Does it matter who is producing an utterance? – Effect of speaker identity in utterances without self-reference

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There is a debate, whether extra-linguistic information about a speaker is integrated as fast as semantic information (one-step model of comprehension) or delayed until a second step (two-step). It seems that the information of a speaker gets rapidly integrated (van Berkum, van den Brink, Tesink, Kos & Hagoort, 2008). To assess the question, whether self-reference – the use of the first person pronoun – might have caused the early integration, we conducted a self-paced reading study, where we employed utterances, which did not directly refer to the speaker. The prolonged reading times for target words mismatching the speaker indicate that readers do integrate speaker identity early on during comprehension. Future ERP-studies with this material might provide more insight into the time course of the integration of speaker identity.

In the debate about the time course of language understanding there is the question whether comprehenders integrate extra-linguistic information as fast as they integrate semantic information (one-step model of comprehension) or whether the integration of extra-linguistic information is delayed until a second step during comprehension (two-step models of comprehension). A study by van Berkum, van den Brink, Tesink, Kos, and Hagoort (2008) demonstrated that comprehenders rapidly integrate the characteristics of a speaker during language comprehension, and thus provides evidence for a one-step model of comprehension. However, the sentences employed in this study all contained a first person singular pronoun referring directly to the speaker of the utterance (e.g., "Every evening I drink some wine before I go to sleep"). This overt reference to the speaker of the utterance might have encouraged listeners to integrate the corresponding extra-linguistic information at an early stage during comprehension. In the current study, we were interested in whether speaker identity is also taken into account early on during the comprehension process when the utterances do not directly refer to the speaker of the utterance.

To address this question, we conducted a self-paced reading study. Participants read 40 utterances which were plausible for a certain group of people but implausible for another without containing any direct reference to the speaker. One word was manipulated and determined the plausibility of the utterance, for example:

> Der schöne Teil des Tages beginnt erst nach der *Schule/Arbeit* so richtig.
> The nice part of the day does not really start until after *school/work*.

In this example, the sentence version with the word *school* is typical for a child, but atypical for an adult. The same applies vice versa to the version with the word *work*. The match vs mismatch in the sentences did not exclusively relate to age, as in the example sentence above, but also to gender (male/female) or political orientation (liberal/conservative) among others. A picture of the speaker, whose stereotypical appearance either matched or mismatched the content of the utterance, was shown above the sentence (see Figure 1). We presented all of the items with a matching and a mismatching speaker, though the participants always saw only one of the four possible combinations.

Sixty-seven native speakers of German took part in the study. One participant did not score above 80% in the control questions randomly asked about filler sentences and was therefore excluded. The remaining 66 participants (3 male) were 18 to 33 years old (M = 20.84, SD = 2.79).

___ _____ ____ ___ _____ _____ ____ ____ ___ Schule __ _____.

Figure 1. Exemplary trial with a picture of a matching speaker (Reines, 2011) and utterance. Here, the participant has reached the target word (*school*).

We performed paired t-tests on reading times for the target word (e.g., "Schule" vs. "Arbeit", as well as for the pre-target word (e.g., "der"), the post-target (e.g., "so"), and the final word of the sentence (e.g., "richtig"). Reading times did not differ significantly for the pre-target word (7ms, $t_1(65) = 1.84$, p=.07, $t_2(39) = 1.11$, n.s.). However, reading times were significantly longer in the mismatching than in the matching condition for the target word (20ms, $t_1(65) = 2.92$, $p = .005$, $t_2(39) = 2.03$, $p = .05$). This effect was still visible on the post-target word (16ms, $t_1(65) = 2.82$, $p = .007$, $t_2(35) = 2.32$, $p = .03$). There was no mismatch effect on the final word of the sentence (6ms, $t_1 < 1$, $t_2<1$).

As expected, there was no significant difference in reading times before participants reached the manipulated target word. As soon as a mismatch occurred between speaker and sentence, reading times were significantly prolonged. The effect persisted on the post-target word and was no longer visible at the end of the sentence. These results indicate that readers do indeed integrate the characteristics of the speaker of an utterance early on during the comprehension process even when the utterance does not directly refer to the speaker. As such, these results provide further evidence for one-step models of comprehension according to which comprehenders rapidly integrate information from all available sources early on during comprehension. As self-paced reading is not of high temporal resolution, future ERP-studies with these materials might provide more insight concerning the time course with which extra-linguistic information concerning speaker identity gets integrated during the comprehension of utterances without direct reference to the speaker.

Reines, S. (2011). Junge [Online image]. Retrieved February 14, 2017 from https://fotoreines.wordpress.com/willkommen-auf-meiner-homepage/

van Berkum, J. J. A., van den Brink, D., Tesink, C. M. J. Y., Kos, M. & Hagoort, P. (2008). The neural integration of speaker and message. *Journal of Cognitive Neuroscience*, *20*, 580-591.