

Priming Prosodic Boundaries in an Online Speech Production Experiment

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Natural language is full of syntactically ambiguous sentences, where two alternative interpretations are equally plausible. In a series of perception studies, researchers (Jun & Bishop, 2015, Mills, 2020) have shown that by priming the intonational phrase structure (*i.e.* prosodic boundaries), it is possible to promote one interpretation over the other. Surprisingly, the quite robust prosodic priming effect found in perception has not been replicated in production experiments, where intonational phrase boundaries were not primed (Tooley et al., 2014, 2018). One possible explanation to this asymmetry is that the production studies conducted so far tested the effect of prosodic boundaries on the hardest possible conditions – that is, when the intonational phrase structure is redundant to the internal structure of the sentence and/or when there is a strong syntactic preference boosting one interpretation of an ambiguous sentence over the other.

In light of these findings and their potential limitations, we replicate the prosodic priming paradigm in an online production study on British English. The goal of the experiment is double. The main aim is to assess whether prosodic boundaries can be primed and facilitate syntactic ambiguity resolution in production, when the saliency of prosodic cues is not heavily reduced by the syntactic structure. The other immediate methodological goal is to test whether online speech production data collection is possible and reliable for prosodic analyses, before running a full experiment at a greater scale. Our overall hypothesis was that, when addressing some methodological limitations in the design, and provided the quality of online audio recordings, it would be possible to see a priming effect of prosodic boundaries in production as well.

To test our hypotheses, we first ran a pilot Prolific study (6 participants), using the original material from Tooley et al.'s (2018) second experiment (1) (40 transfer-of-location sentences) and a second set of newly created 40 globally-ambiguous relative clause sentences (2) (Grillo et al., 2015, Hemforth et al., 2015). A norming study confirmed the equal plausibility of the two interpretations for the relative clauses. Also, it substantiated the claim of a strong bias in the transfer-of-location sentences (Figure 1). The experimental procedure was the same as in previous experiments. Participants were asked to repeat back out loud an auditorily or visually presented sentence. For each trial, participants listened to (and repeated) a prime sentence, and then silently read and repeated a novel target sentence. For each repeated sentence, we measure the 'word-and-pause' duration at the two critical regions (NP1 and NP2) to assess whether or not a boundary was produced.

Preliminary analyses on the data attested the general good quality of the recordings. This positively answered our methodological question (*Can we collect online good quality recordings for prosodic analyses?*). Hence, data collection of speech production data is feasible and sufficiently reliable not only in terms of latencies, but even to perform acoustic analyses. Preliminary prosodic analyses on a subset of the repetition priming data revealed that across constructions speakers produced longer NP1 than the corresponding NP2 after hearing a sentence with an early boundary; whereas speakers produced longer NP2 than NP1 after hearing a sentence with a late boundary (Figure 2). These preliminary results are promising to confirm our main research question (*Can we prime prosodic boundaries and facilitate syntactic ambiguity resolution in production?*). In all, the results of this pilot study allow us to safely proceed with a pre-registered experiment at a greater scale and including more fine-grained analyses to explore how prosody facilitates sentence processing. The full scale experiment with 80 participants will be presented at AMLaP

Example sentences

- (1) *She put the money in the basket on the table.*
- (2) *She stayed with the patient of the doctor who waits for the blood results*

Figure 1. *Plausibility ratings on the interpretation of ambiguous sentences*

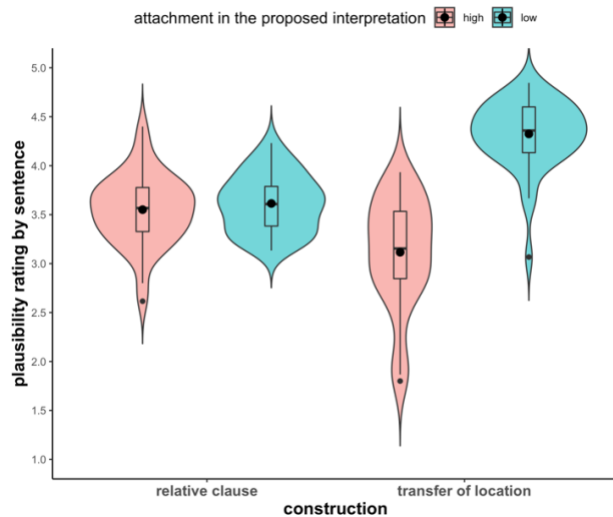
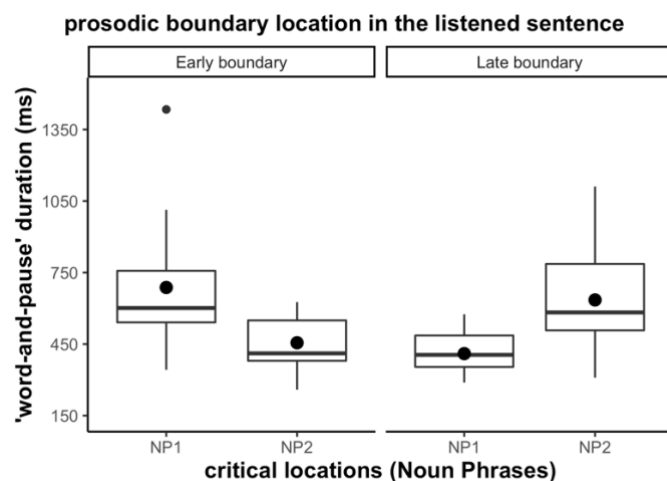


Figure 2. *Duration of NPs at critical locations after hearing sentences with different boundaries*



OSF pre-registered main study: [Anonymized OSF pre-registered study](#)

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