Expectations of discourse salience: An ERP study of argument order preferences for ditransitive verbs

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Words that fail to meet lexical expectations elicited by the verb result in an enlarged N400 effect when compared to the words that are contextually expected (Kutas & Federmeier, 2000; Van Berkum et al., 2005). Such effects have even been observed for the mismatching determiner of an expected noun (DeLong et al., 2005), revealing clear anticipatory, rather than simply integrative, mechanisms. Building on these findings, we examined the influence of discourse salience preferences for generating expectations during comprehension.

Both corpus and behavioral studies have shown that people prefer having salient/given entities mentioned before less-salient/new when ordering the object arguments of ditransitive verbs (Arnold et al., 2000; Bock & Warren, 1985; Clifton & Frazier, 2004). We first conducted a sentence continuation task for sentences such as 1a-d that were cut after the ditransitive verb in German. The result showed that people were more likely to continue the sentence by placing the first-mentioned subject as the first object argument than the second-mentioned entity (p < .05). We then used these materials in an ERP study (1a-1d) to determine the nature of expectations elicited by such a preference. Specifically, the goal was to establish whether violation of the expectation would be revealed at the determiner, suggesting a highly predictive influence, or only during the noun, suggesting integration difficulty. Also of interest is what kind of impact it has, i.e., how long the violation effect lingers. Finally, we examined whether the violation in the order of object arguments is more semantic/thematic or structural in nature.

The second, target, sentence was presented word-by-word in the middle of the screen. ERP signals were time-locked to the onset of the determiners (den/dem) as well as the object nouns. The analyses on the first determiner showed an enhanced late negativity for unexpected order, starting around 600 ms after the determiner onset, while analyses on the first object noun revealed a traditional N400 for the unexpected noun. We therefore assume the effect found after the determiner is in fact the N400 found at the noun. Neither grammatical case of the determiner (accusative vs. dative), nor animacy of the first object noun (Junge vs. Ball), had any influence. Interestingly, the expectation violation did not elicit differing (E)LAN or P600 for the unexpected vs. expected ordering of the arguments. Analyses on the second determiner and the second object noun did not show any lingering effects of recover for the unexpected ordering.

The results suggest that when expectations are violated at the level of thematic roles or information structure, N400 effects are not found on the earlier determiner, as both possible orders are semantically plausible, although not equally preferred. In addition, the effects suggest that the ordering preferences based on discourse salience are not structural in nature (lack of traditional structural effects) but rather affect processing at the level of thematic roles or information structure.
Examples:

1a - expected
Ein Junge ist neben einem Ball im Garten vor dem Haus. Der Vater schenkte dem Jungen den Ball als Geschenk...
‘A boy is next to a ball in the garden of the house. ‘The father gave the boy the ball as a gift...’

1b - expected
Ein Ball ist neben einem Jungen im Garten vor dem Haus. Der Vater schenkte den Ball dem Jungen als Geschenk...
‘A ball is next to a boy in the garden of the house. ‘The father gave the ball to the boy as a gift...’

1c - unexpected
Ein Junge ist neben einem Ball im Garten vor dem Haus. Der Vater schenkte den Ball dem Jungen als Geschenk...
‘A boy is next to a ball in the garden of the house. ‘The father gave the ball to the boy as a gift...’

1d - unexpected
Ein Ball ist neben einem Jungen im Garten vor dem Haus. Der Vater schenkte den Jungen den Ball als Geschenk...
‘A ball is next to a boy in the garden of the house. ‘The father gave the boy the ball as a gift...’

References: