Pitch accents in (visual and linguistic) context: ERPs reveal that missing accents are harder to process than superfluous accents

Sara Bögels¹, Herbert Schriefers², Wietske Vonk³, & Dorothee J. Chwilla²

¹Glasgow University
²Donders Institute for Brain, Cognition and Behaviour, Radboud University Nijmegen
³Max Planck Institute for Psycholinguistics, Nijmegen

In referential communication, pitch accents help to set the intended referent apart from other possible referents. For example, when referring to a car in the context of a full parking lot (an example of a ‘visual context’), you can emphasize its colour to contrast it with differently coloured cars: ‘the RED car is mine’. As another example, you can make a contrast with a car mentioned previously in the conversation (hereafter referred to as the linguistic context): ‘I love this yellow car’, ‘Yes, but I like this RED car’. The present study investigated how pitch accents that mark contrasts in these two kinds of context are processed on-line.

We presented participants with visual displays of two coloured objects (between square brackets in examples (1) to (4)), followed by a spoken reference to one of these; one block with contrasts in the linguistic context (relative to the reference in the previous trial, see (1) and (2)) and another block with contrast in the visual context (relative to the other object in the display, see (3) and (4)).

1. [blue ball green bike]  ‘the blue ball’
   [red ball blue car]    a. ‘the RED ball’ (matching accentuation)
                         b. ‘the red BALL’ (mismatching accentuation)

2. [red hat green bike]  ‘the red hat’
   [red ball blue car]    a. ‘the RED ball’ (mismatching accentuation)
                         b. ‘the red BALL’ (matching accentuation)

3. [blue ball red ball]  a. ‘the RED ball’ (matching accentuation)
                         b. ‘the red BALL’ (mismatching accentuation)

4. [red ball red hat]    a. ‘the RED ball’ (mismatching accentuation)
                         b. ‘the red BALL’ (matching accentuation)

In both contexts, there could be a contrast in colour (e.g., blue ball vs. red ball; see (1) and (3)) or in object (e.g., red hat vs. red ball; see (2) and (4)). The utterances were presented with a pitch accent on the adjective or on the noun (or a neutral accentuation, not discussed further in this abstract). In this way, we created matching and mismatching accentuation patterns. The mismatching patterns (e.g., 2a) always contained one superfluous accent (‘RED’) and one missing accent (‘ball’).

For the linguistic context, we found that missing accents (‘red’ in (1b) and ‘ball’ in (2a)) led to an immediate negativity in the ERPs, elicited before the end of the word, but superfluous accents (‘BALL’ in (1b) and ‘RED’ in (2a)) did not (in line with e.g., Hruska & Alter, 2004, but see Magne et al., 2005).

For the visual context, we found a less consistent pattern of results. When the colour was the contrastive information (as in (3)) we found that missing accents (‘red’ in (3b)) led to a negativity but superfluous accents (‘BALL’ in (3b)) did not, which was consistent with the
linguistic context. However, when the object was the contrastive information (as in (4)), the results were potentially confounded by the fact that the colour information is redundant in this case. Here, we found a negativity for deaccentuation of the colour (‘red’ in (4b)). Speculatively, listeners do not expect the redundant colour information to be mentioned, whereas an accent on the colour gives a reason for mentioning this redundant information anyway.

In conclusion, listeners experience on-line processing difficulty when contrastive information in the linguistic context is not marked by a pitch accent, thus in case of a missing accent. Apparently, listeners want important information to be accented. In contrast, given information can be both accented or deaccented. It is less clear how listeners react to accentuation of contrastive information in the visual context. However, our results provide some evidence for missing accents being harder to process than superfluous accents in this case as well.

references