Predictive processing in Russian: evidence from EMEG

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Predictive processing provides a potential framework to conceptualise language comprehension as probabilistic inference given incomplete input. However, the degree to which we pre-activate upcoming words in natural language processing remains disputed. Here we present two EMEG experiments asking whether constraining grammatical context facilitates predictive pre-activation of upcoming words’ relevant linguistic properties.

The first experiment focused on Russian subject-verb agreement, where the form of an agreement marker is determined by the preceding subject. We compared these with contexts where free Russian word order allows the subject to follow the verb making the suffix form less predictable. Using univariate and RSA techniques we show that predictability changes the way that otherwise identical suffixes are processed in the bilateral temporal cortex.

A second experiment investigated whether and when grammatical constraints can pre-activate words’ grammatical and lexical features. Participants listened to Russian sentences with target words whose grammatical category (noun or verb) was either constrained or unconstrained by the preceding context. Nouns contained derivational suffixes, while verbs contained inflectional suffixes. Only unconstrained inflectional forms produced post-suffix left-fronto-temporal activity, suggesting decompositional processing. In the constrained contexts listeners accessed the target’s morphological form before suffix onset leading to early activation of verb subcategorization information in the left temporal areas. These results suggest that context may facilitate predictive access to a word’s lexico-grammatical properties while also determining the processing strategies applied to an incoming verbal or nominal stem.

Together these experiments provide novel insights into how grammatical constraints in Russian language can be used to investigate the predictive nature of linguistic processing.

Keywords: predictive-processing, Russian, morpho-syntax.