Does Prosody influence Thematic Role Assignment during Real-Time Spoken Language Comprehension?

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In sentence processing different cues can be used in order to structure information. Prosody is one of the cues that can help to assign thematic roles. Using eye-tracking, Weber et al. (2006) showed that prosody rapidly influences young adults' thematic role assignment in locally structurally ambiguous German subject-verb-object (SVO) and object-verb-subject (OVS) sentences. Five-year-old children are eventually also able to assign thematic roles with the help of prosody (Grünloh et al., 2011). However, whether they are able to use prosody in the same way and at the same time in the sentence as the adults is unclear since Grünloh et al. used a different, video-pointing, task. This task largely occurs post-comprehension and does thus not reveal real-time effects in spoken language comprehension. Additionally, also from offline data (Dittmar et al., 2008), we know that children at the age of five tend to interpret the first noun phrase of a sentence as the agent (according to the canonical SVO sentence structure). Moreover, prosody as a cue was not enough to eliminate children's strong bias towards the SVO order, and other means of conveying focus (e.g., cleft structures) do not appear to be rapidly used by 5-year-olds (Voss et al., 2015).

Using eye-tracking, the present study hence examined whether young adults and 5-year-old children can rapidly recruit prosodic cues for incremental thematic role assignment in structurally unambiguous German sentences. We manipulated the word order (SVO vs. OVS) and the prosodic structure (biasing vs. even) for each sentence. In comparison to the sentences by Weber et al. (2006) for which case marking was ambiguous and for which the only cue to thematic role assignment was prosody, case marking unambiguously identified the thematic role relations in our study. We emulated the SVO- and OVS-biasing prosodic contours reported by Weber et al. (2006) and these were either present (Weber et al., 2006 (SVO: L*+H accent on the subject, H* accent on the verb; OVS: L+H* accent on the subject)) or sentence intonation was even. We created 24 sets of stimuli containing three animal characters each. Two of them were role fillers for the sentential noun phrases, whereas the third character was a distractor character. Two characters were depicted as performing the same action (e.g. for the verb 'photographs', *fotografieren*, the two characters were depicted with a camera in their hands (FIG. 1)) such that the actions provided a context but did not give away the correct thematic role assignment. The sentence-initial noun phrase was always masculine since case marking on masculine noun phrases unambiguously signals either OVS or SVO sentence structure. Participants were asked to inspect the scene, listen to the sentence and answer a post-sentence question (who is performing the action or who is being acted upon).

For the adult participants (N=24) the results reveal that prosody does not influence thematic role assignment when case marking is present and thus the constituent order is ambiguous. However, the results did corroborate a significant effect of constituent order. In other words, in SVO sentences adults began to look at the patient of the sentence from the verb region onwards. By contrast, in OVS sentences they started to look at the agent of the sentence from the verb region onwards. For young adults, case marking can thus be seen as a stronger cue for thematic role assignment than prosody in unambiguous German SVO and OVS sentences.

The child data (N=24) reveals that children at the age of five do not yet recruit case marking for incremental thematic role assignment. The results show that there is no statistically significant effect of word order early on in the sentence. Thus, children interpret OVS sentences

as SVO sentences (i.e. they anticipate the patient more often than the agent during the verb region). Time course data reveals that children look more at the patient in OVS sentences during the verb and adverb region when prosody is marked (vs. when it is even) and compared to the SVO sentences. A more fine-grained analysis of this particular region (4500-5800ms: verb/adverb region) confirmed a marginal effect of prosody (p=0.066). In other words, children do make use of prosody, however, they mistakenly exploit the marked prosody for OVS sentences to increase their SVO bias in the interpretation.

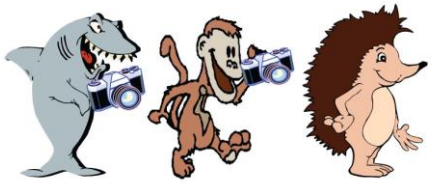

Figure 1. *Example picture of a depicted scene*

German original - SVO: *Der Affe fotografiert gerade den Igel*
Literally: 'The monkey (agent) photographs currently the hedgehog (patient).'
German original - OVS: *Den Affen fotografiert gerade der Hai.*
Literally: 'The monkey (patient) photographs currently the shark (agent). '

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