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Processing Effects For Russian Gender

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The present study investigated the processing of linguistic gender in Russian. For the majority of Russian nouns, gender is marked in a relatively regular manner through the ending of the noun (suffixes for feminine and neuter nouns, the null morpheme for masculine nouns). A subset of Russian nouns ends in palatalized consonants which do not provide reliable gender marking. We will refer to the nouns with end-palatalization as ambiguously marked nouns. A self-paced reading experiment was used to examine how gender-marking and language experience affect speed of processing and accuracy. Twenty-six native speakers of Russian and 18 fluent non-native speakers (typically college professors and graduate students in Russian) read 48 target sentences in which subject-nouns had either regular (e.g. *muka*) or ambiguous gender marking (e.g. *sol'*) and 60 fillers. The overall sentence structure was *Introductory Phrase--Optional Adjective--Subject Noun--Adverb--Correct vs. Incorrect Verb--Prepositional Phrase*. Half of the subject-nouns were preceded by an adjective and half appeared without an adjective. The adjectives reliably marked the genders of the subject nouns. Participants made a forced-choice between two verb forms -- one that was correctly inflected so as to agree with the gender of the subject-NP and one that did not agree with the gender of the subject-NP. We examined error rates for choosing the correct verb form, reading times for individual words up to the verb, and verb choice times, which included the reading times for the verbs and prepositional phrases. Significance was set at $p < .05$, by subjects and items, in analyses using Group (native vs. non-native), Adjective (present vs. absent), and Ending (regular vs. ambiguous gender marking) as factors. For sentences with regular nouns, native and non-native speakers were highly accurate in the verb choices (error rate < 3%), regardless of whether the subject-noun was preceded by an adjective or not. For sentences with ambiguous subject-nouns, the non-natives made significantly more errors than the natives. Non-natives had extreme difficulty correctly choosing the verb when there was no adjective modifier (error rate = 29%). This condition was significantly different from all the others. The difficulty was significantly reduced when there was an adjective modifier (error rate = 6%). Reading times were generally slower for non-native speakers than for native speakers. As signaled by a significant Group X

Adjective interaction at the subject-noun, natives were somewhat slowed down in reading the noun when there was an adjective modifier (666 ms.) than when there was no adjective (613 ms.). The effects for non-natives were in the opposite direction -- 988 ms. with an adjective and 1121 ms. without an adjective. We attribute this interaction to differences in expertise. Natives, who have excellent knowledge of noun genders, may spend time verifying the gender agreement of nouns and adjectives. This tendency may be a consequence of greater sensitivity to the dissociation of referential and grammatical gender occurring in some Russian nouns (e.g. *tolstij muzhchina*). Non-natives compensate for their uncertain knowledge of noun gender by strategic use of the adjective gender marking. Moreover, non-natives took significantly longer to read masculine versus feminine gender nouns, which may in part be a consequence of greater variability in the consonant endings of masculine nouns, which non-natives have not yet mastered as completely as the feminine endings. For the adverb following the subject noun, there were no effects for the natives. The non-natives showed significantly slower reading times if an ambiguously marked noun had not been preceded by an adjective. Choice times were significantly slower for non-natives when the subject-NP did not have an adjective (2401 ms.) compared to when it did (1927 ms.). The slowdown was amplified when the subject noun was ambiguously marked for gender (no adjective, regular noun: 2141 ms.; no adjective, ambiguous noun: 2661 ms.). In separate analyses of the native speakers' data (with lower overall variance), we again found that the subject noun was read more slowly when there was an adjective modifier, but reading and choice times in the verb region were significantly faster. These data indicate that gender access in native speakers does not depend on regular marking on the noun, but gender access can be aided by additional cues like gender marking on an earlier adjective. Gender access in non-natives is aided by additional cues too, but also by the regularity of morphological marking. The data suggest that learning grammatical gender is facilitated by regular morphological marking. These data also provide a set of processing effects that constrain possible models of processing Russian gender. We consider how notions of cue validity, competition, and connectionist processing could be useful toward this end.