September 1, 2009

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Sincerely,
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Editorial Assistant, SEEJ

att.: rough pages
VERBS OF MOTION IN HIGHLY PROFICIENT LEARNERS AND HERITAGE SPEAKERS OF RUSSIAN

Kira Gor, Svetlana Cook, Vera Malyushenkova, Svetlana Cook, and Tatyana Vdovina, University of Maryland

The present article reports the results of a series of three experiments testing perception and production of verbs of motion by highly proficient American learners of Russian. These experiments included (1) an online Grammaticality Judgment Task of non-idiomatic use of verbs of motion, (2) a sentence completion experiment involving idiomatic expressions with the missing sentence-final verb of motion, (3) and a restricted control experiment, in which subjects heard collocations and only the first syllable of the verb of motion in sentence-final position, and were required to produce the missing second part of the verb. All the three tasks were part of a pilot test battery developed to collect data on control of discrete linguistic features in highly proficient American learners of Russian. The study addresses possible sources of difficulty in the use of verbs of motion and compares the performance of ‘true’ second language learners and heritage learners of Russian at the same proficiency levels, with native speakers of Russian serving as a control group.

1. Introduction

There are several reasons why Russian verbs of motion (VoM) are difficult to master for English-speaking learners; this is why instructional materials for teaching Russian to American students place much emphasis on this linguistic domain. While most of instruction in motion verbs deals with more basic uses and targets intermediate level learners, relatively little is known about difficulties experienced by highly proficient learners in mastering VoM. A better understanding of these difficulties will shape pedagogical approaches

This study was funded by the Center for Advanced Study of Language (CASL) as part of the Linguistic Correlates of Proficiency Project. The authors are deeply indebted to Michael Long for guidance they received at every stage of the study, Scott Jackson for programming experiments with DMDX and advice in psycholinguistic methods, and Jennifer Koran for statistical analyses.
Verbs of Motion in Highly Proficient Learners of Russian

and instructional materials for successful teaching and learning of this tricky topic beyond the basic knowledge that already exists. The present article reports the results of a series of three experiments testing perception and production of VoM by highly proficient American learners of Russian. These experiments include an online Grammaticality Judgment Task of non-idiomatic use of VoM, a sentence completion experiment involving idiomatic expressions with the missing sentence-final verb of motion and a restricted control experiment in which subjects heard collocations with only the first syllable of the verb of motion in sentence-final position, and were required to produce the missing second part of the verb. All three tasks are part of a pilot test battery developed to collect data on control of linguistic domains and discrete features in highly proficient American learners of Russian. The study addresses possible sources of difficulty in the use of verbs of motion and compares the performance of ‘true’ second language (L2) learners and heritage learners of Russian at the same proficiency levels, with native speakers of Russian serving as a control group.

The article is structured in the following way: Section 2 provides an overview of the properties of Russian VoM, describes possible sources of difficulty for American learners with special focus on highly proficient learners, and identifies the goals of the study. Section 3 describes the current study, its scope, design, participants, and goals. Sections 4 through 6 report the results of the individual experiments: Section 4—Grammaticality Judgment Task (GJT), Section 5—Restricted Control (RC), and Section 6—Sentence Completion (SC). Section 7 discusses the obtained results and their implications for the understanding of factors underlying second language acquisition and the processing of Russian VoM by ‘true’ L2 learners and heritage speakers of Russian. It then looks at the findings from the perspective of pedagogy and makes suggestions for teaching verbs of motion to highly proficient learners.

2. Verbs of motion in Russian as a second language

Russian VoM have been described from two different perspectives. First, they possess a unique distinction between unidirectional and multidirectional verbs that pertains to a closed class of 14 pairs of basic verb stems. They are all imperfective and found in other Slavic languages. Secondly, from the cognitive linguistics perspective, Russian is typologically a satellite-framed language in which manner is expressed by the verb root itself, while path is expressed by an element associated with the verb root, notably, the prefix (Talmy 1985, 2000). In a recent account, Tore Nesset has combined the cognitive linguistics and Slavic perspectives to claim that unprefixed unidirectional verbs in fact do encode path, unlike their multidirectional counterparts (Nesset 2008). This section

1. High proficiency in this study refers to levels 2–4 on the ILR scale and Advanced, Superior, and Distinguished on the ACTFL scale. For more details, see Section 3.1.
will look at Russian VoM as a linguistic domain to be acquired by L2 learners and make predictions about the problems that even highly proficient American learners may encounter while mastering this domain.

2.1 Unidirectional and multidirectional verbs of motion

The term ‘verb of motion’ (VoM), or ‘motion verb’ is used in a narrow sense in reference to 14 pairs of verb stems, all imperfective, with one stem in the pair referring to unidirectional movement that typically has the source and the goal. The action occurs only once and a multidirectional stem, which may express different types of movement other than unidirectional (Muravyova). Multidirectional verbs include roundtrips or movement to a certain goal and then back to the source, random motion in different directions, and the ability to perform movement with a certain manner. Once a unidirectional stem acquires a path prefix, for example, denoting movement in or out of a space, it turns into a perfective verb. Multidirectional verbs when adding a path prefix remain imperfective. These properties of the closed class of motion verbs can be translated into several predictions with regard to difficulties they will present for American learners given that English does not maintain the uni/multidirectional distinction and has a different temporal and aspectual system. Learners will need to master the distinction between unidirectional and multidirectional stems, meanings associated with them, appropriate contexts for their use, and correct aspectual choices for prefixed VoM. One of the most idiosyncratic elements in the overall system of Russian VoM is the use of multidirectional verbs with the meaning of roundtrips and their contrast with unidirectional verbs referring to motion in one direction only, which mirrors the more general use of imperfective aspect for cancelled actions as in (1) and (2). The contrast is not grammaticalized in English and as a result is notoriously difficult for English-speaking learners of Russian.2

(1) *Ja xodil na počtu.*
   I went\textsubscript{MULT} to post office.
   ‘I went to the post office and came back.’

(2) *Ja šel na počtu.*
   I went\textsubscript{UNI} to post office.
   ‘I was on my way to the post office.’

The following sections will add predictions based on more general considerations arising from the cognitive linguistics approach, formal properties of conjugational patterns, and the role of input frequencies in the acquisition of linguistic units and features.

2 While English translation equivalents support the distinction, with (1) translated as “went” and (2) as “was on my way,” the verb in (1) can never refer to a single action with a goal and an endpoint in the non-past tense. This obscures the use of (1) in the past tense to refer to a single complete action (a roundtrip) for L2 learners.
2.2 Russian verbs of motion in the cognitive linguistics perspective

Cognitive linguistics deals with a broader domain of VoM and is concerned, among other things, with how the path and manner of movement are expressed across languages (Berman and Slobin; Slobin 1996, 2004; Talmy 1985, 2000). According to VoM-based language typology, both Russian and English belong to satellite-framed languages in which the manner of motion (e.g., walking, running, or crawling) is encoded in the verbal root, while path (e.g., motion in and out of a space) is encoded by an element associated with the root. In English this is a postfix while in Russian this is a prefix.3 In verb-framed languages, such as French, path is expressed by the verb root and manner by an element associated with the verb. Unsurprisingly, verb-framed languages tend to avoid heavy phrases required to encode manner and thus manner remains unexpressed, which was demonstrated in a cross-linguistic study based on the *Frog Story* narratives by children and adults (Berman and Slobin; Slobin 2004).4 For example, the picture representing the emergence of the owl from the hole in the tree elicited no manner verbs in verb-framed languages, which preferred to use the verb exit to describe the event. With satellite-framed languages the same study showed, first, that the number of verbs encoding manner dramatically increased, and second, that there was a big disparity even among satellite-framed languages, with English speakers encoding manner in 32% of responses, and Russian speakers in 100% of responses. Russian speakers used manner verbs with path prefixes, while English speakers used the path verb come plus the postfix out to refer to the emergence of the owl. In other words, the use of path prefixes in Russian may be required when the use of path postfixes in English is only optional. Such a bias is likely to influence the native strategies of encoding path. This brings us back to the fact that Russian VoM systematically differentiate motion on foot (*idti-xodit’* [goun’t’-goMULTI]) and by means of transportation (*exat’-ezdit’* [goun’t’-goMULTI]), and therefore, manner is an important characteristic of motion events, more so than in similar English motion expressions. Another property of Russian is that it uses prefixed verbs even when English uses simple bare stems to express motion with a clear source or goal, such as ‘come’ (*pripixdit’*MULTI/prijiti) and ‘leave’ (*uxodit’*MULTI/ujti). Therefore, Russian speakers may be more prone than American learners to using prefixed VoM, when either the source or the goal is important. And finally, in more general terms, since English tends to encode path in postfixes and Russian to encode it in prefixes, one can predict that prefixation would be used more often by Russian native speakers than L2 learners of Russian.

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4. The "*Frog Story*" is a children’s book narrating the adventures of a boy and his dog travelling in search of their friend, a runaway frog, in a series of 24 pictures (see Mayer). The book has been used in numerous studies to elicit a narrative involving verbs of motion in native speakers and L2 learners of different languages.
2.3 Markedness, prototypes, and verbs of motion

The analysis of the closed class of paired VoM within the cognitive linguistics perspective by evoking the notion of prototype, both at the level of form and meaning, has demonstrated that formal and functional prototypicality are relevant for this domain (Nesset 2000). According to Nesset, “In Russian, a non-directional verb of motion evinces more prototypical form and meaning than its unidirectional partner” (2000, 117). This analysis parallels markedness considerations, but operates within the cognitive linguistics framework. Multidirectional verbs are termed non-directional to emphasize the fact that it is the absence of directionality, their general core meaning, that makes them prototypical. Unidirectional verbs are unique exactly in that they express directionality, and are therefore less prototypical. Formal properties of VoM match their meanings with non-directional verbs using the regular default—aj—and the high-frequency productive—i—conjugalional patterns, and unidirectional verbs using low-frequency unproductive—a—, -e—, and—ø— (zero-suffixed) conjugalional patterns. Thus, non-directional verbs use more common, or more prototypical, conjugalional patterns than their unidirectional counterparts. These observations can also be handled within markedness theory, with non-directional verbs being the unmarked member of the pair. Given that unidirectional verbs are less prototypical or more marked, according to the Markedness Differential Hypothesis (Eckman), they are expected to present more difficulties for late L2 learners than non-directional (multidirectional) verbs.

2.4 Typological distance and the influence of L1 on L2

Research on L2 acquisition and processing of VoM in cases where L1 and L2 are typologically different has produced certain evidence in support of Dan Slobin’s ‘thinking for speaking’ hypothesis (Slobin 1996) and at the same time has demonstrated that the influence of L1 on L2 acquisition of VoM (L1 transfer) is a complex multifaceted phenomenon (Cadierno). According to Slobin, native speakers are trained by their linguistic experience to structure and verbalize motion events in a certain way, prioritizing and making explicit some aspects and details of the event and not others. Late L2 learners will then experience difficulties when reconfiguring the structure and segmentation of motion events and encoding them in L2-appropriate ways. The study by Theresa Cadierno compared the use of VoM in the Frog Story written narratives by Spanish native speakers and L2 learners of Spanish, and L1 speakers of Danish. Spanish is a verb-framed language, which expresses path in the verb and manner of motion by means of adverbial or gerundival

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5. Nesset includes 13 pairs of motion verbs in his analyses, and uses the terms unidirectional and non-directional (for multidirectional) verbs (2000).
6. Conjugational patterns are defined by the suffix, based on the one-stem verb system developed by Roman Jakobson (1948).
phrases. Danish is a satellite-framed language which expresses manner in the verb, and path with the help of satellite verb particles. Two findings of the study are relevant for the present research. First, contrary to predictions based on previous findings (Berman and Slobin; Slobin 1996), both Danish and Spanish speakers used the same number of verb types in their native language, and thus manner of motion was not more prominent in Danish, a satellite-framed language, than Spanish, a verb-framed language. At the same time, native speakers of Danish used fewer verb types in L2 Spanish, which could be expected given their limited proficiency in L2 (Intermediate Mid and Advanced on the OPI writing scale). Second, the use of satellites to encode path confirmed the expected pattern based on L1 transfer. Path was expressed more often in Danish than in Spanish as L1, and accordingly Intermediate L2 learners redundantly used directional adverbs in Spanish. Additionally, two more parameters did not provide evidence of transfer from L1 Danish to L2 Spanish. Those were event conflation, or expression of at least two locations referring to the source and goal of motion in the same clause, and elaboration of setting-description, while showing definitive language-specific patterns in Danish and Spanish as L1s. In a follow-up study (Cadierno and Ruiz), a group of Italian learners of Spanish was added to the groups of L1 Spanish speakers and L1 Danish learners of Spanish. Italian and Spanish, both Romance languages, are verb-framed, and the comparison of their treatment of VoM with Danish learners of Spanish aimed at isolating L1 transfer of lexicalization patterns. The study concluded that the differences in type and token use of VoM were insignificant for the two non-native groups, L1 Danish and Italian, which does not support L1 transfer. Also, Danish L1 speakers did not make use of alternative means of expressing manner information, as the ‘thinking for speaking’ hypothesis would have suggested. However, in conformity with the ‘thinking for speaking’ hypothesis, the Danish L1 group exhibited a higher degree of elaboration of path than the other two groups. Thus, the results of the study did not lend strong support to the ‘thinking for speaking’ hypothesis at least for the groups involved that were rated as Advanced on the ACTFL writing proficiency scale.

Both English and Russian are satellite-framed languages, but they differ in the way they encode path, thus from the typological perspective one can expect certain processing difficulties associated with the expression of path and the appropriate use of prefixation in L2 learners.

2.5 Heritage learner profiles

One of the goals of the present study is to establish whether ‘true’ American learners of Russian process VoM in the same way as heritage speakers of Russian at the same proficiency levels. There are few observations in the literature regarding heritage use of VoM, and they are mostly based on limited data and are sometimes in conflict with each other. Nonetheless, these obser-
vations prompt several lines of inquiry useful in narrowing the research agenda. First, American Russian speakers, a term used by Maria Polinsky and Asya Pereltsvaig for American heritage speakers of Russian, overgeneralize the use of unidirectional verbs *idti* [go\_UNI] and *pojti* [go\_PERF] to contexts that would require the use of ‘go’ in English, especially to the ones calling for roundtrips and therefore, the verbs *xodit’* [go\_MULTI], *sxodit’* [go\_PERF], etc. (Andrews; Polinsky; Zemskaya et al.). In other words, roundtrips appear to present considerable difficulties for American Russian speakers. Second, this preference for unidirectional VoM applies only to the most generic stems *idti* and *exat’*, and does not involve all the paired VoM. Third, heritage speakers often choose one verb, unidirectional or multidirectional, and use it in all contexts.

And fourth, it appears that the choice of VoM in American Russian interacts with aspectual usage, which for these heritage speakers is best accommodated by the Lexical Aspect Hypothesis applied to second language acquisition research (see Bardovi-Harlig) and furthermore to heritage learners as well (Pereltsvaig). According to this hypothesis, “Aspectual marking in American Russian encodes the presence vs. absence of an inherent end-point associated with the verbal root: verbs that imply an inherent end-point are marked with the so-called PERFECTIVE morphology, whereas verbs that do not imply an inherent end-point are marked with the so-called IMPERFECTIVE morphology.” (Pereltsvaig, 9).

Based on the observations found in the literature, we put forward the following hypothesis for heritage use of VoM: the choice of one ‘preferred’ verb stem to be used in contexts, which calls for both unidirectional and multidirectional verbs, is dictated by considerations of greater prototypicality of meaning in (heritage) language use. This hypothesis accommodates such seemingly conflicting pieces of evidence as:

(a) Overgeneralization of unidirectional *idti*, *exat’*, *pojti* ‘go’, etc. to contexts requiring multidirectional verbs *xodit’* and *exdit’*. This feature is likely to be prompted by the use of the verb ‘go’ in English.

(b) The choice of multidirectional verbs *begat’*, *letat’* [run\_MULTI, fly\_MULTI] etc., over unidirectional *bežat’* and *letet’* [run\_UNI, fly\_UNI] reported in Polinsky, as these manners of motion verbs usually refer to motion with no explicit goal, such as ‘recreational’ running/jogging, or the ability to perform these activities.

(c) The choice of a higher-frequency verb stem over its lower-frequency counterpart in some cases, but not others, as reported in Polinsky. Apparently, input frequency dictates the choice of one stem to be generalized to all the contexts only when it reflects prototypical usage in the input to heritage speakers.

7. Heritage language use is expected to differ from standard language use, as the former mainly involves colloquial language with little or no exposure to literary written language.
This Prototype Hypothesis could be relevant only for lower-proficiency heritage processing of VoM, and therefore testing it remains outside the scope of this study. Also, it remains to be seen whether similar tendencies can be observed in ‘true’ American learners of Russian and whether they characterize lower-proficiency speakers or persist in higher-proficiency speakers as well.

3. The present study

3.1 Description of the study

The three tests involving VoM reported below, GJT, Restricted Control, Sentence Completion, and an additional test, Collocation Completion, were part of a comprehensive four-hour test battery developed to investigate perception and production of a set of linguistic features and structures in highly proficient American learners of Russian as part of the project Linguistic Correlates of Proficiency. Three groups of subjects, a total of 70 paid volunteers, took part in the study. The learners were pre-tested in oral proficiency using the Interagency Language Roundtable (ILR) Oral Proficiency Interview (OPI) format. ‘True’ American L2 learners were matched as closely as possible with heritage speakers of Russian, with a group of ten Russian native speakers serving as controls. Table 1 contains the data on subject distribution based on ILR OPI ratings. The results obtained from ten native controls were used to eliminate the items, on which more than two native Russian subjects out of ten disagreed, from further analysis. The L2 group traditionally included adult learners of Russian and in our case all were English-speaking. As for the Heritage group, the main criterion for inclusion was native exposure to Russian since birth. All Heritage speakers who participated in the experiments were born outside of the U.S. The age of arrival ranged from 0 to 13 with 8.5 years being the average. The majority of this population (20 out of 24 participants) did not have any further formal training in Russian with the exception of four participants who took Russian language courses as a part of high school or college curriculum. Given that the study targeted highly proficient speakers of Russian, the Heritage sample included some subjects who switched to English relatively late.

Both learner groups, L2 and Heritage, were further subdivided into two subgroups for statistical analyses based on their proficiency. The participants with ratings 2+ and above were included in the “high” subgroup, and those with ratings 2 and below in the “low” subgroup. The purpose was to separate very highly proficient learners from the rest and to establish whether their perform-

8. The ILR oral proficiency scale uses numeric values that correspond to the levels on the ACTFL scale, so that 1 corresponds to Intermediate, 2 to Advanced, 3 to Superior, and 4 to Distinguished levels with “plus” sublevels corresponding to High sublevels on the ACTFL scale.

9. The labels “high” and “low” are arbitrary, since both subgroups, with a few exceptions in the “low” group, comprise highly proficient speakers, ILR 2 (Advanced) and above.
Table 1: Russian Subject Distribution

<table>
<thead>
<tr>
<th>Subject Category</th>
<th>Number of Subjects</th>
<th>Age (Range)</th>
<th>Gender</th>
<th>ILR Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>Native Speakers</td>
<td>10</td>
<td>36 (20–54)</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Heritage Speakers</td>
<td>24</td>
<td>22 (18–51)</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>L2 Learners</td>
<td>36</td>
<td>31 (21–56)</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>29 (18–56)</td>
<td>31</td>
<td>39</td>
</tr>
</tbody>
</table>

ances were significantly superior. The results reported below will refer to the whole groups or subgroups, as deemed appropriate.

In all four tests stimulus material was recorded with two speakers, a male and a female, and two versions of the battery alternated the voices used in each test to avoid any possible speaker-related bias. Testing was computer-based, with each subject tested individually on Dell, Latitude/D820 computers with headsets and game pads in a quiet room. Sound recordings used in the study were digitized and processed using Praat software, and all the programming of the experiments was done with DMDX. Statistical analyses of the obtained results were performed with SAS.

3.2 Goals of the study and predictions tested

The reported study targeted both perception and production of unprefixed and prefixed VoM by highly proficient ‘true’ American learners and heritage speakers of Russian in a set of highly controlled experiments designed to elicit comparable responses in limited and fixed contexts. The first goal was to determine which verb types, unidirectional or multidirectional, presented more difficulties in perception and production, and whether different meanings expressed by multidirectional verbs, such as random or general motion as opposed to roundtrips, would generate different levels of difficulty. The second goal was to analyze problems arising when encoding path and manner of motion. And finally, the third goal was to identify possible differences in the treatment of any aspect of VoM between L2 learners and heritage speakers. Both Russian and English are satellite-framed languages, but they differ in several important ways (see above). Therefore, one cannot expect striking effects arising from L1 transfer, as in the case of L1 Danish and L2 Spanish, yet some tendencies can be hypothesized, e.g., use of path prefixes, which is more common in Russian, may be more problematic for native speakers of English than native speakers of Russian. A notorious source of
difficulties for American learners is the Slavic unidirectional/multidirectional distinction absent in English.

Accordingly, the study tested the following predictions, some of them relevant for both perception and production, and others only for one of the two modalities:

1. There will be significant differences in the treatment of motion verbs by 'true' L2 learners and heritage speakers of Russian.
2. Roundtrips will present more difficulties for L2 learners, while unidirectional verbs will present more difficulties for heritage speakers.
3. Prefixed VoM will be more problematic than unprefixed ones, and to a greater extent for L2 learners than heritage speakers because they encode path and involve aspectual choices.
4. Manner of motion will find limited expression in both heritage and L2 production: manner of motion verbs will be replaced by more generic verbs, such as xodit’, ezdit’ ‘go’.
5. Multidirectional verbs, which are unmarked and use productive conjugalional patterns, will be chosen over unidirectional verbs in production.\(^{10}\)

4. Grammaticality Judgment Task

The online Grammaticality Judgment Task (GJT) contained five blocks of ten sentences each (a total of 50 sentences), with five correct and five incorrect sentences per block: unidirectional unprefixed, unidirectional-prefixed, multidirectional-unprefixed expressing general or random motion, multidirectional-prefixed with prefixes used as Aktionsart, and multidirectional prefixed roundtrips (see Table 2 for examples of each type of sentences with incorrect options provided in parentheses).\(^{11}\) The \textit{Aktionsart} prefixes combined lexical and aspectual meaning and did not include the spatial prefixes. All the sentences were presented randomly as part of a larger GJT including several more linguistic features to avoid the serial effect. Sentences were presented binaurally through the headphones, and subjects had to press one of the two buttons on the game pad to indicate that the sentence was correct or incorrect.

The combined accuracy scores for all the five types of VoM are provided in Table 3, which contains mean accuracy scores for the Heritage and L2 groups broken down by the ILR oral proficiency level, with the score of 0.450 corresponding to 45 percent accuracy, etc. The scores line up perfectly with OPI levels, which indicates that perceptual knowledge of VoM, as assessed by GJT, is acquired incrementally in a linear fashion. Group mean scores

\(^{10}\) This prediction exploring the role of prototypicality and markedness is potentially in conflict with prediction #2 for L2 learners above.

\(^{11}\) All the examples provided in the article are very similar, but not identical to the actual sentences in the tests. Those changes were made to protect the tests, which are still in use.
Table 2: Grammaticality Judgment Task: Testing Material

<table>
<thead>
<tr>
<th>Type of Motion Verb</th>
<th>Number of sentences</th>
<th>Examples¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unidirectional Unprefixed (One-way motion)</td>
<td>5 Correct</td>
<td>Smotri! Anton opjat' kuda-to bežit (*begejt).</td>
</tr>
<tr>
<td></td>
<td>5 Incorrect</td>
<td>Look! Anton again someplace runs &lt;sup&gt;UNI&lt;/sup&gt; (*runs&lt;sup&gt;MULT&lt;/sup&gt;).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘Look! Anton is running (*running around) someplace.’</td>
</tr>
<tr>
<td>Unidirectional Prefixed</td>
<td>5 Correct</td>
<td>Matrosu prikazali bystro zalezť (*zalezť) na mačtu.</td>
</tr>
<tr>
<td></td>
<td>5 Incorrect</td>
<td>Sailor&lt;sub&gt;DAT&lt;/sub&gt; ordered&lt;sub&gt;ND-PERS&lt;/sub&gt; quickly climb&lt;sub&gt;UNI&lt;/sub&gt; (*climb&lt;sub&gt;MULT&lt;/sub&gt;) on mast.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘The sailor was ordered to climb the mast right away.’</td>
</tr>
<tr>
<td>Multidirectional Unprefixed (General/ random motion)</td>
<td>5 Correct</td>
<td>Moj drug letal (*letel) v Pariž na prošloj nedele.</td>
</tr>
<tr>
<td></td>
<td>5 Incorrect</td>
<td>My friend flew&lt;sub&gt;MULT&lt;/sub&gt; (*flew&lt;sub&gt;UNI&lt;/sub&gt;) to Paris on last week.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘My friend flew (*was on his way) to Paris last week.’</td>
</tr>
<tr>
<td>Multidirectional Prefixed</td>
<td>5 Correct</td>
<td>My isxodili (*izošli) ves' les, no gribov ne našli.</td>
</tr>
<tr>
<td></td>
<td>5 Incorrect</td>
<td>We through-walked&lt;sub&gt;MULT&lt;/sub&gt; (*through-walked&lt;sub&gt;UNI&lt;/sub&gt;) all forest, but mushrooms no found.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘We walked around all the forest, but did not find any mushrooms.’</td>
</tr>
<tr>
<td>Multidirectional Prefixed (Perfective Roundtrip)</td>
<td>5 Correct</td>
<td>Maša, nado sbegat' (*sbežat') v magazin za xlebom.</td>
</tr>
<tr>
<td></td>
<td>5 Incorrect</td>
<td>Maša, necessary run&lt;sub&gt;MULT-ROUND,PAST&lt;/sub&gt; (*run&lt;sub&gt;UNI,PAST&lt;/sub&gt;) to store for bread.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘Masha, (it is necessary to) go buy some bread.’</td>
</tr>
</tbody>
</table>

¹ Incorrect options are provided in parentheses. In the actual test, all the sentences were entirely different.

Table 3: Grammaticality Judgment Task: Mean Accuracy Scores for Heritage Speakers and L2 Learners

<table>
<thead>
<tr>
<th>ILR OPI Level</th>
<th>Mean Accuracy Score</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.450</td>
<td>0.087</td>
</tr>
<tr>
<td>1+</td>
<td>0.518</td>
<td>0.057</td>
</tr>
<tr>
<td>2</td>
<td>0.535</td>
<td>0.08</td>
</tr>
<tr>
<td>2+</td>
<td>0.591</td>
<td>0.100</td>
</tr>
<tr>
<td>3</td>
<td>0.707</td>
<td>0.103</td>
</tr>
<tr>
<td>3+</td>
<td>0.781</td>
<td>0.066</td>
</tr>
<tr>
<td>4</td>
<td>0.790</td>
<td>0.063</td>
</tr>
<tr>
<td>4+</td>
<td>0.913</td>
<td>0.053</td>
</tr>
</tbody>
</table>
show a perfect Spearman correlation of 1.00 with ILR proficiency levels and plus sublevels.

The next step in data analysis addressed two issues: whether the two groups, Heritage and L2, differed in their performance on VoM in GJT in general, and which types of VoM were the most difficult for each group. Figure 1 represents accuracy scores for two groups separately and for each of the five VoM types. It demonstrates that (a) overall, the Heritage group slightly outperformed the L2 group, (b) the three prefixed conditions were more difficult than the unprefixed ones for the L2 group, but only one of them was more difficult for the Heritage group, the one that used Aktionsart prefixes on multi-directional stems, and (c) prefixed roundtrips were most difficult for the L2 group, but not the Heritage group.

The Heritage and L2 groups were further subdivided into high-proficiency (ILR 2+ and above) and low-proficiency (ILR 2 and below) subgroups, and these two subject groups and the two proficiency-based subgroups were used in two-way ANOVA analyses for all the tests in the study. A comparison of overall accuracy scores in the Heritage and L2 groups in a repeated measures ANOVA using an alpha level of 0.05 found a statistically significant difference between the two groups of subjects, $F(1, 56) = 13.74, p < 0.01$ and a significant difference between high- and low-proficiency levels, $F(1, 56) = 48.29, p < 0.01$. Statistically significant within-subjects effect for the type of VoM, $F(4, 224) = 5.25, p < 0.01$, and interaction between group and type of VoM, $F(4, 224) = 5.58, p < 0.01$ were also found. Scheffe’s test of paired comparisons revealed significant differences between the two groups for Unidirec-
Finally, a separate analysis was conducted to test the hypothesis that lower-proficiency Heritage speakers would experience more difficulties with unprefixed unidirectional VoM than L2 learners, in the sense that they would be more willing to accept unidirectional verbs in contexts calling for roundtrips. Each of the two groups was divided into high-proficiency (2+ and above) and low-proficiency (2 and below) subgroups, and only accuracy scores for unprefixed unidirectional and multidirectional verbs were analyzed. In each of the two VoM types, responses to correct sentences (requiring a “yes”) and incorrect sentences (requiring a “no”) were examined separately. It was established that, while Heritage accuracy scores were consistently higher than those of L2 Learners, there was one single case where this consistent tendency was reversed. In this case when “no” responses were expected to multidirectional verbs, unidirectional verbs were incorrectly substituted for multidirectional ones in the stimuli sentences. Figure 2 demonstrates that low-proficiency Heritage speakers were more willing than L2 learners to accept the incorrect use of unidirectional verbs instead of multidirectional ones.

To summarize the results obtained in GJT, the group means showed a perfect rank-order correlation with the ILR OPI levels and sublevels when the Heritage and L2 Learners’ data were combined together. At the same time, significant differences were established between overall Heritage and L2 accuracy scores. When the accuracy scores of two groups were examined more closely for each VoM type, it was found that the groups exhibit similar performance on some types, and significant differences on others. First, L2 learn-
ers consistently demonstrate lower accuracy on prefixed than unprefixed VoM, while heritage speakers do not show such a tendency. If we assume that heritage speakers exposed to Russian as L1 in early childhood developed more native-like cognitive mechanisms dealing with path expression, while late American learners had to master the Russian way of systematically encoding path, and in prefixes rather than postfixes, the results support the cognitive typological model of VoM developed by Talmy (1985, 2000) and indicate that heritage speakers may possess an early acquired native-like cognitive structure. Section 7 will address the issue of whether the data lend support to the ‘thinking for speaking’ hypothesis by Slobin (1996). Second, according to the study, even relatively proficient L2 learners experience difficulties with perfective roundtrips, with accuracy rates lagging behind heritage speakers. Again, roundtrips do not find simple straightforward expression in English, and are notoriously problematic for American learners. And finally, lower-proficiency heritage speakers showed a tendency to accept unidirectional unprefixed verbs where the context required the use of a multidirectional one. This tendency supports observations in the literature referring to low-proficiency heritage use (Andrews, Pereltsvaig).

5. Restricted Control Test

Restricted Control is a production task with very limited verbal input required from the test-taker. Subjects hear the beginning of an idiom containing a VoM in sentence-final position and the first syllable of the VoM itself, and are asked to provide the missing part of the verb. The advantages of this test are the relative ease of data collection and scoring, and a highly controlled context. The main concern, the fact that the test measured idiom knowledge as well as knowledge of VoM, and that idiom knowledge could act as a confounding variable, is addressed in the next section on Sentence Completion. Thirty sentences containing idiomatic expressions with VoM were constructed for this task. Sentences with the first syllable of the target VoM were presented aurally through the headsets, and subjects were instructed to say the remainder of the verb into the microphone. All the responses were transcribed and used for further analyses. The idioms included in the testing material ranged from fixed to loose, depending on how much variability they allowed; there were eight fixed, seven loose, and fifteen semi-fixed idioms included. For example, (3) is a fixed idiom that does not allow for any variability in the choice of the verb form. Examples (4) and (5) contain a semi-fixed idiom that allows for a certain amount of variability. In the case where another alternative could be used instead of a main verb, the idiom was considered to be loose, compare (6) and (7).

(3)  
*Sobaka laet—karavan idet.*

Dog barks3RD.SG—caravan goesUNI.

‘The dogs bark, but the caravan goes on.’
Overall, the testing material included 20 prefixed verbs, both perfective and imperfective, and 10 unprefixed imperfective VoM.

A one-way ANOVA on three groups of subjects, Heritage, L2, and Native, with a Tukey post hoc comparison, using an alpha level of 0.05 demonstrated significant differences, $F(2, 66) = 60.05, p < 0.01$. A two-way ANOVA on two groups, Heritage and L2, and two proficiency levels, high and low, demonstrated significant differences in accuracy scores for group, $F(1, 55) = 65.18, p < 0.01$, and proficiency level $F(1, 55) = 22.14, p < 0.01$. Figure 3 represents accuracy scores in the two groups of subjects, Heritage and L2, broken down by two proficiency levels, high and low, based on their ILR OPI scores. It shows that the Heritage group outperformed the L2 group at both proficiency levels. In other words, L2 learners matched with heritage speakers in proficiency exhibited lower accuracy scores on VoM in this task.

Figure 3. Restricted Control: Accuracy Scores of High and Low Proficiency Heritage Speakers and L2 Learners
Finally, the analysis of errors in the choice of VoM by the Heritage and L2 learners revealed a similar tendency in choosing incorrect direction in both groups. They preferred to substitute multidirectional verbs for unidirectional ones, and not unidirectional for multidirectional ones (see Figure 4). Given that the majority of VoM in this task were prefixed (24 prefixed and 6 unprefixed), the preference for multidirectional stems may be due to their unmarked status (Nesset 2000). For obvious reasons, namely since the beginning of the verb was provided to subjects, and therefore the use of prefixes and path expression were constrained by the task, they are not analyzed here.

To summarize the results of Restricted Control Task: Accuracy scores on VoM in the Heritage, L2, and Native groups, as well as high- and low-proficiency Heritage and L2 subgroups, significantly differed, with L2 learners typically lagging behind heritage speakers. When the Heritage and L2 learners made errors in direction, substitutions followed predominantly one direction: multidirectional verb stems were substituted for unidirectional ones.

6. Sentence Completion Task
Sentence Completion differed from Restricted Control in that subjects were required to provide the entire VoM in sentence-final position. A total of 45 sentences containing idiomatic expressions with VoM were constructed for the testing material. There were two kinds of idiomatic expressions included in the test: a) fixed idioms that did not allow for any variability in the choice of the verb, as in (8); and b) loose idioms that allowed some syntactic variation, as in (9). For example, the idiom in (8) exemplifies the case where no syntactic variability is possible, while the idiom in (9) allows inflectional variants in the main verb, as in (10).
Overall, the testing material included 12 fixed and 33 loose idioms. Out of the total of 45, there were 25 prefixed VoM with 19 unidirectional (perfective) and six multidirectional (imperfective) verbs, which designated general motion. In addition, 20 unprefixed VoM were included, with 13 multidirectional (imperfective) verbs expressing general or random motion and round trips, and seven unidirectional (imperfective) verbs. All the stimulus sentences were presented aurally through headsets, and subjects were asked to produce the final missing word (= verb) through a microphone. All responses were subsequently transcribed and analyzed.

A one-way ANOVA on three groups of subjects, Heritage, L2, and Native, using an alpha level of 0.05 demonstrated significant differences, \( F(2, 65) = 57.46, p < 0.01 \). Post hoc Tukey comparisons showed a significant difference in the Native and Heritage group performance, Mean Difference = 0.56787, \( p < 0.05 \). A significant difference in performance was observed for the Native and L2 groups, Mean Difference = 0.75333, \( p < 0.05 \). Also a significant difference in performance for the Heritage and L2 groups was observed, Mean Difference = 0.18546, \( p < 0.05 \). A two-way ANOVA on two groups, Heritage and L2, and two proficiency levels, high and low, demonstrated significant differences in accuracy scores for group, \( F(1, 57) = 21.94, p < 0.01, \) and proficiency level, \( F(1, 57) = 25.53, p < 0.01. \)

As can be seen in Figure 5, Heritage speakers outperformed L2 Learners both in high-proficiency and low-proficiency groups, and high-proficiency subjects were significantly ahead of low-proficiency subjects. Error analysis on Sentence Completion revealed one trend in the pattern of substitutions: generic verb roots expressing the most general kind of motion, such as iditi [go\text{UNI}], nosit’ [carry\text{MULTI}] were substituted for manner of motion roots such as lezi’ [climb\text{UNI}], tašcit’ [haul\text{UNI}] more often, than manner of motion verbs were substituted for generic in both Heritage and L2 groups (see Figure 6). Moreover, when such rare substitutions of manner of motion verbs for more generic took place, Heritage speakers in 50% of responses used the same verb.

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12. This hypothetical example illustrates the absence of syntactic variability in some idioms; however, in the actual items used in the testing material all the verbs of motion were in sentence-final position.
leži' [climb_UNI], and L2 Learners in 57% of responses used two verbs, bežat' [run_UNI] and letat' [fly_MULTI]. Given that both Russian and English are satellite-framed languages, the use of manner of motion verbs was not a cognitive issue for L2 learners, however, one can expect non-native speakers to operate
with a reduced vocabulary of motion verbs, which is a general tendency in L2 vocabulary use. And indeed, both the Heritage and L2 groups reverted to generic VoM when more specific manner of motion verbs were required, leaving manner underspecified.

The use of idioms as the testing material raises the issue of whether the test actually measures the knowledge of VoMs, or merely memorization of individual idioms. The following step was taken to justify use of idiomatic expressions to elicit VoMs in two production tasks, Restricted Control and Sentence Completion. We compared the performance of our three groups of subjects, Heritage, L2, and Native, on the tasks involving VoM, Restricted Control and Sentence Completion, with a comparable task designed to assess idiom knowledge, Collocation Completion, which measured exclusively idiom knowledge and did not contain any VoM. Collocation Completion closely mirrored Sentence Completion in that subjects were required to provide the missing last word of an idiomatic expression.

A one-way ANOVA on accuracy rates on Collocation Completion for the Heritage, L2, and Native groups using an alpha level of 0.05 demonstrated significant differences in performance for the groups, $F(2, 64) = 11.23, p < 0.01$, and two proficiency levels $F(1, 64) = 25.88, p < 0.01$. However, post hoc Tukey comparisons showed no significant difference in performance for the Heritage and L2 groups, Mean Difference $= 0.05743$. Thus, only native-learner differences were significant. Similar analyses demonstrated significant differences for the Heritage and L2 groups both on Restricted Control and Sentence Completion (see Section 5 and this section above).

Figure 7 represents accuracy scores on three different tasks—Restricted Control, Sentence Completion, and Collocation Completion—and illustrates the following point: While there were significant differences in performance for the Heritage and L2 groups on two tasks involving VoM, Restricted Control and Sentence Completion, no such differences were observed on Collocation Completion. This indicates that the differences were not due to idiom knowledge per se, but reflected the processing of VoM.

To summarize, Sentence Completion, a highly controlled production task, produced higher accuracy scores in the Heritage than L2 groups, both in the high and low proficiency ranges. The analysis of errors established that both groups tended to substitute generic VoM for manner of motion verbs, and thus manner expression was limited. Remarkably, Heritage speakers used no more manner of motion verbs in their substitutions than L2 learners.

7. Discussion and conclusions

It is a well-known fact that Russian VoM are difficult to master for American learners, and accordingly, much emphasis is placed on teaching VoM in an Intermediate-level classroom (corresponding to ILR 1) with the assumption that while complex, they developmentally belong to the Intermediate-
Advanced proficiency range. And indeed, the unidirectional/multidirectional distinction and the basic functions of prefixed VoM, are typically acquired at the Advanced (ILR 2) level. Does this mean that highly proficient learners of Russian process VoM in a native-like way? This was the question that motivated the present study.

Section 2 discussed two main approaches to Russian VoM: the approach focusing on the Slavic system of expressing directionality, and the one focusing on cross-linguistic typology of motion events developed in cognitive linguistics. Based on the analysis of Russian VoM within these two approaches, a set of predictions was formulated to be empirically tested in the present study. This section will evaluate the obtained results in the light of these predictions and then proceed to connect the reported data with pedagogical considerations.

The study was designed to (1) target highly proficient ‘true’ learners and heritage speakers of Russian, and (2) gauge perception and production of VoM in a set of highly controlled experiments. This type of data collection is an alternative to the widely used oral elicitation technique making use of guided narratives, such as the Frog Story, and as such, provides additional insights into high-proficiency processing of VoM. First, it demonstrated that even highly proficient American learners of Russian do not process VoM in a native-like way. Second, it compared perception and limited production of VoM by three groups of subjects, with heritage and native speakers, in addition to L2 learners, and identified similarities and differences in their performance. The following general results were obtained:
1. Neither the Heritage nor L2 groups ever attained the accuracy rates of Native controls on any of the three tasks.
2. Heritage speakers consistently outperformed L2 learners on all the tasks, and most types of VoM within each task.

This is an interesting finding, given that the Heritage and L2 groups were matched in proficiency and age. Also, no significant differences were found for these groups on Collocation Completion, a task that did not involve any VoM. More importantly, the study confirmed most of the predictions put forth in Section 2. Each of them is addressed below.

1. As mentioned above, there were statistically significant differences between the Heritage and L2 groups, with Heritage speakers producing higher accuracy scores on most, but not all, VoM types.
2. On the Grammaticality Judgment Task, prefixed roundtrips were most problematic for L2 learners, while unidirectional-unprefixed VoM were most problematic for Heritage speakers.
3. On the Grammaticality Judgment Task, L2 learners produced higher accuracy scores on unprefixed than prefixed types of VoM. Heritage speakers experienced difficulties only with multidirectional verbs using Aktionsart prefixes.
4. On the Sentence Completion Task, both the Heritage and L2 groups preferred to substitute generic VoM for manner of motion verbs, and consequently, manner of motion was not adequately expressed.
5. On the Restricted Control Task, the analysis of directionality in substitutions established that both the Heritage and L2 groups preferred to use unmarked multidirectional stems instead of marked unidirectional stems.

Overall, the results of the study support the claim that the system of VoM is not fully acquired even in highly proficient L2 learners. They typically lag behind not only native speakers, but also heritage speakers at the same proficiency levels. The problems encountered by L2 learners in this study can be traced back to linguistic and cognitive challenges VoM present on several levels: expression of directionality specific for Slavic languages, expression of path and manner of motion from a typological perspective, and Markedness Theory. Comparisons with heritage speakers at the same proficiency levels as L2 learners helped to isolate an L2-specific set of difficulties. Expected problems with directionality, and perfective roundtrips in particular, tend to persist even in highly proficient L2 learners. And indeed, L2 learners, but not heritage speakers found prefixed VoM more difficult to process. Apparently, while both Russian and English are satellite-framed languages, in Russian path expression and the use of prefixes are more obligatory, especially since English mostly uses postfixed to encode path. Heritage speakers seem to develop more native-like linguistic and cognitive strategies in path expression. At the same
time, manner found weaker expression in both the L2 and Heritage groups, most likely, due to limited availability of manner of motion verbs or problems accessing them in the non-native mental lexicon. One feature recorded in heritage speaker performance was not found in L2 learners: eagerness to accept unprefixed-unidirectional VoM in place of multidirectional, which reflects parallelism with the general-purpose use of English ‘go.’ And finally, both the L2 and Heritage groups preferred to substitute unmarked multidirectional stems for marked unidirectional, which supports the role of markedness and prototypicality in processing Russian VoM (Nesset 2000). Therefore, the study confirms that cross-linguistic differences identified in VoM typology exert a certain influence on the processing of VoM even in highly proficient learners. Since the study used perception and limited production data, and did not analyze samples of free speech, its conclusions cannot be used in direct support of the ‘thinking for speaking’ hypothesis (Slobin, 1996), but they are definitely not in conflict with it.

Given the results of the present study, one can see a need in a structured pedagogical approach to help highly proficient American learners overcome residual difficulties with Russian VoM. The first obvious recommendation is to increase the repertoire of manner of motion verbs. Second, intensive work is recommended on prefixed VoM, and especially on verbs with Aktionsart prefixes, thereby pushing use of VoM beyond the more familiar spatial domain. Third, instruction should pay attention to idiomatic use of VoM, and idiomatic knowledge in general. And finally, the study demonstrated that specific difficulties Heritage speakers experience with limiting obligatory contexts for unidirectional VoM persist in a more covert form even in highly proficient speakers, and would benefit from systematic work.

REFERENCES


Абстракт

Кира Гор, Светлана Кук, Вера Малюшенкова, и Татьяна Вдовина
Усвоение глаголов движения изучающими русский язык как иностранный и как семейный язык в нерусскоговорящей среде на продвинутом этапе

В настоящей статье представлены результаты серии трех экспериментов на восприятие и производство глаголов движения американцами, изучающими русский язык на продвинутом этапе. Эксперименты включали задания на (1) проверку грамматической правильности предложений с глаголами движения, употребляемыми в прямом смысле в свободном контексте; (2) производство глаголов движения в идиоматических выражениях в позиции конца предложения и (3) завершение конца слова в устойчивых словосочетаниях, когда испытуемый слышит первый слог глагола движения в позиции конца предложения. Все три эксперимента являлись частью первого варианта батареи тестов, разработанной для сбора данных об уровне владения русскими лингвистическими структурами американскими студентами на продвинутом этапе обучения. В статье обсуждаются возможные источники трудностей при усвоении глаголов движения и сравниваются результаты, полученные в группах изучающих русский как иностранный и как семейный язык в нерусскоговорящей среде. Взрослые носители русского языка служили контрольной группой.