Department of English Language and Literature
Yonsei University
50 Yonsei-ro, Seodaemun-gu, Seoul 03722, Korea
E-mail: eunkyunglee@yonsei.ac.kr

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