STRUCTURAL FREQUENCY AND EXPOSURE: DON'T RAISE YOUR EXPECTATIONS

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Reduced-relative clause (RR) garden path sentences (GPs) (e.g. *The soldiers (who were/NULL) warned about the raid died.*) have been used to test for syntactic facilitation effects wherein there is a reading time reduction in the ambiguity effect of temporarily ambiguous structures after repeated exposure (Fine et al., 2013). Although these effects have been found, post-exposure ambiguity effects to *a priori* more frequent main verb (MV) resolutions (i.e. *The soldiers warned (talked) about the raid late at night.*) have not been reliably found (Harrington-Stack et al., 2018). This lack of *a priori* ambiguity effect has called into question the nature of syntactic "adaptation." Adaptation has mostly referred to a facilitation of a structure after repeated exposure (see Kaan & Chun, 2018); however, this same process has also been referred to as "satiation" effects (Do & Kaiser, 2017). Due to the lack of a reliable *a* priori ambiguity effect in recent studies, we refer to exposure-based structural facilitation as "satiation" and a "near-rational" shift in preferences/expectations (Myslin & Levy, 2016) as "expectation adaptation" (cf. Dempsey et al., in press). Null findings concerning expectation adaptation are particularly troublesome for a feature found in implicit learning and structural priming models called the inverse frequency effect (IFE), which predicts that more infrequent structures should result in a higher degree of learning (Jaeger & Snider, 2013). In order to test for the IFE, the more distributionally balanced 'and' coordination (NP/S) GP structure can be used (e.g. *The vendor sold the hot dog (and/but) the popcorn* ***was still*** *stale.*). This structure has also been shown to elicit syntactic satiation effects (Kaan et al., 2019). Three self-paced reading experiments/sentence completion studies (ns=120) were conducted via Amazon MTurk to address this possibility. In Experiment 1, participants in the exposure group read 'and' coordination GPs (complement continuation) (50% amb.) while the control group read fillers. In Block 2, both groups read items with the counterpart compound NP continuation (e.g. *…(both) the hot dog and the popcorn* ***at the*** *concession stand*). Because participants could see the length of sentences via blanks in the SPR design, this was likely sufficient to be a critical region for these sentences. Participants in the exposure group exhibited satiation to the structure in Block 1; however, in Block 2, there was no penalty effect (Figure 1). Experiment 2 had an identical group structure and Block 1 design, but participants completed sentence preambles (e.g. *The vendor sold the hot dog and the popcorn …*) in Block 2 to test for priming effects as an index of shifting structural preferences. Exposure group participants produced significantly more complement continuations than the control group, suggesting they were primed for the structure after repeated exposure. Contrasted with Experiment 1, this suggests exposure can lead to priming effects but not to a shift in structural expectations. Experiment 3 mimicked the design of Experiment 2 with the RR GP structure (preamble e.g. *The soldiers warned about the raid…*). According to the IFE, this more infrequent RR GP structure should lead to stronger priming effects than the more frequent 'and' coordination GP structure. This was not borne out in the data: the numeric difference between group RR completion rates did not reach significance. A *post hoc* logistic mixed effects model was fit to the Experiment 2 and 3 data to more directly test for the IFE (Figure 2). This model yielded a main effect of exposure such that the 'and' coordination GP structure led to a higher rate of GP sentence completions than the RR GP structure. However, the interaction between experiment and group did not reach significance (p = .88), meaning evidence is inconclusive as to whether 'and' coordination GPs actually lead to a stronger priming effect. What this analysis does show is that RR GP structures, although more infrequent, do not lead to a stronger priming effect in the current data. Interestingly, initial satiation to the RR structure in Experiment 2 was to a greater degree than the satiation to the 'and' coordination structure in Experiment 1. This work therefore supports theories of syntactic facilitation that allow for error-based learning following an IFE in terms of exposure-based facilitation/satiation effects, but does not support the claim that unbalanced exposure rapidly shifts preferences/expectations between two competing garden path resolutions.

Figure 1 - Experiment 1 Penalty Effects

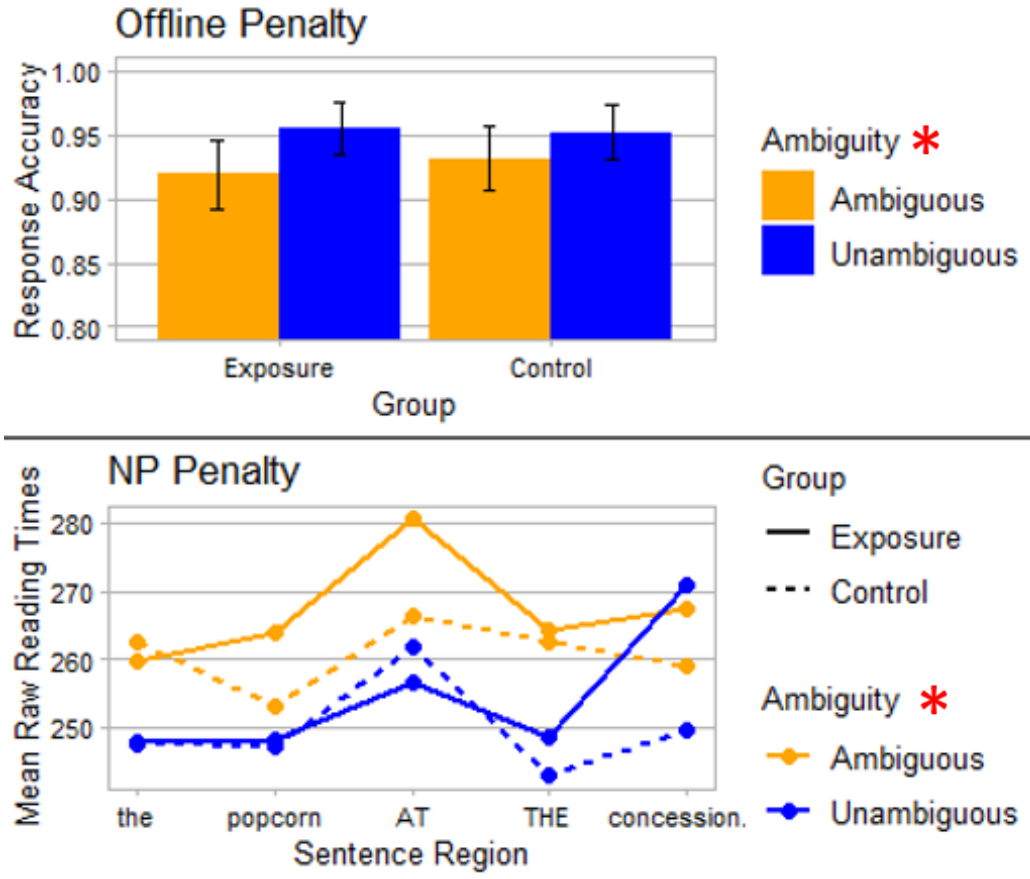

Figure 2 - Dispreferred Resolution Rates