Honorific Agreement Guides but Doesn't Govern in Ambiguity Resolution

So Young Lee[†]
Miami University

ABSTRACT

This study examines how Korean speakers resolve relative clause attachment ambiguity, focusing on the role of honorific agreement. Korean honorifics encode social hierarchy through morphosyntactic marking but are pragmatically motivated, illuminating the interaction of grammar and social information in processing. Using a self-paced reading task and a comprehension measure, this study tested whether honorific marking functions as a strong morphosyntactic cue, such as number or gender agreement, or as a soft interpretive bias. Comprehension results showed a consistent high attachment preference modulated by honorific compatibility, suggesting honorifics operate as soft cues. Online reading times showed no early effects of honorific marking, indicating delayed attachment until sufficient structural and pragmatic information became emerged. Pragmatic expectations shaped interpretations even without explicit honorifics. These findings support an integrative model in which multiple linguistic and social cues are flexibly coordinated in real-time comprehension.

Keywords: RC ambiguity resolution, the effect of the honorific agreement, offline vs. online processing difference

1. Introduction

A main challenge in real-time sentence processing is syntactic ambiguity resolution —determining the intended syntactic structure among competing possibilities. One example is the resolution of relative clause (RC) attachment ambiguity. In sentences with configurations like NP1 of NP2 RC as in (1), the RC *who was honored at the ceremony* could plausibly attach to either *the student* or *the professor*, giving rise to structurally high (NP1) or low (NP2) attachment interpretations.

* This research (or publication) was supported by the 2022 Korean Studies Grant Program of the Academy of Korean Studies (AKS-2022-R-072).
I am deeply grateful to the anonymous reviewers for their thoughtful and constructive feedback, which has significantly improved this manuscript. Any errors or shortcomings that remain are entirely my own.

† Corresponding author: soyounglee.linguist@gmail.com

(1) The student $_{NP1}$ of the professor $_{NP2}$ [who was honored at ceremony] $_{RC}$ smiled.

Previous studies (e.g., Carreiras & Clifton, 1993; Cuetos & Mitchell, 1988; Hemforth et al., 2015) have reported cross-linguistic differences in attachment preferences. For example, Arabic, Basque, Chinese, English and Romanian typically exhibit a low attachment bias (e.g. *the professor* in (1): structurally lower NP and linearly local NP), while languages such as Dutch, French, German and Italian often show a preference for high attachment (e.g. *the student* in (1): structurally higher NP and linearly non-local NP).

Early accounts of relative clause (RC) attachment preferences were grounded in syntactic parsing principles such as Minimal Attachment and Recency. The Minimal Attachment principle, proposed by Frazier (1978, 1987), assumes a two-stage parsing model in which initial syntactic structures are built using minimal structural complexity—defined by the fewest number of syntactic nodes. In cases of ambiguous RC attachment, this principle predicts a preference for low attachment (LA), as it results in simpler syntactic structures. Similarly, the Recency principle (Gibson et al., 1996; Gibson, 2001) favors attaching new elements to the most recently processed constituents. Under this view, incoming material is integrated into the most immediate syntactic context, again leading to an LA bias. However, such syntax-based accounts fail to explain consistent high attachment (HA) patterns found in other languages, such as Spanish. Since the influential findings by Cuetos and Mitchell (1988), cross-linguistic research has aimed to uncover the sources of these differences by examining how language-specific characteristics interact with general parsing mechanisms and distributional cues (Gibson et al., 1996; Grillo & Costa, 2014; Hemforth et al., 2000; Pozniak et al., 2019).

The second major class of accounts emphasizes the role of lexically specific information in guiding attachment preferences. One line of research focuses on argument structure and subcategorization tendencies, suggesting that the parser relies on verbs' structural preferences to resolve ambiguity (e.g., Abney, 1989; Britt, 1994; Ford et al., 1982). Another approach highlights the influence of more fine-grained lexical-semantic cues. For example, Taraban and McClelland (1988, 1990) propose that semantic information associated with each constituent is actively integrated during parsing, enabling the parser to assess how well different interpretations align with the emerging event structure. According to this view, lexical meaning plays a central role in guiding syntactic decisions from the earliest stages of processing.

In contrast to structurally or lexically driven models—which posit that attachment decisions are made largely independently of discourse context—referential accounts attribute initial parsing preferences to representations derived from the discourse model (Altmann & Steedman, 1988; Altmann, 1986, 1987; Crain & Steedman, 1985; Ni & Crain, 1990; Steedman & Altmann, 1989). According to Referential Theory, the parser's goal is to establish coherent referential links within a mental model of the discourse. Thus, attachment preferences for ambiguous phrases are shaped by how well the candidate attachment sites align with discourse referents. Crucially, even in the absence of an overt contextual prompt, readers are assumed to construct some form of discourse representation based on prior linguistic input. This implies that a truly "neutral" or unbiased context may be unattainable, as the parser may still favor one interpretation over another based on inferred or default discourse structures (Altmann & Steedman, 1988; Crain & Steedman, 1985).

Each of the preceding accounts foregrounds a particular source of information—syntactic structure, lexical properties, or discourse representations—as the basis for explaining attachment preferences. However, these theoretical approaches diverge in their assumptions about the timing and integration of different types of information during sentence processing (syntax-first models *vs* intergrative models). Syntax-first models posit a modular and sequential architecture, in which parsing decisions are initially guided by structural principles, with semantic and pragmatic information incorporated only at later stages to evaluate or revise the initial analysis. In contrast, integrative models argue that sentence processing is not strictly staged, but rather shaped by the simultaneous evaluation of multiple constraints. On this view, syntactic, semantic, and pragmatic cues are all available from early stages of processing and can influence interpretation in parallel, with their relative impact determined by their contextual reliability and informativeness. Recent research increasingly supports a view in which multiple sources of information interact simultaneously during parsing (Britt, 1994; MacDonald et al., 1994; Pearlmutter & MacDonald, 1992; Spivey-Knowlton & Tanenhaus, 1994; Trueswell et al., 1994).

Despite growing interest in how multiple information sources interact during sentence processing, it remains unclear how socially grounded grammatical features influence syntactic decisions in real time. This study addresses this gap by examining relative clause attachment in Korean, a language that marks honorific agreement to reflect the social status of referents. Korean honorifics are realized through morphosyntactic marking but are regulated by pragmatic norms, making them ideal

for exploring the interaction between grammatical encoding and socially grounded meaning. This study first examines whether honorific marking functions like a strong grammatical cue—such as number or gender agreement—that constrains syntactic attachment, or whether it functions as a soft cue that probabilistically biases interpretation. In doing so, this study also examines the time course of attachment resolution to determine whether Korean speakers rely primarily on syntactic information during initial parsing or whether they integrate morphosyntactic and pragmatic cues from early stages.

2. Background

Before turning to the experimental details, this section provides a brief overview of two grammatical features in Korean that are central to this study: honorific agreement and relative clause structure.

In English, subject-verb agreement is a grammatical requirement, with features such as number obligatorily marked on the verb (e.g., *The cat runs* vs. *The cats run*). That is, the verb must morphologically agree with the grammatical number of its subject. Korean also exhibits subject-verb agreement, but in a fundamentally different way: it employs a system of honorific agreement, realized through the verbal affix *-si*, which signals that the subject holds a higher social status than the speaker. This form of agreement is not universally obligatory. Rather, it is morphosyntactically constrained and pragmatically licensed (Brown, 2015; Sohn, 2001). For example, as illustrated in (2), it is felicitous when the subject is a socially respected referent (e.g., *sensayng-nim*, 'teacher.HON'), but ungrammatical when used with referents lacking that status (e.g., *ai*, 'child').

(2) a. *sensayng-nim-i BTS-lul cohaha-(si)-nta.*
teacher-HON-NOM BTS-ACC like-(HON)-DEC.
'The teacher likes BTS.'
b. *ai-ka BTS-lul cohaha-(*si)-nta.*
child-NOM BTS-ACC like-(*HON)-DEC.
'The child likes BTS.'

In this sense, the presence of *-si* on the verb systematically encodes social hierarchy, which refers to culturally recognized asymmetries in interpersonal status—

typically determined by factors such as age, kinship, or institutional roles. These status relations license or constrain the use of honorific forms in Korean and may serve as guiding cues during sentence processing.

In addition, Korean is a head-final language in which RCs appear in prenominal position, preceding the noun they modify as shown in (3). This word order requires the relative clause to be processed before the head noun is encountered.

(3) [*BTS-lul cohaha-nun*]$_{RC}$ *sonye-ka khonsethu thikheys-ul sassta.*
BTS-ACC like-REL girl-NOM concert ticket-ACC bought
'The girl who likes BTS bought the concert ticket.'

This structure property can have important implications for incremental parsing, particularly in structurally ambiguous contexts in (4), where the parser encounters multiple potential attachment sites after the RC. Note that throughout this manuscript, NP2 is used to represent the low attachment (LA), local site, and NP1 represents the high attachment (HA), non-local site, in order to maintain consistency and interpretability across languages, regardless of differences in word order or typological features.

(4) [*BTS-lul cohaha-nun*]$_{RC}$ *sensayngnim*$_{NP2}$*-uy ai* $_{NP1}$*-ka khonsethu thikheys-ul sassta.*
BTS-ACC like-REL teacher-of child-NOM concert ticket-ACC bought
'The child $_{NP1}$ of the teacher $_{NP2}$ who likes BTS bought the concert ticket.'

Since relative clauses in Korean are prenominal, information encoded within the RC can influence attachment decisions. For instance, although both NP2 *sensayngnim* 'teacher' and NP1 *ai* 'child' can be modified by the RC *BTS-lul cohaha-nun* 'who likes BTS' in (4), the presence of the honorific marker *-si-* in the RC *BTS-lul cohaha-**si**-nun* can guide interpretation toward NP2 *sensayngnim* 'teacher', the socially appropriate and grammatically compatible referent for honorific agreement.

Based on these, this study examines whether honorific marking biases the parser toward interpreting the relative clause as modifying a socially and grammatically compatible noun, and how such morphosyntactic cues—rooted in pragmatic information—are integrated during different stages of real-time sentence processing.

3. Experiment

3.1. Participants

One hundred eight self-reported native speakers of Korean participated in the experiment. All participants were recruited online and provided informed consent prior to participation. Each participant was compensated approximately $5 USD (or equivalent) for their time.

3.2. Materials

Experimental materials consisted of 6 sets of 6 target items, forming a 2 × 3 factorial design. The two manipulated factors were: (i) the presence of the honorific marker *-si-* on the verb within the relative clause (honorific vs. non-honorific), and (ii) the social hierarchical relationship between two noun phrases (NPs) in complex possessive constructions (NP of NP), with three conditions: higher-lower (HL), lower-higher (LH), and equal status (Equal). This resulted in six distinct conditions per item, as illustrated in Tables 1 and 2.[1)]

Table 1. Honorific conditions

Regions	1	2	3	
	Jwunse hyeng-un	*[thipi-lul*	*po-ko kyey-**si**-ten]*	
	J. brother-TOP	TV-ACC	see-PROG-**HON**-PAST-REL	
	4	5	6	7
HL:	*imo-uy*	*sonca-wa*	*sacin-ul*	*ccik-ess-ta*
	aunt-of	grandson-with	photo-Acc	took
LH:	*ai-uy*	*imo-wa*		
	child-of	aunt-with		
HH:	*imo-uy*	*chinkwubun-kwa*		
	aunt-of	friend-with		

'(My brother) Jwunseo took a photo with {HL: the grandson of the aunt / LH: the aunt of the child / HH: the friend of the aunt} who was watching TV.'

1) Please find the actual stimuli used in the experiment at the following link: https://osf.io/5zyd4/

Table 2. Non-honorific conditions

Regions	1	2	3	
	Jwunse hyeng-un	*[thipi-lul*	*po-ko iss-ten]*	
	J. brother-TOP	TV-ACC	see-PROG-PAST-REL	
	4	5	6	7
HL:	*imo-uy*	*sonca-wa*	*sacin-ul*	*ccik-ess-ta*
	aunt-of	grandson-with	photo-Acc	took
LH:	*ai-uy*	*imo-wa*		
	child-of	aunt-with		
LL:	*ai-uy*	*chinkwu-wa*		
	child-of	friend-with		

'(My brother) Jwunseo took a photo with {HL: the grandson of the aunt / LH: the aunt of the child / LL: the friend of the child} who was watching TV.'

Target sentences contained a complex NP with an embedded relative clause preceding the possessive noun phrase, following the structure: [$_{RC}$ Verb-(si)] NP2-uy NP1, where the relative clause included a verb with or without the honorific marker. Social relationships among the NPs were pragmatically grounded in kinship terms (e.g., *imo* 'aunt', *sonca* 'grandson', *hyeng* 'older brother').[2] These relationships determined the expected compatibility of the honorific-marked verb with each NP, allowing us to examine how honorific agreement cues guide relative clause attachment preferences under varying social contexts.

To ensure the naturalness and uniformity of the materials, all target sentences involved animate referents and employed progressive relative clauses (e.g., *ko iss-ten* 'who was watching'). In the honorific conditions, the existential verb *kyey-si*—the

2) Kinship terms were selected for two main reasons. First, honorific usage in Korean is shaped not only by the lexical identity of a noun but also by the perceived social relationship between the speaker and the referent (Brown, 2015; Sohn, 2001). To pragmatically license honorific agreement, I ensured that the matrix subject—consistently represented by sibling terms such as 'sister' or 'brother'—was interpreted as socially equal to the speaker and hierarchically situated between the two noun phrases modified by the relative clause (e.g., higher than NP1 but lower than NP2 in HL conditions). This setup provided a consistent and coherent framework for encoding asymmetrical social hierarchy across experimental conditions. Second, kinship terms offered more precise control over perceived social status than occupational or institutional roles (e.g., teacher-student), which may introduce ambiguity about relative hierarchy depending on participants' assumptions. In contrast, familial roles such as 'older brother,' 'mother,' and 'grandson' are culturally stable and typically unambiguous in their hierarchical implications, ensuring that only one NP in each condition was clearly compatible with honorific agreement.

respectful counterpart of *iss* ('to be' or 'to exist')—was used in conjunction with the honorific marker *-si*. This combination provided a clear and unambiguous signal of honorific agreement, minimizing syllable-length variation and facilitating participants' interpretation of social hierarchy cues.

Each participant read 82 sentences, including 6 target items and 76 fillers. The filler set was designed to vary in syntactic complexity and structure: approximately one-third included honorific morphology, one-third contained unambiguous relative clauses, and the remaining third featured alternative types of dependency constructions. The materials were distributed using a Latin Square design, and the sentence order was randomized for each participant.

3.3. Procedure

A self-paced reading task was implemented using a non-cumulative moving-window paradigm, delivered through the online experimental platform PennController for Ibex Farm (PCIBex; Zehr & Schwarz, 2018). Each sentence was initially masked with dashes, and participants revealed the text word by word by pressing the space bar. Words appeared sequentially from left to right, with the previously displayed word disappearing as the next word appeared.

Following each target sentence, a full-sentence comprehension question was presented to determine the preferred interpretation, along with a forced-choice response set, as illustrated in (5). Regardless of the conditions of the target sentences, honorific forms were consistently excluded from the comprehension questions.

(5) *nwuka thipilul poko issessnayo?* 'Who was watching TV?
a. *imo* 'aunt' b. *sonca* 'grandson'

Participants selected their answers using a mouse click. To familiarize participants with the task, three practice trials were administered before the main experiment began. The entire session lasted approximately 20 minutes.

3.4. Prediction

In line with the research questions outlined earlier, I articulate two main predictions concerning the role of honorific agreement in interpretation and the nature of real-time parsing strategies in Korean.

First, if Korean subject-verb honorific agreement functions as a strong morphosyntactic cue, comparable to number agreement in English, I expect to observe a robust bias toward LA interpretations in the comprehension task when an honorific-compatible noun appears in NP2 (the structurally lower but linearly local position). This outcome would suggest that honorific marking can override the default HA preference previously reported for Korean. agreement cues guide relative clause attachment preferences under varying social contexts.

Second, regarding real-time parsing strategies, previous research on HA-preference languages has shown that when structural ambiguity is not disambiguated by semantic or pragmatic factors, readers often initially favor LA interpretations. This pattern is consistent with syntax-first models, in which early parsing decisions are guided by structural simplicity or locality. For instance, in languages like Spanish, German, and Italian, studies using relative clause ambiguities (e.g., *The daughters of the doctor who was/were…*) have found longer reading times at the verb *were,* incompatible with the initial LA parse—indicating early commitment to local attachment.

If Korean honorific agreement operates similarly to syntactically encoded cues such as number or gender agreement, I predict that in the self-paced reading task, sentences with non-honorific nouns in NP2 should elicit increased reading times when the RC verb includes *-si*. This would reflect the cost of reanalysis under a syntax-first parsing strategy, as readers initially commit to a local attachment that later proves incompatible with the morphosyntactic features of the verb.

3.5. Comprehension Task

3.5.1. Analysis

All 108 participants were included in the analysis, as their overall accuracy on comprehension questions for unambiguous filler items exceeded 75%. Comprehension results (reflecting offline processing) and self-paced reading times (reflecting online processing) were analyzed separately.

In analyzing the comprehension results, statistical analyses were conducted using R (version 4.5.1; R Core Team, 2021), and linear and generalized linear mixed-effects models were implemented using the lme4 package (Bates et al., 2015).

3.5.2. Results

The overall comprehension results are summarized in Figure 1.

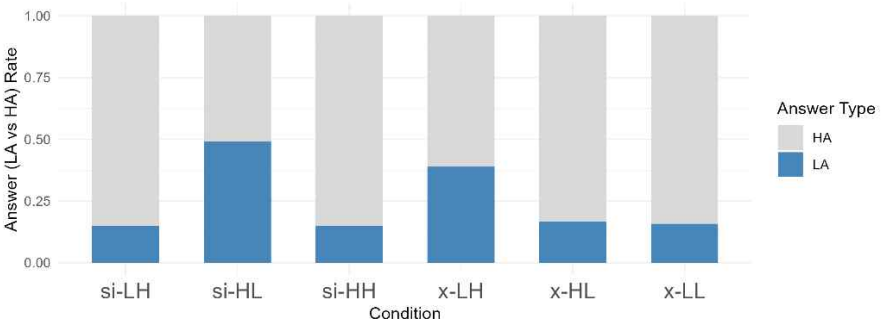

Figure 1. The results (HA or LA response rates) of the forced-choice task.

I first examine the ambiguous conditions in which the two NPs held equal social status—either both high (HH) in the honorific conditions or both low (LL) in the non-honorific conditions. In these cases, both high and low attachment interpretations were grammatically and pragmatically acceptable. Regardless of the presence of the honorific affix *-si* in the relative clause, participants showed a strong preference for high attachment (HA), with over 80% of responses reflecting HA interpretations (β = —0.0982, SE = 0.164, Z = —0.598, p = 0.9912). This confirms prior findings that Korean speakers tend to default to HA in RC attachment ambiguity (Lim, 2012; a.o.).

Next, let us turn to the biased conditions, where the two NPs differed in social status (HL or LH). In these conditions, honorific agreement could act as a cue that guided interpretation toward one of the attachment sites, based on grammatical and pragmatic constraints. That is, the honorific-marked verb could only agree with the NP of higher social status, thereby licensing only one attachment as grammatically acceptable. For example, in the HL condition, only the LA interpretation was compatible with the honorific marking, while in the LH condition, only the HA interpretation was licensed. Despite these biases, participants continued to show a strong HA preference. Notably, in the honorific ***-si* HL** condition—where only LA was grammatically acceptable—participants still chose HA roughly 50% of the time. These results indicate that while honorific agreement can bias interpretation toward

a particular attachment site—as evidenced by the significantly lower HA response rate in the *-si* HL condition compared to other conditions (Table 3)—it does not override Korean speakers' default preference for high attachment.

Table 3. Results of statistical comparisons under honorific (*-si*) conditions

	β	SE	Z	*p*
LH vs HL	—3.039	0.195	—15.548	<.0001
LH vs HH	—0.019	0.174	—0.109	0.9935
HL vs HH	3.020	0.194	15.556	<.0001

In the non-honorific conditions, the absence of the honorific marker *-si* meant that both LA and HA interpretations were grammatically permissible, even when one of the nouns was higher in social status. Interestingly, however, Korean speakers showed a slightly greater tendency toward the LA interpretation (38.88%) in the LH condition compared to the other non-honorific conditions (HL (16.66%) and LL (15.74%)). While this shift did not override the overall HA preference, it suggests that speakers may pragmatically expect honorific marking when referring to higher-status individuals. When such marking is absent, the HA interpretation may be somewhat disfavored, reflecting the influence of pragmatic expectations on attachment preferences (see Table 4). These results point to a pragmatic role of honorific agreement that extends beyond purely structural requirements in guiding interpretation.

Table 4. Results of statistical comparisons under non-honorific conditions

	β	SE	Z	*p*
LH vs HL	3.820	0.317	12.048	<.0001
LH vs LL	3.954	0.332	11.892	<.0001
HL vs LL	0.134	0.207	0.647	0.7942

To better understand how attachment preferences manifest at the individual level—and whether certain participants are more sensitive to morphosyntactic or pragmatic cues—I examined response patterns across all conditions by participant. While group-level analyses revealed a robust preference for high attachment (HA), individual-level data can uncover variability that may be obscured in aggregated results.

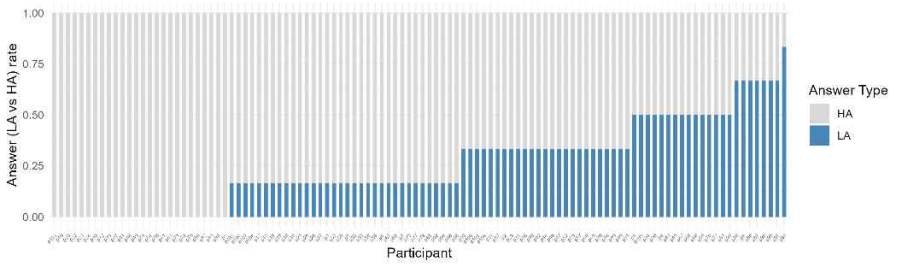

Figure 2. The results (HA or LA response rates) by participants.

As shown in Figure 2, which presents each participant's overall attachment preference across conditions, the HA bias was widespread. Of the 108 participants, 85 showed a strong preference for HA. Among them, 26 consistently selected HA responses across all items, regardless of condition. Only 8 participants favored low attachment (LA), and 15 showed an balanced pattern, responding with HA and LA at similar rates (50-50). These findings confirm that the HA preference in Korean is not only a group-level trend but also a dominant tendency across individual speakers, even in the face of interpretive cues like honorific agreement.

3.6. Self-paced Reading Task

3.6.1. Analysis

The reading time (RT) data were further trimmed using standard procedures. Reading times (RTs) shorter than 100 ms or longer than 5,000 ms were excluded as outliers. To normalize the RT data and account for variation in word length and individual reading speed, a logarithmic transformation was applied. The region variable was also log-transformed to account for potential non-linear effects related to word position in the sentence. Word length, calculated as the number of characters per word, was included as a predictor.

A linear mixed-effects model was then fitted with log-transformed RTs as the dependent variable, and word length and log-transformed region as fixed effects. Random intercepts for participants were included to capture between-subject variability. Residual RTs were extracted from this model, providing a measure of reading time adjusted for lexical and positional factors. This approach allows for a clearer interpretation of condition effects while controlling for structural differences

and individual variability. Following standard procedures (Keating & Jegerski, 2015), I also removed residuals exceeding three standard deviations from the condition mean. This trimming procedure affected less than 3% of the RT data.

Following the normalization procedure described above, I fit separate linear mixed-effects regression (LMER) models for each region of interest, analyzing the data separately based on the presence or absence of the honorific marker (*-si* vs. none).[3] Each model included NPs' social hierarchical relationship (HL, LH, vs. Equal—i.e., LL or HH) as a fixed effect. Random intercepts for participants and items were included in all models. I began model construction using a maximal random-effects structure and incrementally simplified it until convergence was achieved, following the recommendations of Barr et al. (2013). All fixed effects were treatment-coded. Inferential statistics from the final models (*RT Residual ~ NPs + (1|participant) + (1|set)*) are reported in Table 5 and Table 6. The models yielded estimates, standard errors, t-values, and p-values for all fixed effects and interactions. A fixed effect was considered statistically significant if the absolute value of its t-statistic exceeded 2, following Baayen et al. (2008). Planned pairwise contrasts were conducted using the emmeans package (Lenth et al., 2018), applying Tukey's test for multiple comparisons.

3.6.2. Results

The overall results are presented in Figures 3 and 4, with statistical comparisons summarized in Tables 5 and 6. Each figure presents both the raw reading time (RT) data and the log-transformed residual reading time data.[4]

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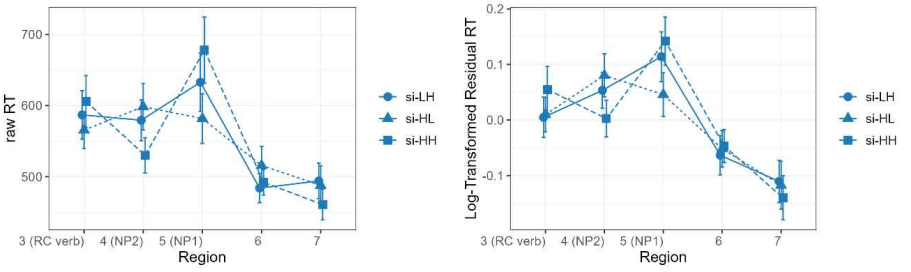
3) This analytic decision was guided by theoretical and empirical considerations, given that the presence or absence of *-si* engages distinct interpretive mechanisms.
In the honorific conditions, *-si* functions as a morphosyntactic marker that interacts with the perceived social hierarchy between referents. Its presence constrains interpretation relative to social status: in HL configurations, the marker aligns with NP2 (the lower structural position), biasing toward low attachment; in LH configurations, it aligns with NP1, biasing toward high attachment. Thus, attachment preferences are guided by the compatibility of *-si* with referential hierarchy. In contrast, in the non-honorific conditions, where *-si* is omitted, interpretation becomes more flexible and context-dependent. Although *-si* is optional in Korean, its absence may still carry pragmatic significance. Drawing on the comprehension results, it is assumed that readers infer bias from omission patterns: in HL configurations, the lack of *-si* may disfavor NP2 and guide interpretation toward NP1; in LH configurations, the absence of *-si* may bias toward NP2. These patterns reflect a reversal of those observed in the honorific conditions.
Because these conditions differ both in cue type and directionality of bias, collapsing them into a single statistical model would obscure meaningful contrasts and conflate interpretive effects that operate independently. For this reason, I report separate LMER models for honorific and non-honorific conditions.

4) Overall, the pattern observed in the raw reading times (RTs) closely mirrors that of the residual RTs based on log-transformed data. In both datasets, a statistically significant effect emerges at Region 5 but only



a. raw RTs b. Residual RTs

Figure 3. Region by region RTs in the honorific (*-si*) conditions.

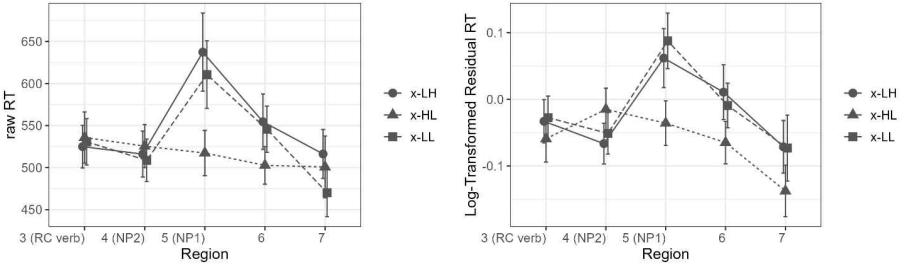
Table 5. Log-transformed residual RTs: statistical comparisons under honorific (*-si*) conditions

	β	SE	*t*	*p*
R3: RC Verb (Intercept)	0.0548	0.0365	1.5006	0.1334
NPs: HL	—0.0450	0.0516	—0.8718	0.3833
NPs: LH	—0.0500	0.0520	—0.0962	0.3358
R4: NP2 (Intercept)	0.0025	0.0348	0.0736	0.9413
NPs: HL	0.0778	0.0492	1.5796	0.1141
NPs: LH	0.0508	0.0494	1.0270	0.3043
R5: NP1 (Intercept)	0.1419	0.0422	3.3622	0.0007***
NPs: HL	—0.0961	0.0602	—1.5956	0.1105
NPs: LH	—0.0279	0.0599	—0.4662	0.6410
R6: spillover (Intercept)	—0.0471	0.0325	—1.4512	0.1467
NPs: HL	—0.0050	0.0453	—0.1113	0.9113
NPs: LH	—0.0165	0.0450	—0.3663	0.7140

In the honorific conditions (see Figure 3 and Table 5), there were no consistent reading time differences across conditions at any region. Notably, the lack of a

under non-honorific conditions. However, the specific contrasts differ: the raw RT data show a significant difference between the HL and LH conditions (p = 0.016), whereas the residual RTs show a significant difference between the HL and LL conditions (p = 0.028). As discussed in the Analysis section, because word length can influence reading times, particularly in Region 5 where word lengths range from three to five characters, the primary results and discussion focus on the residual RTs. This approach provides a more accurate control for this source of variability.

reading time effect at Region 4 (NP2) diverges from predictions made by syntax-first models, which assume that early parsing decisions are guided primarily by structural cues such as locality. This pattern may instead be more compatible with an integrative processing model, in which multiple sources of information—including syntactic structure, verb morphology, and pragmatic context—are evaluated concurrently. In Korean, honorific agreement is not a strictly syntactic requirement but is pragmatically licensed based on the social relationship between the speaker and referents. Because the honorific marker appears on the verb and hierarchical information is encoded through referential semantics and discourse-level knowledge, the relevant cues for attachment resolution become available only after both NPs have been processed. Consequently, readers may delay commitment to an attachment site, adopting a more flexible, context-sensitive parsing strategy consistent with integrative accounts of sentence comprehension.



a. raw RTs

b. Log-transformed residual RTs

Figure 4. Region by region RTs in the non-honorific conditions.

Table 6. Log-transformed residual RTs: statistical comparisons under non-honorific (x) conditions

	β	SE	*t*	*p*
R3: RC Verb (Intercept)	—0.0287	0.0334	—0.8606	0.3894
NPs: LH	—0.0038	0.0450	—0.0857	0.9316
NPs: HL	—0.0297	0.0449	—0.6630	0.5072
R4: NP2 (Intercept)	—0.0510	0.0313	—1.6304	0.1030
NPs: LH	—0.0154	0.0441	—0.3496	0.7265
NPs: HL	0.0360	0.0439	0.8200	0.4122

Table 6. Continued

	β	SE	t	p
R5: NP1 (Intercept)	0.0877	0.0400	2.1911	0.0284*
NPs: LH	—0.0260	0.0560	—0.4656	0.6414
NPs: HL	—0.1232	0.0561	—2.1943	0.0282*
R6: spillover (Intercept)	—0.0064	0.0398	—0.1612	0.8718
NPs: LH	0.0183	0.0473	0.3874	0.6984
NPs: HL	—0.0574	0.0471	—1.2181	0.2231

In the non-honorific conditions, although no reading time differences were observed at Region 4—mirroring the pattern found in the honorific conditions—a reliable effect emerged at Region 5, corresponding to NP1 (the high attachment site). This effect was particularly pronounced when the two NPs differed in social hierarchical status and the lower-status NP appeared in NP1 position (i.e., the HL condition), where reading times at NP1 were significantly faster. In this condition, the relative clause verb did not carry an honorific marker, and the socially higher NP (NP2, the low attachment site) followed immediately after the verb. Given the earlier evidence that readers may delay attachment until relevant cues are fully available, this pattern suggests that the absence of an honorific marker, combined with the presence of a high-status NP in NP2, likely triggered an expectation for a lower-status NP in the upcoming NP1 position. When this expectation was met, processing was facilitated. These findings further support the view that Korean speakers adopt a wait-and-integrate parsing strategy, relying on both structural and socially grounded cues to guide attachment decisions. However, in the non-honorific conditions, a reliable effect emerged at Region 5, which corresponds to NP1—the HA site—particularly when the two NPs differed in social hierarchical status and the lower-status NP appeared in that region (i.e., the HL condition). The reading time at NP1 was significantly faster in this condition. In this case, the relative clause verb lacked the honorific marker, and the socially higher NP (NP2, the low attachment site) immediately followed it. Drawing from the processing patterns observed in the honorific conditions, this configuration supports the interpretation that Korean speakers may postpone attachment decisions until sufficient structural and pragmatic information becomes available.

While processing the non-honorific verb and the high-status NP (NP2), Korean speakers may have generated a predictive expectation that the subsequent NP (NP1)

would be of lower social status—consistent with the lack of honorific marking. When NP1 aligned with this expectation, integration was facilitated, resulting in shorter reading times.

4. Discussion

Using both offline (comprehension) and online (self-paced reading) measures, I examined whether morphosyntactic or pragmatic cues—the social status relationships among referents and the presence or absence of the honorific marker *-si*—modulate attachment preferences.

First, I found robust evidence for a default HA preference in Korean in offline comprehension tasks, replicating and extending prior findings on syntactic disambiguation. Even though the results show that honorific marking reliably biased interpretation toward the attachment site compatible with the honorific morphology, this influence was not absolute. Unlike morphosyntactic features such as number, person, and gender agreement in many Indo-European languages, which often function as strong grammatical constraints, honorific agreement in Korean exhibited a more probabilistic effect. Participants continued to show a preference for HA even in contexts where pragmatic information rendered that interpretation less felicitous. This suggests that while honorific cues can guide attachment decisions, they do not override default syntactic preferences, reflecting the gradient and context-sensitive nature of honorific agreement in sentence processing. For example, approximately 50% of responses consistently favored HA interpretations even in grammatically LA biased conditions, such as the HL-honorific condition, where the HA parse violated honorific agreement constraints. I conjecture that it may be that speakers overuse honorific forms to avoid appearing rude or disrespectful ("saving face"), showing a culturally ingrained tendency toward politeness. Such overuse—sometimes referred to as "excessive politeness"—has been reported and reflects normative pressure in Korean society (Brown, 2022), where honorifics may be used even when not strictly required by grammatical hierarchy. This cultural tendency may therefore shape comprehension responses.

In the online self-paced reading data, the effects of honorific agreement were more nuanced. When the honorific marker was present, no significant reading time differences emerged across conditions. However, a notable effect arose in one of the non-honorific conditions: when the relative clause verb lacked honorific marking

and the socially higher NP appeared in the NP2 (LA) position, readers appeared to anticipate that the upcoming NP1 (HA) would hold a lower social status. Reading times were faster when this expectation was confirmed, indicating that Korean speakers actively draw on pragmatic knowledge about social hierarchy even when no morphosyntactic cue explicitly signals the appropriate attachment. This pattern suggests that pragmatic information can guide attachment preferences independently of formal agreement morphology. In contexts where honorific marking is absent, Korean speakers appear to rely more heavily on pragmatic reasoning and discourse-based expectations to guide interpretation. This suggests that, even in the absence of explicit morphosyntactic cues, socially grounded information—such as the hierarchical relationship between referents—can influence attachment preferences. These findings support an integrative model of sentence processing, in which pragmatic and social cues influence interpretation from early stages. Therefore, rather than committing immediately based on syntactic information alone, Korean speakers appear to delay attachment until morphosyntactic and contextual cues provide sufficient guidance.

This processing strategy contrasts with that of other HA-preference languages such as Spanish. Although Spanish exhibits a high attachment bias in offline interpretation, online measures often show an initial preference for low attachment (Aguilar & Grillo, 2021; a.o.). One plausible explanation lies in cross-linguistic structural differences. In languages such as Spanish, relative clauses are postnominal: the two potential attachment sites (NP1 and NP2) are encountered before the relative clause begins. When the relative pronoun is introduced, readers are forced to initiate attachment without access to disambiguating semantic or pragmatic cues. Under these conditions, parsers can follow syntax-first strategies, relying on locality or structural simplicity to guide early decisions. By contrast, Korean relative clauses are prenominal, and the disambiguating verb—and with it, morphosyntactic cues like honorific agreement—appears before the head noun. Because Korean readers encounter relevant pragmatic and morphosyntactic cues before the potential attachment sites, the input may encourage a wait-and-see strategy—maintaining multiple interpretations until sufficient evidence supports a commitment—which is reflected in the absence of early effects at the linearly local noun (NP2). In addition, the relative strength and reliability of disambiguating cues may differ cross-linguistically. Spanish employs obligatory grammatical features such as number and gender agreement at the verb, which provide robust syntactic cues that strongly constrain interpretation. In contrast, Korean honorific agreement is optional and

pragmatically driven, rather than syntactically mandated. Its use depends not only on morphosyntactic compatibility but also on context-sensitive social relationships between referents and the speaker. As a result, Korean honorifics may serve as softer, less deterministic cues in real-time parsing, allowing for greater interpretive flexibility and reducing their immediate influence on attachment decisions.

These findings may also be shaped by broader patterns in the use of honorifics in Korean. As discussed earlier, honorific marking is often employed as a default strategy to maintain politeness, even in contexts where it is not grammatically mandated. This pragmatic overextension may reduce the cue's reliability for guiding early syntactic decisions. Moreover, while the use of kinship terms was intended to provide clear and culturally stable indicators of social hierarchy, individual variation in how speakers interpret and apply honorific norms—particularly in family contexts—may have influenced their processing behavior. These considerations highlight the complex interplay between grammar, pragmatics, and individual speaker experience in shaping real-time language comprehension.

5. Conclusion

This study examined whether Korean honorific agreement functions as a strong syntactic cue, akin to number or gender agreement, and whether real-time sentence processing in Korean reflects a syntax-first or integrative parsing strategy. The findings indicate that while honorific marking can bias attachment toward socially compatible referents, it does not exert a deterministic influence: even in comprehension tasks, the default high attachment preference persisted across conditions. In self-paced reading, no early effects were observed at the linearly local noun, suggesting that readers delayed commitment until disambiguating cues—such as honorific morphology and referent status—were available. This delayed parsing pattern may be shaped by structural properties of Korean, where relative clauses are prenominal and critical cues are encountered later, as well as by the optional and pragmatically governed nature of honorific agreement. The variability in real-world honorific use, particularly across speakers with different sociocultural backgrounds, may further reduce the cue's predictive strength. Taken together, the results suggest that honorific agreement in Korean operates as a soft cue—grammatically licensed but pragmatically mediated—whose influence is integrated with other contextual information during sentence comprehension.

References

Abney, S. P. (1989). A computational model of human parsing. *Journal of Psycholinguistic Research*, *18*(1), 129-144.

Aguilar, M., & Grillo, N. (2021). Spanish is not different: On the universality of minimal structure and locality principles. *Glossa: A Journal of General Linguistics*.

Altmann, G. (1986). Reference and the resolution of local syntactic ambiguity: The effect of context during human sentence processing.

Altmann, G. (1987). Modularity and interaction in sentence processing. In J. Garfield (Ed.), *Modularity in knowledge representation and natural language processing*. Cambridge, MA: MIT Press.

Altmann, G., & Steedman, M. (1988). Interaction with context during human sentence processing. *Cognition*, *30*(3), 191-238.

Baayen, R. H., Davidson, D. J., & Bates, D. M. (2008). Mixed-effects modeling with crossed random effects for subjects and items. *Journal of Memory and Language, 59*(4), 390-412.

Barr, D. J., Levy, R., Scheepers, C., & Tily, H. J. (2013). Random effects structure for confirmatory hypothesis testing: Keep it maximal. *Journal of Memory and Language, 68*(3), 255-278.

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, *67*, 1-48.

Britt, M. A. (1994). The interaction of referential ambiguity and argument structure in the parsing of prepositional phrases. *Journal of Memory and Language*, *33*(2), 251-283.

Brown, L. (2015). Honorifics and politeness. *The handbook of Korean linguistics*. 303-319.

Brown, L. (2022). Politeness as normative, evaluative and discriminatory: The case of verbal hygiene discourses on correct honorifics use in South Korea. *Journal of Politeness Research*, *18*(1), 63-91.

Carreiras, M., & Clifton Jr, C. (1993). Relative clause interpretation preferences in Spanish and English. *Language and Speech*, *36*(4), 353-372.

Core Team, R. (2021). R: A language and environment for statistical computing [Computer software]. Vienna, Austria: R Foundation for Statistical Computing.

Crain, S., & Steedman, M. (1985). On not being led up the garden path: The use of context by the psychological syntax processor. *Natural Language Parsing: Psychological, Computational, and Theoretical Perspectives*, 320-358.

Cuetos, F., & Mitchell, D. C. (1988). Cross-linguistic differences in parsing: Restrictions on the use of the late closure strategy in spanish. *Cognition, 30*(1), 73-105.

Ford, M. (1982). A competence-based theory of syntactic closure. *The Mental Representation of Grammatical Relations*.

Frazier, L. (1978). *On comprehending sentences: Syntactic parsing strategies* (Ph.D. dissertation) University of Connecticut, Storrs.

Frazier, L. (1987). Theories of sentence processing. In J. Garfield (Ed.), *Modularity in knowledge representation and natural language understanding* (pp. 291-307). Cambridge, MA: MIT Press.

Frazier, L., & Clifton, C. (1996). *Construal*. Mit Press.

Gibson, E. (2001). Recency in verb phrase attachment. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *27*(2), 574-590.

Gibson, E., Pearlmutter, N., Canseco-Gonzalez, E., & Hickok, G. (1996). Recency preference in the human sentence processing mechanism. *Cognition, 59*(1), 23-59.

Grillo, N., & Costa, J. (2014). A novel argument for the universality of parsing principles. *Cognition, 133*(1), 156-187.

Hemforth, B., Fernandez, S., Clifton Jr, C., Frazier, L., Konieczny, L., & Walter, M. (2015). Relative clause attachment in German, English, Spanish and French: Effects of position and length. *Lingua, 166*, 43-64.

Hemforth, B., Konieczny, L., & Scheepers, C. (2000). Syntactic attachment and anaphor resolution: The two sides of relative clause attachment. In M. W. Crocker, M. Pickering, & C. Clifton, Jr. (Eds.), *Architectures and mechanisms for language processing* (pp. 259-281). Cambridge University Press.

Keating, G. D., & Jegerski, J. (2015). Experimental designs in sentence processing research: A methodological review and user's guide. *Studies in Second Language Acquisition*, *37*(1), 1-32.

Lenth, R., Singmann, H., Love, J., Buerkner, P., & Herve, M. (2018). Package "emmean", R package version 4.0-3.

Lim, L. (2012). Processing of relative clauses in Korean. *Korean Journal of Linguistics, 37*(3), 719-736.

MacDonald, M. C., Pearlmutter, N. J., & Seidenberg, M. S. (1994). The lexical nature of syntactic ambiguity resolution. *Psychological Review*, *101*(4), 676.

Ni, W., & Crain, S. (1990). How to resolve structural ambiguities. In *Proceedings of North East Linguistic Society 20, GLSA,* Amherst, MA.

Pealmutter, N. J., & MacDonald, M. C. (1992). Plausibility and syntactic ambiguity

resolution. In *Proceedings of the Annual Meeting of the Cognitive Science Society* (14), 498-503.

Pozniak, C., Hemforth, B., Haendler, Y., Santi, A., & Grillo, N. (2019). Seeing events vs. entities: The processing advantage of pseudo relatives over relative clauses. *Journal of Memory and Language, 107*, 128-151.

Sohn, H.-M. (2001). *The Korean language*. Cambridge University Press.

Spivey-Knowlton, M., & Tanenhaus, M. (1994). Referential context and syntactic ambiguity resolution. In *Perspectives on sentence processing* (415-439). Psychology Press.

Steedman, M., & Altmann, G. (1989). Ambiguity in context: A reply. *Language and Cognitive Processes*, *4*(3-4), 105-122.

Taraban, R., & McClelland, J. L. (1988). Constituent attachment and thematic role assignment in sentence processing: Influences of content-based expectations. *Journal of Memory and Language*, *27*(6), 597-632.

Taraban, R., & McClelland, J. L. (1990). Parsing and comprehension: A multiple-constraint view. In *Comprehension processes in reading* (pp. 231-264). Routledge.

Trueswell, J. C., Tanenhaus, M. K., & Garnsey, S. M. (1994). Semantic influences on parsing: Use of thematic role information in syntactic ambiguity resolution. *Journal of Memory and Language*, *33*(3), 285-318.

Zehr, J., & Schwarz, F. (2018). Penncontroller for internet based experiments (ibex).

So Young Lee
Assistant Professor
Department of English
Miami University
500 Harris Dr. 134 Harris Hall, Oxford, Ohio 45056, USA
E-mail: soyounglee.linguist@gmail.com

Received: June 29, 2025
Revised version received: August 4, 2025
Accepted: August 19, 2025