Interactions between cognitive accessibility and parsing strategies: processing cataphora in Korean

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Previous studies suggest that pronominal elements are interpreted immediately (Barkley, Kluender, & Kutas, 2015), with cataphoric pronouns triggering an active search for antecedents in predicted positions (Kazanina et al., 2007). This active search predicts a subject interpretation preference for pronominal elements, regardless of type, when forming cataphoric dependencies. In contrast, Accessibility Theory posits distinct biases, with pro favoring subject antecedents and overt pronouns favoring object antecedents (Ariel, 1988). To investigate how cognitive accessibility interacts with online parsing strategies, we conducted two experiments examining the processing of pro and overt pronouns using honorific agreement in Korean (1). Experiment 1 employed a questionnaire to collect offline naturalness judgments, while Experiment 2 used an eye-tracking method to investigate real-time sentence processing.

The target sentences (2) included either cataphorically used pro or overt pronouns. Additionally, the order of an honorifiable and nonhonorifiable NP was manipulated, with NP1 consistently appearing in the subject position and NP2 in the object position, following the canonical word order of Korean. Embedded verbs were marked with the subject honorific suffix (e.g., leave-HON), requiring an honorifiable NP as the subject, thereby resolving ambiguity between NP1 and NP2 as potential antecedents.

Experiment 1 (n = 49) revealed significant effects of NP order, with higher naturalness ratings for the H-NH order (M = 5.03) than the NH-H order (M = 3.6) ($\beta = 0.71$, $SE = 0.07$, $t = 10.72$, $p < .001$). Sentences with *pro* (M = 5.79) were also rated more natural than overt pronouns (M = 4.28; $\beta = -0.34$, $SE = 0.08$, $t = -4.18$, $p < .001$), but only in the H-NH order. However, comprehension questions indicated a preference for NP1 as the antecedent, regardless of pronoun type ($\beta = 2.08$, $SE = 0.26$, $t = 8.05$, $p <.001$).

Experiment 2 (n = 40) used the same stimuli. Predictions were made based on form-function correlations guiding online antecedent resolution. Specifically, NH-H ordering was predicted to incur processing difficulty at NP1 for pro, due to honorific feature mismatches given its subject NP bias, and at NP2 for overt pronouns. Single fixation analyses showed greater processing disturbance for *pro* in the NH-H order compared to the H-NH order ($\beta = -0.06$, $SE = 0.03$, $t = -2.05$, $p = .04$; Fig 1), with no significant interaction between pronoun type and NP ordering. On the other hand, later measurements revealed only a main effect of NP ordering, with longer reading times for NH-H compared to H-NH, regardless of pronoun type ($\beta = -0.028$, $SE = 0.013$, $t = -2.18$, $p = .03$; Fig 2).

These findings suggest that parsing strategies for resolving cataphoric dependencies interact with the form-function correlations of pronoun types. While the referential biases of *pro* and overt pronouns are relatively weak and short-lived, they appear to guide predictive processing during referential ambiguity resolution. However, this tendency is easily overridden by the parser's preference to resolve incomplete dependencies quickly, highlighting the interplay between grammatical constraints and cognitive accessibility in language comprehension.

(1) Configuration of the target sentences for Experiments 1 and 2, with lines indicating potential coreference readings between the pronoun and their possible antecedents.

[emb.cl. pronoun emb.verb-hon] [main.cl NP1_subj NP2_obj main.verb]

(2) Target sentences for Experiments 1 and 2

a) [Overt pronoun & H-NH (lawyer-Tom)] or [Overt pronoun & NH-H order (Tom-lawyer)]

he-nom abroad-to business.trip-acc leave-**hon**.before, lawyer-top/Tom-top[W6]

cellphone app-with Tom/lawyer-dat transfer-acc finish-hon-pst-decl

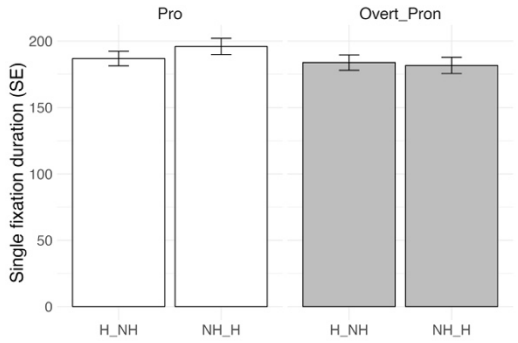
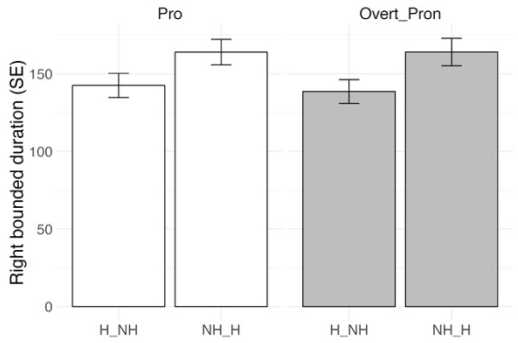
'Before he left for a business trip abroad, the lawyer/Tom sent Tom/lawyer money using a cellphone app.'

a) [*Pro* & H-NH (lawyer-Tom)] or [*Pro* & NH-H order (Tom-lawyer)]

pro abroad-to business.trip-acc leave-**hon**.before, lawyer-top/Tom-top[W6]

cellphone app-with Tom/lawyer-dat transfer-acc finish-hon-pst-decl

'Before *pro* left for a business trip abroad, the lawyer/Tom sent Tom/lawyer money using a cellphone app.'

Fig 1	Fig 2
	
Single fixation durations at the spill-over region	Right bounded durations at the spill-over region