Do Russian speakers rely more on word order or case in real-time processing?

The most common word order in Russian is Subject-Verb-Object (SVO, 1a); it occurs roughly twice as often (60% vs. 30%) as the inverse OVS order (1b) (Lobanova, 2011). Because of this flexibility, Russian speakers need to rely on case marking in sentence interpretation.

(1) a. мужчин-а видит женщин-у — SVO
man-NOM sees woman-ACC
'A man sees a woman.'

b. женщин-у видит мужчин-а — OVS
woman-ACC sees man-NOM
'A man sees a woman'

In online sentence processing, previous research has shown that readers make graded linguistic predictions using multiple types of information as they build sentence representations (Brennan, 2016; Kuperberg & Jaeger, 2016; Luke & Christianson, 2016). The current study investigates whether native Russian speakers rely more on word order canonicity or case markings in initial sentence processing.

Method: EEG responses were recorded while native Russian speakers completed a word-by-word sentence reading task in which we manipulated canonicity of word order (SVO vs. OVS) and grammaticality of the case marking on the second noun (SVS and OVO) in a 2x2 Latin-square design. We examined the P600 response to the second noun. This component occurs 500–800 ms after stimulus presentation and is sensitive to reanalysis of syntactically complex or ungrammatical sentences and may reflect the need to update the mental representation of an utterance when the input renders the previous representation untenable (Brouwer et al., 2012; Jackson et al., 2020; Kaan & Swaab, 2003).

Predictions: If participants rely only on case during online processing, we expect an enhanced P600 to the second noun in both SVS and OVO word orders compared to grammatical SVO and OVS word orders. However, since SVO is more common, participants simply predict that the second noun will have accusative case regardless of the first noun, in which case there should be an increased P600 to SVS and OVS word orders relative to SVO and OVO, since canonical word order does not predict nominative case to appear after the verb. Finally, if participants rely on both case marking of the first noun and canonicity of word order to make predictions about the second noun, then SVS orders should cause the largest P600 (they violate both case and word-order expectations); both OVS and OVO, which each violate either case or word-order expectations, should have intermediate P600 amplitudes relative to SVO.

Preliminary results (N=12) and discussion: SVS had a stronger P600 response than other word orders (Figure 1, $p<.01$). OVS resulted in a significantly larger P600 than SVO ($p=.03$) and even marginally larger than the ungrammatical OVO ($p=.07$). These results were mirrored in delta-band frequencies of the evoked power signal (Figure 2, $p<.01$), which may indicate difficulty in grouping words into syntactic phrases (Meyer, 2018).

These results suggest that readers relied more strongly on canonical word order in predicting the second noun, with the case of the first noun having a relatively small effect, despite the fact that case in these sentences was an unambiguous cue, whereas word order frequency was not.

(***Word count:*** 491 without title)

References

Brennan, J. (2016). Naturalistic sentence comprehension in the brain. *Language and Linguistics Compass*, *10*(7), 299–313.

Brouwer, H., Fitz, H., & Hoeks, J. (2012). Getting Real about Semantic Illusions: Rethinking the Functional Role of the P600 in Language Comprehension. *Brain Research*, *1446*, 127–143.

Jackson, C. N., Lorimor, H., & van Hell, J. G. (2020). The ERP correlates of thematic role assignment for passive versus active sentences. *Journal of Neurolinguistics*, *54*. https://doi.org/10.1016/j.jneuroling.2020.100886

Kaan, E., & Swaab, T. Y. (2003). Repair, revision, and complexity in syntactic analysis. *Journal of Cognitive Neuroscience*, *15*(1), 98-110.

Kuperberg, G. R., & Jaeger, T. F. (2016). What do we mean by prediction in language comprehension? *Language, Cognition and Neuroscience*, *31*(1), 32–59. https://doi.org/10.1080/23273798.2015.1102299

Lobanova, A. (2011). The role of prominence scales for the disambiguation of grammatical functions in Russian. *Russian Linguistics*, *35*(1), 125–142. https://doi.org/10.1007/s11185-010-9066-3

Luke, S., G., & Christianson, K. (2016). Limits on lexical prediction during reading. *Cognitive Psychology*, *88*, 22–60. https://doi.org/10.1016/j.cogpsych.2016.06.002

Figure 1. ERP results

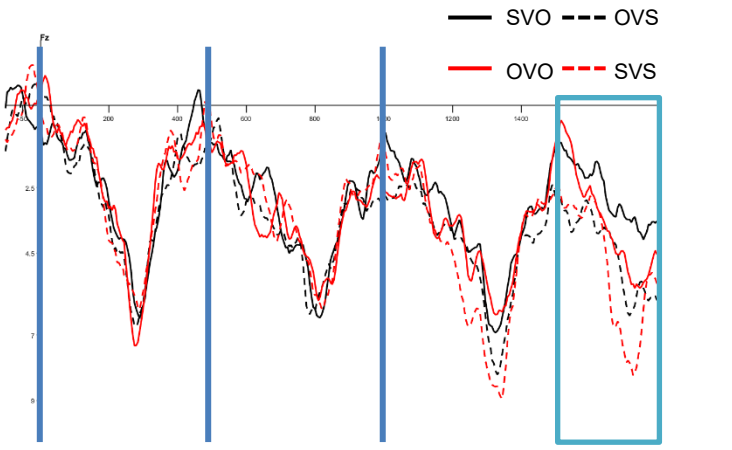

Figure 2. Evoked power