Contrastive topics, corrections and the activation of alternatives

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In the semantic literature it is claimed that focus evokes alternative sets (Rooth, 1992). Often, however, researchers assume a very direct mapping from accent to focus, leaving no room for differences in accent types or their phonetic realization. Accent type distinctions, however, may signal different information structures, such as the distinction between contrastive topics and corrections (in German a prenuclear rise L*+H vs. a nuclear fall L+H*L*), see Grice, Baumann & Benzmüller (2005). Moreover, semantic differences may also be signaled by fine phonetic detail in accent type realization (e.g., Braun, 2006; Gussenhoven, 2002). Recent priming experiments have shown that Dutch listeners activated alternatives to accented sentence-final primes if and only if the primes were spoken with a contrastive focus accent, L+H* (preceded by a contrastive topic accent) but not when they were produced with a non-contrastive focus accent, H*L* (Braun & Tagliapietra, 2010). These priming data suggest that not all kinds of pitch accents activate alternatives alike. In this study we used a visual word eye-tracking paradigm with printed words (McQueen & Viebahn, 2007; Tanenhaus, Spivey-Knowlton, Eberhard, & Sedivy, 1995) to study the activation of alternatives for contrastive topics and corrections as compared to non-contrastive topics. We expected that both contrastive topics and corrections are able to make alternatives salient for the listener.

Thirty-three participants listened to 72 sentences while watching static displays containing four words. Their task was to click on a word when it appeared in the auditory stimulus. In the 36 critical trials the presented words were a) the grammatical object, b) a word contrastively related to this grammatical object, c) a word contrastively related to the subject-NP (henceforth: contrastive subject-referent) and d) an unrelated distractor. We tested three intonation conditions in a between-subjects design (only the pitch in the vicinity of the sentence-initial subject-NP is described): 1) non-contrastive topics (L*+H accent with a subsequent pitch drop), 2) contrastive topics (L*+H accent followed by a high plateau), and 3) corrections (H*L- accent followed by unaccented material). Note that the first two conditions differed only in their phonetic implementation (contrastive topics were realized with significantly later troughs and peaks, a steeper slope and a larger f0 excursion than non-contrastive topics, all p-values < 0.05).

Fixation proportions to contrastive subject-referents were converted to empirical logits and analyzed using linear mixed-effect regression models with participants and items as crossed random factors (Barr, Gann, & Pierce, 2011), as well as condition and the phonetic variables reported above as fixed factors. Model selection was done using backward elimination and log likelihood ratio tests (function anova in R). We analyzed fixations in two time windows, 1) during the processing of the subject-NP and 2) during the auxiliary. In each time window, 150ms were added to account for the time it takes to program an eye-movement (Matin, Shao, & Boff, 1993); time-windows and fixations therein were calculated for each trial individually.

Results showed no effect of condition during the processing of the subject-NP (on average 27%, p-values for all comparisons > 0.5). However, we found significant effects (p < 0.05) for most of the phonetic variables (in short, the more emphatic the rise, the more fixations to the contrastive subject-referent). During the processing of the auxiliary, both contrastive topics and corrections resulted in more fixations to the contrastive subject-referent (on average 34%) compared to the non-contrastive topic condition (on average 28%, p-values for both comparisons < 0.05).

To conclude, listeners do not only interpret pitch accent type differences but are also sensitive to phonetic implementation in online speech perception: more prominent pitch rises led to more fixations to the contrastive subject-referent and hence to the activation of alternatives, which may be explained by biological codes (Gussenhoven, 2002). Our results further show that contrastive topics and corrections behave the same when it comes to activating alternatives. There is
a caveat, though: only in the time window following the respective pitch accent did fixations differ across conditions. This delayed effects suggesting that it either takes time to process the information structural contribution of the accent or that the post-accentual region is a genuine part of the pitch accent, at least when intonational meaning is concerned.

References


