

## Presuppositions and projection in processing

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Presupposition projection; Semantic/pragmatic processing; Eye-tracking; Reading; Acceptability rating; German

**Introduction.** Presuppositions are a component of meaning displaying distinct behavior from asserted content. They are not affected, for example, by embedding under negation: *Tina danced again* and *Tina [didn't [dance again]]* both presuppose that Tina danced before, i.e., they can only be uttered felicitously in contexts that support this presupposition. While presuppositions and their projection behavior have been studied thoroughly in theoretical terms, little is known about their processing. Using eye-tracking in reading, we investigated two issues based on German *wieder* ('again'). First, we looked at the time course of presupposition processing by testing for processing costs of unsupported presuppositions. Secondly, we tested whether embedding *wieder* under negation affected this mis-match effect.

**Methods.** We used a 2x2 design with **Felicity** and **Firstword** (*wieder* vs. *nicht*) as factors, as illustrated below. Version (a) of the target (*wieder* in scope of negation) is felicitous in **C1**, but not **C2**, and vice versa for (b). 24 4-tuples consisting of two target versions and two contexts were created. 32 subjects, split into 4 groups, read 24 items with counterbalanced conditions, intermixed with 48 filler items, while being eye tracked. Based on similar self-paced reading experiments (Schwarz 2007), increases in reading time are expected for sentences in contexts that are inconsistent with the presupposition.

**Results.** Analyses focused on the reading times on the verb following {*wieder nicht*}, since the presupposition of *wieder* crucially relies on the verb of its clause. Standard reading measures were calculated for statistical analyses. Their means are presented in table 1. The primary result is an interaction between **Firstword** and **Felicity** on various reading measures: for (b) (unembedded *wieder*), reading times on the verb were significantly higher in the infelicitous condition. For a) (embedded *wieder*), there was no corresponding simple effect of **Felicity**.

**Discussion.** The results are important for our understanding of presupposition processing and also have theoretical implications. First, there is an ongoing theoretical debate about whether presuppositions are introduced semantically (e.g., Heim 1982, 1990) or pragmatically (Simons 2001, Schlenker 2009). Given parallel debates about scalar implicatures (Bott and Noveck 2004), pragmatic generation of presupposed content might be expected to give rise to processing delays. The immediate processing effect of unsupported presuppositions reflected in our results (in particular in the first fixation and regression proportion measures) thus is more consistent with a semantic account. Secondly, the interaction between **Firstword** and **Felicity**, together with the absence of simple effects for the *nicht wieder* conditions, suggests that the presupposition of *wieder* is not immediately available in processing when embedded under negation, presumably because of the additional complexity involved in presupposition projection. A follow-up rating study confirmed that that subjects indeed perceive a mismatch for the embedded context, which rules out an explanation based on a potential alternative local presupposition interpretation (where it *is* affected by negation). A processing delay for embedded presuppositions that project seems most consistent with theories that posit explicit operations on levels of representation in the computation of global interpretations (van der Sandt 1992).

**C1:** *Tina went ice skating for the first time last week with Karl. The weather was beautiful, and they had a great time.*

**C2:** *Tina wanted to go ice skating for the first time with Karl last week. But the weather was miserable and they gave up on their plan.*

**Target:** Dieses Wochenende war Tina {(a) nicht wieder / (b) wieder nicht}

*This weekend, was Tina not again again not*  
Schlittschuhlaufen, weil das Wetter so schlecht war.  
*ice skating because the weather so bad was*

Table 1: Selected Reading Measures	<i>wieder nicht</i>		<i>nicht wieder</i>	
	Fel	Infel	Fel	Infel
First Fixation (ms)	173	185	171	171
Go-Past (ms)	253	327	282	258
Reg. Prop. (%)	15.2	31.3	15.2	16.1

**Sig. interactions:** Go-past, total ( $p < .01$ ), regression proportion ( $p < .05$ ); marginal: first fixation, regression duration ( $p < 0.1$ ) **Simple effects of Felicity** for *wieder nicht* conditions: Go-past, total time, first fixation, reg. duration ( $p < .01$ ), reg. prop ( $p < .001$ )