

When Are Lexical Errors Noticed? Evidence from a Behavioral Study of Russian

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The annotation of learner corpora has shown that lexical errors often involve greater ambiguity and a wider range of acceptable corrections than orthographic errors, posing a challenge for learner corpus annotation. Unlike spelling errors, which often admit a single obvious correction, lexical errors frequently allow multiple plausible interpretations and correction variants, leading to lower annotator agreement and greater annotation uncertainty [1-3].

In this study, we examine the processing of lexical errors through a behavioral experiment in which native speakers of Russian were asked to identify and correct lexical anomalies in authentic learner-language stimuli. For example, in the sentence *...у которых молодые дети* “...who have young children” (instead of *маленькие дети* ‘small children’), participants had to detect the collocational violation and provide a correction. Responses were evaluated using two measures: visibility (the proportion of participants who noticed the target error) and precision (the proportion of corrections matching a predefined gold standard). In contrast to many ERP studies relying on minimal pairs, our design approximates more naturalistic reading and proofreading conditions.

The study builds on the RLC-CROWD dataset, where over 300 native speakers participated in error correction tasks [4]. Preliminary observations revealed a dissociation: orthographic errors were uniformly corrected, whereas lexical errors showed low visibility and high inter-annotator variability. The main experiment consisted of 32 sentences with lexical errors extracted from the Russian Learner Corpus [5]. Sentences were manipulated by introducing additional errors either within the target word or elsewhere in the sentence, yielding 128 stimuli. A total of 262 participants provided 2,674 responses. For each error, we calculated visibility, precision, collocational strength (LogDice) based on the Russian National Corpus, and semantic similarity via word2vec. Statistical analysis employed mixed-effects logistic regression.

The results indicate that visibility was highest when the target lexical error appeared in isolation, without additional errors in the sentence ($\chi^2 = 38.16$, $p < 0.001$). The presence and type of accompanying errors further modulated detection rates: lexical errors elsewhere in the sentence significantly increased visibility of the target ($\chi^2 = 32.56$, $p < 0.001$), while orthographic errors within the target word facilitated detection more strongly than grammatical deviations ($\chi^2 = 14.08$, $p < 0.001$).

Lexical error type also significantly affected both visibility ($\chi^2 = 17.43$, $p < 0.001$) and precision ($\chi^2 = 13.25$, $p < 0.01$). Paronym substitutions yielded the highest correction precision (91.2%) despite only moderate visibility (72.4%), suggesting that some violations are easier to repair once detected. Additional contextual errors had no reliable effect on precision, indicating that successful correction depends primarily on the lexical properties of the target error itself rather than on surrounding noise.

Beyond error type, semantic similarity between the erroneous and the correct word emerged as a significant predictor of correction accuracy: the closer the two words were semantically, the more likely participants were to produce the gold-standard correction ($\rho = 0.387$, $p = 0.029$). Collocational strength (LogDice) showed a trend-level positive association with visibility ($p = 0.086$), suggesting that stronger collocations are more likely to be noticed when violated. Finally, entropy analysis revealed that error variability – the diversity of acceptable corrections – was significantly reduced when erroneous and correct words were semantically close ($\rho = -0.492$, $p = 0.004$), indicating that semantically constrained errors yield higher annotator agreement. These results suggest that lexical error processing is shaped by distinct mechanisms operating at the detection and repair stages, with semantic and collocational properties playing complementary roles.

References

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