

Comprehending metaphors of different types: Evidence from Russian

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Abstract Despite extensive research, what mechanisms are involved in understanding metaphors is still a matter of debate. This paper focuses on one aspect of this problem: on the sequence of steps in online processing. Some authors think that to understand a metaphor, we must assess and reject the literal meaning of the expression first, so metaphors should be more difficult to process than literal expressions. Some claim that certain metaphors are stored in the mental lexicon as a whole, so they should be easier to process. And yet the others believe that metaphors are processed compositionally, but there is no primacy of the literal meaning. This paper sheds new light on this question, presenting data from a self-paced reading experiment on Russian. We chose syntactically diverse materials to complement previous studies looking primarily at “an x is a y ” metaphors and analyzed how two types of metaphors are processed compared to the same expressions used in the literal meaning. The first type is engrained in the speakers’ minds on the conceptual level, but can be expressed in different ways. The second type is fixed both on the conceptual and on the linguistic level. Our experiment showed that metaphors in these two groups are processed differently. In both cases, we did not find any evidence that the literal meaning is assessed first, but concluded that the latter, unlike the former, are stored in the mental lexicon as a whole.

Introduction

The study of metaphors and other non-literal expressions provoked several important debates. The first concerns the status of metaphor in the language. Aristo-

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tle who was the first to address this question discusses it primarily in *The Poetics* and *The Rhetoric*. He contrasts metaphor with the ‘ordinary language’ and assumes that its main function is ornamental. Aristotle’s theory was widely criticized, but many subsequent works still share its basic insight: that metaphors are ‘special’ (e.g. Black 1962, 1993; Searle 1979, 1993).

An alternative view was suggested by George Lakoff and his colleagues (Lakoff and Johnson 1980, 1999; Lakoff 1993). According to it, metaphors permeate our language and are foundational for our thinking. Namely, since we cannot sense the denotata of abstract concepts, we think and speak of these concepts in terms of concrete concepts. For example, time can be understood in terms of space (time as a road) or conceptualized as a precious resource (time as money).

The second problem that became crucial to the study of metaphors concerns the relation between literal and non-literal meanings. Searle (1979) suggested that to understand a metaphoric expression, the speaker must assess and reject the literal meaning of this expression first. The predictions of this theory can be tested experimentally. In particular, if it is true, metaphors should take longer to be processed than the same expressions in the literal meaning.

Various behavioral studies dedicated to this question did not find any evidence for the primacy of the literal meaning (e.g. Gildea and Glucksberg 1983; Glucksberg 2003; McElree and Nordlie 1999; Ortony et al. 1978). But there are some notable exceptions: for example, Brisard et al. (2001) found that metaphors were processed slower than corresponding literal expressions. It can also be noted that most experiments looked only at one type of metaphors: “an x is a y ” (e.g. Brisard et al. 2001; Glucksberg and Keysar 1990; Glucksberg et al 1997; Jones and Estes 2006; McGlone and Manfredi 2001; Lai et al. 2009). So the debate is still open.

In addition to that, the results of neurophysiological experiments addressing the problem of hemispheric specialization and trying to localize brain regions selectively involved in literal or non-literal language processing are mixed (e.g. Bottini et al. 1994; Eviatar and Just 2006; Giora 2007; Mashal et al. 2007; Pynte et al. 1996; Yang et al. 2009). Clinical studies point to different processing mechanisms for metaphors and literal expressions (e.g. Champagne-Lavau and Stip 2010; Iakimova et al. 2005). Moreover, although several alternatives to Searle’s theory were suggested (e.g. Bowdle and Gentner 2005; Gentner and Wolff 1997; Giora 2003), none of them is widely accepted.

The third problem that is widely discussed in the field revolves around the mental lexicon. Many authors assume that at least some non-literal expressions are stored in the mental lexicon as a whole (Giora 1999). On one hand, this provides an easy explanation to the question how non-literal meanings are retrieved. On the other hand, it does not seem plausible that all metaphors are stored as a whole, so the border must be drawn somewhere.

We supposed that conflicting results obtained in different studies and hence the answers to the above-mentioned questions might depend on the type of the chosen metaphors. In this paper, we present the results of a self-paced reading study based on Russian language where two types of metaphors were analyzed. The first type

is engrained in the speakers' minds on the conceptual level, but can be expressed in different ways. The second type is fixed both on the conceptual and on the linguistic level. To complement previous studies, we chose metaphors with the syntactic structure other than "an x is a y ".

The present study

Method

Participants

Participants were 26 native speakers of Russian (14 male and 12 female) with no history of language disorders.

Design and materials

Two types of metaphors were analyzed in our experiment. The first type was extensively studied by Lakoff and Johnson (1980, 1999). They identified a number of metaphors that form the basis of our abstract thinking. We conceptualize labor as a resource that one can invest or spend, ideas and theories as living organisms or buildings, verbal and emotional interactions as physical interactions (for example, discussions as wars) etc.

However, although such metaphors are engrained in the speakers' minds on the conceptual level, linguistically, they can be expressed in different ways. Let us take metaphors "the mind is a machine" and "the mind is a brittle object"¹ as an example (they partly overlap because both things can break down). These metaphors stand behind the following expressions in Russian (when these expressions are used to refer to people rather than to inanimate objects): *razvalivat'sja na časti*, 'to fall to pieces', *slomat'sja* 'to break down', *čuvstvovat' sebja razbitym* 'to feel slack', literally 'to feel broken', *xrupkij* 'brittle', *razvalina* 'wreck', *zanosit'* 'to skid', *so skripom* 'with squeaks' (about doing something slowly and reluctantly), *bez tormozov* 'without breaks' (usually about a careless or impolite person), among many others.

¹ To be more precise, the first and especially the second metaphor are usually employed to think and speak of one's mental and physical condition and one's mental self.

Syntactically, these expressions are very diverse. The examples above include verbs, nouns and adjectives, as well as prepositional phrases and verb phrases of different structure. We aimed to reflect this diversity in our experimental materials. This seems to be important, especially given the fact that most previous behavioral experiments relied only on one type of metaphors: “an *x* is a *y*”.

The second type of metaphors included in our study is fixed both on the conceptual and on the linguistic level. To give an example, in Russian the expressions *bol'shaja šiška* ‘big (tree) cone’ and *krepkij orešek* ‘hard nut’ can be used to refer to an important person and a tough person, respectively. The latter has an English analogue, *a hard nut to crack*, and the former does not. *Sžeč' korabli* ‘to burn (one’s) ships’ can mean ‘to cutoff the way back, to make decisions that cannot be changed in the future’.

We chose ten metaphors of both types for our study. The aim of the experiment was to analyze how they are processed compared to the same expressions used in the literal meaning: whether they would be read faster or slower. Therefore, all target expressions were placed in two sentences setting up different contexts for them. One presupposed a literal meaning and the other a metaphorical meaning.

Thus, 20 pairs of target sentences were designed. To measure reading times, they were divided into fragments (the details of the experimental procedure are explained below). There were at least three identical fragments in each pair: the one containing the metaphor or the same expression in the literal meaning (the crucial fragment, or *CF*), the one before that (the preceding fragment, or *PF*) and the one after that (the following fragment, or *FF*). Examples with two types of metaphors are given in (1)-(2). Slashes show how they were divided into fragments. The full list of the target sentences can be found in the Appendix.

1. a. *Sergej Ivanovič / k užasu vsech rodstvennikov (PF) / razvalivalsja na časti, (CF) / prostojav tri časa (FF) / pod prolivnym doždem.*
Sergei Ivanovich / to the horror of all relatives / was falling to pieces / after standing for three hours / in the pouring rain
- b. *Ljubimyj babuškin stul / k užasu vsech rodstvennikov (PF) / razvalivalsja na časti, (CF) / prostojav tri časa (FF) / pod prolivnym doždem.*
the grandma's favorite chair / to the horror of all relatives / was falling to pieces / after standing for three hours / in the pouring rain
2. a. *Sotrudniki policii / nikak ne mogli (PF) / raskusit' krepkij orešek (CF) / kak ni staralis' (FF) / vybit' u nego priznanie.*
policemen / absolutely could not / bite through a hard nut / however hard they tried / to beat a confession
- b. *Ryžie beločki / nikak ne mogli (PF) / raskusit' krepkij orešek (CF) / kak ni staralis' (FF) / dobrat'sja do zěrnyška.*
red squirrels / absolutely could not / bite through a hard nut / however hard they tried / to get to the seed

Numerous reading studies show that we keep processing a portion of text for a while when our eyes have already moved to the next portion (e.g. Rayner and Duffy 1986; Rayner et al. 1989). This is known as *spillover effects*. In our experiment, identical PFs were needed to control for such effects in the crucial region. Identical FFs allowed us to analyze later processing stages of the crucial fragments.

Before including target sentences in our experiment, we subjected them to a pretest. 16 native speakers of Russian who subsequently did not take part in the experiment rated them on two four-point scales. Firstly, they were asked whether a given sentence sounded natural to them. Secondly, they were asked whether it was easy to understand. 0 was the lowest mark, and 3 was the highest. Each informant saw only one sentence from a pair, so every sentence was rated by eight speakers.

All sentences received average ratings between 2.1 and 2.9 on both scales, except for one sentence from the second group where the target expression was used in the literal meaning. Its average ratings were 1.7 and 2.0. We decided to remove this sentence and its metaphoric counterpart from the stimulus set and also excluded one pair of sentences from the first group for the balance. As a result, we had 18 pairs of target sentences in our experiment.

During the experiment, each participant read one target sentence from every pair. Thus, we had two experimental lists. They included 18 target sentences and 20 fillers in a random order. In addition to that, three practice items were presented before the main experimental session started so that participants could familiarize themselves with the procedure. All fillers and practice items were approximately of the same length as the target sentences.

Procedure

The experiment was run on a PC using *Presentation* software. We used a self-paced moving window paradigm (Just et al. 1982). Each trial consisted of the participant's silently reading a target or filler sentence and answering a comprehension question. When sentences first appeared on the screen, all words in them were masked by dashes while spaces and punctuation remained intact. The participant pressed a key to reveal a fragment of text such that each key press revealed further text and masked the previously revealed text. *Presentation* software allows measuring the time between each key press with 1 ms accuracy, thus registering reading times for every fragment.

After each sentence, a comprehension question was shown. Then, after the next key press, two possible answers appeared on the right and on the left of the screen, and the participant could choose by pressing the key labeled 'left' or 'right'. The left-right distribution of correct and incorrect answers was randomized. Questions and answers were not masked. Then the participant pressed a key to move onto the next item. Participants were instructed to read at a natural pace and answer the

questions as accurately as possible (comprehension questions are used in such studies to make sure that participants pay attention to what they are reading).

Analysis

We analyzed participants' question-answering accuracy and reading times. All participants answered at least 86.8% of the questions correctly (94.7% on average). Approximately half of the incorrect answers were about filler sentences. Given the low number of relevant errors, a breakdown of reading times into correct and incorrect question trials was not done.

We analyzed reading times for the crucial fragments in the two groups of target sentences and for the fragments preceding and following them (only these fragments were directly comparable in metaphoric and literal conditions). Raw reading times (per fragment) were trimmed in the following way. If they exceeded a threshold of 2.5 standard deviations, by region and condition, they were adjusted to this threshold. In total, about 2.7% of the data was adjusted.

Results and discussion

Average reading times for the crucial, preceding and following fragments of target sentences in different experimental conditions are listed in Table 1. Any effects of experimental manipulation can be expected only in the crucial and following regions, so average reading times for these fragments are also presented in Fig. 1 and Fig. 2. Let us remind that the sentences in the first group contained metaphors that are engrained in the speakers' minds on the conceptual level, but can be expressed in different ways. The sentences in the second group contained metaphors that are fixed both on the conceptual and on the linguistic level.

	Preceding fragment		Crucial fragment		Following fragment	
	literal	metaphoric	literal	metaphoric	literal	metaphoric
Group 1	792.9	757.7	732.5	737.7	759.3	807.9
Group 2	807.8	792.2	848.2	734.7	774.1	771.3

Table 1. Average reading times for the crucial, preceding and following fragments of target sentences (in ms)

In the first group, there was no significant reading time difference between metaphors and literal expressions in any region ($F_s < 0.6$, $p_s > 0.4$ for all comparisons). In the second group, the crucial fragments were read significantly faster in the metaphoric condition than in the literal condition ($F1[1,51] = 3.95$, $p = 0.05$; $F2[1,17] = 5.22$, $p = 0.04$). The difference between the following fragments was

not significant, as well as the difference between preceding fragments ($F_s < 0.2$, $p_s > 0.6$ for both comparisons).

Thus, in both groups we could not find any evidence for the primacy of the literal meaning, which would suggest that to understand a metaphor, the literal meaning must be accessed and rejected first. At the same time, our findings indicate that metaphors of different types are processed differently. The fact that metaphors from the second group are read faster than the corresponding literal expressions, while the metaphors in the first group are not can be taken to indicate that the former are stored in the mental lexicon as a whole, so their meanings can be accessed directly, while the latter are processed compositionally. The facilitatory effect in the second group manifests itself at early processing stages, as expected.

Conclusions

This paper addresses the question how metaphors are processed. Existing behavioral studies show controversial results. In some cases, metaphors were read slower than corresponding literal expressions, and this was taken to support Searle's (1979) theory and similar approaches according to which to understand a metaphor, we must assess and reject the literal meaning of the expression first. In several other studies, metaphors were processed faster, which led to the conclusion that they are stored in the mental lexicon as a whole. And some authors did not find any difference between metaphors and literal expressions.

We suggest that at least some of these controversies might be due to the fact that different types of metaphors are processed differently. Our self-paced reading experiment on Russian demonstrates that metaphors that are fixed both on the conceptual and on the linguistic level are read faster than the corresponding literal expressions. We conclude that such metaphors are stored in the mental lexicon as a whole, which facilitates their processing because their meanings can be accessed directly, rather than computed compositionally.

Metaphors of a different type, which are engrained in the speakers' minds on the conceptual level, but can be expressed in different ways, do not exhibit similar facilitatory effects. At the same time, they are not read slower than the corresponding literal expressions. Finally, studies like (Brisard et al. 2001) show that novel metaphors that are not familiar to the readers either on the linguistic or on the conceptual level and look unusual to them take more time than literal expressions.² We conclude that these two types of metaphors are processed compositionally.

² It can be noted that in our experiment, metaphors in this group were read slightly slower than literal expressions. However, we do not think that this difference was similar to what Brisard et al. (2001) found, but simply did not reach significance. The effect they observed was early: it was significant only in the region containing the target expression, while in our study, a small difference could be seen only in the following region.

As it seems to us, taken together, these findings also indicate that we do not access and reject literal meanings when understanding metaphors. This approach would make sense if it could be applied to all cases where the metaphoric expression is not stored in the mental lexicon as a whole. If we *can* compute metaphoric meanings without accessing literal meanings first—and our results with the second type of metaphors point into this direction—nothing precludes the conclusion that we always do so. Some additional assumptions would be necessary to explain why this mechanism is available in some cases, but not in the others.

How do we explain that metaphors of the third type are read slower than literal expressions? Searle's (1979) theory and similar approaches are not the only ones that can predict that. In fact, many authors assume that literal and non-literal meanings are processed differently, but this difference is qualitative rather than quantitative and does not involve computing ones before the others (e.g. Rumelhart 1993). Results from neurophysiological and clinical studies are compatible with this view. If it is correct, we do not expect that metaphors will always be read as fast as literal expressions or slower than they are—this may depend on additional factors such as metaphor novelty.

Appendix: Experimental materials

Target sentences from the first group:

- 1M. *Sergej Ivanovič / k užasu vseh rodstvennikov / razvalivalsja na časti, / prostojav tri časa / pod prolivnym doždem.*
Sergei Ivanovich / to the horror of all relatives / was falling to pieces / after standing for three hours / in the pouring rain
- 1L. *Ljubimyj babuškin stul / k užasu vseh rodstvennikov / razvalivalsja na časti, / prostojav tri časa / pod prolivnym doždem.*
the grandma's favorite chair / to the horror of all relatives / was falling to pieces / after standing for three hours / in the pouring rain
- 2M. *Posle svad'by / naši otnošenija / kak-to nezametno / zašli v tupik, / teper' nužno bylo / iskat' vyhod / iz složivšejsja situacii.*
after the wedding / our relationship / somehow imperceptibly / hit a dead end / now it was necessary / to find a way out / from this situation
- 2L. *Guljaja po ulicam, / Petja i Vasja / kak-to nezametno / zašli v tupik, / teper' nužno bylo / iskat' novuju dorogu.*
walking along the streets / Petya and Vasya / somehow imperceptibly / hit a dead end / now it was necessary / to find a new way

- 3M. *Sily / v konce putešestvija / prišlos' ékonomit', / čtoby xvatilo / na poslednij perexod.*
efforts / at the end of the journey / had to be saved / so that we had enough / for the last passage
- 3L. *Den'gi / v konce putešestvija / prišlos' ékonomit', / čtoby xvatilo / na obratnyj bilet.*
money / at the end of the journey / had to be saved / so that we had enough / for a return ticket
- 4M. *Obryvok frazy, / neostorožno skazannoj / staršim synom, / gluboko ranil / Mariju Petrovnu, / i ej prišlos' / obratit'sja k psixologu.*
a fragment of the phrase / carelessly said / by the eldest son / deeply wounded / Maria Petrovna / and she had / to consult a psychologist
- 4L. *Oskolok butylki, / neostorožno razbitoj / staršim synom, / gluboko ranil / Mariju Petrovnu, / i ej prišlos' / obratit'sja k vraču.*
a fragment of the bottle / carelessly broken / by the eldest son / deeply wounded / Maria Petrovna / and she had / to consult a doctor
- 5M. *Glavnyj argument / Andreja Alekseeviča / byl razbit / iz-za ego neumenija / jasno izlagat' / svoi mysli.*
the main argument / of Andrey Alekseevich / was crushed / due to his inability / to express clearly / his ideas
- 5L. *Bamper mašiny / Andreja Alekseeviča / byl razbit / iz-za ego neumenija / pravil'no parkovat'sja.*
the bumper of the car / of Andrey Alekseevich / was crushed / due to his inability / to park correctly
- 6M. *Uxaživaja za Polinoj, / Pavel byl vynužden / sbavit' oboroty, / čtoby ne ispugat' / robkiju devušku / svoej nastojčhivost'ju.*
courting Polina / Pavel was forced / to slow down / so as not to frighten / the timid girl / with his persistence
- 6L. *Na krutom spuske / Pavel byl vynužden / sbavit' oboroty, / čtoby ne ispugat' / exavšuju s nim / požiluju tetju.*
on the steep downhill / Pavel was forced / to slow down / so as not to frighten / his elderly aunt / riding with him
- 7M. *Novaja teorija, / stavšaja populjarnoj, / byla postroena / na osnove nedavno obnaružennyx, / no mnogokratno proverennyx / dannyx.*
a new theory / which became popular / was built / on the basis of newly discovered, / but repeatedly checked / data
- 7L. *Novaja krepost', / stavšaja populjarnoj, / byla postroena / na osnove nedavno obnaružennyx / drevnix fundamentov.*
a new fortress / which became popular / was built / on the basis of newly discovered / ancient foundations

- 8M. *Množestvo / xorošix idej / v époxu zastoja / umerlo tol'ko potomu, / čto im ne okazali / dolžnogo vnimanija.*
a lot / of good ideas / in the period of stagnation / died only because / they did not get / enough attention
- 8L. *Množestvo / xorošix ljudej / v époxu zastoja / umerlo tol'ko potomu, / čto im ne okazali / svoevremennoj pomoščhi.*
a lot / of good people / in the period of stagnation / died only because / they did not get / help in time
- 9M. *Sotrudnik, / prinjatyj v štat /v prošlom mesjace, / bystro slomalsja / iz-za nepreryvnoj raboty / i ušel / na bol'ničnyj.*
an employee / hired / last month / quickly broke down / due to working without pauses / and went away / on medical leave
- 9L. *Televizor, / kuplennyj babuškoj /v prošlom mesjace, / bystro slomalsja / iz-za nepreryvnoj raboty / i byl otdan / na remont.*
a TV set / bought by the grandma / last month / quickly broke down / due to working without pauses / and was given away / to be repaired

Target sentences from the second group:

- 1M. *Sotrudniki policii / nikak ne mogli / raskusit' krepkijj orešek / kak ni staralis' / vybit' u nego priznanie.*
policemen / absolutely could not / bite through a hard nut / however hard they tried / to beat a confession
- 1L. *Ryžie beločki / nikak ne mogli / raskusit' krepkijj orešek / kak ni staralis' / dobrat'sja do zěrnyška.*
red squirrels / absolutely could not / bite through a hard nut / however hard they tried / to get to the seed
- 2M. *Na novoj rabote / vmesto družnogo kollektiva / Ol'ga obnaružila / zmeinoe gnezdo / i neožidanno dlja sebja / prišla v užas.*
at the new job / instead of a friendly team / Olga found / a nest of vipers / and unexpectedly for herself / was horrified
- 2L. *V gustoj trave / vmesto gribov / Ol'ga obnaružila / zmeinoe gnezdo / i neožidanno dlja sebja / prišla v užas.*
in the thick grass / instead of mushrooms / Olga found / a nest of vipers / and unexpectedly for herself / was horrified
- 3M. *Kogda Kolja opazdyval, / učitel'nice matematiki / prixodilos' slušat' / babuškiny skazki / vmesto ožidaemyx / iskrennix izvinenij.*
when *Kolya* was being late / the math teacher / had to listen / to granny's tales / instead of the expected / sincere apologies

- 3L. *Kogda otključali svet, / pjatiletnej Olen'ke / prihodilos' slušat' / babuškinj skazki / vmesto ožidaemyx / večernix mul'fil'mov.*
when lights went off / five year old Olechka / had to listen / to granny's tales / instead of the expected / evening cartoons
- 4M. *Opytnyj psixolog / znaet, kak ne popast' / v bol'noe mesto, / kogda nado postavit' / pacientu diagnoz.*
an experienced psychologist / knows how not to hit / a sore spot / when (she) has to diagnose a patient (literally: when (she) has to put / to a patient a diagnosis)
- 4L. *Opytnaja medsestra / znaet, kak ne popast' / v bol'noe mesto, / kogda nado postavit' / pacientu kapel'nicu.*
an experienced nurse / knows how not to hit / a sore spot / when (she) has to put / a patient on a drip
- 5M. *V štabe bastujuščix rabočix / k včheru pojavilas' / bol'saja šiška, / i srazu stalo ponjatno, / čto ix trebovanija / budut učteny.*
at the headquarters of the workers on strike / in the evening there appeared / a big strobile/bump / and it became clear at once / that their demands / will be considered
- 5L. *Na lbu u Vani / k večeru pojavilas' / bol'saja šiška, / i srazu stalo ponjatno, / čto on ne skazal mame / vsej pravdy.*
on Vanya's forehead / in the evening there appeared / a big strobile/bump / and it became clear at once / that he did not tell / the whole truth to his mother
- 6M. *Učastniki konferencii / bezžalostno metali / jadovitye strely / v ocepenevšego ot užasa / neopytnogo dokladčika.*
conference participants / mercilessly threw / poisonous arrows / in a petrified with horror / inexperienced speaker
- 6L. *Na znamenitoj kartine / drevnie oxotniki / bezžalostno metali / jadovitye strely / v ocepenevšego ot užasa / ogromnogo mamonta.*
in the famous picture / ancient hunters / mercilessly threw / poisonous arrows / in a petrified with horror / huge mammoth
- 7M. *Kogda novyj proekt Niny / poterpel neudaču, / Polina pervoj / brosila v nee kamen' / i, ne razdumyvaja, / potrebovala eë uvolit'.*
when Nina's new project / failed / Polina was the first / to throw a stone at her / and without hesitation / demanded her to be dismissed
- 7L. *Kogda sobaka / kinulas' na rebjat, / Polina pervoj / brosila v nee kamen' / i, ne razdumyvaja, / vstala meždu nej / i malyšami.*
when the dog / attacked the children / Polina was the first / to throw a stone at it (literally: at her) / and without hesitation / stepped between it / and the kids

- 8M. *Korupcija i bjurokratija / v našej strane / bystro sozdali / blagodatnuju počvu, / ideal'no podxodjaščuju / dlja rosta prestupnosti.*
corruption and bureaucracy / in our country / quickly created / a fertile ground / ideally suited / for the growth of crime
- 8L. *Ispol'zuja udobrenija, / južnye fermery / bystro sozdali / blagodatnuju počvu, / ideal'no podxodjaščuju / dlja vyraščivanija kukuruzy.*
using fertilizers / southern farmers / quickly created / a fertile ground / ideally suited / for growing corn
- 9M. *Byvšim suprugam / ničego ne ostalos', / kak sžeč' korabli, / čtoby v budušem izbežat' / utomljajuščix ix / ssor i konfliktov.*
former spouses / had nothing left / but to burn the ships / to avoid in the future / tiresome / quarrels and conflicts
- 9L. *Posle poraženija / vice-admiralu / ničego ne ostalos', / kak sžeč' korabli, / čtoby v buduščem izbežat' / zaxvata flota vragom.*
after the defeat / vice admiral / had nothing left / but to burn the ships / to avoid in the future / the capture of the navy by the enemy

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Figure captions:

Fig. 1. Average reading times for the sentences in the group 1 (in ms)

Fig. 2. Average reading times for the sentences in the group 2 (in ms)