

## Paradigms: cognitive plausibility and pedagogical application

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Russian corpus data and a computational experiment suggest that learning of inflectional morphology should focus on the most frequent word forms rather than presenting entire paradigms. These research findings are implemented in a new pedagogical resource, the Strategic Mastery of Russian Tool (SMARTool).

Among major world languages with large numbers of second language learners, Russian has relatively complex inflectional morphology: each noun has at least 12 wordforms, each adjective has 28 wordforms, and, while verbs vary, 100 or more forms are typically possible for each verb. Mastering these paradigms is a daunting task for L2 learners. And there is evidence that paradigms represented as matrices of equiprobable cells is not a cognitively plausible model for native speakers either. We offer a usage-based approach to the question of how to model inflectional paradigms.

Corpus data (Janda & Tyers 2018) reveals that for any given Russian lexeme, only a few (usually 1-3) wordforms account for nearly all attestations, while the remaining wordforms are rare or unattested. Our computational learning experiment shows that learning of Russian inflectional forms is best when training focuses only on the highest frequency wordforms: accuracy of prediction is consistently higher and severity of errors lower. These findings lend support to the idea that inflectional paradigms have the cognitive status of radial categories with prototypical and peripheral members (Nesset & Janda 2010). This cognitive model also accounts for the “Paradigm Cell Filling Problem” (Ackerman et al. 2009): native speakers of inflectional languages like Russian routinely recognize and produce peripheral wordforms that they have never been exposed to. Because the profile of prototypical wordforms is different for each lexeme, wordforms that are peripheral for some lexemes are prototypical for others, facilitating triangulation. For example, the Dative Plural wordform *dulam* of *dulo* ‘muzzle’ is so rare (2 attestations in 283M words, Russian National Corpus) that most native speakers have probably never encountered it. However the Dative Plural *slovam* is among the most common wordforms of *slovo* ‘word’, supporting analogy from the prototype of one lexeme to the periphery of another.

The SMARTool is a free, publicly available web resource that aims to help L2 learners of Russian achieve native-like prototype-periphery radial category structure for wordform paradigms. The SMARTool provides access to the most used wordforms, plus the grammatical constructions and collocations most typical for each noun, verb, and adjective. Representative grammatical constructions and collocations are determined based on data from the Russian National Corpus (<http://ruscorpora.ru>) and the Russian Collocations Colligations Corpora (<http://cococo.cosyco.ru>). Over 3000 Russian lexemes are represented in the SMARTool, culled from frequency lists and textbooks for a total of 500 each at CEFR levels A1 & A2, 1000 each at CEFR levels B1 & B2. Lexemes can be filtered according to proficiency level, topic, textbook, and grammatical categories. For each lexeme, the SMARTool provides the three most prototypical wordforms, plus example sentences that show how those wordforms are used, yielding over 9000 wordforms and example sentences. Users get a parse of each wordform and they can access a translation for each sentence with a button, as well as audio in both male and female voices. Interactive exercises are also under development.

### References

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