

Influence of rhythmic structure on syntactic ambiguity resolution in reading aloud

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Reading aloud necessitates not only the phonological encoding of words but also the on-line construction of supra-lexical prosody in accordance with the syntactic analysis of the sentence (Koriat et al. 2002). Phrasal or sentence prosody might involve reanalysis processes such as stress shift to avoid stress clashes and to allow for an eurhythmic alternation of stressed and unstressed syllables (Hayes 1995). The question addressed here is how readers deal with sub-optimal rhythmic representations like stress clashes in the word string and how these affect sentence processing during reading.

This is examined for German sentences like (1) that contain a local syntactic ambiguity in writing but are unambiguous when spoken because of relevant prosodic cues. The ambiguity concerns the word *mehr*. In 1a) and 1b), *mehr* is part of the negative adverbial *nicht mehr* and by default unstressed. In 1c) and 1d), *mehr* is a comparative adverb which receives stress. Since stress information is not encoded orthographically, the sentences are disambiguated in reading only after the verb complex. The verb following *mehr* has either initial stress as in 1a) and 1c) or medial stress as in 1b) and 1d). The verbs are otherwise matched for frequency, length and argument structure requirements.

Bader (1996) suggests that readers prefer the negative adverbial reading of *nicht mehr*. Assuming that prosodic processing has an influence on sentence processing during reading, this preference might be modulated by the rhythmic environment. The comparative reading (represented by stress on *mehr*) might be even less preferred if the following verb has initial stress, since this would either induce a stress clash or it would require costly prosodic reanalysis on the verb.

24 sentences in 4 conditions, interspersed with numerous fillers were allocated to 24 participants in a latin square design. Participants were to read each sentence fluently without preparation as soon as it appeared on screen. That way, the prosody realised on *mehr* represents the current reading chosen by the speaker, irrespective of its suitability to the disambiguating material. Readers were discouraged from interrupting or correcting themselves even in case the prosody chosen did not fit the appropriate reading.

The realisation of stress on *mehr* was judged for each sentence. The results show that readers favour leaving *mehr* unstressed, corroborating the preference for the negative adverbial reading. Importantly, the rhythmic effect is also borne out: Readers choose the comparative reading with stress on *mehr* significantly less often if the verb following *mehr* has initial stress, confirming the prediction that the stress pattern of the verb contributes to syntactic ambiguity resolution during reading aloud. This strongly supports the hypothesis that prosodic processing during reading influences parsing decisions.

Given that prosodic representations are routinely activated in silent reading as well (Ashby & Martin 2007), it will be worth investigating the impact of rhythmic structure in silent reading. Processing patterns like those found in the present experiment would back the idea that implicit prosody may influence syntactic ambiguity resolution (Fodor 2002).

(1)

- a) ..., dass man nicht mehr anbieten sollte, die Hausaufgaben zu erledigen.
... *that one should not offer any more, to do the homework.*
- b) ..., dass man nicht mehr versprechen sollte, die Hausaufgaben zu erledigen.
... *that one should not promise any more, to do the homework.*
- c) ..., dass man nicht mehr anbieten sollte, als das Erledigen der Hausaufgaben.
... *that one should not offer more than the completion of the homework.*
- d) ..., dass man nicht mehr versprechen sollte, als das Erledigen der Hausaufgaben.
... *that one should not promise more than the completion of the homework.*

References

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