Priming discourse structure guides pronoun comprehension

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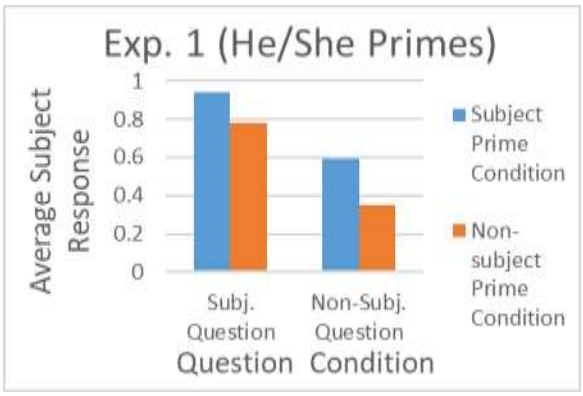
Ambiguous pronouns require people to infer the referent from the context. In “Ana went to the store with Liz. She bought bread,” people tend to assume that “she” refers to topical referents, for example the subject of the prior sentence, Ana (e.g., Brennan, 1995). Where does this bias come from? The exposure hypothesis suggests that people are sensitive to the referential patterns that are frequent in natural language. Speakers frequently refer to subjects overall, so listeners learn to expect subject reference, and apply this expectation when they see an ambiguous pronoun. This view is supported by evidence that these frequency patterns do hold in natural language (Arnold, 1998). In addition, the tendency to follow the subject-assignment strategy for ambiguous pronouns is stronger for people who have high print exposure (i.e., people who read a lot), which means that language exposure is correlated with the use of this discourse strategy. However, this effect is correlational, and does not directly show a link between discourse exposure and pronoun comprehension. In addition, it is not clear what types of exposure matter. Do people track the frequencies of subject-reference for all forms, or just pronouns, or just third-person pronouns?

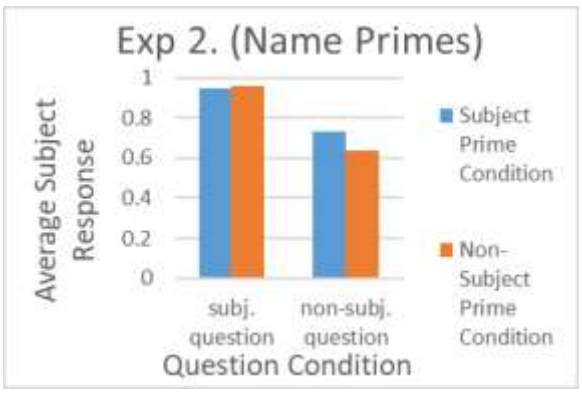
Our project seeks to address these questions with a priming study, to test whether exposure matters in the short term. Mturk participants read stories like “Ana went hiking with Liz. She used the binoculars.” They answered questions like “Did Ana use the binoculars?” or “Did Liz use the binoculars?” which indicated their interpretation of the ambiguous pronoun. Critically, these ambiguous stories were combined with unambiguous prime stories. Participants in the subject-prime condition only saw primes with reference to the subject character (“Ana played music with Matt. She ….”); those in the nonsubject-prime condition only saw nonsubject-reference stories (“Ana played music with Matt. He….”). The experiment started with 12 prime stories; the other 20 primes were interspersed with 12 ambiguous stories. Our key question was whether participants would be more likely to assign the pronoun to the subject in the subject-prime condition. We also manipulated whether the question asked about the subject or the nonsubject. E.g., in the example above, “yes” to the Ana question and “no” to the Liz question were coded as reflecting a subject interpretation.

In three experiments, we tested 3 prime types. Experiment 1 (59 participants) used unambiguous pronoun primes (using different-gender contexts to make the pronoun ambiguous). Experiment 2 (59 participants) used name primes (e.g., “Ana played music with Matt. Ana played the piano.” Experiment 3 (54 participants) used I/you primes (e.g., “I played music with you. I played the piano.”) In addition, we tested print exposure with the Author Recognition Task (ART; Stanovitch & West, 1989), where participants saw a list of real and fake authors, and indicated which ones they recognized as real.

Our critical finding (see Fig. 1) was that people were more likely to select the subject character as the referent for the ambiguous pronouns in the subject-prime than non-subject prime conditions, but most strongly when primed with unambiguous third-person pronouns (Exp. 1 $p < .01$). In Exp. 1 there was also a main effect of print exposure, where people with high ART scores were more likely to select the subject overall. With name primes (Exp. 2), there was also a smaller priming effect, but it only occurred for people with high print exposure, leading to an interaction between ART and priming ($p = .045$). In Exp. 3 there was no priming effect with I/you pronoun primes ($p = .886$), and a numerical but nonsignificant effect of print exposure ($p = .09$). There was also a main effect of the question type in all experiments, because people tended to answer yes to both questions, leading to a stronger subject bias with subject questions.

These findings provide the first evidence that discourse exposure guides pronoun comprehension, and that even very brief exposures can modulate the subject bias. We also observed limits to the priming effect, which was strongest when the priming stimuli (he/she pronouns) were most similar to the test items.





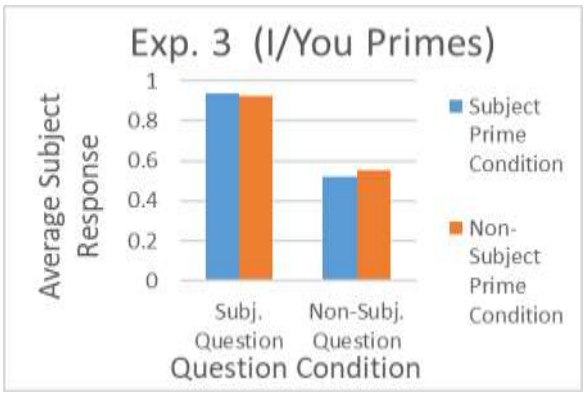


Figure 1. Priming effect in each experiment – Average subject selection when asked about subject or non-subject character

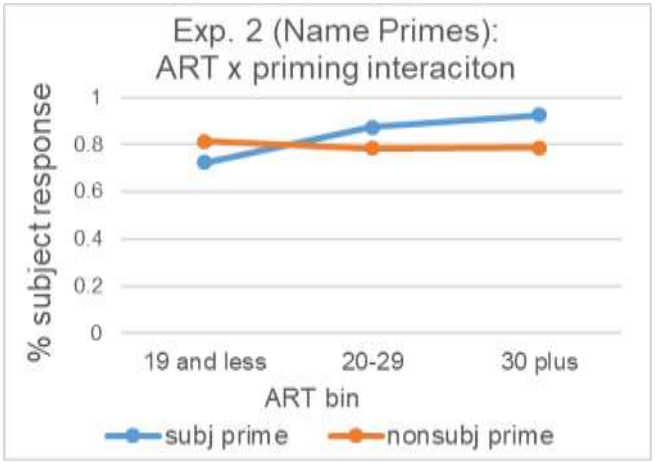


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Figure 2. ART x Condition interaction

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