

## A CUE-BASED APPROACH TO PROCESSING ADJUNCTS

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**Introduction:** Cue-based retrieval models [1-2] lack consensus about the types of features available as cues during sentence-processing [3-7]. Active debate in the field circles the question whether retrieval cues should be “lexically specific” [8] or “semantically general” [9]. We show that lexically specific semantic features are active and may interfere with wh-dependency resolution in online sentence processing. Specifically, we show preliminary data from an eye-tracking experiment (n=30) that locative and temporal PPs (e.g., *in the park*, *in the morning*) may cause a similarity-based interference effect [1] with the resolution of wh-gap dependencies involving locative (i.e., *where*) or temporal (i.e., *when*) wh-phrases. Our basic observation is that when a locative PP intervenes in a locative wh-verb dependency, the verb is read slower in early eye-tracking measures, consistent with other studies of interference phenomena (cf. [6,8]). Similarly, when a temporal PP intervenes a temporal wh-verb dependency, the verb is likewise read slower. These slowdown effects, we argue, are caused by the semantic feature of the PPs that is similar to that of wh-phrases and thus, they created a similarity-based interference effect. From this, we argue cue-based models must be sensitive to semantic features specific to particular lexical items.

**Experiment:** An eye-tracking experiment was conducted with 30 English speaking undergraduates at Northwestern University. Experimenters manipulated (i) the type of PP (Temporal/ Locative) and (ii) the degree of semantic overlap (Match/Mismatch/No Match), using a 1x3 factorial design. To avoid the PP being interpreted as the modifier of the embedded verb (*ate*), the PP is embedded inside the relative clause attached to the subject NP. The critical region, the main verb ‘ate’ in (1) where retrieval is expected to take place [9-10], as the temporal/locative adjunct is interpreted modifying event represented by the main verb.

Weak, but significant main effects of semantic overlap were observed using linear mixed effects regression (lme4) in the first-pass ( $\beta = 305.00$ ,  $se = 15.12$ ,  $t = 20.17$ ,  $p < .01$ ) and first-fixation ( $\beta = 262.45$ ,  $se = 12.18$ ,  $t = 21.55$ ,  $p < .01$ ) reading times of Matched conditions (2) suggesting an inhibitory effect of interveners. This is consistent with the belief that semantic features of wh-adjuncts remain active in memory during wh-resolution, and that structurally unavailable PPs interfere with the processing of the matrix wh-dependency. Furthermore, these effects being limited only to Matched conditions, despite all interveners being PPs, indicates that the interference effect is not from morphological or structural cues.

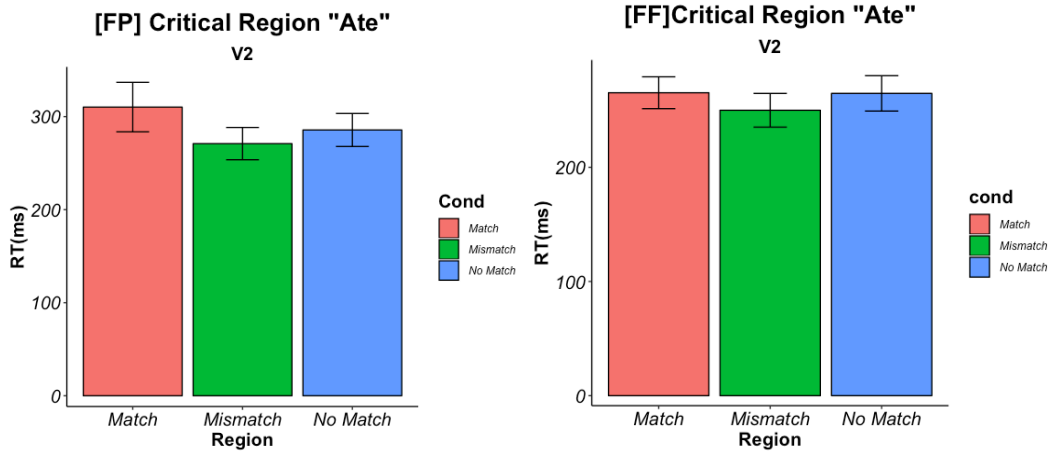
**Discussion:** The similarity-based interference effect we observed in the wh-verb dependency formation supports the position that semantic features like *+locative* or *+temporal* may be accessible to either retrieval or encoding mechanisms [2,6,9] in online dependency resolution of adjunct wh-phrases like *when* or *where*. Thus, this means that on top of the overt morphological features, or structural features, lexically specific semantic features may also be relevant for cue-based parsing models.

## Examples/Charts:

(1) John inquired **when/where** the girl that danced ... ate sushi and donuts.

- a. ....where in the park (Match)
- b. ....where in the morning (Mismatch)
- c. ....if in the park (No Match)

(2)



(3) **Model used:**

`lmer(RT ~ condition+(subj|item), data = data)`

## References

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