

## **Adjectival Modifiers and Reference Resolution: When Prosodic Focus Matters**

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Previous eye-movement studies have shown that listeners establish referents in sentences as soon as adjectival modifiers uniquely identify them (e.g., [1]). Furthermore, Sedivy and colleagues [2] found a preference to interpret modified nouns contrastively. They observed earlier saccades to a second referent when it formed a contrastive set with a first referent than when it did not. Surprisingly, Sedivy and colleagues did not find an effect of prosodic focus over and above the use of adjectival modifiers. This could be because the first referent had lacked the relevant prosodic marking. The present study therefore tested the use of prosodic focus for the resolution of reference ambiguity again, crucially changing the prosodic marking of the first referent (narrow rather than broad focus).

Experimental displays contained a first referent (red book), a contrastive second referent (green book), a non-contrastive second referent (green shirt), and an unrelated distractor object. First, 32 native German listeners were told in German to “click on the RED book”. Narrow prosodic focus on the color adjective, as indicated by capital letters, is appropriate given that the display contains a contrasting object (green book). Second, listeners were either told to click on the other member of the contrastive set (green book) or on the non-contrastive object (green shirt). Prosodic focus in the second instruction was either on the adjective (narrow focus in 1(a) and (b)) or on the noun (broad focus in 1(c) and (d)):

### **Examples**

- (1) Click on the RED book.
- (a) Now click on the GREEN book.
- (b) Now click on the GREEN shirt.
- (c) Now click on the green BOOK.
- (d) Now click on the green SHIRT.

It was predicted that narrow focus in the second instruction strongly marks the upcoming referent as belonging to the contrastive set (green book), whereas broad focus should not bias the interpretation. Indeed, in both 1(a) and (b) only fixation probabilities for the contrastive object (green book) increased immediately after adjective onset, prior to noun onset. In 1(b), the increase in fixation probabilities for the non-contrastive object (green shirt) was delayed until after noun onset. Narrow focus apparently raised the significance of objects that belong to the contrast set. Contrary to Sedivy et al., we only found a contrastive interpretation for color adjectives when narrow focus was given in the second instruction. In the broad focus conditions (1(c) and (d)), immediately after adjective onset both the contrastive and the non-contrastive object were fixated. The increase in fixation probabilities for the non-contrastive object in 1(d) was not delayed. The results suggest an interplay between the preference for contrast sets and the use of prosodic focus. Whereas broad focus on the first referent in Sedivy et al.’s study could not modulate the interpretation of subsequent prosodic focus, narrow focus in our study could. In sum, listeners not only interpret color adjectives incrementally, taking the visual context into account, but use prosodic focus immediately to resolve reference ambiguities.

### **References**

- [1] Eberhard, K., Spivey-Knowlton, S., Sedivy, J., & Tanenhaus, M. (1995). Eye movements as a window into real-time spoken-language processing in natural contexts. *Journal of Psycholinguistic Research*, 24, 409-436.
- [2] Sedivy, J., Tanenhaus, M., Chambers, C., & Carlson, G. (1999). Achieving incremental semantic interpretation through contextual representation. *Cognition*, 71, 109-147.