

Differential online and offline effects of misparse plausibility on post-interpretive representations

Previous Work

Work over the past decades on the processing of temporary ambiguities (or garden path structures; GPs) has shown a clear GP effect wherein processing is disrupted (i.e., longer reading times, higher probability of rereading previous regions, and heightened ERP responses) upon encountering input that contradicts an initial parse of the sentence's structure, unless disambiguated earlier by prior input (e.g., Ferreira & Henderson, 1991; Frazier & Rayner, 1982). Studies also show that readers often fail to inhibit this initial misparse in memory, leading to lower comprehension when probed about the initial misparse and higher priming for its structure (Christianson et al., 2001, 2006; Kaschak & Glenberg, 2004; Slattery et al., 2013; van Gompel et al., 2006). Although these structural effects often occur as soon as the misparse is encountered, subsequent input may directly support or contradict the initial misparse of ambiguous GPs, for example in the sentence: "The report confirmed our suspicions were actually completely true/false" (see Table 1 for a 2x2 of ambiguity and match conditions). Sturt (2007) investigated these GPs in English using an eye-tracking paradigm to test whether semantic persistence of the initial misparse might lead to processing difficulty when the subsequent input mismatches the meaning of the initial misparse. These sentences were the second in three-sentence discourses, and the other two sentences did not bias toward or against the misparse of the target sentence. He found ambiguity effects in first-pass and go-past times at the critical and final regions of the sentence and in second-to-*n*th pass times at the precritical and critical regions. He also found that ambiguous, mismatching conditions elicited more rereading of the critical region. These findings support the argument for semantic persistence following GP misparses, which has since been corroborated (e.g., Slattery et al., 2013; Qian et al., 2018).

Current Work

Although real-time processing disruptions were investigated by Sturt (2007), they did not directly measure post-interpretive representations, leaving open the possibility that matching or mismatching semantic content following temporarily ambiguous input eventually mitigates or worsens semantic persistence of initial misparses. To this end, we first ran a quasi-replication of Sturt (2007) using bidirectional self-paced reading (BSPR; e.g., Paape & Vasishth, 2022) instead of eye-tracking, wherein 78 native English speakers could read and reread sentences at their own pace. Critically, we also probed the initial misparses by asking participants binary questions like "Did the report confirm our suspicions?". Using Bayesian hierarchical modeling, we found lower accuracy and more rereading in general for mismatch conditions, but we failed to replicate any first-pass effects, suggesting there may have been a methodological issue. For this reason, we ran a second experiment (n=118) using self-paced reading followed by the same comprehension probes. We successfully replicated the match effect in accuracy from Experiment 1 (Figure 1), with no effect of ambiguity found, and we also found an online ambiguity effect at the spillover word and full sentence reading times (Figure 2), suggesting that the failure to find these online effects in Experiment 1 was due to methodological issues. We argue that the differential online and offline findings in Experiment 2 fit best in an account where the inhibition of GP misparses is heavily influenced by their semantic fit with the global event structure. A third experiment is planned to address a potential caveat where readers may loosely interpret the matrix verbs when directly probed (e.g., "confirm → either confirmed or disconfirmed").

Table 1. Experimental items (Question only in Experiment 2)

Ambiguity	Match	Sentence	Question
Ambiguous	Matching	The report confirmed our suspicions were actually completely true.	Did the report confirm our suspicions?
Ambiguous	Mismatching	The report confirmed our suspicions were actually completely false.	Did the report confirm our suspicions?
Unambiguous	Matching	The report confirmed that our suspicions were actually completely true.	Did the report confirm our suspicions?
Unambiguous	Mismatching	The report confirmed that our suspicions were actually completely false.	Did the report confirm our suspicions?

Figure 1. Accuracy to comprehension probes in Experiment 2

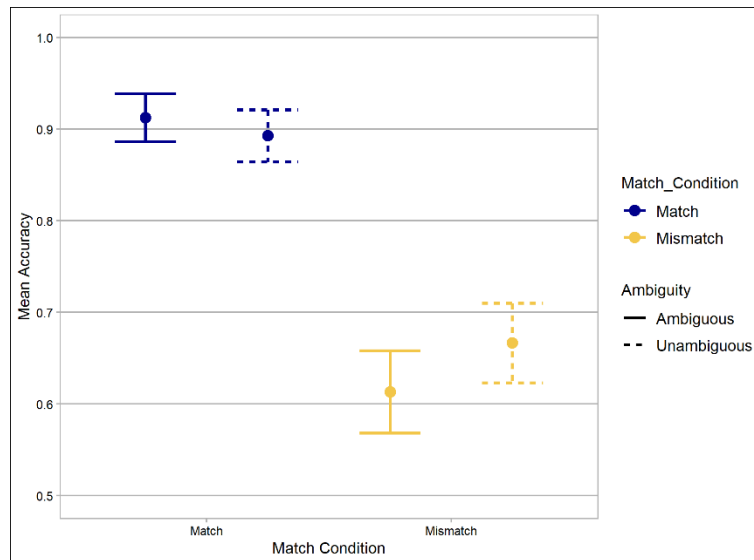


Figure 2. Reading times by region in Experiment 2

