

## Effects of coherence relations on the interpretation of Korean null pronouns

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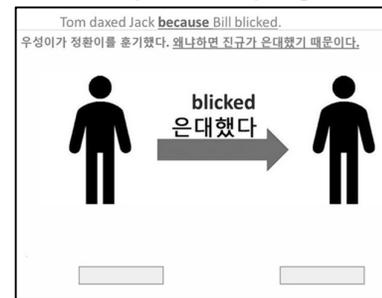
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Broadly speaking, current models of pronoun interpretation can be divided into two types: (i) a largely structurally-based heuristics approach which focuses on mostly linguistic factors such as subjecthood and structural parallelism (e.g., Stevenson, Crawley & Kleinman, 1994, Smyth 1994 *inter alia*) and (ii) a discourse-based coherence relation approach (e.g., Hobbs, 1979; Kehler, 2002) which regards pronoun resolution as a side-effect of general inferencing processes during discourse comprehension. Prior work shows that coherence relations play a key role in shaping expectations about upcoming discourse, including who will be mentioned and with what kind of referring expression. Our work extends the domain of inquiry to null pronouns in subject and object position in Korean.

Although a lot of work has assessed these two approaches, most research on *null pronouns* (which we refer to as '*pro*') has focused only on one of the heuristic strategies (the subject preference) and mostly on *pro* in subject position. Very few studies on *pro* interpretation have investigated the discourse-level of the coherence relation approach or looked at object-position *pro*. Thus, we aim to (i) shed light on the underlying mechanism that governs *pro* resolution—the heuristics-based approach (i.e., subject preference, parallel function preference) vs. the coherence relation approach—and more specifically on (ii) the factors that influence the interpretation of *pro* in both subject and object position.

We conducted **two studies** using a *sentence+picture completion task* (sample display on the right). Participants saw a sentence (in Korean) and typed the names of the event participants in the boxes. We used *nonce verbs* to avoid effects of verb semantics. Note that the picture indicates that verb is transitive; in the example image shown here, for example, the Korean sentence has a null *pro* in object position. (English text was not shown in the experiment; it is included here for ease of exposition.) The names participants type in the boxes for the subject and object allow us to see how they interpret the *pro* in the second clause (e.g. *because Bill blicked [null]*).



**Design:** We manipulated 3 factors that create expectations for different discourse-level coherence relations: (i) connective type (*kuliko* “and” or *waynyahamyen* “because”), (ii) presence/absence of the additive marker *-to* “also” on the name in the *second* clause (also vs. Nom), and (iii) presence/absence of the topic marker *-(n)un* on the subject of the *first* clause (Top vs. Nom). Connective type was manipulated between experiments: **Exp1** tested *because*, which signals an *explanation* relation (40 participants, 24 targets, 36 fillers). **Exp2** tested *and*, which can signal a *resemblance* relation (32 new participants, 24 targets, 36 fillers).

Importantly, the presence of the additive marker *-to* “also” not only provides another cue for a *resemblance* relation: it also makes the grammatical role of *pro* ambiguous. This allows us to test how our manipulations influence participants' expectations about (a) who the null *pro* refers to (does it refer to the *preceding* subject or object?), and (b) what grammatical position the null *pro* occupies (is it the subject or object of *its clause*?). This is illustrated in ex(1). When the name in the second clause is marked with **nominative**, the *null pro must be in object position* (1a). However, when the name in the second clause is **marked with the additive marker**, the case marker is dropped, so the name can be Nom or Acc – and thus the null *pro can be in subject or in object position* (1b). This allows us to see if participants 'put' the *pro* in a parallel grammatical role relative to their antecedent choice. We can tell from participants' responses what position they interpret the *pro* as being in (as well as who it refers to).

(1a) Example w/ Nom case on the name in clause 2 (*Nom2 condition*); Exp1 (*because*) & Exp2 (*and*).

Tom{-i / -nun} Jack-ul tayksuhayssta.  
 Tom{-Nom / Top} Jack-Acc daxed  
 {Waynyahamyen / kuliko} Bill-i pullikhaysski ttaymwun-i-ta.  
 {Because / and} Bill-Nom blicked reason-be-Dec  
 ‘Tom{-Nom/Top} daxed Jack (.) {because / and} Bill-Nom blicked [null].’ [object-position pro]

(1b) Example w/ *Also* on the name in clause 2 (*also condition*); Exp1 (*because*) & Exp2 (*and*).

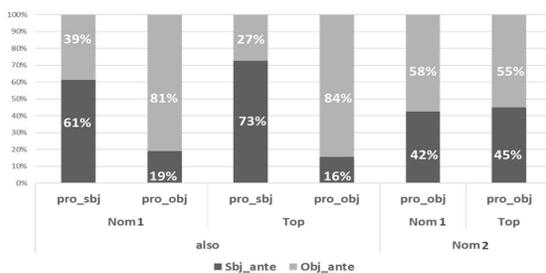
Tom{-i / -nun} Jack-ul tayksuhayssta.  
 Tom{-Nom / Top} Jack-Acc daxed.  
 {Waynyahamyen / kuliko} Bill-to pullikhaysski ttaymwun-i-ta.  
 {Because / and} Bill-also blicked reason-be-Dec  
 ‘Tom{-Nom/Top} daxed Jack (.) {because / and} Bill{-Also} blicked [null].’ [reading1:obj-position pro]  
 ‘Tom{-Nom/Top} daxed Jack (.) {because / and} [null] blicked Bill{-Also}.’ [reading2:subj-position pro]

**Predictions.** According to the **coherence-relation approach**, *pro* resolution will be modulated by the factors we manipulated: When a *resemblance* relation is signaled by “and” or the additive marker *-to* “also,” we expect a preference for parallel antecedents (see e.g. Kehler, 2002 on resemblance). No strong bias for either antecedent is expected with *explanation* relations (“because”), since prior work on implicit causality shows that these configurations can be biased towards subjects *or* objects. (We used nonce verbs, so people have no information about verb semantics.) As regards Top marking, that may increase overall subject-antecedent choices. In contrast, *pro* resolution will not be modulated by these factors if it is guided only by a specific heuristic: The **subjecthood** preference predicts a uniform subject-antecedent preference in all conditions; the **parallel function** preference (if it is sensitive only to syntactic parallelism) predicts a uniform parallel grammatical role preference.

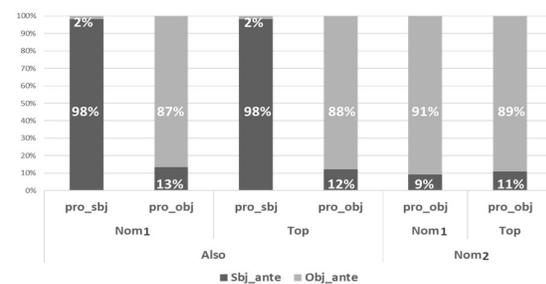
**Results** support the coherence-relation approach. When all signs point to an *explanation* relation – the name in clause2 is Nom and the connective is *because* (2 rightmost bars in Fig.1) – there is no clear preference for either antecedent ( $p=n.s.$ ). But when *resemblance* is signaled by either *and* (2 rightmost bars in Fig.2) or *also* (4 leftmost bars in Fig.1), we find a clear preference for an antecedent in the *parallel grammatical position* to that of the pronoun itself ( $p<.05$ ). Furthermore, this parallel bias is stronger when *resemblance* is signaled by both *and* and *also* ( $p<.05$ , compare 4 leftmost bars in Fig.2 to those in Fig. 1), relative to only *also*. Top-marking has no effect, maybe due to lack of context.

**In sum**, our studies provide new evidence that both *subject- and object-position null pronouns* are sensitive to both structural and discourse-level factors. We find that *pro* resolution is not guided by a single heuristic, but it is a by-product of multiple factors that use more general reasoning to establish the most coherent discourse-level interpretation. These findings fit with the view that pronoun interpretation is guided by expectations that comprehenders create based on preceding discourse, in particular expectations about the coherence relations that hold between clauses.

**Fig 1.** Exp1 (*because* connective)



**Fig 2.** Exp2 (*and* connective)



**Fig.1, Fig.2:** % trials where *pro* is interpreted as referring to preceding subject/object (Sbj/Obj\_ante), as a function of whether the pronoun itself is interpreted as being in subject or object position (pro\_sbj/pro\_obj). Recall that in Nom2 conditions, *pro* is unambiguously in object position (pro\_obj).