The structural signalling effect of filled pauses during reading

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Filled pauses (e.g., uh/um in English) in speech are known to influence listeners' processing strategies. For instance, they may influence listeners' interpretation of the given-new status of discourse entities (Arnold et al 2003), listeners' perception of the frequency of a following noun (Corley et al 2006), or even the speed at which listeners recover from processing a speech repair (Brennan and Schober 1999). In often-cited work by Bailey and Ferreira (2003), the placement of filled pauses relative to structural boundaries influenced listeners' processing of heard sentences. In a grammaticality judgment perceptual paradigm (their Experiment 3), listeners heard a stimulus sentence with a filled pause ("uh uh" in their study) inserted at either a clause boundary (actually, just after the boundary) as in 1b and 2a or a non-boundary as in 1a and 2b.

1a. [Sandra bumped into the uh uh busboy] and [the waiter got angry].
1b. [Sandra bumped into the busboy] and [the uh uh waiter got angry].
2a. [While [the man hunted] the uh uh deer ran into the woods].
2b. [While [the man hunted] the deer uh uh ran into the woods].

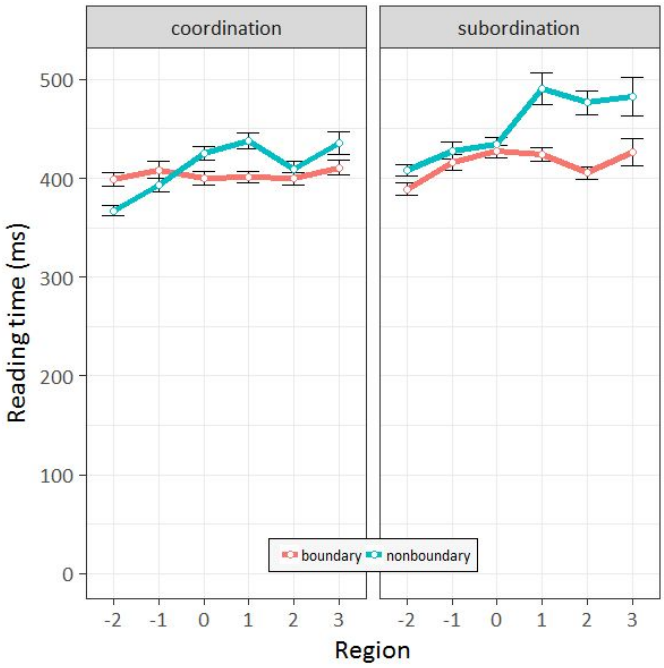
Their results showed that listeners were more likely to judge the whole sentence as ungrammatical when the disfluency was at the clause boundary. This was consistent both for stimuli using coordination structures as in (1) and subordination structures as in (2). They explained this as a signal effect: When the disfluency occurs at a clause boundary, it is a good signal and facilitates the listener's ongoing structural processing. On the other hand, when the disfluency occurs at a non-boundary, it is a bad signal and hinders the listener's correct parsing.

The present study seeks to build on this finding. Although filled pauses are fundamentally a speech phenomenon, they are increasingly found in written environments probably due to the influence of social media. The present research explores the signalling effect of filled pauses in reading using the Bailey and Ferreira basic experimental design. If, indeed, the signalling account of filled pauses in speech is accurate, then one prediction is that readers would find sentences such as 1a and 2b more difficult to process correctly than those like 1b and 2a.

To test this prediction, the original stimuli set of Bailey and Ferreira was extended and used in a self-paced reading paradigm with the regions of interest being those immediately following the disfluency. In contrast to Bailey and Ferreira's study, this approach is an on-line measure of the signal effect, as opposed to the off-line measurement of grammaticality judgment. Stimuli (84 items, 100 fillers) were presented using JESPR (Rose 2018)—a tool for the management of self-paced reading experiments through a web browser interface. Participants were recruited through the Amazon Mechanical Turk crowd-sourcing system and were paid US$5.00 each. 30 participants who were native English speakers (self-reported) completed the experiment.

Results (see Fig. 1) show that reading times were slower in the first [$F(1,29)=15.6$, $p<0.001$], second [$F(1,29)=8.6$, $p<0.001$], and third [$F(1,29)=7.8$, $p<0.01$] regions (i.e., words) after the disfluency when it was in a non-boundary position (cf. 1a/2b) than when in a boundary position (cf. 1b/2a). The effect was observed for both coordination and subordination stimuli, although it was slightly weaker in the former. This suggests that the signalling effect of filled pauses is a robust phenomenon, observable even in very different perceptual conditions (reading vs. listening) and experimental paradigms (self-paced reading vs. grammaticality judgment).

Figure 1. Reading times in relevant regions for stimuli containing a disfluency at region 0



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