

Научная статья

УДК 81'33

DOI 10.25205/1818-7935-2023-21-4-115-130

## Обработка русских идиом эритажными носителями русского языка и изучающими русский как иностранный

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### Аннотация

Данное исследование посвящено изучению процесса обработки идиом нестандартными носителями русского языка (эритажные носители и студенты РКИ) в сравнении со стандартными (носители русского языка). Употребление идиом является характерной чертой речи носителей, которая отличает их от изучающих русский язык как иностранный. Стоит отметить, что экспериментальные исследования в отношении употребления идиом эритажными носителями русского языка ранее не проводились. Эритажные носители – это несбалансированные билингвы, которые усваивают русский язык в семьях естественным образом. Однако их уровень владения может быть сопоставим со студентами РКИ: язык эритажных носителей формируется в языковой среде, где доминирующим языком является английский (в рамках нашего исследования). Соответственно, русский язык является для них слабым. Чтобы сравнить обработку идиом у эритажных носителей со студентами РКИ, мы провели эксперимент по чтению с регулировкой скорости, учитывая уровень владения русским языком, а также социолингвистические особенности участников эксперимента. Идиомы в стимульном материале были разделены на три категории в зависимости от фактора межъязыкового влияния: имеющие полные английские эквиваленты, полуквивалентные или не имеющие эквивалентов. Межъязыковое влияние – это ключевой параметр, который влияет на усвоение и обработку идиом в рамках нашего исследования. Наши результаты не показали существенной разницы в обработке идиом эритажными носителями и студентами РКИ. В то же время обработка идиом обеими группами нестандартных носителей существенно отличалась от контрольной группы (носители русского языка). Мы обнаружили, что все три группы участников по-разному обрабатывают полные эквиваленты и неэквивалентные идиомы. Помимо этого, эритажные носители и студенты РКИ демонстрируют разницу в обработке полных и полуквивалентных идиом. Данные результаты можно проинтерпретировать, учитывая различные факторы: развитие определенных навыков у эритажных носителей (устная речь), сравнивая со студентами РКИ (чтение, письменная речь).

### Ключевые слова

обработка идиом, эритажные носители, билингвизм, русский язык как иностранный, чтение с регулировкой скорости, межъязыковое влияние

### Благодарность

Мы выражаем благодарность Нине Ладинской за помощь в подготовке эксперимента и сборе данных, Андрею Тициану за помощь в подготовке статистического анализа, а также Наталии Слюсарь за помощь в подготовке эксперимента.

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*Финансирование*

Исследование осуществлено при поддержке ФГН, НИУ ВШЭ (Конкурс проектных групп студентов и аспирантов).

*Для цитирования*

Гриднева Е. М., Здорова Н. С., Иваненко А. А., Грабовская М. А. Обработка русских идиом эритажными носителями русского языка и изучающими русский как иностранный // Вестник НГУ. Серия: Лингвистика и межкультурная коммуникация. 2023. Т. 21, № 4. С. 115–130. DOI 10.25205/1818-7935-2023-21-4-115-130

## The processing of Russian Idioms in Heritage Russian Speakers and L2 Russian Learners

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*Abstract*

The use of idioms differentiates native speakers (NSs) from second language (L2) learners, whereas the use of idioms by heritage speakers (HSs) might resemble both groups at the same time. This study examines the processing of idioms in heritage Russian speakers (N = 16) and L2 Russian learners (N = 16), comparing them to Russian native speakers as a control group (N = 23). Heritage speakers acquire Russian similarly to the first language acquisition in their family. This enables them to have a more natural approach to language than L2 learners. However, heritage speakers are also similar to L2 learners since their Russian language competence is still not native-like due to insufficient language input. To test whether idiom processing in HSs resembles that of L2 learners or rather in NSs, we conducted a self-paced reading experiment. The idioms were divided into three categories based on the cross-language influence factor: having full English equivalents, semi-equivalents, or no-equivalents. Our findings show no significant difference in idiom processing in HSs and L2 learners, whereas their processing significantly differed from that by NSs of Russian. Also, we found different processing for full and semi-equivalent idioms (in the HS and L2 groups). Full and no-equivalent idioms were also processed differently in all the three groups.

*Keywords*

idiom processing, heritage speakers, bilinguals, second language learners, self-paced reading, cross-language overlap, cross-language influence

*Acknowledgements*

We would like to express our special thanks and gratitude to our colleague Nina Ladinskaya who contributed largely to the experiment design and data collection; our colleague Andrey Titsian who contributed greatly to the statistical analysis in this research; to Professor Natalia Sloussar from HSE University who assisted us in the experimental design. Also, we thank all the participants of the experiment who voluntarily invested their time in the research/project.

*Funding*

The research was supported by the HSE University student grant.

*For citation*

Gridneva E. M., Ivanenko A. A., Zdorova N. S., Grabovskaya M. A. The processing of Russian Idioms in Heritage Russian Speakers and L2 Russian Learners. *Vestnik NSU. Series: Linguistics and Intercultural Communication*, 2023, vol. 21, no. 4, pp. 115–130. DOI 10.25205/1818-7935-2023-21-4-115-130

## 1. Introduction

Frequent use of idiomatic expressions in spontaneous speech is a characteristic feature of native speech. Native speakers (NSs) tend to use idioms without being aware of their figurative meaning. Cieślicka [2017] underlines that the pervasiveness of figurative language is best shown in the estimates concerning the number of figurative expressions that an average NS produces on a daily basis. This amount can be represented as approximately 4.7 million novels and 21.4 million frozen or conventional metaphors over a sixty-year lifespan [Pollio, Barlow, Fine, & Pollio, 1977]. Jackendoff [1997] noted that the number of fixed expressions in a native speaker's mental lexicon is nearly similar to that of single words. An idiom is generally understood as a collocation or phrase which meaning is not obvious from the meaning of individual words and which must be learnt as a whole unit [Hornby, 2005]; [Irujo, 1986; Abel, 2003). The majority of studies define an idiom as a fixed multiword item whose figurative interpretation cannot be obtained from the compositional analysis of the individual words (e.g., [Chafe, 1970; Fraser, 1970; Katz, 1973; Makkai, 1972]). We use this definition in our study.

Idiom processing in Heritage speakers (HSs) is of special interest as this group is opposed and at the same time close to both NSs and L2 learners. According to Polinsky [2015. P. 3], HSs are “unbalanced bilinguals, sequential or simultaneous whose home language is much less present in their linguistic repertoire than the dominant language of their society”. In HSs' language development, there has always been a strong dominant language and a weak minority language, the level of which could range from fluent to barely speaking [Montrul & Polinsky, 2011; Polinsky & Kagan, 2007]. The majority of studies mainly investigated morphosyntactic features of heritage language, its differences from the “usual” language, and the process of its acquisition, whereas idiom processing in Russian HSs remains understudied. Considering their native-like Russian acquisition, their idiom processing might be strong and consolidated like in NSs, but due to the limited input of Russian they might rather be like L2 learners. At the same time, studies into collocations (and idioms are a certain type of them) outlined that HSs differ from monolinguals and L2 learners [Doğruöz & Backus, 2009; Rakhilina et al., 2016; Treffers-Daller et al., 2016]. Hence, we might also expect unique idiom processing in HSs not seen in NSs or L2 learners.

The present study investigates Russian idiom processing in HSs and L2 learners (with native speakers of Russian, aka NSs, as a control group) from the perspective of cross-language influence that was proven significant in L2's idioms processing [Yamashita & Jiang, 2010; Wolter & Gyllstad, 2011, 2013; Carrol et al., 2016]. Based on this factor, we divided Russian idioms into three groups: having full English equivalents (congruent), semi-equivalents (semi-congruent), or no-equivalents (incongruent). Our main aim is to find out to what extent HSs are closer either to NSs or L2s in their idiom processing, and how these results correlate with the cross-language influence, or cross-language overlap, in particular. We analyse whether Russian-English full equivalents, semi-equivalents, and no-equivalents are processed differently across the groups of HSs, L2 learners, and NSs based on a self-paced reading experiment with Russian sentences containing idioms.

The paper is structured as follows: in section 2 the literature overview and theoretical background of the study are provided. Section 3 describes the methodology of the study, including participants' profiles (demographic and socio-linguistic information), materials of the experiment, apparatus and procedure. Section 4, statistical analysis and its results are provided. Section 5 we discuss the results obtained in relation to previous studies and make general conclusions.

## 2. Literature Review and Theoretical Background

**2.1. Heritage Russian speakers.** Their language competence has been previously studied from different perspectives: describing specific grammatical features of heritage languages [Polinsky, 2008, 2011], outlining its acquisition [Montrul, 2010, Montrul et al., 2015], and the relationship between

heritage language and L2 [Montrul, 2010; Montrul et al., 2015]. In her works, Montrul [Montrul, 2010; Montrul et al., 2015] described the correspondences in the acquisition of heritage languages and second languages. The study by Rakhilina, Vyrenkova & Polinsky [2016] into the grammar of mistakes and the grammar of specific constructions has made a crucial impact in this area. According to [Rakhilina et al., 2016], HSs are more likely to follow general principles of compositionality in constructing innovative expressions compared with L2 learners.

**2.2. Idiom processing in heritage Russian speakers.** To the best of our knowledge, idiom processing in HSs has not yet been extensively studied. Kopotev et al. [2020] analysed the use of frequency-based collocations defined with a quote from [Evert, 2008] as “recurrent and predictable word combinations” [Kopotev et al., 2020. P. 2] such as *to apply for a [job/position]*. In contrast to idioms, frequency-based collocations “do not necessarily presuppose semantic non-compositionality” [Kopotev et al., 2020. P. 2]. Kopotev et al. [2020] used three corpora of narratives collected for other research projects from Russian HSs residing in different countries and speaking different dominant languages (Finnish-dominant, German-dominant and English-dominant). The analysis of heritage collocations (nonexistent in Russian) enabled the researchers to categorise them into three categories: *calques*, *amalgams* (“combinations of structures present in the heritage and the dominant language” [Kopotev et al., 2020. P. 17]), and *non-transfer collocations*. This evidence substantiates the idea of the strong L1 influence in collocation production in HSs, and might also predict a similar influence in idiom processing.

**2.3. Preliminary study.** A previous pilot study by Gridneva [2018] was conducted in Russian immigrant families living in the US, exploring the recognition and knowledge of Russian idioms in parents (first-generation immigrants or baseline speakers) and their children (Russian heritage children). Participants had to guess a Russian idiom by means of an explanation and with the help of a picture associated with this idiom. The results showed that the majority of parents knew and recognised all of the idioms, while their children did not know them at all. Importantly, even idiom naming in parents was drastically improved when pictures and explanations were used. This facilitating effect was also seen in Russian heritage children, although the majority of Russian heritage children did not know the idioms even with pictures and when having been given the answers. Importantly, when these results were compared to Russian native children of the same age (i.e. Russian HSs vs. Russian NSs), it turned out that Russian native children were significantly more accurate in idiom naming than their heritage peers. However, the parents of Russian heritage children were still better at idiom knowledge when compared to Russian native children. Consequently, we observed that age matters in idiom recognition when we compare parents of Russian HSs and Russian NSs. However, when we compare Russian heritage children and Russian native children, age does not play a significant role as Russian native children still recognise idioms better.

**2.4. Idioms acquisition and processing in L1.** There are noncompositional and compositional theories of idioms processing. The first one referred to direct look-up models [Glucksberg, 1993], idiom meanings are arbitrary and understood by retrieving the meaning of an idiomatic phrase as a whole, rather than by processing their component parts. The major noncompositional models include the Idiom List Hypothesis [Bobrow & Bell, 1973], the Lexical Representation Hypothesis [Swinney & Cutler, 1979], and the Direct Access Model [Gibbs, 1980, 2002]. Compositional models of idiom processing suggest that idiomatic meaning unfolds both from the literal analysis of idiom constituents and the specific figurative interpretation of these constituent word meanings within a given context. Major compositional theories of L1 idiom processing are the Idiom Decomposition Model [Gibbs & Nayak, 1989; Gibbs, Nayak, & Cutting, 1989], the Configuration Model [Cacciari & Tabossi, 1988; Cacciari & Glucksberg, 1991; Vespignani, Canal, Molinaro, Fonda, & Cacciari, 2010], and the Phrase-Induced Polysemy Model [Glucksberg, 1993, 2001]. The most recent approaches are the Hybrid Model [Caillies & Butcher, 2007; Cutting & Bock, 1997; Sprenger, Levelt, & Kempen, 2006] or Constraint-Based Model [Libben & Titone, 2008] which assume that idioms are non-compositional because they are highly automatised multi-word phrases whose meaning can be accessed

directly from the mental lexicon. At the same time, some idioms can be described as compositional because a literal analysis of their constituents allows inferring the original motivation from their figurative meaning.

**2.5. L2 and the Parasitic Hypothesis.** The Parasitic Hypothesis of vocabulary development [Hall, 2002] suggests that the “initial referent of a new L2 vocabulary item is a conceptual structure of the most closely corresponding L1 word” [Cieślicka, 2017. P. 214]. As a consequence, a new L2 word does not constitute its own separate meaning but relies or parasites on the L1 concept. However, at a more advanced level, L2 meaning “can be accessed directly through active within-language connections that have been built between the idiom entry at the lexical level and its L2 conceptual representation at the conceptual level” [Cieślicka, 2017. P. 215]. Matlock and Heredia [2002] suggested that at the beginner stage, learners translate the L2 idiom into their native language before they access its figurative meaning. Advanced learners directly retrieve the figurative meaning. Beck & Weber [2016] also found that L2 listeners with high levels of proficiency process idioms’ figurative meaning in a way that is not wholly distinctive from L1 listeners, that is, it is influenced by the same factors that L1 idiom processing is. The rates of reading time (RT) in their experiment showed that the translatability of idioms from listeners’ L1 to their L2 did not have a measurable impact on idiom processing, the main decisive factor was the level of L2 proficiency.

**2.6. Idioms acquisition and processing in L2.** The Idiom Diffusion Model of Second Languages in Liontas [2002] is based on the interaction of cross-language idiom similarity and context in L2 idiom comprehension. There are two stages of L2 idiom comprehension. First comes the prediction stage: the learner tries to predict the L2 idiom’s figurative interpretation where the predictions are based on the level of its transparency, semantic distance from the corresponding idiom in L1, and the presence of the supporting context. If the context is absent, the learner has to rely only on the literal analysis of the idiom components. The next model of L2 idiom processing is the Model of Dual Idiom Representation [Abel, 2003], which refers to the level of idiom decomposability and familiarity. Basically, a representation of idioms in the lexicon depends on its decomposability. Non-decomposable idioms do have their separate lexical entries (idiom entries), while decomposable idioms can be accessed through their constituents (constituent entries). Plus, idiom familiarity matters: the more frequently a learner comes across it, the more likely this idiom has its own idiom entry. Cieślicka’s Literal Salience Model [2006] is strongly based on a literal analysis by L2 learners who acquire their L2 mainly in a classroom environment. The main idea is that the literal meaning of idiom components is more salient than the whole figurative meaning of this idiom. As L2 language is learned in a formal setting, speakers acquire the literal meaning before the figurative one, which means that the literal part is strongly encoded in their lexicon and is more salient.

**2.7. Factors affecting L2 idiom processing.** Literal plausibility (i.e., the extent to which the idiom can be explained in a direct interpretation), also called literality, or literalness [Cronk & Schweigert, 1992], mentioned in a number of L1 idiom-processing studies (e.g., [Cronk, Lima, & Schweigert, 1993; Forrester, 1995; Mueller & Gibbs, 1987; Titone & Connine, 1994]). Idiom semantic decomposability, or the “degree to which idiom meaning is decomposable, may be particularly relevant for non-native language users, given their tendency to analyse fixed phrases into constituent parts” (e.g., [Abel, 2003]).

**2.8. Cross-language similarity or Cross-language influence factor.** This factor [Cieślicka, 2015; Du et al., 2021] plays an important role in idiom processing. Its consequence – cross-language overlap was shown to be sufficient in the L2’ processing of multiword expressions (MWEs, they also include idioms); L2 speakers can process congruent MWEs more rapidly than incongruent L2-only MWEs [Yamashita & Jiang, 2010; Wolter & Gyllstad, 2011, 2013; Carrol et al., 2016]. This factor is a defining one for the purpose of our study as we classify our idioms into three groups: having full English equivalents (congruent), semi-equivalents (semi-congruent) or no-equivalents (Russian-only).

**2.9. A self-paced reading test.** As a means of examining idioms' processing, was also used in the Beck & Weber [2020] study where they considered how effects of biasing contexts in idiom processing interact with effects of idiom literalness.

### 3. Material and Method

**3.1. Participants.** We conducted a self-paced reading experiment with three groups of participants. All participants gave informed consent before the study, and their participation was voluntary.

In the group of Russian Heritage speakers (HSs), participants were 16 adult speakers of Russian as their heritage language (10 females;  $M_{age} = 27.9$  years;  $SD = 6.5$ ; range 19–40; mean years of education = 17.6, range 12–22; 3 left-handed, 1 ambidextrous). Mean Russian test score was 33 (out of 36),  $SD = 3.2$ , median = 34, range 26–36. Almost half of the group ( $N=7$ ) were born in Russia (or the USSR), and came to the United States at the mean age of 7.1 ( $SD = 6.7$ ; range 6 months – 20 y.o.). All participants reported that both of their parents speak Russian, and 10 participants also indicated that their parents speak English. 93 % (i.e. 15 participants) started acquiring Russian from their birth. According to their self-assessment, their mean rate of reading ability in Russian (on the scale from 1 to 5 with 1 as very poor and 5 as excellent) was 3.3 with  $SD = 1.1$ .

The group of adult learners of Russian as a second language (L2 learners) included 16 participants whose L1 was English (5 females;  $M_{age} = 24.1$  years;  $SD = 3.0$ ; range 18–29; mean years of education = 17.1, range 12–20; 3 left-handed). Mean Russian test score was 28.4 (out of 36 points maximum),  $SD = 6.9$ , median = 29, range 16–36. According to their self-assessment, their mean rate of reading ability in Russian (on the scale from 1 to 5 with 1 as very poor and 5 as excellent) was 3.1 with  $SD = 1.05$ .

The control group included 23 adult NSs of Russian (12 females;  $M_{age} = 30.4$  years;  $SD = 8.9$ ; range 22 - 50; mean number of years of education = 17.9,  $SD = 2.1$ , range 15–22; all right-handed). All NSs were also English L2 speakers. The distribution of English levels among participants according to the Common European Framework of Reference (CEFR) scale (based on the reported self-assessment) was as follows: A1 (3), A2 (4), B1 (4), B2 (7), C1 (4), C2 (1).

**3.2. Materials.** Experimental stimuli were 45 Russian sentences from 6 to 9 content words in length, containing an idiom in the middle of the sentence, i.e. the idiom took word positions from 4 to 6. There were three experimental conditions based on the cross-language overlap in idioms between English and Russian. The first condition included Russian idioms that have a full equivalent in English, which implies both a similar structure, lexical components, and same meaning, e.g. *volej-nevolej/willy-nilly*. The second condition was presented with Russian idioms that have a semi-equivalent in English. They had similar meaning, but not necessarily the same structure or same lexical components, like *knut i prjanik/carrot-and-stick*. The third condition included Russian idioms that do not have an equivalent or semi-equivalent in English, e.g. *bud' drugom/please, be so kind and do a favour; čestnoe slovo/promise to do smth, dlja otvoda glaz/to divert attention*. An example of experimental conditions is provided in Table 1 below.

The idioms for the stimuli were selected from the Dictionary of Russian idioms [Baranov & Dobrovolsky, 2007], and were controlled for frequency in the Russian National Corpus [Lyashevskaya & Sharoff, 2009] and for their morpho-syntactic structure. All idioms had a frequency higher than 500 entries (i.e. were highly frequent) and were distributed morphologically as follows: 13 noun phrases, 13 verb phrases, and 19 adverbial idioms.

Filler sentences ( $N = 25$ ) imitated the experimental ones, and had eight content words in length. They were unambiguous simple Russian sentences with the vocabulary of basic Russian level and without any idiomatic expressions. Each filler was followed by a comprehension question with two alternatives. For instance, a filler sentence *Vchera mama kupila tjoplyje perchatki v bol'shom novom magazine/Yesterday mom bought warm gloves in a big new store* was followed with a comprehen-

Table 1

## Example of an experimental item

Таблица 1

## Пример экспериментального материала

Condition	English equivalence	
(1)	full	<i>Aniny deti xoteli <b>ljuboj cenoj</b> naučit'sja varit' sup.</i> Anna's children wanted <b>at any price</b> to learn how to cook soup.
(2)	semi	<i>Sergeia uvolili s raboty s <b>eë podači</b>, teper' ona dovol'na.</i> Sergey was fired from his job <b>at her behest</b> , now she is happy.
(3)	no	<i>Smelyx mal'čikov bylo <b>xot' otbavliai</b> v našem bol'šom klasse.</i> There were <b>plenty</b> of brave boys in our big class.

sion question *Kakije perchatki kupila mama? / What gloves did mom buy?* The two alternatives were *tjeplyje / warm and kholodnyje / cold*. The full set of idioms and their classification, experimental sentences, filler sentences with comprehension questions, data, and analysis code are available online at the OSF project page <https://osf.io/k6q3g/>.

A considerable part of materials in the groups of HSs and L2 learners was a questionnaire of language experience and a Russian test. The former was LEAP-Q [Marian, Blumenfeld, & Kaushanskaya, 2007] in a shortened form. The latter was compiled by experts in Russian as Foreign language. It was a multiple-choice grammar test with 30 questions in total and 36 maximum points. The test covered language levels A1, A2, B1 on the CEFR scale, with 10 questions of each. Vocabulary in the questions was selected according to the official Lexical minimum in Russian as a foreign language for each level [Andryushina et al., 2019].

**3.3. Procedure.** The experiment was conducted by means of two platforms representing two steps of the experiment. First, participants filled in a sociodemographic questionnaire, language-experience questionnaire, a Russian placement test (for HSs and L2 learners only), and gave informed consent in Google Forms. Second, participants completed a self-paced reading task on the Ibex Farm platform (developed by Alex Drummond); that was later followed with a test on the knowledge of the Russian idioms used in the experiment (for HSs and L2 learners only). The whole experiment procedure lasted for approximately 20 minutes for Russian NSs, and about 40 minutes for HSs and L2 learners.

The self-paced reading task started with an instruction in both Russian and English, and continued with three practice sentences with a comprehension question after each. Sentences were presented word by word. Words were centered on the screen and appeared with a spacebar press. Comprehension questions appeared after filler sentences only. Their appearance could not have been predicted by participants. A question had two alternatives marked with letters F and J, and participants answered by pressing a corresponding keyboard letter. Both sentences and comprehension questions were presented in 20 pt black Verdana font.

HSs and L2 participants were also asked to complete a short multiple-choice test checking Russian idioms familiarity. The four alternatives (translated into English) included the real idiomatic meaning, the literal meaning, an irrelevant meaning, and the option *I haven't known it before*.

**3.4. Data analysis.** Data analysis was performed in R [R Core Team, 2016]. The preliminary analysis included the correlation between mean reading time for each participant (in HSs and L2 learners) and their Russian test scores. Further, we looked at the absolute reading time (RT) rates of the critical region (idiom) that was from 2 to 3 words in length. Then, comprehension accuracy in filler

sentences, and idiom familiarity test results (in HSs and L2 learners) were calculated. No participants were excluded based on the comprehension accuracy of fillers with the critical accuracy of 70 %, which indicated their high engagement and attention throughout the experiment. Importantly, we did not use the idiom familiarity test as a cut-off factor as (not) knowing the precise idiomatic meaning should not undermine idiom processing in a context, reliance on language intuition and the understanding of literal but not idiomatic meaning of an idiom. For this reason, we instead treated the idiom familiarity test as an additional tool to describe our participants' language profile.

Afterwards, to examine the impact of the Cross-Language influence factor on idiom's comprehension, which was the main aim of the current study, the main statistical analysis included three one-way ANOVA tests (aka Kruskal–Wallis test) with RT of idioms as a dependent variable (log transformed). The experiment included three experimental conditions depending on the lack or presence of English equivalent idioms with a full-equivalent, semi-equivalent and no-equivalent conditions. Therefore, one ANOVA test compared RT at the critical region between groups (with conditions being merged). The second test compared RT of the critical region between conditions in a merged group of HSs and L2. Finally, the third test compared RT of the critical region between conditions in a group of NSs. The results are reported further in the same sequence.

**3.5. Results.** The correlation between mean reading time for each participant (in HSs and L2 learners) and their Russian test scores was negative, meaning that participants with a more advanced Russian level read overall faster than the ones with a less advanced Russian level (see Figure 1).

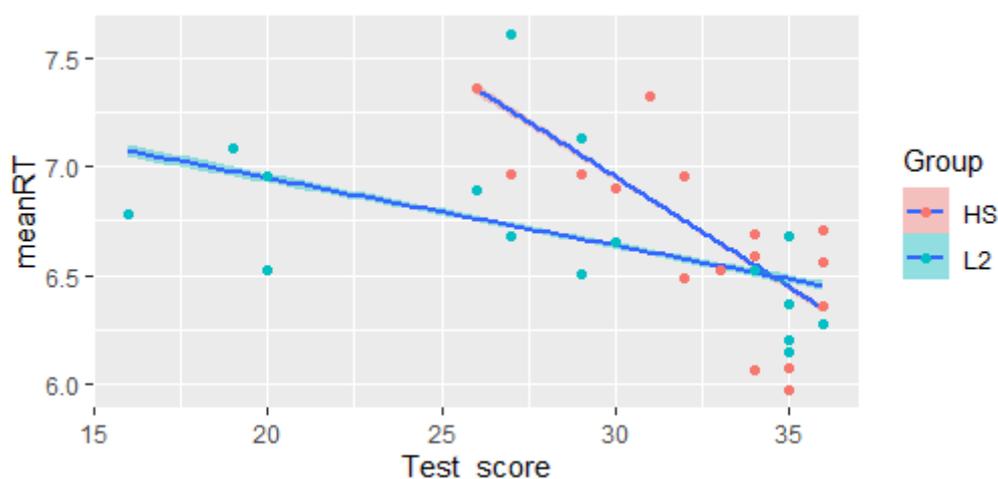


Fig. 1. Correlation between mean RT and Russian test score in HS and L2 learners

Рис. 1. Корреляция между средней скоростью чтения и результатом тестирования на знание русского языка у эритажных носителей русского языка и изучающих русский как иностранный

Crucially, the percentage of answers with completely irrelevant meaning was low in both groups (2.8 % in HSs and 2.1 % in L2 learners). HSs were quite familiar with the idioms used (63.5 % of answers were with correct idiomatic meaning and 25.6 % were “I haven’t known it before”), while L2 learners demonstrated the opposite with 60 % “I haven’t known it before” and 33.3 % of idiomatic answers. The more detailed descriptive statistics is summarised in Table 2.

The distribution of absolute reading time (RT) of the critical region (idiom) across groups and conditions is plotted in Figure 2 below.

Figure 2 shows that HSs and L2 learners tend to read idioms similarly, whereas they both differ from NSs. Full-equivalent idioms (condition a) are obviously read similarly in HS and L2 groups as

Table 2

Means and standard deviations (in parenthesis) RT at the critical region in msec, Russian test score (for HSs and L2 learners only), and idiom familiarity test results (for HSs and L2 learners only) in percentages

Таблица 2

Средние и стандартные отклонения (в скобках) скорости чтения в критической области в мс, результат тестирования на знание русского языка и результат теста на знание идиом в процентах (только у эритажных носителей русского языка и изучающих русский как иностранный)

Group	Idiom RT (msec)	Russian test score (max = 36)	Idiom familiarity test results (%)			
			distractor	idiomatic	literal	NA
HS	1064 (841)	32.1 (3.35)	2.8	63.5	8.1	25.6
L2	1017 (946)	28.3 (6.63)	2.1	33.3	4.6	60
NS	492 (238)	—	—	—	—	—

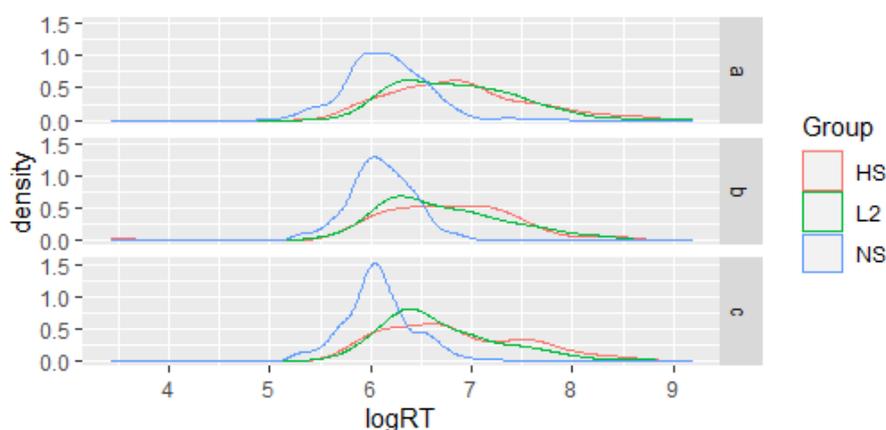


Fig. 2. Group difference in RT (log transformed) at the critical region across conditions Experimental conditions: (a) full-equivalent, (b) semi-equivalent, and (c) no-equivalent idioms consequently

Рис. 2. Разница в скорости чтения (log) в критической области в мс с учетом условий эксперимента: а) полные эквиваленты; б) полуквиваленты; в) идиомы без эквивалента

expected, whereas semi-equivalent (condition b) and no-equivalent (condition c) idioms' reading time might have some between-group statistical difference, which is reported below.

A one-way ANOVA test comparing RT between groups showed no difference between HS and L2 groups, whereas it showed significant differences between HSs and NSs, and between L2 and NS with p-values = 0.05. For more detail see Table 3.

ANOVA test comparing RT between conditions demonstrated an overall significant difference between full-equivalent and semi-equivalent conditions, as well as between full-equivalent and no-equivalent conditions (p-value = 0.05) in the groups HS and L2 merged together. A difference between semi-equivalent and no-equivalent conditions was not found. More detail is provided in Table 4.

Interestingly, the same analysis showed a significant difference between full- and no-equivalent conditions for the NS group with p-value = 0.05 (see Table 5).

Table 3

Multiple comparison test after one-way ANOVA output  
with between-group difference

Таблица 3

Сравнение результатов всех участников эксперимента  
после одностороннего дисперсионного анализа

Comparisons	Observed difference	Critical difference	Difference
HS-L2	46.67	91.25	FALSE
HS-NS	869.21	83.37	TRUE
L2-NS	822.54	87.55	TRUE

Table 4

Multiple comparison test after one-way ANOVA output with between-condition difference  
for groups HS and L2 together

Таблица 4

Сравнение результатов после одностороннего дисперсионного анализа  
(эритажные носители русского языка и изучающие русский как иностранный)

Comparisons	Observed difference	Critical difference	Difference
full-semi equivalent	77.83	67.20	TRUE
full-no equivalent	76.60	67.20	TRUE
semi-no equivalent	1.22	67.20	FALSE

Table 5

Multiple comparison test after one-way ANOVA output with between-condition  
difference for NS

Таблица 5

Сравнение результатов после одностороннего дисперсионного анализа  
(носители русского языка)

Comparisons	Observed difference	Critical difference	Difference
full-semi equivalent	23.83478	54.48605	FALSE
full-no equivalent	54.90870	54.48605	TRUE
semi-no equivalent	31.07391	54.48605	FALSE

To sum up, there were significant differences in idiom reading time between HSs and L2 learners versus NSs (2 distinct groups). This means that HSs tend to process idioms like L2 learners rather than like NSs. The type of idiom (not) having an English full or semi equivalent matters for HSs and L2 learners. Specifically, for both groups (HS and L2) significant differences were found between the full and semi equivalent conditions and between the full and no equivalent conditions. Moreover, a significant difference in idiom reading time was found between full and no equivalent conditions in the NS group, which was quite unexpected. The differences in idiom reading time between conditions are summarised within each group in Figure 3.

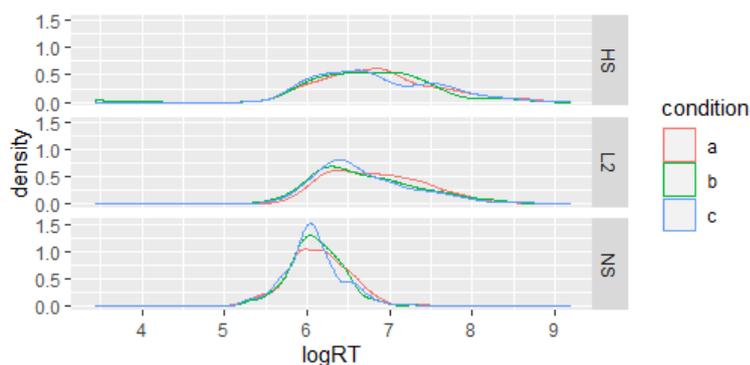


Fig. 3. Condition difference in RT (log transformed) at the critical region across groups  
 Experimental conditions: (a) full-equivalent, (b) semi-equivalent, and (c) no-equivalent idioms consequently  
 Рис. 3. Разница в скорости чтения (log) в критической области с учетом условий эксперимента:  
 а) полные эквиваленты; б) полуквиваленты; в) идиомы без эквивалента

#### 4. Discussion

In this research, we studied how HSs and L2 learners processed Russian idioms. The cross-language similarity factor (as a factor that can influence L2 learners' idiom processing) served as the basis of this study, i.e. we tested whether the processing of Russian-English full equivalent, semi-equivalent and no-equivalent idioms is different across the groups. In order to study the impact of this factor, a self-paced reading experiment was conducted. The experiment included Russian sentences with idioms in the middle of the sentence.

The experiment involved three groups of participants: HSs, L2 learners and NSs. The data from non-standard participants (HSs and L2 learners) were considered as comparable with the control group data (NSs) in accordance with their Russian language level with the following scores on the Russian placement test: HSs = 32.1; L2 = 28.3; max = 36. Evidence of L2 idioms processing theories show that high proficiency L2 learners process idiom's figurative meaning in a mode that is not unlike native speaker's strategy [Matlock & Heredia, 2002; Beck & Weber, 2016; Cieślicka, 2017]. Thus, the scores on the Russian placement test illustrate that the level of Russian proficiency among non-standard speakers is commensurate and this allows us to assess the impact of the nature of bilingualism on the idiom processing.

An interesting finding is that L2 learners who scored less in the Russian placement test read sentences almost with the same reading speed as HSs with a higher Russian test score (Figure 1). This difference can be accounted for by the features of language acquisition in both groups. HSs typically acquire language in a natural setting, drawing on oral input and less written input, while L2 learners in a classroom environment learn language not only from oral input but also from written input. L2 participants reveal a moderate advantage in Idiom RT over HSs (Table 2), but both of these groups of non-standard Russian speakers significantly differ from NSs, whose Idioms RT is 2 times less. In this paper, we set ourselves the task of studying how the processing of idioms by HSs is more consistent to NSs or to L2 learners, and the data (Table 2) shows that it is more aligned with L2 processing.

The results of the idiom familiarity test (Table 2) showed that L2 learners correctly chose the meaning of the stimuli idioms only in 33.3 % of cases. This can be attributed not only to their high uncertainty about idioms, but also to their "safe" strategy of dealing with the test. They chose the option "I do not know" most of the time (over 60 %), to be on the safe side, when they were not completely sure about the idiom's figurative meaning, as incorrect answers with a literal or irrelevant meaning of an idiom were rarely chosen (4.6 % and 2.1 % correspondingly). As mentioned, the idiom familiarity test was not used as a cut-off factor.

Hereinafter are cross-language similarity factor's effects on idiom comprehension in our data. Crucially, we discovered a significant difference between the full-equivalent and semi-equivalent conditions, as well as between the full-equivalent and no-equivalent conditions in the groups of HSs and L2 learners. This can be explained by the parasitic mechanism of L2 idiom acquisition [Hall, 2002; Cieślicka, 2017]. These models could also be applied for HSs, as they behave and acquire idioms as L2 learners. They rely on their strong language (English), so the difference between acquiring full-equivalent and semi-equivalent idioms is crucial as is between full-equivalent and no-equivalent. HSs may use parasitic mechanisms of acquiring idioms as L2 learners do. This is consistent with results of Kopotev and co-authors project [Kopotev et al., 2020], which showed the strong L1 influence in collocation production in HSs speaking different dominant languages.

Our analysis showed the difference between the reading time of full equivalents and no equivalents in NSs. We have three possible explanations for these results. First, a significant difference between them in the statistical analysis was based on a quite small difference between observed value (54.5) and the critical one (54.9). Second, all participants from NSs indicated that they know English as L2 to some extent. The presence of English as L2 even at a low or moderate level could have contributed to the idiom processing with L2 influence [Weinreich, 1953. P. 1; Cook, 2003]. Third, there is the possibility of universal ways of metaphorization, with the help of which new idioms (the idioms that are full equivalents in different languages), with the same mechanism of meaning transfer, may appear.

## 5. Conclusion

Our study highlights the fact that further investigation of cross-language influence factors for experiments in idiom processing are essential. Participants from 3 groups process full Russian - English equivalents and no English equivalents noticeably differently. While bilingual groups of participants (HSs and L2 learners) are also more susceptible to semi Russian - English equivalents. The obtained findings are in line with previous studies outlining the role of congruency in L2 idiom processing [Yamashita & Jiang, 2010; Wolter & Gyllstad, 2011, 2013; Carrol et al. 2016]. NSs in our control group use English less frequently in everyday communication than HSs and L2 learners, so they seem to “unite” three types of idioms into two groups. In contrast, HSs and L2 learners are more sensitive to lexical variations of idioms that express a similar idea in Russian and English (semi-equivalent idioms).

In the current work we divided idioms mainly according to their cross-linguistic similarity. However, there are other approaches to idiom classification. For example, Beck and Weber [2016, 2020] compared idioms with a high potential for literal interpretation, such as *break the ice*, and the ones with a low potential like *lose one's cool*. Beck and Weber tested whether these two types of idioms were processed differently in figuratively and literally biasing contexts. For Russian idioms, there is no similar research that studies idioms from the same perspective as there is still no idiom database for these purposes. Consequently, our future research will be devoted to the creation of a database of Russian idiom indexes for literality and familiarity.

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*Статья поступила в редакцию 07.07.2023;  
одобрена после рецензирования 17.08.2023; принята к публикации 06.09.2023  
The article was submitted 07.07.2023; approved after reviewing 17.08.2023;  
accepted for publication 06.09.2023*