

Investigating the role of case markers in honorific agreement processing in Korean

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Abstract. This study explores the influence of case markers on the attraction effect in subject-verb honorific agreement in Korean. Using a self-paced reading experiment on PCIBex Farm, we manipulated case markers (possessive *vs.* nominative) and the presence of the honorific marker *-si* on verbs to assess their impact on the attraction effect, where syntactically illicit NPs are erroneously retrieved due to partial feature matching. While Avetisyan et al. (2020) reported that in Armenian, case information is used as a retrieval cue during subject-verb number agreement, our preliminary findings reveal no significant attraction effect related to case marker similarity, indicating that the case features (nominative case) do not crucially trigger the attraction effect in honorific agreement. The discrepancy with previous studies highlights the role of noun animacy and the specific construction of Korean sentence structure. Our results contribute to understanding the nuanced factors influencing honorific agreement processing in Korean and suggest that case marking, while integral to sentence structure, does not significantly affect the attraction effect in honorific agreement processing.

Keywords. honorific agreement; attraction effect; case marker effect; Korean

1. Introduction. Attraction on agreement is a fundamental linguistic feature present in the majority of human languages, serving as a crucial component for cross-linguistic comparisons and the development of universal theories about syntactic relationships in sentence production. This study examines the attraction effect on subject-verb agreement in Korean, hypothesizing that although foundational syntactic encoding principles may align with those of other languages, unique challenges may arise from distinct morphosyntactic features, such as honorifics. Particularly, this study focuses on the role of case markers in subject-verb honorific agreement in Korean.

1.1. **ATTRACTION.** English requires that subjects and verbs agree in number and person. Thus, the sentence in (1) is ungrammatical because the subject *key* does not agree in number with the verb *are*.

(1) *The key to the cabinets are new.

(2) is similarly ungrammatical due to the same agreement issue. However, studies show that speakers are more likely to make such agreement errors with (1) than with (2) in both production and comprehension, which is a phenomenon known as agreement attraction (Bock & Cutting 1992; Bock & Eberhard 1993; Dillon et al. 2013; Pearlmutter et al. 1999).

(2) *The key to the cabinet are new.

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Attraction may emerge as an unintended consequence of the cue-based memory retrieval process outlined in the model by Lewis et al. (2006) and Lewis & Vasishth (2013), designed to explain the facilitation of long-distance dependencies during comprehension. According to this perspective, attraction effects occur due to the erroneous retrieval of the subject's head caused by interference at moments requiring the head's reactivation for number agreement (as seen with the verb *are* in (1) and (2)). This cue-based retrieval framework posits that elements of sentences are stored in working memory as segments with feature values delineating both a constituents syntactic role and its morphosyntactic attributes (such as number and gender). For the successful resolution of long-distance dependent elements, it is necessary to retrieve these previously stored segments from memory. This retrieval is facilitated by cues that align with the segments' feature values.

The successful memory retrieval and its speed depend significantly on how closely the target item's features match the retrieval cues. For instance, in (1), the verb *are* requires a subject marked for plurality to conform to its number requirement. The memory search identifies two partially matching candidates: the noun *key* (a target item) associated with the primary subject aligns with the syntactic cue [+subject], and the interfering noun *cabinets* (a distractor) matches the number cue [+plural]. This partial match leads to the competition between the two elements. If the distractor noun *cabniet* is misretrieved, the parser erroneously licenses the ungrammatical plural verb, and an illusion of the grammaticality happens. The partial match explains the faster processing in (1) compared to (2), where there is no competing item that partially matches the required features, leading to slower processing. The observed acceleration in processing times between (1) and (2) is termed facilitatory interference.

1.2. HONORIFIC AGREEMENT. Honorifics are a distinctive aspect of the Korean language, serving to express respect, politeness, and deference towards a referent or an addressee through specific morphemes such as *-nim* (honorable) on nouns and *-si* (honorific affix) on verbs. These elements play a crucial role in the speech, signaling the social status of the subject relative to the speaker.

Honorific agreements in Korean significantly diverge from the strict agreement systems found in Indo-European languages, such as English. For instance, the honorific affix *-si* is added to the verb stem to agree with esteemed subjects like *sensayng-nim* ('teacher') in (3).

- (3) a. *sensayng-nim-i hakkyo-ey ka-ss-ta.*
 teacher-HON-NOM school-LOC go-PAST-DEC
 The teacher went to school.
- b. *sensayng-nim-i hakkyo-ey ka-si-ss-ta.*
 teacher-HON-NOM school-LOC go-HON-PAST-DEC
 The teacher went to school.

However, the grammaticality of a sentence with an honorable noun is not contingent on the presence of the honorific affix *-si* on the verb, allowing for its omission depending on the social context. In this sense, Korean does not have a rigid subject-verb agreement system, as opposed to Indo-European languages.

Nevertheless, Korean honorifics do establish systematic dependency relationships between subjects and verbs (Brown & Yeon 2015; Lee & Yoo 2023; Sohn 2001). For example, a low so-

cial status subject, such as *ai* ('kid') in (2), cannot be paired with the honorific suffix, making such sentences grammatically incorrect. Essentially, the affix *-si* necessitates an associated subject of high social standing.

- (4) a. ai-ka hakkyo-ey ka-ss-ta.
 kid-NOM school-LOC go-PAST-DEC
 The kid went to school.
- b. *ai-ka hakkyo-ey ka-si-ss-ta.
 kid-NOM school-LOC go-HON-PAST-DEC
 The kid went to school.

The honorific suffix *-si* must agree with the honorific status of the subject noun phrase. Therefore, it merits exploration whether this unique agreement system, integrating syntactic, semantic, and pragmatic information, poses specific challenges in language processing. A key question in previous studies has been how this system affects the attraction effect in Korean subject-verb agreement whether it intensifies or diminishes.

Kwon & Sturt (2016) found the attraction effect in Korean honorific agreement similar to English subject-verb number agreements. The syntactic configuration of the tested sentences in their study is in (5).

- (5) [_{matrix} Subject(H/NH - distractor) [_{embedded} Subject (H/NH) Verb-*si*] Verb]

In Korean, honorific agreements happen within the same clause (Sohn 2001). Therefore, if the embedded subject lacks honorifics (i.e., NH), the honorific affix *-si* on the embedded verb does not find a match, leading to agreement failure. In Kwon & Sturt (2016), it is found that the difficulty of mismatched features in subject-verb honorific agreement within an embedded clause is reduced when accompanied by a main subject (the distractor) that is structurally incompatible yet feature-matching. Given that the distractor in their examples did not linearly intervene with honorific agreements, it implies that any memory item with a matching feature would be activated during the process of establishing honorific dependencies, regardless of its linear position.

In contrast to their findings, Lee & Yoo (2023) observed no attraction effect when a distractor linearly intervenes between the dependent elements, as in (6).

- (6) [_{matrix} Subject(H/NH) [_{embedded} Subject (H/NH - *distractor*) Verb] Verb-*si*]

They proposed that variations in the attraction effects could arise from the parser's different processing strategies influenced by the specific structural configurations encountered.

1.3. A ROLE OF CASE IN ATTRACTION EFFECTS. In addition to syntactic structure, case markers can also affect processing. Substantial research supports the use of case information in assigning grammatical and thematic roles during sentence processing, with studies across various languages and methodologies (Chow et al. 2018; Henry et al. 2017; Kamide et al. 2003; Sato et al. 2009; Yamashita 1997). For example, experiments in German using the visual world paradigm have shown that participants use the case marking on sentence-initial noun phrases (NPs) and verb meanings to anticipate subsequent arguments. This predictive skill, leveraging case marking

to anticipate argument roles, also applies to verb-final languages such as Japanese, where listeners use the case markings of preceding noun phrases (NPs) to deduce the roles of following NPs before the verb is even introduced.

The impact of cases may extend beyond the realm of predictive processing. Given the crucial role of case marking in determining grammatical and thematic roles, we propose that case information could influence the process of subject-verb agreement during reading comprehension. More precisely, case markers might serve as crucial cues within cue-based retrieval models for resolving subject-verb agreement issues. The cue-based retrieval theory, as outlined by Lewis et al. (2006), suggests that morphosyntactic information is used as a cue for resolving subject-verb agreement. Within this framework, case markers can greatly assist by serving as clear indicators to identify the verb's subject, thus easing the resolution of subject-verb agreement. Alternatively, the case information of a distractor might complicate the parsing process by introducing an additional matching feature. In order to investigate the role of case markers in subject-verb honorific agreement in Korean, we conducted an experiment, specifically focusing on the attraction effect.

2. Experiment. In this study, we carried out a self-paced reading experiment on the web-based platform PCIBex Farm to examine whether the similarity of case marking strengthens the attraction effect in Korean subject-verb honorific agreement.

2.1. PARTICIPANT. Twenty-four native speakers of Korean participated in the experiment. They were naive about the purpose of the experiment. Participants received \$5 for participation in the experiment.

2.2. METHODOLOGY. To explore the case effect, we manipulated the case markers based on the schema used in the previous study (Kim & Shin 2021). Note that in Korean double nominative case markers are allowed when the NPs in the subject position have the possessive relation as in (11).

- (7) a. John-uy pal-i khu-ta
John-POSS feet-NOM big-DEC
John's feet are big.
- b. John-i pal-i khu-ta
John-NOM feet-NOM big-DEC
John's feet are big.

The example set of the stimuli is in (8). In our experimental design, each target sentence was paired with a preceding context sentence. The manipulation within the target sentences involved two key factors: i) the case marking on the distractor, possessive vs. nominative, and ii) the inclusion or exclusion of the honorific marker *-si* on the verb. To ensure uniformity between the distractor and the main subject, human nouns were uniformly employed as noun phrases in subject positions, as in (8).

- (8) a. POSS-si
halmeni-uy sonca-ka kkway calsayngki-**si**-ess-tako Cia-ka
 grandmother-POSS grandson-NOM very handsome-HON-PAST-DEC Cia-NOM
 sayngkakhay-ss-ta
 think-PAST-DEC
 'Cia thought that the grandmother's grandson was very handsome.'
- b. NOM-si
halmeni-ka sonca-ka kkway calsayngki-**si**-ess-tako Cia-ka
 grandmother-NOM grandson-NOM very handsome-HON-PAST-DEC Cia-NOM
 sayngkakhay-ss-ta
 think-PAST-DEC
 'Cia thought that the grandmother's grandson was very handsome.'
- c. POSS-x
halmeni-uy sonca-ka kkway calsayngki-ess-tako Cia-ka
 grandmother-POSS grandson-NOM very handsome-PAST-DEC Cia-NOM
 sayngkakhay-ss-ta.
 think-PAST-DEC
 'Cia thought that the grandmother's grandson was very handsome.'
- d. NOM-x
halmeni-ka sonca-ka kkway calsayngki-ess-tako Cia-ka
 grandmother-NOM grandson-NOM very handsome-PAST-DEC Cia-NOM
 sayngkakhay-ss-ta.
 think-PAST-DEC
 'Cia thought that the grandmother's grandson was very handsome.'

We created twenty-four sets of experimental sentences (96 sentences = 24 sets X 4 conditions). They were distributed across four groups in a Latin Square design. Each sentence was followed by a comprehension task.

2.3. PROCEDURE. The stimulus was presented using a word-by-word moving window. To familiarize participants with the self-paced moving window technique, a practice session was included. The experiment began when participants pressed a button to indicate readiness, with sentences appearing on the screen as a series of dashes. Participants then pressed the Space Bar to reveal each word sequentially. After each sentence was fully revealed, a comprehension task followed. These tasks aimed to evaluate the participants' attention to the material presented. The experiment took 20-30 minutes.

2.4. ANALYSIS AND RESULTS. The reading times are detailed in Figure 1. We employed a rigorous cleaning process to ensure our data quality. Initially, check-up questions assessed participant comprehension to confirm understanding of the experimental sentences during the task. Each participant demonstrated a high level of comprehension accuracy, with scores above 80.0%, indicating careful attention to the sentences. Consequently, we retained the data from all participants for subsequent analyses.

The examination of the reading times for critical sentences was conducted across critical, spill-over, and wrap-up regions. Prior to statistical analysis, data trimming procedures were applied. Incorrect responses to comprehension questions resulted in the exclusion of the data. Reading times shorter than 100 ms or longer than 5000 ms were considered outliers and removed. Furthermore, reading times exceeding three standard deviations from the mean were also excluded.

The analysis of the reading time data was performed using Linear Mixed Effect Regression analysis with the lme4 package in R. Two fixed-effect factors were included in the regression: the distractor case and the affix *-si* on the verb, with their interaction. These predictors were contrast-coded. We incorporated crossed-random intercepts for participants and items. The initial model adhered to the maximal random effect structure suggested by Barr (2013). Due to non-convergence with this complex model, we simplified the random effect structure progressively until convergence was achieved.

The region 4, where the verb appears, was the critical region.

2.5. RESULTS. The results are summarized in Figure 1.

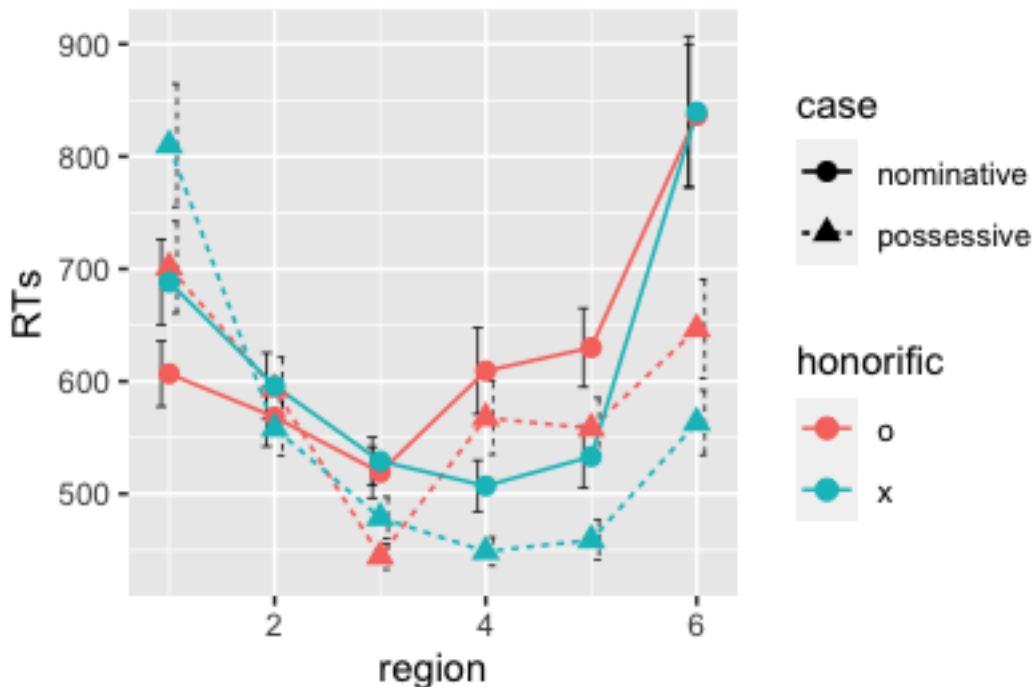


Figure 1. Average reading time by region

Preliminary results revealed three key findings. Crucially, no attraction effect of the distractor was found, regardless of its case marker possessive or nominative markers. It implies that the same case feature of the distractor with the case of the subject does not seem to strengthen the attraction effect. In both possessive and nominative conditions, significant slowdowns in reading times were observed when the honorific marker *-si* appeared on the verb at the target region (Region 4) ($p < 0.05$). Interestingly, no attraction effect in possessive conditions from our study was inconsistent with the results reported in Kim & Shin (2021); slow reading times were observed without *-si* markers, indicating the presence of the attraction effect of possessive distractors. This

discrepancy may be attributed to the different animacy of the subject nouns in the two studies (animate in the current study but inanimate in Kim & Shin (2021)). Since *-si* is associated with humans, the human distractor in Kim & Shin (2021) could have been strongly activated. Lastly, in the nominative conditions, which results in double nominative constructions, overall reading times were slow compared to the possessive conditions. This processing difficulty may be attributed to the increased processing cost associated with double nominative constructions (Frisch & Schlesewsky 2005; Kim & Shin 2021).

3. Conclusion. In conclusion, the findings suggest that case markers do not play a crucial role in triggering the attraction effect in Korean subject-verb honorific agreement. This study contributes to our understanding of the factors influencing honorific agreement in Korean and provides insights into the role of case marking in this linguistic phenomenon.

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