Adjectival Modifiers and Reference Resolution:
When Prosodic Focus Matters
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Introduction

Previous eye-movement studies have shown that listeners establish referents in sentences as soon as adjectival modifiers uniquely identify them (e.g., Elbernd et al., 1995). Furthermore, Sedivy et al. (1999) found a preference to interpret modified nouns contrastively, but found no additional effect of prosodic focus. In their study, the first referent (of a contrastive set) was introduced with broad prosodic focus, and the second referent with either broad or narrow focus. The absence of a prosodic effect for the resolution of the second referent could have been due to the first referent lacking the expected prosodic marking. Narrow focus on the first referent could emphasize the relevance of contrastiveness. A high prosodic accent on the adjectival modifier (narrow focus) rather than on the noun of the first referent (broad focus) is felicitous given that the display contains the contrasting second referent.

Questions

Are prosodic cues used by listeners to resolve reference ambiguity in the context of previous prosodic cues?
Specifically, can narrow prosodic focus speed up the resolution of reference ambiguity when a previously mentioned contrastive referent was also in narrow focus?

Experiment

- Each experimental trial consisted of two instructions to click on an object on the screen.
- The display showed the referent of the first instruction (yellow comb), a contrastive second referent (green comb), a non-contrastive second referent (green ball), and a distractor object (hammer).
- Both, the referent of the first and second instruction were modified by a color adjective. In the first instruction, the color adjective always carried a high prosodic accent (narrow focus).
- 2 x 2 design: The second instruction referred either to the contrastive or the non-contrastive referent, and had a high prosodic accent on either the adjective (narrow focus) or the noun (broad focus).

1st instruction: Klicke den GELBEN Kamm an. Click on the YELLOW comb.
2nd instruction:
  a) Klicke jetzt den GRÜNEN Kamm an. Now click on the GREEN comb.
  b) Klicke jetzt den GRÜNEN Ball an. Now click on the GREEN BALL.
  c) Klicke jetzt den grünen KAMM an. Now click on the green COMB.
  d) Klicke jetzt den grünen BALL an. Now click on the green BALL.

Results

- All instructions were pre-recorded and controlled for the correct prosodic contour.
- 16 experimental trials.
- 25 filler trials to divert from prosody, color, and contrastiveness.
- 32 native speakers of German.

- „Click on the YELLOW comb. Now click on the ...“
- “Klicke den GELBEN Kamm an. Click on the YELLOW comb.”

Figure 1: Average fixation proportions over time to the target object of the second instruction, the competitor, and the unrelated distractor.

- Narrow focus marked the upcoming referent as belonging to the contrastive set. We found an increase in looks to the green comb in both (a) and (b) immediately after adjective onset. Fixation proportions to the target green ball in (b) did not increase until after noun onset.
- Broad focus did not bias the interpretation that strongly: Again, fixation proportions to the green comb initially increased in both (c) and (d). In (c), however, they started to drop prior to noun onset. Furthermore, in (d), the increase in fixation proportions to the green ball was not delayed.

Figure 2: Average fixation proportions over time to the target object of the second instruction in the four experimental conditions.

- When comparing fixation proportions in Figure 2, we found more looks to the contrastive target comb when the adjective rather than the noun carried a high accent (blue lines). Thus, in contrast to Sedivy et al. (1999), narrow focus heightened the contrast effect.
- The non-contrastive target ball, on the other hand, received fewer looks when the adjective rather than the noun carried a high accent (red lines).
- The interaction between contrastiveness and prosodic marking was significant in the 200-1000 ms time window (F(1,13)=39.51, p<.001; F(1,13)=30.43, p<.001). The same significant interaction was found when analyzing eye movement latencies (first fixations on target object) rather than fixation proportions.

Conclusion

- Listeners interpret color adjectives incrementally, taking the visual context into account.
- Prosodic marking influences the resolution of reference ambiguity immediately: narrow prosodic focus enhances the preference for a contrastive interpretation of modified nouns.
- Preliminary results from a follow up study suggest a prosodic effect for reference resolution even when the first instruction carries broad focus. The difference in results between Sedivy et al.’s (1999) study and our study may be due to methodological differences.


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