Comprehension of Fluent and Disfluent Relative Clauses in Spoken Sentences

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Research on the processing of repair disfluencies (e.g., "Turn left, uh I mean right.") has demonstrated that information about the reparandum ("left" in this example) is not erased from the comprehender's representation of the sentence, but rather lingers in memory and influences interpretation (Karimi et al., 2021; Lau & Ferreira, 2005). The primary goal of the current experiment was to determine whether similar patterns would emerge during the processing of complex syntactic structures (i.e., relative clauses) in which information in the reparandum could potentially help the comprehender arrive at the correct interpretation of the sentence.

A large literature has demonstrated that object-extracted relative clauses (ORCs; 1b) are more difficult to process than subject-extracted relative clauses (SRCs; 1a). This difference is often explained as resulting from a greater memory burden placed on the comprehender while processing ORCs. This burden stems from the need to encode two noun phrases (NPs) into memory and store them until verbs cue their retrieval. Retrieval of the NPs in the correct order can be difficult, especially when they are similar to one another, resulting in interference. Evidence for similarity-based interference in the processing of RCs comes from experiments demonstrating that the ORC-SRC asymmetry is reduced when the two NPs come from different semantic classes (1d vs. 1c) compared to when they come from the same semantic class (1b vs. 1a) (Gordon et al., 2001, 2004). Importantly, however, most research on RC processing has been conducted with written materials; in contrast, little work has examined RC processing in spoken sentences. Thus, an additional goal of the current experiment was to replicate previous demonstrations of similarity-based interference in the processing of RCs in the auditory domain.

Participants (n = 105) recruited via Mechanical Turk listened to spoken English sentences like those in (1). Following each sentence, a visually presented comprehension question was displayed. There were 36 experimental items like those in (1), which were counterbalanced across six lists and intermixed with 60 filler sentences. Items were presented randomly.

Figure 1 presents mean accuracy rates across the six conditions, whereas Figure 2 presents mean response time to answer the question. Results showed a robust effect of RC type such that accuracy was lower and RT was longer for ORCs versus SRCs. The magnitude of the RC effect was significantly reduced when the NPs were a mixture of a descriptive noun and a proper name compared to when both NPs were a descriptive noun. Comparing the disfluent condition (1f vs. 1e) to the fluent condition (1b vs. 1a), we observed a main effect of fluency, such that accuracy was lower and RT was longer for the disfluent versus the fluent items. The fluency manipulation did not interact with RC type.

The experiment replicates some of the key findings on comprehension of relative clauses and extends them to the domain of spoken language. In particular, this work provides further evidence in support of similarity-based interference as an explanation for the ORC-SRC processing asymmetry. In addition, the results showed that inserting a repair disfluency into the sentences had the effect of decreasing accuracy and increasing RT to a similar degree for both the ORCs and SRCs, likely because these sentences were longer than the others and were therefore more difficult to hold in memory. We observed no evidence to suggest that participants used information about the reparandum to help comprehend the sentence; if they had, then we should have observed a reduction in the ORC-SRC difference for 1f vs. 1e. Our prediction was based on the assumption that upon hearing an utterance like "Stephen, uh I mean the mailman," listeners would derive the interpretation that the speaker thought it was more appropriate to refer to this character as "the mailman" rather than "Stephen," but that the two labels referred to the same person. Instead, it seems that listeners interpreted the name as an additional discourse character, which perhaps led to enhanced interference (see Karimi et al., 2021).

<u>Descriptive-Descriptive, Fluent</u>
(1a) The robber that insulted the mailman read the article about the fire. (SRC)
(1b) The robber that the mailman insulted read the article about the fire. (ORC)

<u>Descriptive-Name, Fluent</u>
(1c) The robber that insulted Stephen read the article about the fire. (SRC)
(1d) The robber that Stephen insulted read the article about the fire. (ORC)

<u>Descriptive-Descriptive, Disfluent</u>
(1e) The robber that insulted Stephen, uh I mean the mailman read the article about the fire. (SRC)
(1f) The robber that Stephen, uh I mean the mailman insulted read the article about the fire. (ORC)

Example comprehension question – T or F: The mailman insulted the robber.

Figure 1.

Figure 2.
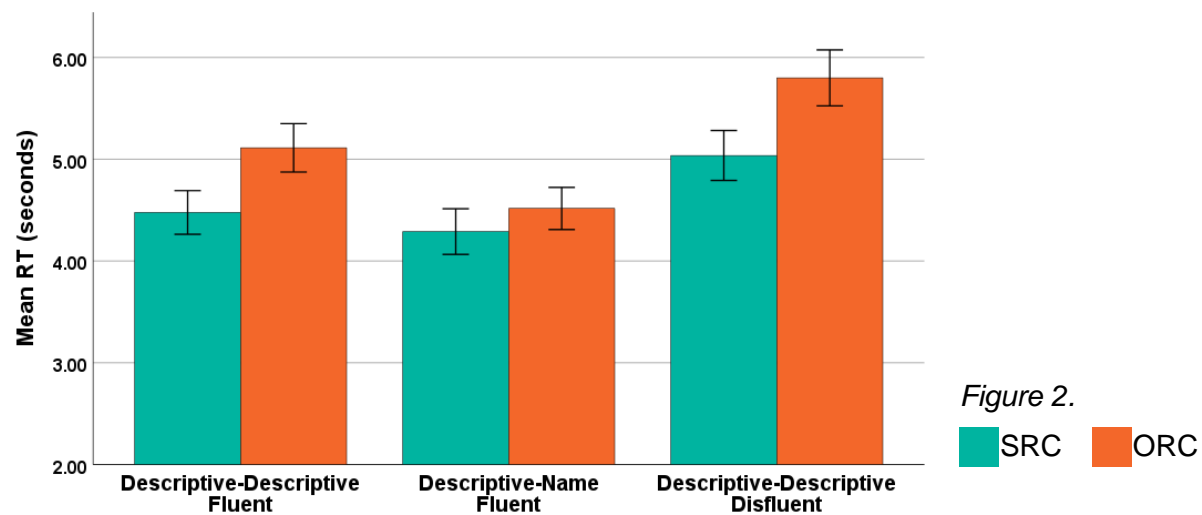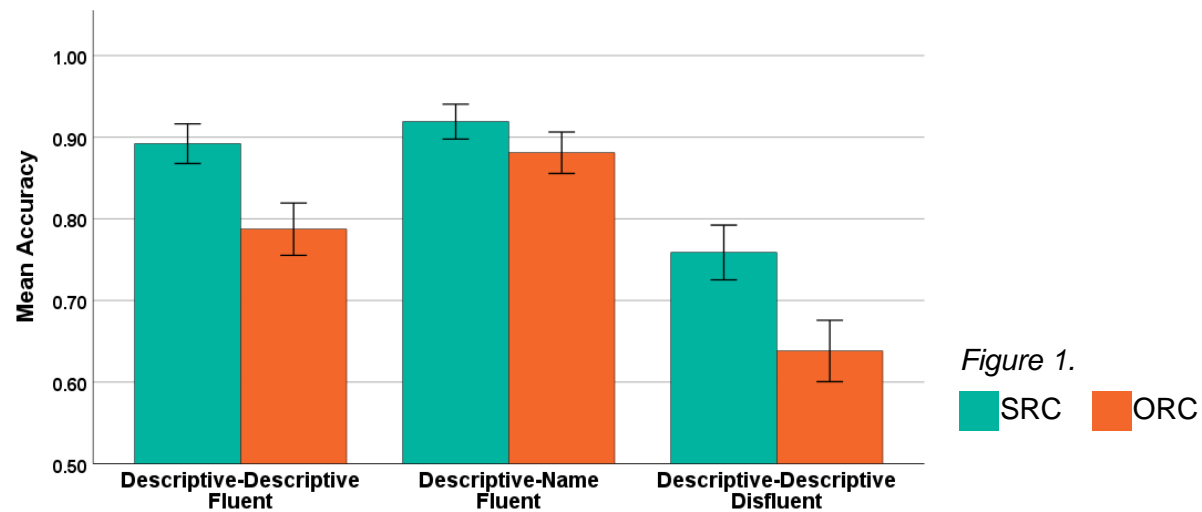
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