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ACQUISITION OF RUSSIAN NOMINAL CASE INFLECTIONS BY MONOLINGUAL CHILDREN: A PSYCHOLINGUISTIC APPROACH

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Acquisition of Russian nominal case inflections by monolingual children: a psycholinguistic approach

While different researchers agree that the acquisition of Russian nominal cases proceeds somewhat sequentially, there is no consensus about the exact order of case acquisition in the literature on L1 acquisition (see Ceitlin, 2000; Gvozdev, 1981, 2007; Gagarina & Voeikova, 2009). Besides, accumulated longitudinal data are sparse and disparate, coming from children of different ages, socio-economic statuses, and language acquisition backgrounds. We adopt a psycholinguistic approach to examine acquisition of Russian nominal case inflections by Russian monolingual children (2-5 years old). The goal of the study is twofold: it sets out 1) to examine at what age children learn to generalize rules of noun case usage, and 2) to identify the order of acquisition of Russian oblique case inflections. Children perform a picture-based sentence completion task in which they have to finish the sentence by naming real or non-existing objects in the pictures. Five sentence frames are constructed to bias the children's responses towards the use of a noun form in one of the five oblique Russian cases, across three declensions plus plural forms. Data collection is in progress, but interim results show that monolingual Russian-speaking children learn to generalize morphological rules to novel nouns by the age of 2 and that nouns in the plural form are acquired later in language development compared to singular forms. Within the singular forms, 3rd declension cases, especially the instrumental case, present most difficulty. Additionally, 2-3-year-old children tend to substitute oblique cases with the nominative case forms. The results corroborate some of the previous findings and add additional insights into the acquisition of Russian case.

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Introduction

Russian, as a highly inflective and morphologically rich language, provides many variations of properties for investigation of case. The case category in Russian is a complex and abstract grammatical system of oppositions with obscure semantics. Further, it is complicated by non-transparent forms and connections between number (singular and plural), gender (three gender systems: masculine, feminine, and neuter), and declension (three declensional types). Moreover, acquisition of cases creates difficulties due to different other aspects. The difference in cue validity, for instance, associated with different cases is reflected in the order in which they are acquired by children. Presumably, less frequent and less salient cases are acquired later in childhood than the more frequent and salient ones.

While different researchers agree that the acquisition of different cases proceeds somewhat sequentially, there is no consensus about the exact order of case acquisition in the literature on child L1 acquisition. For instance, according to Ceitlin, the nominative case appears in the child speech first, followed by the accusative case around 24 months of age and the genitive case around 36 months of age (Ceitlin 1988, 2000). At this stage, the differentiation of cases is not yet stable, and children can use both cases in the same communicative situations. The instrumental case, understood in the meaning of the "instrument", is assimilated later than other cases – children tend to use the nominative form in place of the instrumental case. Gvozdev (1981, 2007) notes that until about 3 years of age, children do not use case inflections in a productive way. Rather, case forms are "frozen" and are used with specific nouns in a child's speech but are not regularized to all nouns. Lepskaya (1988) argues that children first make a distinction between nominative and accusative cases, after which all the other oblique case forms appear almost simultaneously within an impressively short period of time (2-3 months). It is therefore difficult to document the chronology of the occurrence of cases in children's speech. The case system and its development in the speech of Russian monolingual children is also examined in the works of Slobin (1966), Babyonyshev (1993), and, more recently, in papers by Miranovyč (2011), Ionova (2007), and Voeikova and Gagarina (2002, 2009). While longitudinal studies provide invaluable data on L1 acquisition of the Russian case system, the accumulated data are, unfortunately, sparse and disparate, coming from children of different ages, socio-economic statuses, and language acquisition backgrounds. Their results are therefore difficult to generalize, because they may be sampling a great degree of individual variability in language, which normally characterizes the early stages of language acquisition. Therefore, it is necessary to complement existing longitudinal studies with a psycholinguistic perspective. We adopt an experimentalist approach to examine the order of acquisition of Russian oblique case inflections

and investigate at what age monolingual Russian-speaking children learn to generalize rules of noun case usage. By including a pseudoword manipulation ("wug"-test, Jean Berko Gleason (1958)), we aim to test whether 2-5-year-old children can generalize the type of the inflectional paradigm when given a novel nominative form. For example, if they are given a nonexistent word form "vomaka", would they be able to inflect it correctly based on form similarity with the 1st declension singular feminine nouns, e.g. "sobaka" (dog)?

To summarize, the main contribution of this study consists in complementing the insights gained from longitudinal studies with the experimental data. It will also refine the previously reported timeline for the acquisition of Russian cases by monolingual Russian-speaking children while extending the findings not only to known, but also to novel, word productions.

Methods

Participants

A total of 35 monolingual 2-5-year-old Russian-speaking children (13 males, 22 females; 2 years old – 13, 3 years old - 8, 4 years old - 10, 5 years old - 4) participated in the present study. Exclusion criteria were previous history of hearing / vision problems, neurological or psychiatric disorders. The parent or primary caregiver of the children provided a written informed consent for their children to participate in the experiment. In addition, we asked the parents to fill out a questionnaire about language experience of their child. In the questionnaire, we asked about the level of parental education, the child's siblings (if any), etc. All data were collected in Moscow, Russia.

Stimuli

One target word was chosen for each oblique case (Genitive, Dative, Accusative, Instrumental, and Prepositional), each declension (first, second, and third) and number (singular and plural). Nominative case was not included in the stimuli because it is a prototypical baseline case that corresponds to the citation form. If case inflections varied depending on whether the noun referred to animate or inanimate objects, both animate and inanimate nouns were selected (e.g., стол-∅ (table_ACC), жук-а (beetle_ACC)). As a result, a total of 24 distinct real Russian words were selected for the experiment (see Appendix 1 for target words and frames). Experimental words were selected from the frequency dictionary of the modern Russian language (Lyashevskaya & Sharov, 2009) based on the following criteria: all nouns had to have high

frequency of occurrence with the age of acquisition not later than 2 years old (Akinina et al., 2015), they had to be nouns denoting countable objects, highly imageable, phonotactically simple (i.e., containing no difficult consonant clusters), containing no phonetic alterations, not longer than two syllables, and not used in the diminutive form. Additionally, we used the MacArthur questionnaire (Essex et al., 2002) for finding the percentage of children producing the given words at 24 months.

Twenty-four matching novel words (pseudowords) were created by replacing two consonants in each target real word. Thus, we retained the same properties for the novel words— the length, the phonotactics, and the inflection type — that characterized real words. After creating novel words, we made a questionnaire for adult Russian native speakers, in which we asked them 1) whether a given word exists in the Russian language, 2) looks like a real Russian word. Also, we asked adult Russian native speakers to inflect all novel words according to the Russian case paradigm. Based on the received feedback, we calibrated the novel words to be included in the experiment.

We created four experimental lists for words and pseudowords. Each experimental list contained pseudorandomized 24 words/pseudowords. Words and pseudowords were presented separately. After constructing the target stimuli, five sentence frames were constructed to elicit a noun in one of the five oblique Russian cases, e.g. "The boy is holding a… beetle$_{ACC}$" (target word). Verbs familiar to two-year old children (according to the MacArthur questionnaire) were selected for five sentence frames. Because it is sometimes impossible to determine the declension of the novel words in Russian without the semantics and the gender information about the words, gender-marked adjectives were added to the leading sentences to resolve ambiguity in novel words in the pseudoword block, e.g., "Look, this is a little$_{MASC.NOM}$… dreetle" (target pseudoword).

Twenty-four objects denoting 24 target word stimuli were drawn by an artist for presentation in isolation (to elicit naming responses) and for presentation of situations (to elicit oblique case markings). The pictures used in the pseudoword block were selected from the set of pictures of novel objects included in the Novel Object and Unusual Name Database (NOUN; Horst & Hout, 2016). They were redrawn by the artist, who drew the real-word objects with the same style and palette.

Procedure

Children performed a picture-based sentence completion task in which they had to finish the sentence provided by the experimenter by naming an object in the picture. The task was

administered in two blocks, first, for real words and then for pseudowords. Four practice items were provided at the beginning of the experiment to familiarize the participants with the procedure. The instructions varied slightly, depending on the experimental block.

In the word block, the experimenter showed a picture of an object in isolation to the child and asked, "What is it?", and then the experimenter waited for the response. If a participant could not answer the question, the experimenter provided a prompt (the first syllable), and if the child still did not name the object, the experimenter provided the name of the object and asked the child to repeat it. If a child named the object correctly from the first attempt, the experimenter continued with the second screen, on which the same object was depicted in a situation. For instance, one picture may show a train, and the second picture will show children riding the train (Figure 1A). The child needed to complete the sentence with the required form of the noun (i.e. train) in the given context, after the experimenter provided the first part of the sentence "The children are riding the …"

In the pseudoword block, the experimenter asked the child to imagine a new world where there were interesting new objects and animals he/she had never seen. Then the experimenter said, "I will name an object and you will repeat after me". When the experimenter was sure that the child understood the explanation, she showed a picture of a nonexistent object in isolation to the child and said the name of this object or animal, which the child repeated after the experimenter. The second picture depicting a situation was shown afterwards. For instance, one picture showed a nonexistent animal (e.g. "boog"), and the second picture depicted the following situation: "the boy is holding a little… boog" (Figure 1B). The child needed to complete the sentence with the required form of the pseudoword in the given context, using the inflection that s/he considered fit for this word.

The duration of the experiment took a maximum of 15 minutes, depending on the age of the child. With two-year old children, a short break between the two blocks was sometimes necessary.

A

B

Figure 1. A schematic representation of a trial in the real word block (A) and in the pseudoword block (B).

Results

The first analysis examined the effect of age, number and declension on the accuracy of responses in words and pseudowords. As can be seen from Figure 2, children made more errors in plural forms than singular forms across all age groups ($p < 0.05$). While there was no significant effect of age group on accuracy, there was a tendency for higher accuracy overall as children became older. The significant difference between words and pseudowords was found only in the 2-year-old age group in the usage of plural forms ($t = 8.9$, $p = 0.003$).
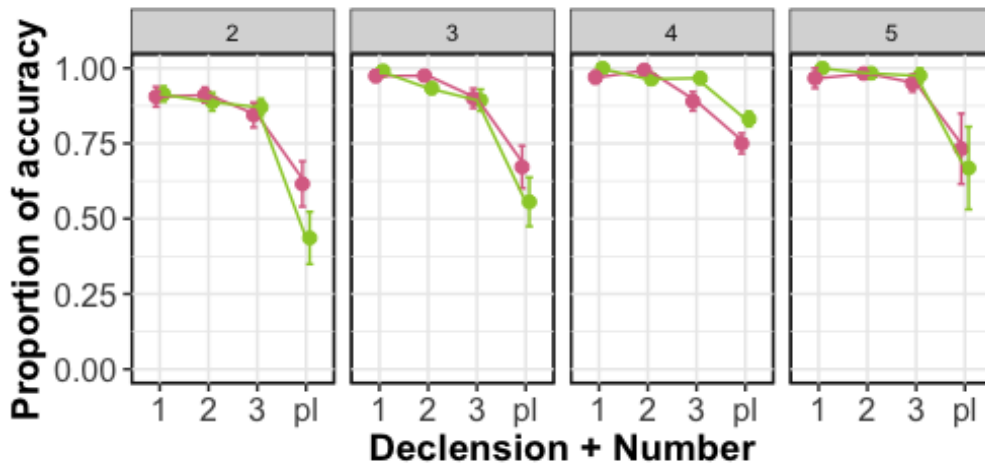
Figure 2. Proportion of accuracy for singular nouns in the 1, 2, and 3 declensions and plural nouns (on the x-axis) in 2-5-year-old Russian-speaking children. Pseudowords are shown in red color, real words are shown in green color.

Proportion of accurate responses per each type of stimuli is represented in Figure 3. As can be seen from the figure, children's responses across cases are very heterogeneous, especially in the 2-year-old group and in the plural forms across all age groups. However, a consistent result is that all children tend to make most errors in the instrumental case of the 3rd declension nouns and that plural forms present more difficulty compared to singular forms.
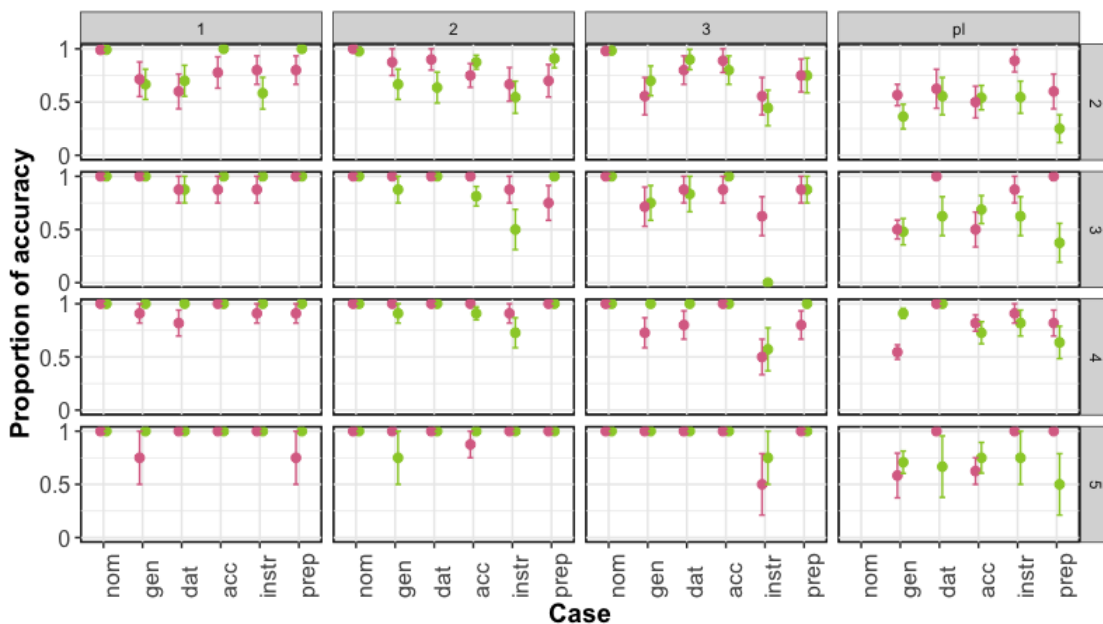

Figure 3. Proportion of accuracy across all case uses in pseudowords and words for singular nouns in the 1, 2, and 3 declensions and plural nouns. Pseudowords are shown in red color, real words are shown in green color.

For qualitative analysis, we examined what kinds of mistakes children make at different ages. Erroneous responses were grouped into the following categories: wrong case (e.g., case replacement), wrong declension, wrong number, wrong form (unusual form), and wrong stress. Percent of different kinds of errors made by children in different age groups is represented in Table 1. The most frequent error was the use of the wrong case. 2-3-year-old children tend to substitute oblique cases with the nominative case. For instance, a child can use the nominative, or 'frozen' form, in sentences that require a genitive form of the noun: *Malchik derjit sobaki*$_{NOM.PL}$ *instead of Malchik derjit sobak*$_{GEN.PL}$. While 4-5-year-old children sometimes also used case forms incorrectly, they did not replace oblique cases with the nominative case. Instead, they tended to use the wrong oblique case form.

Error type	2 years	3 years	4 years	5 years
wrong case	57%	39%	28%	26%
wrong declension	11%	13%	13%	21%
wrong number	21%	23%	10%	21%
unusual form	7%	17%	28%	32%
wrong stress	5%	9%	21%	0%

Table 1. Percent of different types of errors broken down by age group.

The second most common error was in the use of the declension. Children tended to replace second declension noun endings with cases endings of the first declension, e.g., they preferred the stressed and transparent endings *–ov* and *–ev* to zero inflections. For example, *Malchik derjit sobakOV* instead of *Malchik derjit sobak*$_{GEN.PL}$. Moreover, similar mistakes were found in the pseudoword block: *Devochka sidit vozle maktinOV* instead of *Devochka sidit vozle maktin*$_{GEN.PL}$. In addition, declension 3 seems to present a big challenge: children tended to replace third declension noun endings with case endings of the second declension. For instance, in *Malchik igraet s mish'yu*$_{INSTR.SG}$, children used a word form '*mishey*'; they tended to make similar errors in the use of pseudowords: *"limoy" instead of "lim'yu"* in *Malchik igraet s lim'yu*$_{INST.SG}$. Also, mistakes with number were frequent. Children often used singular form instead of the plural. For example: *Malchik derjit korobku*$_{ACC.SG}$ in place of *Malchik derjit korobki*$_{NOM.PL}$.

Discussion

The present study aimed to investigate at what age Russian-speaking monolingual children can generalize rules of case use to novel words and identify main areas of difficulty in the use of the Russian noun case inflections. In fact, this study is the first to assess the full set of oblique cases in the Russian language for regular noun case forms.

We found that there is an association between the age of the child and the degree of mastery of case forms. Additionally, plural case forms presented most difficulty for all children from 2 to 5 years old compared to singular forms. This finding is in line with previous studies (e.g., Schwartz & Minkov, 2014). Noun case endings of the 3rd declension also presented difficulty, resulting in high error rate across all children's age groups, especially in the instrumental case. In addition, we found that children tend to substitute zero-inflection case endings in the plural form with the more salient, transparent and stressed –*ov,-ev* endings, supporting the idea of *'inflectional imperialism'* (Slobin, 1966). Younger children (2-3 year-olds) tended to substitute oblique cases with the nominative case endings, while 4-5-year-old children did not make such mistakes.

Regarding the question of when Russian-speaking children learn to regularize case inflections to novel words, we did not find significant differences between the use of case endings in words vs. pseudowords block, except in the use of plural forms by 2-year-olds. This result suggests that, overall, children are able to extract and apply complex morphological rules to novel input early on in language development.

In the Russian language, gender and case information is combined in the inflection of the noun form, which makes it difficult to disentangle acquisition of gender and case. Additionally, this study only focused on a specific set of case meanings, whereas different cases may carry different functions in the Russian language. Besides, we only examined transparent, regular case inflections to the exclusion of exceptional case uses. While these and other aspects of L1 acquisition of case are not addressed in the present study, they are worth examining in future studies.

References

Akinina, Y., Malyutina, S., Ivanova, M., Iskra, E., Mannova, E., & Dragoy, O. (2015). Russian normative data for 375 action pictures and verbs. *Behavior Research Methods, 47*(3), 691–707.

Babyonyshev, M. (1993). Acquisition of the Russian case system. *MIT working papers in linguistics*, *19*, 1-43.

Berko, J. (1958). The child's learning of English morphology. *Word, 14*, 150-177.

Ceitlin, S. N. (2000). *Jazyk i rebenok: Lingvistika detskoj rechi* (Moscow, Vlados).

Ceitlin, S. N. (1988). *Okkazional'nye morfologicheskie formy v detskoj rechi* (Leningrad, LGPI im. A. I. Gerzena).

Essex, M. J., Boyce, W. T., Goldstein, L. H., Armstrong, J. M., Kraemer, H. C., Kupfer, D. J., & MacArthur Assessment Battery Working Group. (2002). The confluence of mental, physical, social, and academic difficulties in middle childhood. II: Developing the MacArthur Health and Behavior Questionnaire. *Journal of the American Academy of Child & Adolescent Psychiatry*, *41*(5), 588-603.

Gagarina N., Voeikova M. (2009). *Acquisition of case and number in Russian. Development of nominal inflection in first language acquisition: A cross-linguistic perspective*, 179-215.

Gvozdev, A. N. (2007). *Formirovanie u rebjonka grammaticˇeskogo stroja russkogo jazyka, Voprosy izucˇenija detskoj recˇi* (Sankt Petersburg, Detstvo-Press; Moscow, Sfera).

Gvozdev, A. N. (1981). *Ot pervyx slov do pervogo klassa: Dnevnik naucˇnyx nabljudenij* (Saratov, Izdanie Saratovskogo Universiteta).

Horst J. S., Hout M. C. (2016). The Novel Object and Unusual Name (NOUN) Database: A collection of novel images for use in experimental research. *Behavior research methods*, 48(4), 1393-1409.

Ionova, N. V. (2007). *Semantic functions of case forms and prepositional phrases in the speech of preschool children*. Unpublished PhD Dissertation. Cherepovets.

Lepskaya N. (1988). *Acquisition of the category of case by children. Semantics in the speech activity in the material of ontogenesis*, 48-58.

Lyashevskaya O., Sharov S. (2009). The frequency dictionary of modern Russian language (Azbukovnik, Moscow).

Schwartz M., Minkov M. (2014). Russian case system acquisition among russian–hebrew speaking children, *Journal of Slavic Linguistics*, 51-92.

Slobin, D. I. (1966). Acquisition of Russian as a Native Language. In F. Smith & G. A. Miller (eds.), The Genesis of Language. A Psycholinguistic Approach. *Proceedings of a*

Conference on Language Development in Children (Cambridge, MA, and London, MIT Press).

Voeikova, M., & Gagarina, N. (2002). MLU, first lexicon, and the early stages in the acquisition of case forms by two Russian children. *LINCOM studies in theoretical linguistics*, *29*, 115-131.

Miranovyč A. (2011). *Osvoenie padežnoj sistemy det'mi-monolingvami*. MA thesis, University of Perm.

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