

Exploring readers' spontaneous use of perspective inferencing in pronoun interpretation

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Identifying a pronoun's referent is critical for establishing utterance meaning. Recent work in English exploring the interpretation of grammatically-ambiguous pronouns in sentences like examples (1a-b) has highlighted a key role for **perspective-based computations** [1]. Specifically, in an "assertion" scenario such as (1a), readers near-categorically understood *she* as coreferring with Alyssa (the subject antecedent) because the sentence reflects Alyssa's intention to share information with Daisy that Daisy does not know [cf. 2, 3]. In contrast, in a "question" scenario like (1b), Alyssa is now seeking information, reversing the pattern such that there is now a near-ceiling preference for Daisy (object antecedent) as the intended referent. A follow-up study showed that these patterns are not simply due to lexical biases arising from the main verbs *tell* and *ask*. This is because a prior **context sentence** can "reverse" the above-described patterns (see "shifting" contexts: 2a-b) [4]. Specifically, readers now prefer subject antecedents 23% of the time for *tell* and 68% of the time for *ask*. This effect arises because the context sentence adds information to the situation model that alters the two characters' likelihoods of possessing or lacking the key knowledge at hand. This information in turn overrules the otherwise default assumptions about which character will possess the key knowledge for a "telling" or "asking" event. In contrast, contexts that do not alter information in this way preserve the original antecedent preferences found in (1a-b): see (2c). Here, readers prefer subject antecedents 95% of the time for *tell*, and 10% for *ask*.

Although these results provide evidence that the patterns are not driven by the main verbs, the capacity for nuanced and flexible forms of perspective reasoning is still unclear. This is because the context sentence itself provides extremely salient information that "sets up" a number of expectations for how the narrative text will proceed. The reading of the critical sentence then occurs against this expectation-driven situational backdrop. The current study (in English) addresses this concern using materials where the key information that should "shift" the antecedent preference (i) is contained **within** the test sentence itself, and (ii) involves only the manipulation of a phrase relating to the main-clause object character. More specifically, we kept the main verb constant (*ask*) and made simple changes that varied what readers knew about the object antecedent. For example, in (3a, "neutral" condition), Isabelle is likely asking if the addressee (her sister) has normal blood pressure. This reflects the 'default' circumstance where the pronoun is interpreted as referring to the addressee. In contrast, with (3b, "shifting" condition), Isabelle is likely asking the addressee (her physician) about herself, as a physician would hold the relevant expertise to answer Isabelle's question about her blood pressure. The findings showed a strong reversal in antecedent selection preferences, where readers selected the subject antecedent 13% of the time in the neutral cases and 86% of the time in shifting cases, see Figure 1 (corroborated by GLME modelling: $\beta = -2.84$, $SE = 0.29$, $z = -9.6$, $p < .001$). This outcome provides robust evidence that readers engage in flexible and nuanced forms of perspective inferencing "on the fly" to understand pronouns, and (aligned with the earlier work) that these inferences go beyond any lexical biases stemming from the main verb. Further, the strength of the information readers use to make these inferences does not depend on the kind of salient expectations that are set up in a separate preceding context sentence. This is even more striking when considering the degree of change in subject antecedent selections between the neutral and biasing cases: In the current study, the proportion of subject antecedent selections increased by 0.73, whereas the increase in [4] was 0.58 for comparable *ask* cases.

Together, the findings provide further evidence that the effects found in previous work arise from genuine perspective reasoning, and that this process can be strongly influenced by comparatively minor changes to the information occurring in the same sentence as the antecedents and pronoun.

Example Sentences – Previous Work

- (1) a. Alyssa told Daisy that she likes making new friends at school.
b. Alyssa asked Daisy if she likes making new friends at school.
- (2) a. Molly, a tour guide, was talking to Hana, who is unfamiliar with Japanese currency. Molly told Hana that she had enough cash to buy a sandwich. (*shifting-tell*)
b. Molly, who is unfamiliar with Japanese currency, was talking to her tour guide, Hana. Molly asked Hana if she had enough cash to buy a sandwich. (*shifting-ask*)
c. Molly, who noticed it was almost 12:30 PM, was walking with her good friend Hana. Molly [told/asked] Hana [that/if] she had enough cash to buy a sandwich. (*neutral*)

Example Sentences – Current Study

- (3) a. Isabelle asked her sister Melanie if she has normal blood pressure. (*neutral*)
b. Isabelle asked her physician Melanie if she has normal blood pressure. (*shifting*)

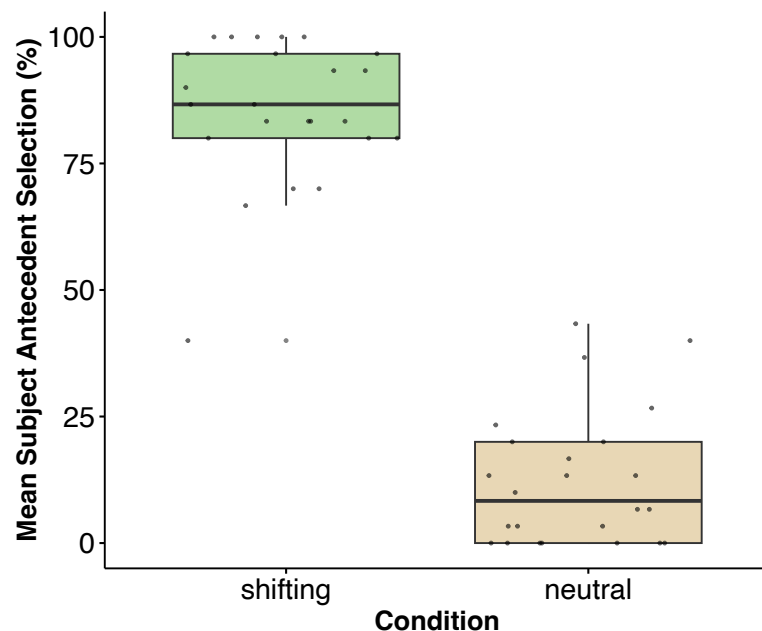


Figure 1: Mean subject antecedent selections by condition. Individual data points reflect item averages. ($n_{\text{ppts}} = 60$, $n_{\text{items}} = 24$)

References:

- [1] Simovic, T. V., & Chambers, C. G. (2023). The pragmatics of characters' mental perspectives in pronominal reference resolution. In *Proceedings of The Sixth Workshop on Computational Models of Reference, Anaphora and Coreference (CRAC 2023)*, 48-50.
- [2] Grice, H. P. (1975). Logic and conversation. In Cole & Morgan (Eds.), *Syntax & semantics vol. 3: Speech acts* (pp. 41-58). Brill.
- [3] Smyth, R. (1995). Conceptual perspective-taking and children's interpretation of pronouns in reported speech. *Journal of Child Language*, 22(1), 171-187.
- [4] Simovic, T. V., & Chambers, C. G. (2024). *Pronoun interpretation highlights the robustness of social perspective reasoning* [Conference presentation]. 37th Annual Conference on Human Sentence Processing, Ann Arbor, MI, United States.