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 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:**
\[ \text{lmer} \left( \text{RT} \sim \text{condition} + (\text{subj} | \text{item}), \text{data} = \text{data} \right) \]

**References**