

Referential predictability and topicality diverge in implicit causality

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Many current models of pronoun comprehension are based on referential probabilities, i.e. the idea that people predict who is likely to be mentioned next (Arnold, 2010; Hartshorne et al. Kehler & Rohde, 2013), and this guides pronoun comprehension. For example, following a sentence like “Ana admired Liz...”, most people assume that the cause of this admiration was Liz. This implicit causality (IC) leads people to predict that Liz will be mentioned next, and guides pronoun interpretation. IC is dependent on the assumed coherence relation, namely that the upcoming clause is expected to provide an explanation for the first clause.

But it is not clear where predictability comes from. Some models suggest that predictability is linked to topicality (Arnold, 2010; Givon, 1983). Consistent with this, Author & Author (2019) found that people judge the subject to be both topical and predictable in sentences like “Ana is cleaning up with Liz.” But Kehler and Rohde’s (2013) model contains separate representations for the predictability of the referent and the suitability of a pronoun, which is linked to the topicality of the referent. In their model, the topic is defined as the prior grammatical subject.

We test whether predictability and topicality are distinct or not in implicit causality scenarios, using either subject-cause verbs, e.g. *Ana and Liz were competing in a marathon. Ana enraged Liz {because}...*, or object-cause verbs, e.g. *Will and Matt were fishing with their kids. Will admired Matt {because}...* Participants answered a question about either topicality “Who do you think is the **main character** of this story?” or predictability: “Think about the **rest of the second sentence** in this story. Who do you think will be mentioned?” We asked two research questions. **1)** Are topicality and predictability influenced by similar or different properties? We test the effects of subjecthood, verbytype (subject- vs. object-cause), and whether or not the fragment ends in “because”, which strengthens the explanation coherence relation. **2)** How do these judgments vary across individuals? Recent evidence suggests that people who have higher print exposure (i.e., those who read more) are more likely to assign ambiguous pronouns to the grammatical subject for a verb type where the subject is both topical and predictable (Arnold et al., 2018). For IC sentences, the subject bias is modulated by IC, which is predicted to dissociate predictability and topicality. This provides an opportunity to test whether print exposure is related to topicality judgments or predictability judgments, or both.

Methods. Mturk participants read 6 IC stories with both subj- and obj-cause verbs and 6 fillers, and answered either the topicality question (Exp. 1, n=32) or predictability question (Exp. 2, n=32). The presence of “because” was manipulated between subjects. We measured print exposure with the Author Recognition Task (ART; Stanovich & West, 1989). **Results.** Main character question: there was a uniform preference to pick the subject (see Fig. 1). In a mixed effects logistic regression, only the intercept was significant ($p < .001$). Next mention question: people chose the subject more when it was the cause than not (main effect of verbytype, $p = .049$), but more often in the presence of because (verbytype x connection interaction, $p = .015$; see Fig. 2). When we added ART scores and their interactions to the models (Fig. 3), they had no effect on the main character question, but for the prediction question, high-ART participants showed a stronger effect of verb type (verbytype x ART interaction, $p = .01$) **Conclusions.** Predictability was judged separately from topicality, unlike other verb types (Author and Author, 2019), which suggests predictability calculations vary by both verb type and language exposure.

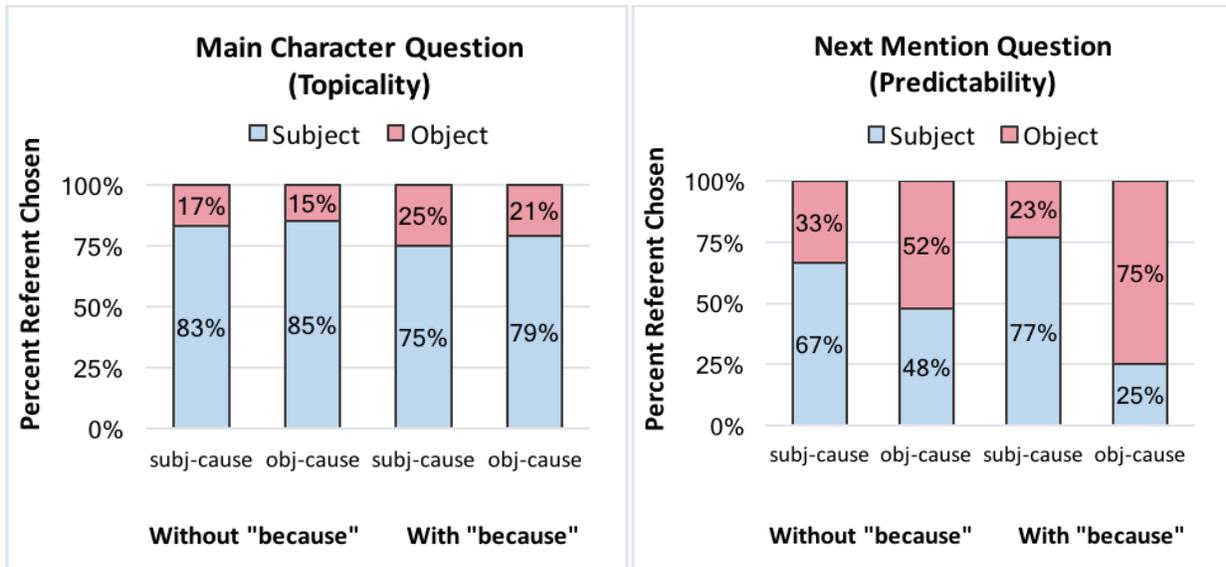


Figure 1 and 2. Percentage of referent chosen for measures of topicality and predictability.

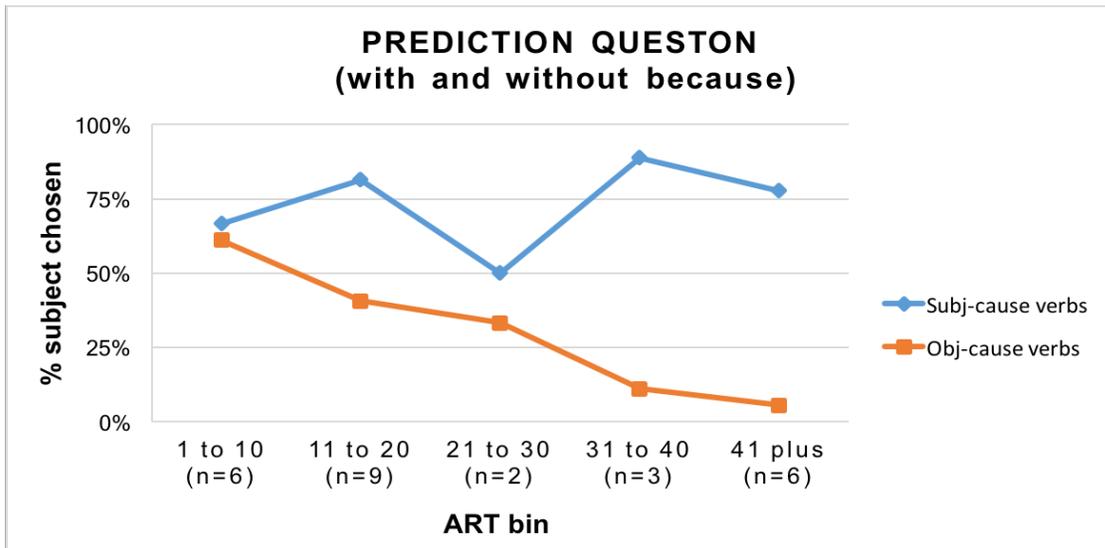


Figure 3. The interaction between print exposure (as measured by the Author Recognition Task (ART)) and verb type. ART scores are binned, number of subjects in each bin are indicated.

References

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