

The source of misinterpretation effects – Evidence from eye tracking

Anna Fiona Weiss (annafiona.weiss@ku.de)¹, Markus Bader², Michael Meng³

¹Catholic University of Eichstätt-Ingolstadt, ²Goethe University Frankfurt, ³Merseburg University

Background Misinterpretation effects in language comprehension show that readers sometimes derive interpretations that conflict with linguistic input. (1, 2). While these effects are well established in offline tasks, little is known about how the underlying representations emerge during online processing and whether or not these representations differ depending on whether comprehension is ultimately correct.

Current Study The study combines online measures (eye tracking) and offline measures (agent/patient naming, plausibility judgments) to examine how German speakers comprehend simple sentences varying in plausibility (plausible vs. implausible) and word order (subject-before-object [SO] vs. object-before-subject [OS]). After reading each sentence, participants performed one of the two offline tasks while the sentence remained visible, allowing re-reading. This design provides reading measures before (pre-task) and after (post-task) the secondary task is revealed, enabling us to address the following research questions: (i) Do pre-task reading measures for implausible OS sentences differ depending on whether comprehension is ultimately accurate? (ii) Do post-task re-reading patterns depend on task type and accuracy?

Method 32 monolingual German speakers read 32 experimental sentences (plus 64 filler items), that were manipulated among the factors Plausibility (plausible vs. implausible), Word Order (SO vs. OS), and Task (plausibility judgment vs. agent/patient naming) (see Table 1). During reading, their dominant eye was monitored, using an EyeLink Portable Duo Eye Tracker (1000Hz). The study was pre-registered at <https://osf.io/>. For analysis, mixed effect models were fitted.

Results and Discussion Accuracy data on agent/patient naming and plausibility judgments showed that plausibility and word order had much larger effects on task accuracy for agent-patient naming compared to plausibility judgments, in line with previous reports (Figure 1). Pre-task reading measures (dwell times) showed robust additive effects of plausibility ($t = -2.51$) and word order ($t = 4.66$): implausible meaning and OS order led to increased effort (Figure 2). Correct responses for implausible OS sentences were associated with significantly longer pre-task dwell times compared to incorrect responses and compared to plausible SO sentences (Figure 3). The analysis of post-task reading measures showed that responses to the agent/patient task generally involved more re-reading than responses to plausibility judgments. In addition, participants who answered incorrectly showed more re-fixations on incorrect regions during re-reading (Figure 4).

Taken together, the results indicate that implausible OS sentences elicit more online processing difficulty compared to plausible SO sentences, suggesting that participants in general do not miss the implausibility and the non-canonical OS structure. Also, pre-task reading times do not reliably predict task accuracy. However, participants who answered incorrectly show hints of heuristic processing in both reading times (for implausible OS sentences) as well as re-reading strategies (by focusing on the first argument as a default strategy, irrespectively whether that region would inform a correct answer). We also conclude that the agent/patient naming task is solved more strategically than the plausibility judgment task, involving substantial re-reading of specific sentence regions.

References

- [1] Zhenguang G. Cai, Nan Zhao, and Martin J. Pickering. How do people interpret implausible sentences? *Cognition*, 225:105101, 2022. doi: 10.1016/j.cognition.2022.105101.
- [2] Fernanda Ferreira. The misinterpretation of noncanonical sentences. *Cognitive Psychology*, 47(2):164–203, 2003. doi: 10.1016/S0010-0285(03)00005-7.

Figures and Tables

Table 1: A stimulus item in all four versions

plausible	SO	Es wird erzählt, dass	2	der	Lehrer	2 3	den	Fehler	3 4	korrigiert	4	hat.
		it is said that		the-NOM	teacher		the-ACC	mistake		corrected		has
	OS	Es wird erzählt, dass	2	den	Fehler	2 3	der	Lehrer	3 4	korrigiert	4	hat.
		it is said that		the-ACC	mistake		the-NOM	teacher		corrected		has
'It is said that the teacher corrected the mistake.'												
implausible	SO	Es wird erzählt, dass	2	der	Fehler	2 3	den	Lehrer	3 4	korrigiert	4	hat.
		it is said that		the-NOM	mistake		the-ACC	teacher		corrected		has
	OS	Es wird erzählt, dass	2	den	Lehrer	2 3	der	Fehler	3 4	korrigiert	4	hat.
		it is said that		the-ACC	teacher		the-NOM	mistake		corrected		has
'It is said that the mistake corrected the teacher.'												

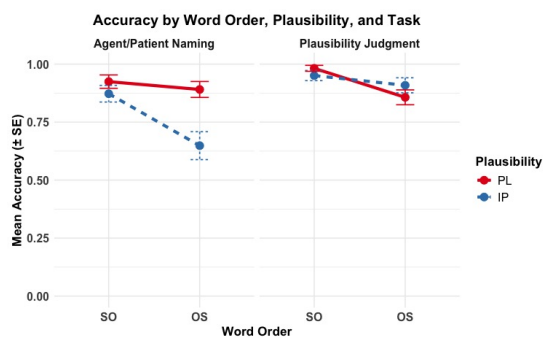


Figure 1: Accuracy on task

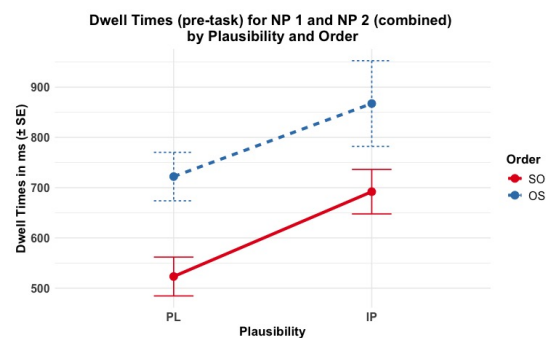


Figure 2: Dwell Times (pre-task)

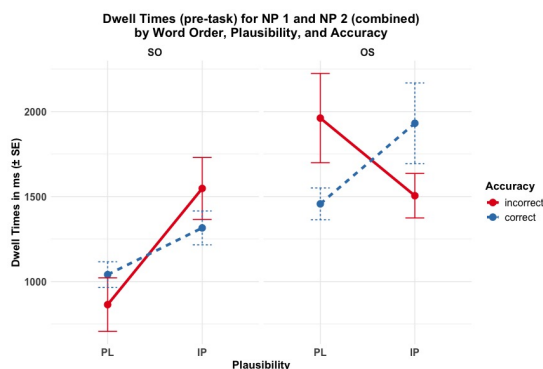


Figure 3: Dwell Times & Accuracy (pre-task)

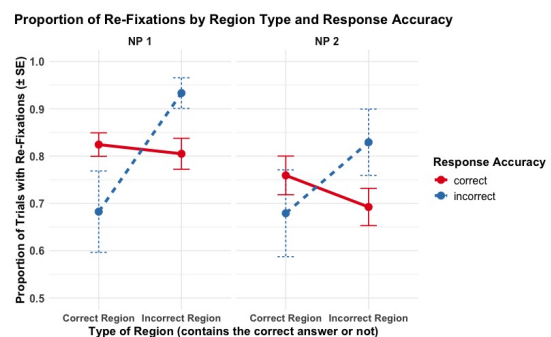


Figure 4: Re-Fixations (post-task)