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Сборник издается по итогам Шестого Санкт-Петербургского зимнего симпозиума по экспериментальным исследованиям языка и речи, который прошел 15–16 декабря 2022 г. на факультете свободных искусств и наук Санкт-Петербургского государственного университета. Симпозиум, организованный Институтом когнитивных исследований СПбГУ, собрал более 100 участников из различных городов России и из других стран. Представленные устные и стендовые доклады относились к междисциплинарной научной проблематике, связанной с экспериментальным изучением языка, речи, их психических и биологических механизмов, развития, патологии.

Edited by Tatiana Chernigovskaya, Tatiana Petrova, Natalia Slioussar

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Papers collected in this volume were presented at the 6th Saint Petersburg Winter Workshop on Experimental Studies of Speech and Language (Night Whites 2022). The workshop was organized by the Institute for Cognitive Studies of Saint Petersburg State University on December 15–16, 2022. More than 100 participants from Russia and other countries attended the workshop. The talks and posters focused on topics in the domain of psycholinguistics, neurolinguistics, cognitive neuroscience, computational modeling of linguistic processes, neuropsychology, experimental phonetics.

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ISBN 978-5-98620-694-3

CONTENTS

KEYNOTE LECTURES

ORAL AND POSTER PRESENTATIONS

KEYNOTE LECTURES

A. Kibrik
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PRO-PLURALISM IN EXPERIMENTAL LINGUISTICS. TO THE MEMORY OF RUSSELL TOMLIN

I begin with an homage to Russell Tomlin, a great linguist who passed away this year. Tomlin's research program was highly original and insightful. I concentrate on his well-known 1995 paper "Focal attention, voice, and word order: An experimental cross-linguistic study" that is important in more than one way. First, in that paper Tomlin attempted a cognitive reinterpretation of the notion of topic/theme and proposed the cognitive phenomenon of focal attention as a likely candidate. Second, Tomlin developed an experimental paradigm in which speaker's focal attention is manipulated and one observes systematic coding of a focally attended referent as a clause subject.

Unfortunately, Tomlin's study met little understanding among experimental linguists, and as a result this paradigm was further developed only in a small number of studies. The reasons behind that reception of Tomlin's work are associated with methodological details of his study that did not quite conform to the conventional standards adopted in psycholinguistics. Recognizing that methodological rigor is important, at the same time I regret that the baby was thrown out with the bathwater. In my view, Tomlin's empirical result is so robust that it is beyond any doubt notwithstanding methodological details. His theoretical result is highly important and helped me to construct a theory of reference and referential choice, in which these two linguistic processes are tightly knit in a consistent picture with the cognitive processes of attention and working memory.

In the subsequent part of the paper I proceed with my "light experimental" study, dealing with another central cross-linguistic phenomenon, namely the choice between finite and non-finite verb forms in narrative clauses. The study is based on the evidence from Karachay-Balkar, a Turkic language of Northern Caucasus. I studied this language in a field trip situation. I started off with analysing two stories, each involving about 85 narra-

tive clauses. An analysis of that limited corpus led me to hypothesize that the choice between finite and non-finite verb forms (a) is not random and (b) is driven by the absence/presence of a causal nuance in the temporal relation.

Hypothesis (a) was further tested through an experimental procedure, in which four language speakers retold the discourse passages in question. I found that my prediction was held 88 % of the time, that is apparently the choice between finite and non-finite verb forms is systematic. These kinds of supplementary experiments are useful in linguistic field work and lead to more solid generalizations. I conclude that it is useful to recognize a larger family of light experimental and quasi-experimental methods and approaches, supplementing canonical methods found in psycholinguistics and in corpus linguistics.

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SENTENCE PRODUCTION: FROM PERCEPTION TO SPEAKING

The world that we perceive and describe changes constantly. Because our descriptions of the world need to be accurate and consistent, we must assume that the content and the structure of the sentences we produce reflect accurately and consistently the world's constantly changing nature. If so, a comprehensive production system needs to model the sentence generation process considering this basic assumption: Words, their linear arrangement, and the structures they are inserted in must somehow reflect the corresponding parameters of the described events. This system must include representation of salience as its integral component. The interplay between visual perception and the organization of spoken sentences involves constant, regular, and automatic mappings between elements of a visual scene and the structural arrangement of the constituents as well as the grammatical relations between them. Perceptual input contributes initially to this mapping process by prioritizing information for further conceptual and linguistic encoding. This information is systematically filtered, selected, and relayed based on a regular interface between the aspects of attention and their corresponding counterparts in the conceptual and linguistic structures. Bottom-up and top-down features of the interface include noticeability, importance, and relevance. As a result, linguistic output reflects in a regular way the event's conceptual organization including the attentional state of the speaker. In my presentation, I will discuss the priming studies that show how the mapping between attentional focus and structural choice forms a part of a more complex sentence production mechanism that simultaneously considers lexical-semantic, structural, and visual accessibility traces.

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NEUROCOGNITIVE SYSTEMS FOR VERBAL LEARNING

Despite its clear importance, the unique human ability to acquire new words quickly and efficiently remains poorly understood; its neural foundations are particularly unclear. Even though behavioural manifestations of learning are evident near instantly (e.g., we can start using new words immediately after hearing or reading them), the bulk of neuroimaging work has largely studied slow neural changes associated with months or years of practice. To address this gap in the current knowledge, we used a variety of state-of-the-art neuroimaging tools, including EEG, MEG, MRI, TMS and tDCS, as well as bespoke learning paradigms to tackle rapid brain mechanisms underpinning different types of word acquisition. Our studies used passive exposure to novel spoken and written words as well as contextual learning designs engaging different strategies of word acquisition. The results show a network of cortical areas that take part in online word and morpheme acquisition, which exhibit immediate functional and structural plasticity. This plasticity depends on multiple factors, including phonology, semantic references, individual language experience, age etc. Distinct cortical mechanisms become involved depending on the type of learning and semantic and morphological content of novel words. Furthermore, we show that these cortical learning systems can be modulated using neurostimulation tools to boost word acquisition outcomes, which may in the future lead to development of new applications, therapies and interventions.

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ATTRACTIONS OF AGREEMENT: WHAT THREE DECADES OF EXPERIMENTS TAUGHT US

Agreement is one of the basic linguistic mechanisms, and many production and comprehension studies focusing on it rely on the phenomenon of agreement attraction. A classic example is given in (1a), in which the verb agrees not with the head of the subject phrase, but with a dependent noun phrase (an attractor). Across languages, such errors in number and also in gender agreement have been shown to arise more frequently than errors of the type exhibited in (1b), where no attraction is possible. They are also more easily missed in comprehension.

(1) a. **The key to the cabinets were rusty.*
b. **The key to the cabinet were rusty.*

Starting with the first experimental study by Bock and Miller (1991), attraction errors were used to address many 'big questions' in linguistics: how morphosyntax and semantics interact in the process of production and comprehension, how grammatical features are represented in the mental grammar, how long-distance dependencies are processed, and so on. In this talk, I will briefly outline what we have learnt from this research and will focus in more detail on the insights that came from the studies based on Russian.

ORAL AND POSTER PRESENTATIONS

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LETTER PROCESSING IN FINNISH: DOES ORTHOGRAPHY MATTER?

Introduction. In alphabetic languages, recognizing a printed word form begins with identifying individual letters in a character string [Coltheart et al. 2001]. Currently, there are two models for identifying letters in a word: sequential [Whitney 2001] and parallel [Grainger & van Heuven 2003] processing. The former suggests that letters are processed sequentially — one after the other — in the direction set by the orthography of a given language. The latter posits that letters are processed in parallel.

Pitchford and colleagues (2008) have put forward a hypothesis that letter processing depends on the type of orthography of a particular language. A parallel strategy prevails in deep orthography languages with irregular letter-phoneme correspondence (for example, English), while a sequential strategy is characteristic of transparent orthography languages with more consistent spelling-to-sound mapping (Greek). The orthography hypothesis is based on the data from the English and Greek languages [Ktori & Pitchford 2008]. This data comes from a visual search task, in which participants need to determine whether a letter string contains a previously presented target letter. The position of a letter in the letter string varies. Speed up in the final position compared to the preceding one is in favor of parallel processing.

The recent study on Russian [Alexeeva & Dobrego 2021], a relatively transparent language [Grigorenko 2013], is in line with the parallel processing model and thus evidences against the orthography hypothesis. This project aims to test the parallel processing hypothesis on Finnish as a language with a notably transparent orthography.

Method and results. Forty-two native Finnish speakers participated in the study. We used all 29 letters of the Finnish alphabet. For each letter, we

generated five random letter strings of five characters, with the position of the target letter varying from 1 to 5. We used a total of 145 stimuli and 145 fillers (letter strings that did not contain the target letter). The participants were presented with a visual search task. We used linear mixed models to determine how letter position affects the speed of letter recognition in stimuli. In Finnish, as well as in English and Russian, the fifth letter was identified faster than the fourth.

Discussion. Our study supports a parallel strategy for identifying letters at the early stages of reading in a language with a clearly transparent orthography, such as Finnish. Thus, it can be argued that parallel processing is a universal strategy for word recognition during reading. This concept is a separate part of the OB1-reader — a modern word recognition model developed in France (Snell et al., 2018). As for the Greek-based data with a lack of speed up in the final position, which seemingly contradicts our conclusions and OB1-reader architecture [Ktori & Pitchford 2008], it holds true only for elderly Greek speakers. Young adults, who are normally targeted for such studies, showed a search pattern that favors parallel letter processing. Thus, the letter identification strategy may change with age, but this remains to be tested in further research.

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PHONETIC CHANGES IN SPEECH IN VARIOUS PHYSICAL STATES

The main goal of the work is to describe various phonetic changes that appear in speech, affected by various conditions, e. g., fast rate, speaking while walking or running and "morning voice". These aspects may be rather topical as they are important for various speech technology applications.

Material. Five speakers have recorded their speech using smartphones. The task was "to recite M. Lermontov's poem 'Sail' by heart 1) sitting and breathing normally, 2) at the highest possible rate, 3) while running 4) while walking, 5) right after waking up". The recordings were analyzed using Wave Assistant and Praat.

Results. The speaking and articulation rate was counted for both normal conditions and increased speed in phonemes per second as well as the number of sounds in full transcription and their actual quantity. In addition, the average length of every phoneme for normal and fast rate was calculated.

Considering the recordings of speech during physical activity the number of syntagmas and audible breath segments was counted. There were assumptions about the influence of gender, age and level of physical fitness on the pitch, the number of pauses, breath and syntagmas and differences from the same parameters when speaking under normal conditions.

For speech changes while walking, jitter and shimmer as well as pitch frequency were counted and compared to the normal recordings. In the research of the effect of sleep on speech, the number of phonemes and syntagmas, the pitch and duration of an audio recording were calculated.

Conclusion. The speakers managed to reduce their speech rate up to 50 %. This led to the reduction of the number of phonemes. The ending sounds, in many cases, dropped out, especially if they could easily be restored due to the knowledge of grammar and context. According to the calculations of speech speed for walking case, some speakers managed to increase their rate which has also led to the phoneme reduction. Obviously, the quality of sounds changed and their length became less. Moreover, there is a relationship between the duration of phonemes and the speech rate.

Some assumptions that were made for speech during running turned out to be incorrect or partially incorrect, some of them were proved. During phys-

ical activity, the pitch increases, audible segments of breathing appear, their number depends on the level of physical fitness of the speaker, an ascending intonation is observed at the end of the exercise. The number of pauses has increased in the recordings of speech while walking, however, their length hasn't changed in the way it was expected. On the other hand, the assumption that jitter and shimmer grow up in this case was proved. While speaking after waking up, the hoarseness appeared in the speech, noises in vowels and voiced consonant phonemes were observed, the pitch was reduced, there was a strong reduction of unstressed vowels in some cases. In addition, the structural organization of speech changed as the number of syntagmas has reduced or increased.

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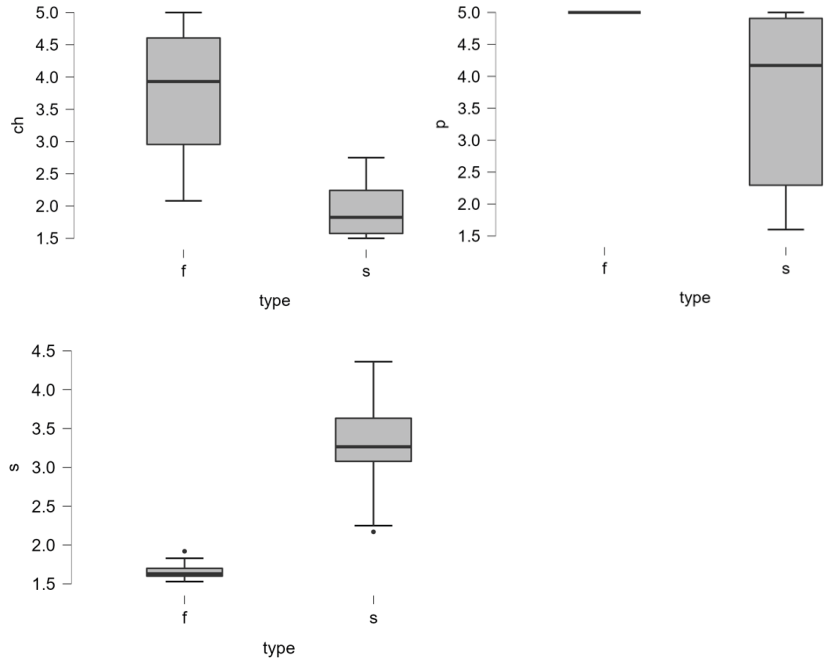
WHAT MAKES RUSSIAN WORDS FUNNY

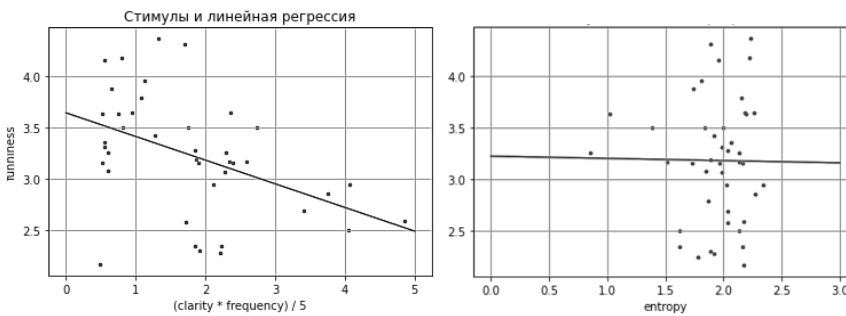
Humor prediction is a complicated task. Previous studies based on English analyzed the entities having as less variables as possible [Westbury et al. 2016; Westbury & Hollis 2019]. Due to the simpleness of the entities some exact factors predicting humor judgement were defined. For non-words, they are containing rude-alluding substrings and average letters' entropy (non-words with lower entropy per letter were considered funnier). For words they are frequency, average letters' entropy, semantic, or connotational features. We used experimental and statistical methods to find the factors of the meaning and form which make Russian words funny for Russian speakers.

Firstly, we asked more than 300 native Russian speakers to write down Russian words which they consider funny. We were not interested in studying the derivates from 4 obscene roots and eliminated these words. The final list included 596 words. The statistical analysis revealed statistically significant features for the words in the list, such as belonging to any of 10 semantic categories (e. g. 'ridiculous or dismissive', 'animals', 'food'), having diminutive suffixes, containing syllable reduplication (e. g. *имбибиция*), consisting of less frequent letters, and containing the letter 'к'.

The next step was to check whether these words are really considered as funnier than other words which were not in the list. We used the semantic differential as an experimental method. 40 words with the highest frequency from the previous stage of the study were used as the stimuli. The participants either read the words or listened to them pronounced by a male or female speaker. After every word they estimated its funniness, clarity and subjective frequency from 1 'not at all' to 5 'very'. Every participant was given randomly 10 stimuli and 10 fillers. We supposed that the lower the estimation of clarity and subjective frequency would be, the funnier a word would appear. 128 native Russian speakers ($M = 18.7$, $SD = 8.64$) took part in the experiment. The data was analyzed in the JASP software. All the differences were significant in independent samples t-test. Frequency (ch — частотность): $t = 10.734$, $p < .001$. Clarity (p — понятность): $t = 6.1$, $p < .001$. Funniness (s — смешность): $t = -15.065$, $p < .001$.



Among the stimuli Pearson's correlation coefficient between funniness and clarity multiplied by subjective frequency is r = –0.458, significant with p < .01. But no correlation was found between funniness and entropy per letter.



There are some factors were previously found in English studies and revealed in our research. These are word's frequency, entropy per letter, belonging to some semantic categories, containing rude-alluding substrings. We managed to experimentally found importance of subjective frequency and estimated clarity.

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DETECTING CASE AND NUMBER AGREEMENT ERRORS IN PARTICIPIAL MODIFIERS: AN EXPERIMENTAL STUDY ON RUSSIAN

In Russian, adjectives and participles agree with the noun they modify in case, number and gender (in singular). They can precede the noun or follow it (postposition is frequent in case of participial constructions). In this study, we compared processing of case and number errors on postposed participles, also taking the orthographic similarity of different forms into account. Previously, only number and gender error processing were compared in some Romance languages [e. g. Barber & Carreiras 2005; Faussart et al. 1999; Sagarra & Herschensohn 2011], so our goal was to extend these findings.

We conducted a non-cumulative self-paced reading experiment using the IbexFarm platform. 44 speakers of Russian participated in it. Our target sentences contained prepositions that take noun phrases in dative or locative case, as in (1) and (2). These sentences were presented in the correct form or with various errors on the participle. Experimental conditions are listed in Table 1. Incorrect forms could differ from the correct one in case or number; they could have the same number of letters or be one letter longer.

(1) *Trener podošel k sportsmenam, polučivšim zolotye medali.*
coach came to athletes having-received$_{\text{DAT. PL}}$ gold medals
'The coach approached the athletes who received gold medals.'

(2) *Zriteli govorili o muzykantax, otkryvšix džazovyj festival'.*
viewers talked about musicians having-opened$_{\text{LOC. PL}}$ jazz festival
'The audience talked about the musicians who opened the jazz festival.'

Table 1. **Experimental conditions**

Dative set	Conditions	Locative set	Conditions
polučivšim (Dat.Pl)	correct	*otkryvšix* (Loc.Pl)	correct
polučivšix (Gen=Loc.Pl)	case	*otkryvšim* (Dat.Pl)	case
polučivšimi (Ins.Pl)	case+length	*otkryvšimi* (Ins.Pl)	case+length
polučivšemu (Dat.Sg)	number+length	*otkryvšem* (Loc.Sg)	number

For the statistical analysis conducted in the *R Studio*, we used mixed effects linear regressions with random intercepts by participants and by items. The following factors were included in the models: whether the participle has the correct case, number and length (i. e. whether its length coincides with that of the correct form). Significant differences were found in the target region (participle) and on the following word. In the target region, the number factor ($\beta = 149.57$, SE = 27.32, $p < 0.01$) and the length factor ($\beta = 128.30$, SE = 25.82, $p < 0.01$) were significant. On the following word, the number factor ($\beta = 70.14$, SE = 13.66, $p < 0.01$) and the case factor ($\beta = 47.21$, SE = 15.34, $p = 0.04$) were.

Firstly, these results show that readers are less sensitive to case errors than to number errors. This resonates with earlier findings by Chernova et al. (2016) who showed that case is used less effectively than number to resolve modifier attachment ambiguity and with Rusakova's (2013) observation that naturally case errors are more frequent than other agreement errors. The following explanation may be suggested: number significantly affects the discourse representation of a referent, while different case forms refer to the same referent, and case is needed only to insert the noun phrase into the syntactic structure.

Secondly, we demonstrated that orthographic similarity is also an important factor. The role of this factor in error processing has not been explored before. The current experiment is only the first step — we did not include gender errors, combinations of number and case errors and many other potentially interesting conditions. When this is done in the future, the degree of orthographic similarity between different forms should be taken into account.

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SPLITTING OF COMPLEX PREPOSITIONAL PHRASES IN RUSSIAN: AN EXPERIMENTAL APPROACH

XP-splits, by which we mean such a configuration that a constituent results discontinuously at the surface-level sentence, are widely attested in different languages:

(1) *O* *kome* *su* *oni* *objavili* *članak?*
about whom aux they published article
'Who did they publish an article about?'
(Croatian, Bašič 2004: 85)

Split-PPs in Russian have already been researched with experimental methods by I. Sekerina (1997). Nevertheless, there are several premises for our work. Firstly, some of I. Sekerina's experimental-based conclusions were lately disproven by A. Pereltsvaig (2008) in their examination of Colloquial Russian corpus data. Secondly, I. Sekerina only observed scrambled PPs, but other types of A'-movements can also trigger XP-splits, cf. [Fanselow, Ćavar 2002]. Finally, splitting is in general a more resource-costly operation than full movement [Nunes 2004]; however, there is no research on whether it is sensitive to the phonological weight or structural complexity of the parts of a constituent. In particular, there were no previous works on whether dislocating a head from its complement is acceptable in comparison with dislocating a left element.

Thus, we conducted an experiment using the Likert scale 1–7 and self-paced reading tasks. We used preposition phrases containing noun phrases with elements on their left periphery as well as infinitival or PP-complements. The experimental design consisted of three independent variables: movement type (3 levels: wh-movement / relativization / scrambling), moved part type (two levels: possessive or wh-word *čej* / demonstrative or wh-word *kakoj*), and split position (before the head, *early* / after the head, *late*). As relativization can be formed only with a *chej* wh-word, there were ten experimental conditions in total. 30 test stimuli were distributed by ten experimental lists with 30 filler sentences, half of which were ungrammatical.

97 respondents completed the experiment. The results were statistically processed with the use of linear mixed models (LMM). Respondents' IDs and sentence numbers were used as random slopes. The factor of the moving part

type turned out to be non-significant, unlike the two others. The split position is relevant only to relativization movement but not to wh-movement nor scrambling: early-split relativization is rated significantly lower than late-split one. Scrambling is rated the lowest but significantly higher than the ungrammatical fillers.

The results are interesting in two ways. On the one hand, the extremely low ratings of split scrambling are not in line with the results of I. Sekerina's experiments. As scrambling is sensitive to the information structure, it can be hard to process without context. On the other hand, the acceptability of early and late splits differing for wh-movement and relativization is unexpected: one could suppose that all late splits would be rated lower because they form a meaningful combination of words on the left periphery. The observed difference is probably related to the information structure as well: wh-movement and relativization favorise different communicative statuses of moving parts, cf. Lyutikova (2019).

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LEXICAL ACCESS IN L1 AND L2 READING: AN EYE-TRACKING STUDY

Lexical access involves visual perception, decoding, choosing the right candidate in our mental lexicon [Acha, Carreiras 2014], i. e. word recognition and access to semantic, syntactic, phonological information. The main parameters affecting lexical access can be divided into two groups: universal factors — the length, frequency and contextual predictability of a word, and language-specific factors that are determined by a particular language.

The mechanisms of lexical access when reading in a foreign language are of significant interest. Thus, there is evidence that the frequency of words has a stronger effect on their processing when reading in L2 than in L1 [Whitford, Titone 2012]. Data on the role of predictability in reading in a foreign language are contradictory.

This study aims to investigate lexical access in reading Russian as L1 and L2.

40 native Chinese speakers studying Russian as a foreign language (level A2-B1) took part in the study. They were asked to read sentences (a corpus of 90 sentences in Russian, adapted in accordance with the lexical and grammatical competencies of L2 learners, see [Norkina et al. 2022]) and to answer comprehension questions. 40 native Russian speakers took part in the experiment as a control group. All the participants had higher education or were university students, all had normal or corrected to normal vision. Their eye movements were registered using SR Research EyeLink 1000+. Participants who gave less than 70 % correct answers to comprehension questions were excluded from the analysis.

The duration of the first pass (first-pass time) was evaluated as a measure reflecting lexical access (determining the meaning of the word). A comparison of the groups showed that, on average, the reading speed of native Russian speakers is about twice as high as that of L2 learners. Statistical analysis has shown that the universal effects of length, frequency, and contextual predictability have a significant impact on first-pass reading time both among native Russian speakers and L2 learners, and when reading in L2, all effects are much more pronounced. With regard to short and high-frequency words, no significant difference between L1 and L2 readers was not found, while

first-pass reading time of highly predictable words is significantly longer in L2 readers.

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ORTHOGRAPHIC REPRESENTATION OF WORDS IN THE MENTAL LEXICON: EXPOSURE TO PRINT AFFECTS PERFORMANCE IN SPELLING RECOGNITION TASK

Spelling errors can be considered as consequence of a word's weak orthographic representation in mental lexicon (see the Lexical Quality Hypothesis [Perfetti & Hart 2007]). Rahmanian and Kuperman (2019) suggested that frequent alternative spellings can affect visual recognition of correctly spelled words as they increase entropy in mental lexicon and blur orthographic representations. High entropy is expected to result in slower word recognition, even if spelled correctly which has been shown for several typologically different languages [Kuperman et al. 2021]. Print exposure has been shown to affect orthographic processing skills [Stanovich, West 1989] as well as word recognition [Chateu, Jared 2000]. However, the question whether the level of print exposure affects the robustness of the word in mental lexicon still remains open.

We selected 65 words which are frequently misspelled according to General Internet Corpus of Russian (http://www.webcorpora.ru/), which includes unedited texts from social media (20 billion words). For each word we defined the frequency of the correct spelling, the frequency of the incorrect spelling, and the uncertainty between spelling variants using an information-theoretic measure of entropy (see [Rahmanian & Kuperman 2019]). We used a spelling decision task, presenting in the first report half of the words with correct spelling, half with errors and vice versa in the second experimental list.

75 native speakers of Russian (aged 18–65, 39 female) took part in the study. The experiment was conducted online using PCIbex (https://farm.pcibex.net/). The participants were presented isolated words and had to decide whether the spelling is correct or not. Accuracy and reaction times were registered. Also each participant were given an Author Recognition Test [Stanovich. West 1989], adapted for Russian by [Chernova, Bakhturina 2021].

As for answer accuracy, is affected both by entropy ($\beta = -2.5$, $Z = -4.9$, $p < 0.001$) and the print exposure of the participant ($\beta = 0.02$, $Z = 2.99$, $p = 0.003$). However, these factors do not interact ($\beta = -0.001$, $Z = 0.16$, $p = 0.8$). Answer accuracy is also affected on how the word has been presented — it is easier to state there is no mistake in a correct word than to find a mistake in an incorrect one ($\beta = 1.2$, $Z = 14.4$, $p < 0.001$). The reac-

tion time was only affected by how the word has been presented ($\beta = -114.9$, SE = 25.343, $t = -4.537$, $p < 0.001$). Other factors were not significant.

Our data gives evidence that frequent misspelling blurs representation of the word in mental lexicon, making it difficult to make a spelling decision. Experienced readers have more robust orthographic representations which is in line with findings that print exposure improves spelling abilities. At the same time, print exposure does not speed up the decision — the response time is only affected by the frequency of the presented variant.

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COHERENT TEXT PROCESSING: THE ROLE OF INDIVIDUAL DIFFERENCES IN PRINT EXPOSURE (AN EYE-TRACKING STUDY)

Print exposure is related to how much time a person spends reading. Print exposure is a characteristic important for a number of psycholinguistic studies related to the written speech processing [Stanovich & West 1989; Martin-Chang & Gould 2008]. It seems intuitively clear that a rich reading experience of any written material predicts a high level of reading skills. Nevertheless, there are data that indicate that the correlate of such parameters as reading speed, vocabulary, literacy is precisely the experience of reading fiction [Martin-Chang & Gould 2008].

The current study aims to investigate how individual differences in the print exposure affect coherent text processing. We focus on two text types: fiction and non-fiction. 32 native speakers of the Russian language aged 18 to 28 years took part in the study. They were asked to read six short texts (three fiction texts and three Wikipedia-style texts taken from [Siegelmann et al. 2022]) and to answer the comprehension questions.

For a more detailed description of fiction texts processing, in addition to comprehension questions, we also used the keyword task [Murzin & Stern 1991], periphrasis and the questionnaire of narrative engagement [Kuijpers et al. 2014]. The parameters of eye movement during reading were recorded using the Eyelink 1000+ (SR Research).The print exposure of the participants was evaluated using the Author recognition test [Stanovich & West 1989], a Russian-language adaptation developed in [Bakhturina & Chernova 2021] was used.

The study revealed that individual differences in the print exposure are interrelated with the patterns of oculomotor activity: with an increase in the level of reading experience, the average saccade amplitude significantly increases both in fiction text ($r = 0.414$, $p < 0.001$) and non-fiction texts ($r = 0.407$, $p < 0.001$). Measures of text comprehension level are to be reported as well.

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SPELLING ABILITY ASSESSMENT IN RUSSIAN: DICTATION AND SPELLING RECOGNITION TASKS

Spelling skills reflect the robustness of orthographic representations in the mental lexicon [Perfetti 2007]. We form these representations while reading, so their lexical quality is strongly interrelated with the general print exposure [Stanovich & West 1989]. Spelling skills include both the ability to spell words correctly and the ability to detect spelling errors. Recent studies show that orthographic knowledge is not a homogenous competence [Andrews et al. 2020].

The aim of the current study is to develop a tool for spelling ability assessment in Russian. To select the most difficult words with opaque spelling we used the General Internet Corpus of the Russian language [Belikov et al. 2013] which includes unedited texts from social media. We also relied on the results of our previous spelling experiments [Chernova et al. 2020], including words that provoked many errors in the current study and excluding those that showed ceiling accuracy. As a result, we selected 40 words that are frequently misspelled. For each word we defined the frequency of the correct and incorrect spelling variants.

To assess different aspects of orthographic knowledge, we used two tasks: a dictation task and a spelling recognition task (deciding whether a word is spelled correctly or not). Half of the words were included in the former task and another half in the latter task in the first and second experimental lists, and vice versa in the third and fourth lists. We had four lists because in the spelling recognition task, half of the words were presented in the correct spelling, and another half was misspelled.

95 native speakers of Russian aged 19–63 volunteered to take part in the experiment on the PCIbex platform [Zehr & Schwarz 2018]. They also completed the Russian version of the Author Recognition Test [Chernova & Bakhturina 2021] to assess their general print exposure. All participants provided informed consent and were unaware of the purpose of the study.

We had a within subject design: each participant completed both tests. In the spelling recognition task, participants saw a word on the monitor and had 2000 ms to decide whether it is spelled correctly or not. In the dictation

task, they had to type words that were presented audially. They could listen to the recording only once.

The results of two spelling tests show a significant correlation ($r = 0.57$, $p < 0.001$) as both of them assess spelling ability. However, we see that the type of the task affects accuracy: the spelling recognition task turns out to be significantly more difficult than the dictation task ($b = -0.9$, $z = -13.5$, $p < 0.001$). Maybe, the first task is simply less familiar to the participants, but the reasons may be deeper. All spelling variants that we encounter, including incorrect ones, are stored in the mental lexicon, so rejecting an incorrect spelling may be more difficult than deciding how to spell the word correctly. This resonates with earlier findings that even the speakers who know how to spell are affected by the general frequency of incorrect spellings when they read words [Rahmanian & Kuperman 2019; Chernova et al. 2020].

Answering accuracy in the spelling recognition task is affected by word frequency ($b = -0.02$, $z = -7.4$, $p < 0.001$) as frequent words have more robust mental representations. However, word frequency did not significantly affect performance in the dictation task ($b = -0.0001$, $z = -1.2$, $p = 0.2$). Print exposure correlates significantly with the results of the spelling recognition task ($b = 0.036$, $z = 4.01$, $p < 0.01$) as more experienced readers have higher quality of orthographic representations. However, there is no significant correlation with the performance in the dictation task ($b = 0.016$, $z = 1.59$, $p = 0.11$).

Both parts of the test show considerable by-subject variability and no ceiling effects (also on the level of individual words: all words included in the experiment triggered at least some errors). Thus, the resulting test is valid to assess spelling ability in different populations of Russian native speakers. Depending on the researchers' goals, one of the two tasks or both tasks can be used.

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ROLE OF COLORS IN UNDERSTANDING RUSSIAN MENTALITY: EVIDENCE FROM ASSOCIATION EXPERIMENTS

Prior research on coloristics [Frumkina 1984; Berlin, Kay 1969; Vasilievich 1987] show that collective consciousness can be observed through the semantic field of collocations with color adjectives. A well-known experimental method using free word associations could not only reveal both qualitative and quantitative aspects of color associations, but also show the changes in collective consciousness in a diachronic aspect. The aim of the present study is to reveal changes in associations for color adjectives of Russian people over the last two decades. In this paper, we compare the results of our research with the article by S. Svinchukova (2010) [Svinchukova 2013], using the stimuli presented by the author: the words 'white', 'black', 'red', and 'green'.

The research is based on the free word associations experiment. At the beginning of the study our team conducted a pilot test to check the feasibility of the experiment. The sample includes 140 participants aged from 16 to 30 years old, balanced on the gender criterion. The experiment was conducted through the platform 'Google forms'. The instruction was to write the first word that comes to mind when reading every stimulus. In total, 140 reactions for every stimulus were received.

As a result, we had four associative verbal fields for every stimulus. Within the associative core, we found both similar and unique reactions, compared to the mentioned research [Svinchukova 2013]. The medium and periphery fields also underwent slight changes, characterized by new generation-specific reactions. However, the most prominent finding is that the changes occurred within the associative verbal fields. Here are the most interesting observations: for black and white colors most frequent associations have become their antonyms, which is different from the previous research in 2010 [Svinchukova 2013]. The most popular association with the green colour is 'grass', although it did not have the lead earlier. With the red colour participants recalled blood and traffic lights more often than political symbols.

The results are in line with the findings of the previous study that was conducted in 2010 [Svinchukova 2013]. Associations given by participants correspond to the hypothesis that the associative core connected with colours

have undergone a number of changes over 12 years. However, a considerable number of reactions have not changed. We interpret these findings as characteristic of the collective consciousness of individuals, illustrated by significant similarities in the mental lexicon of Russian people through the decade. Findings correspond to the previous study [Svinchukova 2013] and confirm the idea that the national mentality plays a role in associative experiments. The interpretation of the answers also contributes greatly to the results, therefore, we cannot certainly connect the results to the Russian mentality only. This forms the basis for future cross-national experiments. In the present time, the results can be observed in terms of how the cultural code and external environment influence the occurrence of associations.

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PHONOLOGY AND SEMANTICS IN MORPHOLOGICAL PROCESSING: GENDER AGREEMENT WITH INDECLINABLE NOUNS

About 1 % nouns in Russian are indeclinable. Although they have been studied before [e. g. Corbett 1982; Galbreath 2010; Mjakilja 2000; Mučnik 1971; Murphy 2000; Wang 2014], we present the first large corpus study dedicated to their grammatical gender. We selected 145 common inanimate indeclinable nouns ending in a vowel (*-a, -o, -e, -i, -u*) and searched the LiveJournal subcorpus of the General Internet Corpus of Russian, or GICR. 36079 corpus instances were collected.

We analyzed the influence of the final segment, the gender of the hypernym (for 90 lexemes having a single salient basic level hypernym), as well as some other factors, like stress position. We found extensive variation influenced primarily by semantic and morphophonological factors. We compared different approaches to data modeling (and their theoretical implications) and eventually modeled the data with mixed-effect logistic regressions with random intercepts by noun.

Theoretical approaches to gender assignment fall into two groups: structural vs. rule or constraint-based. Our data are more difficult to capture in the former than in the latter. Distributed Morphology (DM) is the most widespread family of structural theories. In DM [e. g. Kramer 2015], gender as a syntactic feature cannot be affected by phonological factors. Moreover, DM is not geared to deal with variation in general and especially with the interplay of semantic and (morpho)phonological factors.

Our data are more readily compatible with the Optimality Theory framework, in particular with the Optimal Gender Assignment Theory [Rice 2006; Galbreath 2010; Corteen 2018]. In the OGAT, semantic, morphological and phonological constraints are equally ranked, allowing for competition, which is crucial for our data. In the current version of OGAT, a single gender feature is selected as a result of the competition. We introduced weighted constraints in it to be able to embrace the full complexity of our data.

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LANGUAGE OF IMPROVISATION AS A WAY OF TEACHING RUSSIAN TO FOREIGNERS

Drama does things with words. It introduces language as an essential and authentic method of communication. Drama sustains interactions between students within the target language, creating a world of social roles and relations in which the learner is an active participant. The language that arises is fluent, purposeful and generative because it is embedded in context.

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The objective of the study was to create and test the improvisation games in order to improve foreign children speaking ability. The experiment was conducted at Saint Petersburg secondary school no. 16, where five pupils of the same class were involved in the process. Their native languages were Tajik, Uzbek, Kyrgyz, and Georgian. The children had extracurricular activities twice a week. The game, being basis of dramatic improvisations, was the main method we implemented at our classes. People learn the material through the game more easily and enjoyably [Kao, O'Neill 1998; Pakhomov et al. 2021]. The process of teaching Russian as a foreign language was based on the combination of the principles of improvisational games, logorhythmics and a communicative-activity approach [Volkova 2002]. At the lessons the children not only developed and consolidated the skills of making dialogues and monologues, but also improved their pronunciation, expanded vocabulary and learned the correct grammar constructions [Latif, Saifurahman 2019]. We used logorhytmic exercises to correct their sound pronunciation and prosodic features of speech.

Each lesson was divided into three parts. The first part was musical. The children pronounced or sang along certain speech patterns (from sounds to phrases), accompanying singing with various movements, simultaneously improving their breathing, voice, articulation and intonation. We use the same exercises which are usually used in speech therapy. The second part was devoted to communicative games based on the methods of the founder of the Theater of Dramatic Improvisations P. P. Podervyanskii [2007]. The pu-

pils made simple dialogues or played roles in different communicative situations. In the third part of the lesson we staged fairy tales or poems, performed plastic and musical improvisations. Being constantly in communicative interaction with the teacher and each other, the children got rid of their language difficulties as well as assimilated into the Russian culture and became more confident in their communication with Russian speakers.

Having worked with the same group of children for more than two years we noticed tremendous changes in their speaking abilities. The pupils have grown up not only linguistically and artistically, but also became more empowered to speak their mind.

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DO INTERMEDIATE AND ADVANCED BILINGUALS DIFFER IN SELF-OTHER SOURCE MONITORING?

Source monitoring (SM) is post-retrieval process required for assessment and identification of the source of information [Johnson et al. 1993]. Different studies suggest that there are differences in bilingual information processing and resulting memory, yet, cross-linguistic SM remains understudied as well as its subtypes [Dolgoarshinnaia & Martin-Luengo 2021; Dolgoarshinnaia & Martin-Luengo 2022; Suarez & Beato 2021]. Reality monitoring (RM) is a type of SM when individuals distinguish between memories from external and internal events, e.g., between a memory of what one themselves said and a memory of what another person said [Raye & Johnson 2013]. Previous study on RM in bilinguals indicated that participants could hardly identify the information they produced, and simultaneously were better at identifying the information presented in their second language compared to first language [Dolgoarshinnaia & Martin-Luengo 2022]. In this study we further investigated how well Russian-English bilinguals can process and recall the modality (self-generated or other-generated) of information presented in their first or second language and whether their performance differs depending on their level of second language proficiency.

To this end we recruited 112 Russian-English bilinguals, with English being their second language. Based on the level of their English proficiency we further divided participants into 2 groups each consisting of 56 people — intermediate (45 females, *M* age = 22.1 ± 4.5, *M* second language proficiency = 18/25 ± 1.3) and advanced (50 females, *M* age = 22.8 ± 4.8, *M* second language proficiency = 23/25 ± 1.5). We used a 2 (language: first, second) × 2 (modality: selfgenerated, other-generated) within subject design. Participants, first, read aloud (self-generated condition) or listened to (other-generated condition) words presented on the screen in their first or second language. Then participants completed a combined RM (modality) and SM (language) task. They had to indicate whether the word was previously read aloud in English, read aloud in Russian, heard in English, heard in Russian, or the word was new i.e., not presented in the first part of the experiment.

We analyzed both proportions of correct and incorrect answers given by the participants on modality and language monitoring tasks. For RM the patterns were identical in both groups showing overall better accuracy for other-generated and new information. For SM, although accuracy for first language was the lowest in both groups, there were also some notable differences in misattributions — the erroneous options chosen by participants. Specifically, for new information, only intermediate participants favored first over second language as the erroneous options, whereas advanced ones did not distinguish between them.

Our general conclusion is that processing information in second language requires more cognitive effort that allows for later successful monitoring reflected by lower proportion of correct identifications of first language words. Moreover, level of proficiency might also affect this process as shown by the differences in misattributions, particularly with new words. This, however, might be interpreted as the result of a bias that the person might have regarding their memory and language command, more than difference in information processing. This point requires further investigation.

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ACQUISITION OF SECONDARY NARRATIVE SKILLS: THE CASE OF VISUAL STIMULUS

The paper presents the stages of narrative skills formation for constructing a coherent monologue text by Russian-speaking children based on a visual stimulus. The results are based on a series of experiments with children of preschool, primary school and middle school age. During the experiment, children were asked to watch a fragment of the cartoon "How to grow big?" and retell it either simultaneously with watching or after it. The experiments were carried out with each child separately, the stories were audio-recorded, all data were anonymized.

Unlike verbal-based secondary narratives, visual-based secondary narratives are not included in the school curriculum and children do not receive directed training in their construction. The studies by R. Berman, I. Ovchinnikova, M. Shiro and many others have shown that child stories gradually become longer, more detailed and better organized; cohesion across episodes increases with age through the use of syntactic devices, such as conjunctions; with age episodes are more likely to be complete and to be embedded within larger episodes [Berman, Slobin 1994; Stein 2004; Wigglesworth 1997; Manhardt, Rescorla 2002; Shiro 2003; Berman, Nir-Sagiv 2004; Ovchinnikova 2005].

To assess the level of mastering the skills of secondary narratives elicitation, quantitative and qualitative measures were considered: the length of the story (in words and clauses); coherence of the narrative: sequence and completeness of the events, thematic progressions, story grammar (setting and ending remarks, detailed description, variety of characters, the presence of an evaluation, links between episodes).

Present analysis of Russian data confirms some of these statements:

- the age of children has a significant impact on the length of the secondary narrative by visual stimulus: both in belated and simultaneous retelling, the stories of preschool children are noticeably shorter than the stories of children of older age groups;
- preschool children reduce the story to the last episode in their retelling of a visual stimulus; most children of primary school age present episodes in accordance with their appearance in the source

stimulus, however, a large number of stories by the children of this age present events in the reverse order; secondary school students present events in the original sequence;

- with the simultaneous retelling of the visual stimulus, preschool children are actively involved in the situation of the cartoon, which can lead to the loss of both coherence and cohesion of their own stories; children of primary and secondary school age remain in the experimental situation, presenting the events proposed by the cartoon from the side of an abstract observer;
- cohesion is present in the secondary narratives of children of all age groups, however, the choice of the main cohesion means changes with age: preschool children most often use lexical repetitions and subject ellipsis, children of primary school age more often use pronominal repetitions, middle school children prefer to use pronominal repetitions and conjunction;
- coherence of the initial visual stimulus is understood by children of all age groups, which is confirmed with the experiments using the keyword technique; however, with age, the variety and depth of suggested keywords increases.

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LITERARY TRANSLATION IN THE RECEPTION OF PRIMARY AND SECONDARY LINGUISTIC PERSONALITY

Studies of linguistic personality are interdisciplinary, since they are conducted at the intersection of linguistic and psychological sciences and lie in the field of psycholinguistics. Studying of the individual linguistic behaviour allows of establishing the relationship between the actual linguistic behaviour and the psychological and cognitive characteristics of the individual.

Personality was considered in different aspects by psychologists such as Ch. Cooley, G. Mead, A. Leontiev, Y. Sorokin, L. Vygotsky, and linguists such as Y. Karaulov, V. Karasik, V. Neroznak, A. Baranov, and V. Shakhovsky. I. Haleeva introduced the concepts of primary and secondary linguistic personality into linguodidactics and methods of teaching foreign languages. The secondary linguistic personality is defined as a tool for understanding the "picture of the world" of a foreign language community through its verbal and semantic resources.

The object of the study is the reception of a translated poetic text by a primary and secondary linguistic personality, and the subject is the "points" of cognitive tension in the reception of primary and secondary linguistic personalities of a translated poetic text. The aim of the study is description of localization, and comprehension of points of cognitive tension in the reception of translated literary text by primary and secondary linguistic personalities. The objectives of the study are to describe the types of localizations, the principles of scaling points of cognitive tension in the reception of translated poetic text by primary and secondary linguistic personalities.

The first type of localization of cognitive tension was recorded using the introspection method at the stages of pre-translation analysis and translation of a poetic text from Russian into a foreign language by a secondary linguistic personality (non-native speaker, translator). In the course of the study, those fragments were noted, the translation of which seemed difficult to the recipient (translator). The second type of localization was identified based on the results of an experiment in which poetic texts translated into a foreign language were offered for reception to native speakers.

At the first stage of the research, poetic texts were created in Russian. During the second stage, their pre-translation analysis was carried out ac-

cording to the model of Ya. M. Kolker and the points of cognitive tension in the reception of rhyming, lexical, rhythmic and syntactic organization of the original poetic text from the point of view of the native speaker's language (Russian) were determined. At the third stage, the poetic texts were translated into English, the points of cognitive tension in the reception of the rhyming, lexical, rhythmic and syntactic organization of the translated poetic text from the point of view of the non-native language (English) were determined. The fourth stage of the study was an experiment in order to determine the points of cognitive tension in the reception of rhyming, lexical, rhythmic and syntactic organization of the translated poetic text from the point of view of the native speaker's language (English).

Translated texts were offered for review to a sample group of respondents whose primary linguistic identity is English-speaking. According to the experimental conditions, the respondents were asked to highlight in colour the different types of interferences they found at different levels of the studied texts: 1) lexical, 2) grammatical, 3) rhyming and 4) rhythmic.

The results of the experiment were subjected to statistical processing and scaling. In addition to scaling ones, elements of the semantic differential method were used in the processing of the obtained data, and a model of localization of the studied points of cognitive stress was created.

Two groups and four types of scales were formed — based on the localization of cognitive stress points marked by non-native speakers and native English speakers. The first type of scales allows one to localize cognitive tension at the lexical level, for this type of experiment showed the largest proportion of coincidences. The second largest as for the ratio of coincidences is the scale of grammatical interference. The proportion of coincidences at the rhythmic level is even smaller. The scale of localization of rhyming points of cognitive tension showed the smallest number of coincidences and marking of cognitive tension points in groups.

The results of the study allow for noting the following: firstly, native and non-native speakers demonstrated the highest degree of identity in the reception of the lexical and grammatical organization of the translated poetic text. Apparently, this indicates the identity of the system organization of the translation language in the reception of native speakers and non-native speakers. Secondly, in the reception of the rhythmic and rhyming organization of the translated poetic text, native speakers and non-native speakers demonstrated the lowest degree of identity, which indicates the non-identity and lack of formation (non-consistency) of cognitive expectations in the reception of a poetic work by native speakers and non-native speakers.

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FEATURES OF DATA MARKUP FOR A DATABASE OF ACCENTUATED BYZANTINE INSCRIPTIONS

The database of accentuated Byzantine inscriptions consists of c. 1000 images, marked-up texts, and a glossary of the accented words. Each image has tags by date, region, and accentuation system. In each text, only lexemes with accents are marked, to which a link is attached leading to a glossary with their more detailed description. Since there is no spelling unification in Byzantine Greek inscriptions, the main problem of markup is to take into account the spelling of each word, and, at the same time, present these features in the glossary depending on the chosen accentuation system.

Thus, the glossary is built as a tree, in which branches from the unified according to the dictionary lexeme go the variants with the chosen accentuation system. The variant of the lexeme with the correct spelling acts as a model, and the variants of word spelling presented in the inscriptions with the same spelling depend on it. Each spelling variant provided a photo of the word cut out from the inscription image, a link to the text of the inscription, tags with the date, place of discovery, the genre of the inscription, and the leading accentuation system.

This approach to markup allows us to take into account the accentuation system implemented in the word, and also to identify words whose accentuation system does not depend on the accentuation type prevailing in the inscription, but on the coping from text to text. And also, this markup shows that sometimes the accentuation is copied along with the spelling. That is, we can say that several words had a stable spelling according to these two indicators, sometimes in certain periods or specific regions. In the case of regions, we can attribute these features, among other things, to the written fixation of dialectal pronunciation. In the future, we plan to use this glossary to train a neural network to recognize and classify accented words in the inscriptions images that were not currently included in our database.

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ERP CORRELATES OF SYLLABLES READING IN CHILDREN AGED 8–10 YEARS IN DYSLEXIA

The skill of syllabic reading and syllabication is formed and then automated in children during elementary school, but these processes could cause difficulties. Neurocognitive mechanisms of mastering syllabic recoding in children with dyslexia and their typically developed peers have not been studied enough. Along the process of acquiring reading and writing the activation of certain brain structures changes during the perception of letter strings and words developing firstly sensitivity, and then the selectivity — selective reactivity of neurons to the letter structures that form the word.

The question of how brain activity changes during the formation of syllabic recoding have been poorly studied. Thus, at the beginning of learning to read, the N170 component has a greater amplitude when perceiving letters of the native alphabet than when perceiving symbols. Since this effect disappears, while reading skills are strengthened, the question arises: is this neurophysiological phenomenon associated specifically with letters, or with the operational reading unit (OPRU) — letters, syllables, words? If the N170 phenomena is specific to actual OPRU, it could be observed in older students, not for letters, but for syllables, when syllables become the OPRU.

The purpose of this study was to describe the neurophysiological mechanisms of automatic recognition of letters and syllables in children of the initial stage of reading acquisition in TD and dyslexic children, depending on the training in the perception of syllables. The longitudinal study involved 56 children, 27 children with dyslexia, and 27 TD children. Children were examined twice with a break of six months. Some of the children took a course of implicit intensive training in the perception of syllables using the SLOGY online program, and some did not.

EEG in the ERP paradigm was recorded in children during the task of differentiating syllables from non-syllables. The sensitivity of the ERP components N170 and P300 to training was shown in the parietal-temporal-occipital region bilaterally. Thus, the decrease in the amplitude of the N170 component to both syllables and non-syllables was observed when comparing the first and second examinations.

This effect was shown for TD children and dyslexic children with a high score in training, but not in dyslexic with low training rates and without training. Such a strict dependence on the control study in the situation of distinguishing between letters and symbols was not obtained. Thus, it was not possible to unambiguously determine the neurophysiological significance of the N170 component in this study — on the one hand, this component is sensitive to the effect of training and automated syllable recognition, on the other hand, the control condition with letters determination did not confirm the effect of N170 on mastered operative reading units. Further research is required.

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AGREEMENT VARIATION IN RUSSIAN BINOMINAL CLAUSES: THE ROLE OF INVERSION AND PROSODY

The talk examines whether the choice of agreement pattern in Russian binominal clause depends on its syntactic structure and theme-rheme mapping. Drawing on experimental data we show that unlike Germanic languages Russian exhibits agreement variation in both specificational and predicational clauses, regardless of the prosodic focus marking of the rheme.

Russian binominal clauses exhibit agreement variation (1). The reason for variation is suggested to be the theme-rheme structure of the clause [Paducheva, Uspenskij 1979]: the copula agrees either with the referential thematic NP1 or with the referential rhematic NP2. Nevertheless, this generalization is confronted by many counterexamples, which E. Paducheva and V. Uspenskij consider themselves.

The typology of binominal copular clauses in Germanic languages, which also exhibit agreement variation, is built upon three main criteria: (a) position of a more referential NP; (b) syntactic properties; (c) constraints on information structure (Table 1). Specificational clauses are claimed to be derived from predicational by inversion [Heggie 1988; Moro 1997; Mikkelsen 2005; den Dikken]. Movement of predicational NP2 to the left periphery can be motivated by the information structure, namely, the *focus* feature on a referential NP [Mikkelsen 2005; Shlonsky, Rizzi 2008; Hartmann 2019]. This movement results in a syntactic structure which allows for agreement variation [Hartmann, Heycock 2020].

We investigate whether agreement variation in Russian binominal clauses depends on the two specified properties: the theme-rheme mapping and the syntactic structure. Although information structure properties are considered among the reasons for specificational inversion, we do not expect that in Russian they are realized the same way as in Germanic languages. For example, in English left dislocation obligatory leads to thematization [Bache, Davidsen-Nielsen 1997; Biber et al. 1999], while in Russian the status of the dislocated element is not restricted. Consequently, the restriction on focus position in Russian specificational clauses is in question.

One hundred native speakers participated in two parallel acceptability judgment experiments, which manipulated the type of binominative clause, the focus position and the agreement pattern ($2 \times 2 \times 2$ design). The context

licensed the NP under focus as a rheme, the other NP — as a theme. The experiments differed in the pause position as it can bias the choice of agreement pattern [Paducheva, Uspenskij 1979]. In each experiment 50 participants judged 96 sentences (64 target, 32 filler, 4 practice) on a 7-point Likert scale.

The experiments reveal that both types of binominative clauses exhibit agreement variation. Notably, agreement with NP2 is only acceptable when the speaker considers agreement with NP1 acceptable as well. In specificational and predicational clauses focus can be available on both NPs when contextually licensed. The theme-rheme mapping and focus position do not influence the choice of agreement pattern. Finally, a pause after the copula drastically decreases the acceptability of NP2 agreement.

We conclude that the syntactic structure and theme-rheme mapping do not define agreement variation in Russian binominal clauses. The only factor that can influence acceptability of different agreement patterns is the pause position, i.e. the prosodic segmentation. We suggest that the agreement variation in Russian binominal clauses is determined by other factors, namely, the φ-features of potential agreement controllers. This is a key issue to be explored further.

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(1) [*Pričina avarii*]$_{\text{F.SG}}$ *byla* $_{\text{F.SG}}$ /*byli* $_{\text{PL}}$ [*neispravnye tormoza*]$_{\text{PL}}$.
reason of failure was.F.SG /were.PL broken brakes
'The reason of failure were the broken brakes.'

Table 1. **The opposition of binominal clauses**

	Predicational	**Specificational**
(a)	referential NP1	referential NP2
(b)	wh-extraction ECM without copula no agreement variation	no wh-extraction overt copula in ECM agreement variation
(c)	focus not restricted	focus on NP2 only

Appendix 1. **Linear mixed effects model results**

Experiment 1, pause before copula: significant main effect for the focus position ($\beta = -0.21$, SE = 0.08, t = –2.64, p-value = 0.009 *), the clause type ($\beta = -0.32$, SE = 0.07, t = –4.55, p-value << 0.0001), and their interaction ($\beta = 0.75$, SE = 0.1, t = –7.53, p-value << 0.0001).

Experiment 2, pause after copula: significant main effect for the agreement pattern ($\beta = -0.53$, SE = 0.07, $t = -7.74$, p-value << 0.0001), its interaction with the focus position ($\beta = -0.18$, SE = 0.09, $t = -2.07$, p-value = 0.04), interaction of the focus position and the clause type ($\beta = 0.43$, SE = 0.1, $t = 4.47$, p-value << 0.0001).

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TESTING THE CONTINUUM/SPECTRUM MODEL OF DEVELOPMENTAL LANGUAGE DISORDER IN CHILDREN

Developmental language disorder (DLD) is characterized by difficulties in language acquisition despite the normal intelligence level and hearing and vision abilities [Leonard 2008]. Although DLD was widely discussed in the literature, two major questions still spark debates: what is the age of onset of language impairment symptoms and what are the profiles of language impairment in children with DLD [Bishop, 2004; Conti-Ramsden et al. 1997; Leonard 2014]. For example, according to the Diagnostic and Statistical Manual of mental disorders (DSM-5), children with DLD should have difficulties in comprehension and production domains at the lexical, morphosyntactic, and discourse levels. However, several studies showed that children with DLD also had impairments at the phonological level [Bedore & Leonard, 2001; Marshall & van der Lely, 2007] and may not have impairments at the lexical level (Marini et al., 2008). Moreover, Lancaster and Camarata (2019) recently showed that the continuum/spectrum model of the DLD best explains high heterogeneity of symptoms and different ages of onset in children with DLD. We hypothesize that the continuum/spectrum approach to language performance in children with DLD can be considered as a part of a bigger continuum that also includes late talkers, children with not severe social deprivation, and children whose performance in language tests is below average. This approach can explain different patterns of language development in typically and atypically developing children.

To clarify the issue we assessed language abilities in a group of children with DLD aged 4-to-7 years (N = 53) and their age and gender-matched peers without speech and language diagnoses (N = 53, TD). We evaluated children's performance at all linguistic levels in production and comprehension domains using 11 tests of the RuCLAB assessment [Arutiunian et al. 2022]. We used the k-means clustering method with the accuracy results on each task of the RuCLAB as grouping variables. Clustering analysis did not require participants' subgrouping (TD vs DLD).

The analysis revealed that the optimal number of clusters was two. Both clusters included DLD and TD children: the group with higher test scores

(Group 1; TD = 45, DLD = 24 children) and the group with lower scores (Group 2; TD = 8, DLD = 29). Interestingly, 4–5-year-old children with DLD were more likely to be in Group 2, whereas 6–7-year-old children with DLD were more likely to be in Group 1. This observation is in line with previous studies: younger children with language impairment can catch up by later ages [Ellis & Thal 2008]. Interestingly, only 10 children with DLD that were in Group 2 had impaired performance at all linguistic levels, whereas 19 children with DLD demonstrated various patterns of language behavior. This finding can support the theory that different tasks can be sensitive to different reasons of DLD, for example, lower performance at the lexical level is typical for DLD children with low socio-economic status, then for children with biological reasons of DLD [Campbell et al. 1997; Spencer et al. 2012]. Generally, our results support the continuum/spectrum approach to DLD and to the results of TD children.

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APPROPRIATENESS OF INTERPERSONAL TOUCH IN RUSSIAN CULTURE: THE EFFECTS OF COMMUNICATION CONTEXT AND MORPHOLOGICAL PROPERTIES OF A TOUCH GESTURE

Introduction. Interpersonal touch gestures are one of the least studied groups of gestures in multimodal linguistics (see e. g. [Calbris 2011; Grishina 2017]). A detailed qualitative description was performed by Kreidlin (2002), however, quantitative research on interpersonal touch is scarce and was mostly performed by cultural anthropologists (Hall) or even by experimental psychologists or neuroscientists [Suvilehto et al. 2015]. A recent influx of interest to affective touch was provoked by recent discoveries revealing an independent slow emotional touch system comprising unmyelinated C type afferents (C-tactile afferents) which sole purpose seems to provide a feeling of pleasure in response to slow gentle touch, promoting affiliative behaviors [McGlone et al. 2014; Varlamov et al. 2019]. This system optimally reacts to slow stroking touch suggesting linking it to positive emotions and eliciting feelings of comfort and emotional closeness. Therefore, the semantics of gentle stroking touch gestures may be somewhat biologically predetermined, and these gestures may be reserved for intimate communication [Varlamov et al. 2020].

A study by Suvilehto et al. (2015) revealed that the allowance of social touch depends on bodily regions and the strength of emotional bond; however, that study does not differentiate between particular kinds of touch. The present study aims to assess whether slow stroking touch, viewed as most pleasant in several cultures [Walker et al. 2017; Trotter et al. 2018], would be, at the same time, most restricted and limited to more intimate communication.

Materials and Methods. 48 Russian-speaking participants (M = 13, F = 35, aged 17 to 54, mean age 25.8, SD = 8.7) viewed 15 affective touch video clips [Trotter et al. 2018] depicting interpersonal touch delivered with 3 different velocities (static touch; slow strokes, 5 cm/s; fast strokes, 30 cm/s) to 5 body parts (palm, hand, forearm, shoulder, back) and assessed the appropriateness of touch for 3 degrees of closeness (partners; close friends;

acquaintances) and 3 contexts (alone; with friends; in general public) using 4-point Likert scales. All the videos were 6 s long.

Results. Repeated measures ANOVAS (Body Site 5 × Velocity 3 x Social Proximity 3 × Context) yielded highly significant effects of Body Site, Velocity, Social Proximity, and Context, and interactions Velocity × Context, and Velocity × Velocity × Social Proximity (all $p < 0.0001$), revealing that slow stroking touch is most restricted and can be more freely used only by partners and when communicants are alone, not in public.

Discussion and Conclusions. The results of the study confirm our experimental hypothesis that slow gentle strokes, while being consistently rated as the most pleasant in studies of vicarious touch, are deemed appropriate only for partners and preferably in more intimate contexts. The data were collected for Russian samples but we suggest that it may be non culture-specific, though it should be confirmed by further studies. These results should be taken into account when developing touch-based interventions.

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THE ASSESSMENT OF THE SLIDER TOOL FOR MEASURING AFFECTIVE NORMS OF RUSSIAN NOUNS

A prerequisite for the effectiveness of communication is the understanding of not only the denotative meaning, but also the connotative one. Starting with the classical works by Wundt (1896), different methods to measure affective responses to words have been developed [Osgood 1964; Mehrabian & Russell 1974; Bradley & Lang 1994]. In the present study we focus on the slider task, which has shown its effectiveness in measuring affective responses on English material [Warriner et al. 2017]. The purposes of our research are to establish whether the use of the slider on Russian material reveals previously noted statistical tendencies, as well as to investigate how sensitive the slider is to the gender and psychological characteristics of participants.

One hundred thirty-nine (92 women and 47 men) respondents participated in the experiment, ranged in age from 18 to 59 years (M = 24.96 years, SD = 7.91). The 280 stimuli were selected from among the translated English equivalents, the affective ratings of which significantly contrast in the groups of male and female participants [Warriner et al. 2017].

The experimental task was programmed using Experiment Builder software. In the first part, participants answered demographic questions. Then the participants moved on to the main part of the experiment with the slider (≈ 20 minutes). On each page participants saw a horizontal line with a humankind manikin, which showed their own sex for the first 140 nouns and opposite sex for the second 140 nouns. The noun was presented both to the right and to the left of the line. The manikin was in the center of line and participants had to drag and drop it in a chosen distance. Our main assumption was that the participants would move the manikin closer to nouns that seem pleasant (positive) to them and further away from nouns that seem unpleasant (negative). The sequence of stimulus presentation was randomized for each participant. In the third part of the experiment, participants filled out Russian-language adaptation of questionnaires to determine the level of empathy [Jolliffe & Farrington 2006], sociability [Cheek & Buss 1981] and shyness [Carver & White 1994].

The collected data includes 24 244 ratings. The key variable for assessment of affective norms is a distance between manikin and stimuli. All nouns were estimated by participants with a slider scale from –0.5 (min) to 0.5 (max). The majority of stimuli (70 %) were evaluated with ratings greater than zero. This distribution represents *the positivity biases* — the universal tendency described on material of other languages [Augustine, Mehl & Larsen 2011; Kloumann et al. 2012; Warriner et al. 2013]. Wilcoxon signed rank test with continuity correction showed a high similarity of affective ratings between English words and their Russian equivalents (effsize = 0.113). On the basis of the data we collected, we managed to fix statistical tendencies noted earlier on English material [Warriner et al. 2013; 2017]: 1) affective ratings of emotional words (both positive and negative) have significantly lower SD compared to neutral nouns (Spearman's $p = –0.78$, p-value < 0.001); 2) the frequency of stimuli positively correlates with distance and also the age of acquisition negatively correlates with a distance at the level of trends; 3) shy participants tend to give lower affective ratings ($\beta = –0.03$, p-value < 0.001); 4) male participants were better at predicting the responses of the opposite sex at the trend level.

Therefore, the slider is a valid method of collecting affective norms: this tool is very susceptible to individual differences and it allows establishing universal cross-language tendencies.

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COGNITIVE STRATEGIES OF L2 VOCABULARY LEARNING OUT OF CONTEXT: AN EYE TRACKING STUDY

Explicit vocabulary learning out of context is a frequent activity in the process of L2 acquisition, which spurs the research of L2 vocabulary learning in paired-associate paradigm. While there is ample evidence of the keyword method (providing acoustic link to the L2 word and an imagery link to the L1 word) advantage over rote rehearsal [Atkinson 1975; Shapiro, Waters 2005; Wyra, Lawson 2018], the effect is not always reproduced [Campos et al., 2003]. These strategies can be argued to invoke different depth of processing, with the keyword method implying semantic encoding, and rote rehearsal implying phonemic encoding.

An eye tracking study was aimed at determining eye movement correlates of cognitive strategies in paired-associate L2 vocabulary learning. The subjects (N = 31) memorized 40 pseudowords presented concurrently with 40 concrete L1 words, providing post-hoc report about the learning strategies after the recall. Eye movements were recorded with Eyelink 1000 eye tracker. The effect of learning strategy was established, with semantic encoding (keyword method) yielding significantly better results as compared to phonemic encoding (rote rehearsal), visual encoding and no report of the strategy ($F(3; 868) = 17.1$ ($p < 0.01$)). Therefore, the results support the advantage of semantic encoding over phonemic encoding. Eye movement patterns of the learning strategies were identified: rote rehearsal was associated with higher transition count between the words and longer mean fixation duration, while the keyword method was characterized with longer dwell time on the pseudowords. Effects of first fixation location in the keyword method was established: first fixation on the L1 word was associated with less transitions between the words and with higher recall, as compared to first fixation on L2 word.

The design of an experiment, aimed at inducing the keyword method, is proposed. It is hypothesized that explicit keyword strategy instruction will induce higher recall score; explicit keyword strategy instruction will be associated with lower AOI transition count; descending associability will induce higher recall score.

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WORD-FORMATION OF FEMINITIVES IN RUSSIAN: PSYCHOLINGUISTIC STUDY

One of the most popular and controversial topics in experimental studies of Russian language and wide public discussions are formation of gender marked words connected to job-titles or social statuses of women. The high interest in both scientific and social circles makes the study of feminitives actual [Slioussar 2021; Garanovich 2022; Russian psycholinguistics 2021]. The purpose of the study was to determine the most common ways of feminitives formation by the native Russian speakers, and to check how frequently gender-marked job-titles are used on a daily life. The hypothesis was that word formation depends on the last phoneme of a masculative word which is used as a basis for feminitive [Pipersky 2019].

However, feminitives are rarely used in everyday conversations due to being not enshrined in language norms. To check the hypothesis two experiments with Google-forms as a platform were conducted. In Exp 1. 359 female and 72 male; 245 in age up to 30 (will be mentioned as young further) and 176 in age from 31 (will be mentioned as adults further) were asked to create 69 feminitives for masulative pseudowords. The pseudowords were created from Russian job-titles with preservation of stress, number of syllables and final phoneme. For example, barísta → kerísta; advokát → adricát etc. The results confirmed schemes for formation of feminitives suggested by Pipersky and proved the hypothesis. For example, stems with suffixes -tel' and -nik were used with the suffix -(ni)ca in 72,2 % (for -tel') and 45,2 % (for -nik) from all answers for these stimulus.

In Exp 2 241 female and 85 male (235 young people and 91 adults) were asked to write a word to describe a person that they see on a picture. 31 pictures of women doing certain kind of work were chosen as stimuli (for example, a programmer, a swimmer etc.), and 30 pictures of men and children doing a hobby were chosen as fillers. The statistical analysis using the X^2 and p values has shown a correlation between the age of the participants and usage of feminitives ($X^2 = 65.185$, $p < .001$): young people tend to use feminitive forms of job-titles more often than adults. The correlation also has been found between a gender and formation of feminitives ($X^2 = 18.961$, $p < .001$), that means that women tend to use feminitive forms more often than men. Still, only 35 % of women and 24 % of men; 17 % of adults and 37 % of young

people used feminitives to describe women presented in the pictures. This result indicates that masculatives have a leading position for recipients.

Overall results have shown that language gives high opportunities and affixes for production of feminitives and native speakers use them in language games (pseudowords). However, in case of daily use (image naming) most participants prefer to use masculatives, which proves the hypothesis.

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EXPLORING GAZE AS MODULATED BY TEXT EVENT SEMANTICS IN THE PILOT CORPUS MULTICORTEXT

The study explores the gaze behavior in text AOIs as affected by text event semantics and also implements the gaze behavior results of a series of eye tracking experiments to develop the architecture of the pilot corpus MultiCorText. As known, most existing eye tracking corpora operate on Potsdam Sentence Corpus protocol [Kliegl et al. 2004] which tags POS length and frequency in several languages, French [Kennedy, Pynthe 2005], Dutch [The GECO Corpus: Cop et al. 2017; Kuperman et al. 2010], Chinese [Bai et al. 2008; Li et al. 2014], Japanese [Sainio et al. 2007] and Russian [Laurinavichyute et al. 2019]. However, Potsdam Sentence Corpus protocol adopts a formal semantic approach to sentence tagging and does not consider event construal effects attested and verified in cognitive semantics [Talmy 2000; Verhagen 2007; Iriskhanova 2013; Papafragou 2015]. MultiCorText operates on Event construal protocol priorly developed and tested [Ji & Papafragou 2018; Divjak et al. 2019; Brône 2021]; still, this is the first attempt to apply it systematically to mediate the gaze behavior and to implement it in the gaze behavior corpus.

In the study, we develop and verify (in prior eye-tracking experiments) the Event construal protocol parameters, and apply them to explore the gaze behavior of the readers in the Russian language text fragments (featuring modern plays). MultiCorText allows to process the queries on participant (agentive participant, recipient, object, instrument), event frame (action dynamic, action stative, perception visual, audial, olfactory, etc., space and time location) and perspective (subjectivation, objectivation, intersubjectivation); additionally, it incorporates linguistic and visual foreground tagging and POS tagging. MultiCorText stores the AOI and single gaze events data, processes the queries and visualizes the gaze paths. It uses text event semantics annotation (done manually by two annotators, Cohen's kappa agreement was measured) developed for the needs of the corpus parametric search and allowing to identify the differences in the event semantics in 126 AOI which are the clauses in the experiment stimuli.

The accumulated and processed data allowed to identify the effects of several text event characteristics such as animated / non-animated referent,

dynamic and stative action, action regularity / irregularity, subjectivation / objectivation (among others) as modulating the gaze behavior of the readers manifesting different cognitive style (impulsive and reflective). MultiCor-Text interface is implemented as a small web application using the Lua programming language and the SQLite DBMS (both of those are free and open source). The web server's functions are to construct the search form, process a query to obtain search results, and retrieve the details of a particular AOI. Though these three tasks are implemented separately, they all use the same configuration file for the description of how data are processed.

Overall, the study presents both state-of-the art results in gaze behavior modulated by text event semantics, and the corpus itself being a web application operating on Event construal protocol.

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INTERACTION OF PROSODIC AND PARALINGUISTIC MEANS OF IRONY EXPRESSION IN RUSSIAN

One of the most challenging issues in automatic speech recognition and synthesis nowadays remains the interpretation of emotions and attitudes and especially the correct interpretation of ironic meaning. It becomes a highly important task for the artificial intelligence systems in case when there is no context or lexical marker of irony. Then one can rely only on the prosodic features of the utterance, gestures and mimical movements of the interlocutor. The goal of the current study was to consider the possible combinations of these cues of ironic meaning in laboratory speech, their synchronisation and their role in the perception of irony.

In our previous work, we found that in actors' speech the only statistically reliable prosodic feature of irony was the melodic range of the stressed syllable. The visual cues played a more important role than the audial cues. Gestures and mimical movements in 100 % of ironic utterances were synchronized with the intonation centre of the utterance. As the speech of actors and non-actors may differ, the main hypothesis of the current study was that in the laboratory speech the auditory cues will be more significant for the perception than the visual cues (contrary to the actors' speech in films and series). We also supposed that gestures and mimical movements will not be synchronised with the intonation centre.

In order to test these hypotheses we conducted a series of three perceptually experiments. The audio and video snippets were extracted from the recordings of the homonymous ironic and non-ironic utterances read by Russian native speakers with no professional acting background. In the first experiment the participants listened to the audio only, in the second experiment the mute video was suggested, in the third experiment both video and audio were presented simultaneously.

The results of the experiments showed that there was no such prevalence of the visual cues, as in actors' speech. The laboratory speech also differed in the number of prosodic features that were relevant for the perception of irony. Another difference consisted in a more complicate combination of the prosodic and paralinguistic parameters and incongruences in their synchronisation, including shifts in relation to the intonation centre of the utterance.

The data obtained lead us to suppose that not only the combination of paralinguistic means and prosodic features may vary depending on the communicative situation and type of speech, but the very expectations of the interlocutors may differ.

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PROCESSING OF HIGH- AND LOW-FREQUENCY RUSSIAN BINOMIALS

Binomial is "the sequence of two words pertaining to the same form-class, placed on an identical level of syntactic hierarchy, and ordinarily connected by a lexical link" [Malkiel 1959]. The whole class is a continuum from hapax legomena to idioms, which denotes different degrees of decomposability of these expressions.

Frequency is an objective indicator that affects the fixation of binomials in any language. However, there is not enough evidence of their processing by Russian native speakers. For example, how the frequency of the binomial and its constituent words affects language processing.

According to [Sinclair, 1991] there are two types of language processing: the open-choice principle (linguistic components are results of many complex choices) and the idiom principle (holistic storage of language fragments). High-frequency combinations are stored in the mental lexicon according to the idiomatic principle [Erman, Warren 2000; Slioussar et al. 2017].

The **aim** of the study is to check if the frequency of a binomial affects its decomposability and processing.

Methods and Material. 40 binomials were selected as stimuli: 20 high-frequency — over 500 occurrences in the Russian National Corpus (*день и ночь* — 2166; *братья и сестры* — 511), 20 low-frequency — under 30 occurrences (*прав и возможностей* — 24; *артисты и исполнители* — 0). 71 Russian native speakers, aged 18 to 24, were asked to restore the second part of 40 binomials ("1st word + and +…") by adding one word.

Results. 2840 reactions were got as a result. There were four types of responses: 1) control word match; 2) no answer; 3) combination of words; 4) a new variant (a quasi-synonym, an antonym, and a complementation of the control word).

All high-frequency binomials but one (*сил и средств*) were restored by the participants. In nine stimuli, 60–94 % of the reactions matched the control group, in seven — 20–40 %, in three — under 10 %. Low-frequency binomials were recognized less. In 13 stimuli the number of reactions matching the control group did not exceed 35 %. Seven had no matches.

For high-frequency stimuli the respondents proposed 332 new variants, for the low-frequency — 552. Thus, the response variability of the low-fre-

quency binomials is higher. In the first group, 152 new variants were confirmed by the RNC as binomials, in the second only 150.

The hypothesis was confirmed: native speakers process high- and low-frequency binomials differently. Low-frequency stimuli were processed according to the open choice principle: low control word recognition, many new variants, many binomials not found in the RNC. The fact that native speakers restore most of the high-frequency binomials is the proof of their holistic storage in the mental lexicon.

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READING ADVERTISING POSTERS WITH DELIBERATE AMBIGUITY

Deliberate ambiguity, or a pun, is one of the common types of speech play in advertising. One form of a pun is playing with literal and non-literal meanings of idiomatic expressions. The pun is created because the context does not incline the reader to choose the idiomatic meaning of the idiomatic expression, on the contrary, the picture on the poster supports one meaning, and the text supports another, thus ambiguity appears. People appreciate advertising with puns based on ambiguity [Lagerwerf 2002; Konovalova, Petrova 2022], but what oculomotor mechanisms cause it is not investigated.

The material of the study was 11 advertising posters with slogans containing a pun based on playing with the literal and non-literal meaning of idiomatic expressions (for example, *Sorvis` s kriuchka* 'get off the hook'). Also, 11 posters without puns were used in the study. The advertising posters were collected on the Internet and then edited so they had the same size, font, background colour, the layout of the elements and the number of letters in the text and in the slogan. See examples below.

Advertising with a pun (on the left), the text says 'Get off the hook! Smoking is an addiction. Social advertising'; advertising without a pun (on the right), the text says 'Alcohol destroys families. Think of your loved ones — stop drinking. Social advertising'

EyeLink 1000 Plus (SR Research) eye-tracker was used. Participants watched all posters one after the other, moving on to the next one after they were ready. After viewing each poster, they were asked to rate how original and attention-grabbing the poster was, and whether the statements they saw on the screen were consistent with the content of the poster.

Eye-movement data was collected from 53 participants (female = 41, Mage = 22).

People processed posters with a pun significantly longer than at posters without a pun (6139 ms versus 5810.8 ms, $p = 0.004$), while reading the text of a poster with a pun and without a pun did not differ, but the time spent viewing the pictorial part of the poster differed: people look at the picture of the poster with a pun significantly longer ($p < 0.001$). This may be due to the fact that people are trying to associate the content of the picture, which is not directly consistent with the content of a slogan, with the content of the advertising text. Also, the presence of a pun does not affect the total time of reading the slogan and the number of returns to it, however, it increases the time run reading time the slogans with a pun ($p = 0.011$). This may be because people expect the pun to be present in the advertising but they cannot understand it on their first run. These findings allow us to assert that the pun in such advertising posters is polycode, that is, it is created by combination of the verbal and non-verbal components of the advertising poster.

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BRAIN MECHANISMS FOR THE ACQUISITION OF THEMATIC ROLES ASSIGNMENT IN PASSIVE SENTENCES

It was shown that preschool children tend to rely on semantics and not on syntax during oral speech comprehension. Only 9–10 year-olds are competent in grammar enough to rely on syntax in complex grammar sentences. In reversible constructions the analysis of syntactic markers becomes decisive and the reliance on semantics for understanding the statement is impossible. Thus, reversible constructions in active and passive voice are a convenient model for studying the formation of syntactic skills in children.

The aim of our study was to describe the brain mechanisms of syntax analysis in typically developing children aged 4–6 years. For this, we have designed special stimuli to unambiguously assess the child's ability to use exactly grammatical markers, on the one hand, and to assess brain sensitivity to these components, on the other ("Gramkonstruktor"). Children aged 4–6 years (n = 50) and adults (n = 26) completed the picture-sentence matching task with the reversible three-word sentences in the active or passive voice with the corresponding paired plot images during ERP recording. For further analysis of event-related potentials, 50 children were selected who correctly interpret sentences.

Both adults and children showed brain sensitivity to grammatical voice markers (the ending of the third word in a sentence — a noun), which was expressed in a greater amplitude of the evoked response to sentences in the passive voice than in the active voice. In children aged 4–6 years, a biphasic positive-negative component was recorded in the interval of 200–400 ms from the beginning of the presentation of the third word in a sentence in the fronto-central region and in the temporo-parietal regions of both hemispheres of the brain. LAN-like negativity seems to be a mechanism that allows children as early as 4–5 years old to analyze grammatical markers of active and passive voice. In addition, 6-year-old children in the right temporo-parietal region showed significant differences in P600 when they comprehend sentences in the active and passive voices. Both in terms of behavioral and EEG results, children of 6 years old differed from children of 4 and 5 years old, demonstrating reliance on the analysis of syntactic markers characteristic of adults.

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LINGUISTIC CUES IN AFFORDANCE-AESTHETICS INTERACTION

The future research addresses the question of how linguistic cues associated with objects' aesthetics influence perception of affordances, thus providing insights on how the context in which the concept is presented modulates the sensory-motor simulations. According to the embodied theories, language activates online simulations that assist in efficient interaction with the environment [Barsalou 2009; Borghi & Cimatti 2010; Gallese, 2008]. It was shown that linguistic context contributes to the competition of multiple affordances. In particular, empirical data demonstrates that stable affordances (shape, size, canonical orientation of an object that are stored in long-term memory) are more likely to win in linguistic processing, while variable affordances (handle orientation, distance to an object) are more likely to win in online processing, i. e. visual stimulation [Borghi & Riggio 2009]. In terms of specific linguistic cues, a growing body of research has revealed that both objects' names and motion verbs elicit the corresponding motor programs, and generate an affordance-based compatibility effect, specifically in the form of the relevant grasp affordances (micro-affordances) [Borghi and Riggio 2009; Constantini et al. 2011]. Moreover, it was shown that adjectives associated with size influence motor control by enhancing grip aperture in coherent conditions [Glover & Dixon 2002], however little is known about the modulation effect of adjectives related to other perceptual modalities or complex realistic objects' characteristics.

At the same time, in our everyday life, we interact not only with the utilitarian physical properties of an object, but also with its inherent aesthetic features, which tie down the object's general design (size or shape) and its current appearance. To date, there are a number of landmark papers which have demonstrated through visual materials that the attractiveness of an object affects our behavior when interacting with it [Freedberg & Gallese 2007; Righi et al. 2017; Righi et al. 2014]. However, in these papers, aesthetics was varied by changing an object as a whole, including modifications of its shape, which is known to be crucial for affordance activation [Borghi & Riggio

2015]. Subsequently, this fact reveals the rather difficult problem of decomposing aesthetics into measurable elements suitable for empirical verification.

To overcome the methodological issue and deepen our knowledge of mechanisms of sensory-motor simulations evoked by linguistic stimuli related to aesthetics we propose to focus on the surface aesthetic qualities (SAQ) as characteristics significantly contributing to our attitude to the environment. Studies related to (SAQ) outline a vast range of properties, including color, texture, or higher-level qualities like style [Leddy 1995; Rietveld & Kiverstein 2014]. Experimental data show that using the majority of them as variables in the studies of affordances may lead to lower validity. Nevertheless, one surface quality is able to overcome these obstacles. And this quality is neatness. It not only forms a general impression of an object, but also, unlike other high-level features, it can be divided into district levels (CLEAN/DIRTY).

Thus, this study aims to explore how linguistic cues modulate the perception of affordances in objects of different neatness. In particular, we want to know if neatness affects the activation of micro-affordances. So, we will ask our participants to categorize an object they hear about by responding in a precise or power-way. An object will be accompanied by an adjective associated with surface neatness (DIRTY FORK). We expect adjectives associated with untidiness to modulate reaction times in different grips in a certain way.

Overall, the study will provide in-depth knowledge and empirical insights on how linguistic information about aesthetic properties of graspable objects modulates the activation of the sensory-motor system.

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EYE-TRACKING EVALUATION OF STRATEGIES FOR ANALYZING AND REANALYZING GRAMMATICAL MARKERS OF THEMATIC ROLES IN A SENTENCE

The process of identifying grammatical markers of thematic roles in passive sentences is critical for comprehension. Acquiring of passive voice lasts through the preschool age in Russian, and the success of learning depends on the frequency of using various language structures in everyday speech. It is assumed that an effective strategy for analyzing such structures is formed gradually by adulthood. However, it is still unknown whether this strategy is universal or not. Is there a behavioral sign of an effective strategy for thematic roles assignment? At what age an effective strategy assessed with eye-tracking becomes mainstream? As a first step, we aimed to describe decision-making strategies in thematic roles assignment in adults using a picture-sentence-matching task. The subjects were 18 adults (n = 18, age 18–55, 11 female). Thirty-six paired symmetrical plot pictures with the subject and object of the action were used as stimuli. While the paired pictures were presented on the screen, a sentence corresponding to one of the paired pictures was sounded in headphones. The task was to match the picture to the correct sentence. We used four grammar forms — an active voice with the direct word order (AD, n = 18), active voice with reverse word order (AR, n = 18), passive voice with the direct word order (PD, n = 18), passive voice with the reverse word order (PR, n = 18). In order to bring closer the experimental paradigm to children in further investigation, all the presented samples (n = 72) were divided into three series. Gaze registration was carried out separately during the stage of listening to a sentence (analysis) and at the decision-making stage (reanalysis) (eye-tracker Gazepoint GP3 60Hz).

The decision-making strategies were analyzed for such parameters of oculomotor reactions as number (fix before) and duration of the first fixation on the area of interest, (the area of interest (AOI) corresponding to the subject or object of the action); time from the start of the stimulus to the first fixation (time to fixation); total duration (fix time) and the number of fixations; the number of returns to AOI, the average duration of fixation; amplitude and number of saccades in AOI. These parameters were analyzed separately for the stage of listening to the sentence (analysis) and for making a decision (re-

analysis). A statistically significant difference was found between the stages of analysis and reanalysis in parameters of gaze fixation, depending on the type of sentence. For the AR sentences, time to fixation differed with $F(1, 292) = 8.263$, $p = 0.001$. For the PD sentence fix before differed with $F(1, 205) = 8.929$, $p = 0.003$. For the PR sentences, the fix time differed $F(1, 184) = 4.961$, $p = 0.027$. Thus, for all types of sentences, except sentences in AD (the most frequent for the Russian language), oculomotor behavior has a statistically significant difference at the stages of analysis and reanalysis.

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DESCRIBING SHUGHNI CORONALS BY MEANS OF PALATOGRAPHY

Some sounds are not clearly discernible. To the untrained ear, the difference between dental [n̪ t̪ s̪] and alveolar [n t s] seems imperceptible, though it is one of the reasons for the foreign accent. For example, in Standard Russian, these sounds are rather dental while in English they are generally alveolar [Ladefoged & Johnson 2014: 175; Knyazev & Pozharitskaya 2012: 49]. Practical advice for Russian learners of English is then to try to produce the alveolars rather than the dentals. On top of that, various phonetic and phonological processes depend on the exact place of articulation, so information about it is essential for describing them properly.

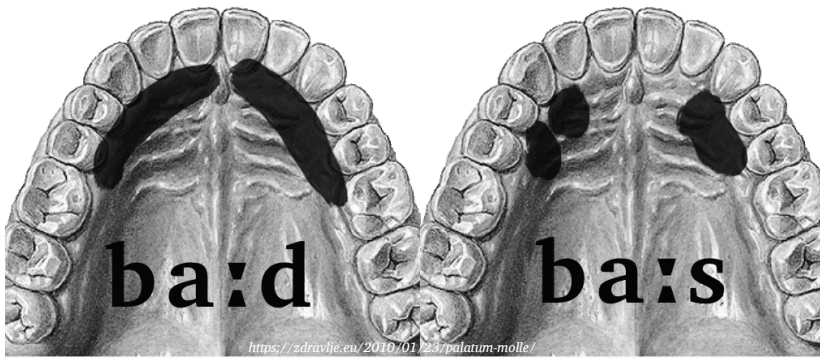
Since such subtle aspects of sounds are hardly audible, instrumental phonetic techniques should be used to describe the sound system. Some of them are bound to nontransportable apparatus (magnetic resonance or ultrasound imaging) but others are quite easy to employ in the field. Acoustic methods are not very useful for deciding whether a consonant is dental or alveolar; even if it is possible to find some clues in the spectrogram, one needs preliminary knowledge of the articulatory properties of the sounds. Another way to study the production of sounds outside the laboratory is by means of palatography [Ladefoged 2003: 36].

Despite obvious limitations (it can only be effectively applied to the coronals), palatography is still helpful in language description, which I will demonstrate with the example of Shughni, an Iranic language of Pamir spoken by ca. 100,000 people in Tajikistan and Afghanistan.

Some phonetic descriptions of Shughni indicate that it has dental /t d n r ʦ ʤ s z θ ð l/ [Edelman & Dodykhudoeva 2009]. Others shorten the list to just /t d θ ð/ [Olson 2017]. Such discordance accompanied by the lack of instrumental evidence has to be addressed. While Olson's inventory of dentals seems normal, that of Edelman & Dodykhudoeva does not as there are data showing the tendency for /s z/ to be alveolar in the presence of /θ ð/ [Laver 1994: 589–590].

During my field trip to Khorugh (Tajikistan) in 2022, I used palatography to determine the exact place of articulation of /d/ and /s/, assuming that their counterparts having a different phonation type are articulatory equal. A Shughni teenager, speaking Shughni and Russian, produced the

words /baːd/ 'then' and /baːs/ 'enough!' Her tongue was painted with a mixture of sunflower oil and powdered charcoal, then she pronounced a word, after which she opened her mouth, put her tongue out and got her roof of the mouth photographed with the help of an intraoral mirror. The schematic representations of the photos are given in Picture 1. The results suggest that Shughni /d/ and /s/ are in fact alveolar.



Picture 1. Areas of the tongue-palate contacts (painted black)

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NODS AND THEIR FUNCTIONS IN RUSSIAN AND KOREAN DIALOGUES

Nod is a type of head gestures that is performed in vertical axis. Nods can be single or multiple and have different amplitude [Sukhova 2017]. Various works showed that nods can fulfill functions from different domains (have symbolic meaning, structure the speech, regulate turn-taking in a dialogue, etc.) While there exists relatively profound research on nods in Russian communication [Sukhova 2017, Nikolaeva & Evdokimova 2019, etc.], nods in Korean communication is an under-researched area [McClave 2007]. Cross-cultural differences are of particular interest as well.

The current study focuses on comparing nods in Korean and Russian dialogues and aims to determine connections between functions and types of nods. This research was carried out using a self-made corpus of video fragments from various interviews, talk-shows, TV-shows, etc. in Korean and Russian (10 minutes for each language). All videos were annotated according to the following parameters: role in communication (speaker/listener), type (nod, small nod, big nod, jerk, multiple nod, multiple small nod) and function of the nod. The annotation was made separately for each person in the video. In order to annotate the functions of the nods, the approximate list of functions was compiled based on the multimedia corpus of the Russian language (MURKO).

It was found that nods are slightly more frequent in Korean than in Russian communication. The nod functions in Korean communication are more varied for both roles in communication (some interesting functions were observed: mimicry, emphasis on grammatical elements, etc.). Multiple nods were more frequent for the speaker's role for both languages. Some similar functions were also found (different types of reaction for the listener's role; emphasis, beat, etc. for the speaker's role).

In the presentation I am going to describe the obtained data in general and for each role in communication separately for both languages. I will show the most frequent types of nods; the correlation between type of the nod and its duration; various functions that nods can have and their connection to the nod types. Then the comparison between languages will be drawn.

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SPECTRAL AND TEMPORAL CHARACTERISTICS OF WHISPERED SPEECH

The aim of this research was to investigate the changes in the formant values and the duration of six Russian vowels (/a/, /e/, /i/, /o/, /u/, /ɨ/) in voiced and whispered speech. The first three formants were analyzed.

Whisper is a phonation mode characterized by an absence of vocal cord vibration. In this speech mode, vocal cords are adducted so that a turbulent airflow can be created during exhalation. This phonation mode is used for communication with nearby interlocutors in situations where loud speech is inappropriate or in cases of speech pathologies.

Whispered speech is mainly studied in the areas of speech recognition and speaker recognition. Many studies report that the values of the first formant (F1) and of the second formant (F2) increase in whisper as compared to phonated mode. In contrast, the values of the third formant (F3) can decrease in whispered speech. There is also some evidence that F3 values in whisper might not differ considerably from those in voiced speech. The duration of whispered vowels and consonants is generally higher than that of voiced vowels. The compensation of melodic component in whisper is also widely investigated. It was indicated that formant values convey intonation in whispered mode.

The phonetically representative text was read in phonated and whispered manner by five female 20-year-old students of the Saint Petersburg State University. The speech samples were recorded in the Professional recording Studio of the Department of Phonetics SPbSU. The recordings were annotated in four levels (syntagms, nuclei, the vowels in the nuclei, fundamental frequency tags) using Wave Assistant. The annotation files in the SEG formant were converted into Praat Textgrid files. The formant values, the nuclear vowel duration and the total duration of each speaker's recordings were computed for voiced and whispered speech using Praat. Statistical significance of the changes in the considered parameters was calculated in Excel 2016.

The results indicated that the average F1 values and the average F3 values of all the vowels increased in whispered speech for all the speakers. However, the average F2 values decreased in whisper for two vowels (/e/ and /i/).

The average total vowel duration became greater in whispered mode for three speakers. The average duration of each vowel increased for most speakers.

The changes in the values of F1 were statistically insignificant for vowel /i/ for one speaker. They were significant for the rest of the vowels produced by this speaker and for all the vowels produced by the other informants. F2 and F3 values shifted significantly in approximately a half of all the vowels for all the participants (54 % and 47 % respectively). The change of vowel duration was mostly insignificant (80 % of all the vowels produced by all the informants).

The findings obtained are consistent with the results of the previous research. F1 and F2 values increased in whisper as existing works demonstrated. The duration of each vowel and the total duration of the speech samples became higher in whispered mode. Many researchers reported the same phenomenon.

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THE LINGUISTIC CHARACTERISTICS OF SPONTANEOUS SPEECH IMPAIRMENTS IN DYNAMIC APHASIA

Introduction. Aphasia is a common consequence of focal brain damage. It may negatively affect daily communication, decision-making, mood, engagement, and overall reduce the quality of the patient's life [Bullier et al. 2020; Damasio 1992]. Among other aphasia types, dynamic aphasia is distinguished by significantly impaired spontaneous speech despite relatively intact core language skills — naming, comprehension and repetition. Due to its rarity [Pedersen 2003], dynamic aphasia has mainly been investigated in case studies (e. g. [Costello & Warrington 1989; Robinson et al. 1998]). Studies indicate that dynamic aphasia can present in pure and mixed forms [Robinson et al. 2005]. Nonetheless, the distinguishing feature of both forms of dynamic aphasia is reduced spontaneous speech. There is yet no detailed description of the linguistic characteristics of spontaneous speech impairments in dynamic aphasia. That is why the aim of the current study is to explore the nature of dynamic aphasia and to provide a description of patterns of spontaneous speech impairment in dynamic aphasia.

Participants. The participants were divided into two groups: clinical and normative. The clinical group consists of 15 patients (8 women, 39–71, M_{age} = 53.87, SD = 10.98) with stroke-induced dynamic aphasia (14 of which had a primary stroke and 1 patient — secondary). Depending on the results of a qualified speech therapy examination, the patients were divided into two subgroups: patients with dynamic aphasia (N = 7) and control group: patients with other frontal forms of aphasia, except for dynamic aphasia (N = 8). The normative group consists of 37 neurologically healthy russian-speaking volunteers (22 women, 38–74, M_{age} = 55.69, SD = 9.11). All participants filled out an informed consent form before taking part in the experiment.

Materials. The testing consisted of two discourse tasks: narrative based on a picture and interview. Picture narrative is a discourse task from the Russian Aphasia Test [RAT, Ivanova 2021], which illustrates a scene with a complex plot. The interview includes 3–6 questions on the following topics: medical condition (clinical group), recent illness (normative), work, study, hobbies, daily routine and accommodation.

Procedure. The testing procedure was the same for all participants and conducted by a trained linguist. The stimulus in the narrative task was pre-

sented on a tablet (screen size 10.4”). The questions in the interview were asked out loud.

Results. The audio samples were preprocessed in Audacity and then annotated in ELAN [Wittenburg et al. 2006]. The annotation also included false starts, perseverations, semantic, grammatical and phonetic errors. The Bayesian Test of Difference [Crawford & Garthwaite 2007] was implemented to compare a single case from the clinical group with the distributions in the control and normative groups. Statistically significant results for several subjects from the clinical dynamic aphasia subgroup were found on the following metrics: lexical diversity, speech rate, percentage of nouns and percentage of verbs. Some results (e. g. the proportion of nouns) were specific to dynamic aphasia, while decrease of other metrics (e. g. lexical diversity) were also observed in the control group.

Discussion. Despite its limitations, our study showed that some speech impairments in dynamic aphasia may not be specific to the disorder.

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REPEATED READINGS IN WRITTEN TEXT COMPREHENSION: EYE-TRACKING STUDY IN DYSLEXICS AGED 9–12

It is known that repeated readings are a type of reading strategy aimed to improve the quality of text comprehension. Several studies have shown the importance of repeated readings in the text comprehension quality [Hyona, Niemi 1990]. Other studies described the role of repeated readings in the control of conclusions [Carpenter, Daneman 1981; Frazier, Rayner 1982] and checking the coherence of the text model [Zabrucky, Commander 1993; McNamara 2001] during reading. This issue in dyslexic children is not well studied.

The current eye tracking study aimed to analyze repeated reading as a strategic component of text comprehension in dyslexic children aged 9–12. Eye movements were recorded by using an eye-tracker system SMI RED500, while children read two expository and two narrative texts. The study involved 82 participants: 40 dyslexic and 42 typically-developing children. Quality of text comprehension and oculomotor parameters such as number of fixations, progressive saccades, micro-regressive, short, medium and large regressive saccades were analyzed.

Statistical analysis revealed differences between the groups in number of repeated readings. Dyslexic children used repeated readings less often than typically-developing children ($p = 0.001$). Regression analysis revealed that the number of repeated readings does not affect the text comprehension in dyslexic children. At the same time, in a group of typically developing children, repeated readings improved the quality of text comprehension ($F = 6.927$, $R^2 = 0.041$, $p = 0.009$).

Comparative analysis of the oculomotor parameters during first readings and repeated readings in dyslexic children reveal less fixations ($p = 0.001$) and progressive saccades ($p = 0.001$) during repeated reading. Typically-developing children made less count of fixations ($p = 0.001$), micro-regressive ($p = 0.001$), short regressive saccades ($p = 0.001$) and more medium ($p = 0.001$) and large regressive saccades ($p = 0.001$) during repeated reading.

Our findings allow to suggest that the presence of repeated readings does not affect the text comprehension in dyslexic children. At the same time, typi-

cally developing children used the repeated readings for conclusions checking and the coherence of the constructed text model assessing.

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AGAINST ATB-ANALYSIS OF PARTIAL PREDICATIVE AGREEMENT IN RUSSIAN: AN EXPERIMENTAL STUDY

Russian clauses with coordinated subjects show two strategies of predicate number agreement. The first strategy, *full agreement*, prescribes plural number marking on the predicate. The predicate agrees with the whole coordinated NP subject. In the second strategy, *partial agreement* (PA) or *first conjunct agreement*, the predicate shows singular agreement with one of the conjuncts of the coordinated NP (1).

(1) *Na stole* ***lezh-at /*** ***lezh-it*** *ruchka i karandash.*
on table **lie-PRS.PL / lie-PRS.SG** pen and pencil
'Pen and pencil are lying on the table.'

One of the analyses of PA [Krejci 2020] explains this phenomenon in terms of Across-the-Board Movement (ATB). According to this study, clauses with PA structurally contain no coordinated subject, conjunction in fact occurs on the level of VP. The coordinated VP includes two identical singular V heads, which are ATB-moved to Asp (2). Consequently, the predicate is pronounced only once creating the effect of PA.

(2) [$_{TP}$ [$_{AspP}$ [$_{Asp}$ lezhit] [$_{VP0}$ [$_{VP1}$ ruchka ~~lezhit~~] [$_{\&P}$ [$_{\&}$i] [$_{VP2}$ karandash ~~lezhit~~]]]]]

One of the arguments in favor of this analysis found in [Krejci 2020] is based on the fact that PA is impossible with predicates which require their subject to be semantically plural. One type of such predicates is symmetrical predicates, which have at least two arguments bearing the same thematic role in their argument structure (e. g. *vstretit'sya* 'meet each other'). PA is claimed to be incompatible with symmetricity of the predicates, regardless of the theoretical framework [Shvedova 1980: 243; Sannikov 2008: 159; Pekelis 2013; Krejci 2020: 248]. In line with the discussed analysis, PA is blocked by the fact that the conjoined symmetrical VPs with only one argument each would violate the Locality of Selection requirement. However, the constraint on PA of symmetrical predicates found in the literature is supported with introspective judgements only and contradicts corpus data.

The other aspect relevant for the discussion of ATB-derivation of PA is the position of the predicate with respect to the coordinated subject.

It is argued in the literature that the preposition of the predicate creates a more acceptable context for PA. This statement corresponds to the fact that ATB-movement in Russian, just as other types of A'-movement, occurs leftwards. Thus, the linear postposition of the predicate would require additional derivations, which could affect the acceptability of PA.

We conducted an experimental study using acceptability judgement task (Likert scale 1–7), aiming to investigate whether symmetricity and position of the predicate define the acceptability of PA. The design of the experiment included three independent variables: 1. predicate symmetricity (yes/no), 2. predicate position (pre-/post-), 3. predicate number (sg/pl). The data was analyzed by means of linear mixed effects models and Tukey's multiple pairwise comparisons.

According to our results, the factor of symmetricity is irrelevant for the acceptability of PA, contrary to the predictions of [Krejci 2020]. Hence, our study proposes an argument against ATB-analysis of PA. Meanwhile, the factor of position has proven to be relevant, PA being more acceptable in preposition with respect to the subject.

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CONNECTING AHA!-EXPERIENCE WITH SUBJECTIVE DIFFICULTY IN SOLVING POLYCODE REBUS PUZZLES

The present study investigates the connection between Aha!-experience and objective and subjective difficulty in solving polycode rebus puzzles. Based on previous work [Moroshkina et al. 2022], we assumed that the Aha!-experience reports would be associated with the subjective difficulty of the problems. We developed 110 polycode rebus puzzles based on different encryption principles. The answers to rebuses were Russian common expressions. Font characteristics (style, color, size, etc.), spatial arrangement and number of words, etc were used as various encryption principles. Polycode rebus puzzles require people to reinterpret the meanings of words taking into account their perceptual features/characteristics. We created rebuses that contained from 1 to 3 encryption principles, because it was previously shown that the number of principles may affect the solvability of rebus puzzles [MacGregor, Cunningham 2008].

160 volunteers (18 to 35 years (M = 23, SD = 4.6), 114 were women) solved 55 puzzles each and assessed the subjective difficulty of the problem before and after the solution, as well as Aha!-experience at the time of solving the problem and after seeing the correct answer. We found that the solution accuracy of puzzles depends on the number of encryption principles and the familiarity of expressions. The more encryption principles in the rebus there are, the lower the probability of its solution ($r = -0.582$, $p < 0.001$) and the longer the solution time is ($r = 0.580$, $p < 0.001$). Lesser familiarity of an expression correlated with the lower probability of the correct solution ($r = -0.295$, $p < 0.01$) and the longer solution time ($r = 0.266$, $p < 0.01$). The subjective difficulty of the rebus was rated three times: 5 sec. after the presentation, immediately after the solution generation, and after the demonstration of the correct answer. All three ratings negatively correlate with the probability of the correct solution ($r1 = -0.838$, $r2 = -0.800$, $r3 = -0.581$, at $p < 0.001$, respectively). The first assessment of subjective rebus difficulty was the strongest predictor of the Aha!-experience. Rebuses rated as more difficult within the first 5 seconds received higher Aha!-experience scores after the correct solution generation ($r = 0.674$, $p < 0.001$). This correlation remains significant under the control for the objective rebus solvability ($r = 0.353$, $p < 0.001$).

To sum up, in our study, we showed that the number of encryption principles and the familiarity of the expression are two independent predictors of the objective difficulty of the rebus. This result is in line with the similar studies on English and Italian puzzles [MacGregor, Cunningham 2008; Salvi et al. 2015]. Also, we validated rebuses as problems that can evoke Aha!-experience. The subjective difficulty of the rebus is one of the Aha!'s predictors: with equal objective difficulty of the problems, the more difficult the rebus seems at first glance, the higher the score of the Aha!-experience after the solution is.

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LINGUO-PHISIOLOGICAL CORRELATES OF BREATHGROUPS IN ENGLISH AND CHINESE

The aim of the study is to find physiological factors that provoke pronunciation problems for speakers of syllabic languages (Chinese) when speaking a phonemic language (English or Russian). There is some literature on the English/Chinese interference [Feifei 2013; Zhang, Yin, 2009], but little is written about the physiological roots of the problem. Linguistic structure in different groups of languages can impose specific limitations on models of speech breathing. Without rhythmic breathing, pauses and normal gas exchange in the body, a person loses the power of speech. The purpose of research is to consider physiological correlates of prosodic features in English and Chinese. They can be used as a marker for recognition of a non-native speech signal and for developing pedagogically-oriented technologies. The task is being investigated through the use of ergospirometry — a testing method with gas analysis for evaluating human performance under a physical stress. It is widely used in sports medicine. We consider speaking a foreign language to be a component of psycho-physiological load.

There were 7 subjects involved in the pilot experiment, 1 native speaker of English and 6 Chinese native speakers. All the speakers read out aloud experimental material consisting of 11 phrases (tongue twisters) and 31 minimal pairs with strong and weak consonants and tense and lax vowels (maximum speaking load). Audio recording was done simultaneously with the ergospirometry. The intensity of sound signal curve was synchronized by us with the ergospirometry data curves [Pavlovskaya, Bozhevolnov, Lan Hao, 2021] (Fig. 1). The number and length of pauses was estimated and classified earlier [Лань Хао, Тананайко 2020].

Four parameters have turned to be the most informative: 1) respiratory rate (frequency); 2) respiratory volume; 3) the ratio of exhalation time to inhalation time (tex/tin; 4) amplitude values of the intensity of the speech signal on a comparable scale.

The preliminary data allow us to assume that a violation of the native "respiratory rhythm" leads to "physiological stress". Chinese natives when speaking English use shorter breath groups with longer silence intervals and have more frequent breathing cycles than the native English speaker.

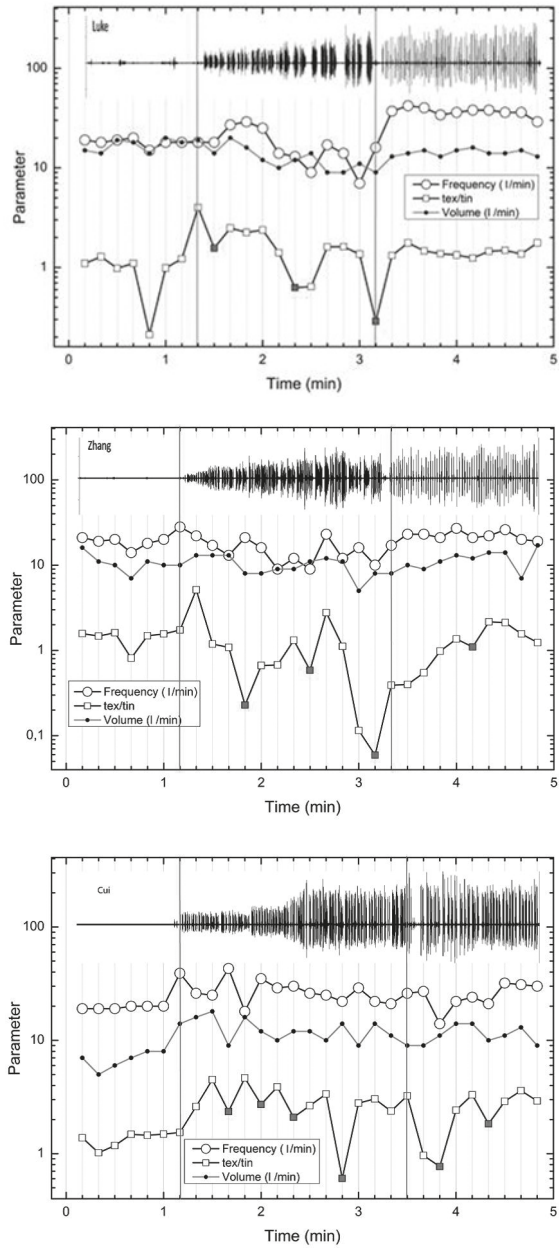

Fig. 1. Speech breathing parameters of English (Luke) and Chinese (Zhang and Cui) speakers

The experiment is based at the Federal Medical Research Center named after V. A. Almazov, Saint Petersburg, Russia. The work is in progress.

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ORAL OR SILENT READING: WHAT IS BETTER FOR SIGHT TRANSLATION? EVIDENCE FROM EYE-TRACKING

The study aims to answer two questions: does reading type (oral vs. silent) contribute to L2 text perception quality, and what type of reading is more advantageous for successful text processing and sight translation. According to Hale et al. (2007), reading aloud facilitates understanding of the text, despite the fact that it requires to exert more cognitive effort for a reader. Fuchs et al. (2001) suggested that aloud reading fluency represents the overall reading competence. It was also shown that silent reading suits better for narratives paraphrasing [Schimmel & Ness 2017].

Sight Translation task seems to be a good method to check reading comprehension skills [Karimnia 2014]. In our two-group experimental design, Russian native speakers (N = 20, Mage = 23, B2-C1 level of English) were reading two English texts (aloud or silently). We asked them to give us their subjective difficulty estimation, and to translate them from English into Russian. Both texts were of the same length, topic and readability (checked via http://readable.com) as is customary in psycholinguistic research of text processing [Petrova 2016]. The participants eye movement patterns during the pre-reading task have been recorded (EyeLink 1000 Plus by SR Research).

We have measured the reading duration (RD), total fixations amount (TFA), average fixation duration (AFD), and total amount of regressions (TRA). The sight translation quality of each participant has been assessed with the use of Gilmullina's (2016) sight translation quantitative analysis method. Mann-Whitney U test has shown that when subjects were reading aloud, they were reading significantly slower (RT: $p = 0{,}008$; TFC: $p = 0{,}027$; AFD: $p = 0{,}036$; RC: $p = 0.134$), as opposed to silent reading duration. No significant correlation between sight translation quality and subjective difficulty of text perception (oral reading vs silent reading) was found. However, we have found that despite the fact that aloud reading does not affect text perception significantly, though it delays the promptitude of sight translation, since it requires more time on text processing. This way we have found that aloud reading type is less time efficient and therefore the least preferable for this type of action. We also assume that aloud pre-reading type does not threaten the overall quality of sight translation because the interpreter

can read the text when performing sight translation. This means that the text availability does not affect the interpreter's performance, but contributes to it.

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DIACHRONIC CHANGES OF THE ASSOCIATIVE NORM: EVIDENCE FROM RUSSIAN

The main purpose of this study is to reveal diachronic differences in Russian associative norms (if there are any) from 1977. We assume that the associative norm depends on the cultural and socio-historical context [Russian psycholinguistics 2021].

The objectives of our study are the following:

- to reveal the main social problems of nowadays and words/lexemas associated with them;
- to conduct a free associative experiment — these words as stimuli ("уехать", "дело", "война");
- to compare the results with the data from two dictionaries: Russian Language Dictionary of Associative Norms [Leontiev 1977] ("RLDAN") by A. A. Leontiev (1977) and the Russian Associative Dictionary [Russian Associative Dictionary 1994–1998] ("RAD") by Yu. N. Karaulov (1994–1999)/

150 native speakers of Russian (101 women, 49 men; from 14 to 72 y. o., average age — 27, median age — 22) have participated in the experiment. Participants were asked to give the first associations (one word or a word combination) for three stimuli (уехать, дело, война). The experiment was conducted through Google Forms (GF). We also used three filler words. There were 150 reactions received for each stimulus. There were 19.33 % of different reactions [Davydovich, Petrova 2021] for the word «уехать», 30,6 % for "война", and 66 % for the word "дело". Then we analyzed the most frequent associations that were given for the stimuli.

The most interesting observations are as follows.

With the stimuli "уехать":

- The association "from Russia" ("из России") was not was not found neither in RLDAN nor in RAN In our research in 2022 it is one of the most frequent reactions (5.3 % from general).
- The frequency of occurrence of the association "abroad" ("за границу") increases from ≈ 1 % in 1977 and 1999 to 9.3 % in 2022.

- With the stimuli “дело”:
- The most frequent associations differ in all three studies: 1977 — “work” (“работа”) (14.29 %), 1990s — done (“сделано”) (8.8 %), 2022 — business (бизнес) (6.6 %).
- “Criminal” is the second most popular response (6.6 %) in 2022, compared to 1.9 % in 1990 and 0.55 % in 1977.
- With the stimuli “война”:
- The most frequent associative reaction in all three experiments is “peace” (“мир”) — 1977 — 27.3 %, 1999 — 14.4 %, 2022 — 25 %). We count “peace” and “and peace” as the same reactions. This is the one and the last stimuli that has the same main reaction in every corpus.
- In 2022 “death” (“смерть”) was the second most popular association, compared to the fifth most popular response in 1977 and the fourth in 1999.

Since our study has identified diachronic differences in associative norms in 1970s, 1990s and 2020s, we can conclude that associative norm in fact depends on the cultural and socio-historical context. The intensity of the associative field for all three words has decreased over the past 50 years (from 25.64 % to 19.33 % for the stimuli “уехать”, from 40 % to 30.6 % for “война”, from 70.6 % to 66 % for “дело”). That means that respondents have become less consistent in their responses.

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ABSORPTION QUESTIONNAIRES AS A TOOL TO ASSESS LITERARY TEXT PROCESSING

The most common methods to evaluate text processing in psycholinguistic studies of reading are comprehension questions, keyword highlighting and retelling. However, these methods are mostly applicable for non-fiction texts, not for literary texts in which factual information acquisition is not a primary outcome of reading.

We suggest considering narrative absorption as one of the measures that reflects the quality of interaction between the text and the reader. Narrative absorption has different definitions but most authors agree that it represents an experiential state which emerges during the reading of a narrative text. It is usually characterized by the reader's focused attention on the story world presented in the text, as a consequence of which readers distract from their surroundings and themselves and lose track of time. People feel transported to the world of the story and this feeling can be supported by strong emotional reactions to what happens in the story world and by mental imagery they generate. Narrative absorption is assessed by self-report questionnaires.

Extensive research has been carried out to show that narrative absorption can predict reader's enjoyment, impact and understanding of the literary text. However, due to the fact that absorption is a vast multidimensional construct, which is not exclusive to the textual domain and therefore studied in different scientific fields, the taxonomy of absorption-like states becomes problematic. We aim to analyze different theories of absorption and questionnaires developed on their basis.

We analyze Transportation Scale [Green & Brock 2000], Narrative engagement scale [Buzelle & Bilandzic 2009], Story world absorption scale [Kuijpers 2014] and Absorption-like states questionnaire (ASQ) [Kuiken & Douglas 2017]. We argue that Story world absorption scale (SWAS) [Kuijpers 2014] is the most suitable for the empirical linguistic research of text processing. First, SWAS addresses main drawbacks of previous questionnaires: based on the holistic Transportation scale it divides absorption into four concepts namely attention, mental imagery, emotional engagement and transportation. In contrast with Narrative engagement scale, which is also multidimensional, SWAS highlights mental imagery as one of its subscales, which is not present in Narrative engagement scale. Imagination of what is

described in the text facilitates absorption experience bridging the gap between attention and transportation and therefore is crucial for absorption in the textual domain. In addition, SWAS is based on the theoretical framework which distinguishes absorption experience in different types of texts. This is especially valuable for psycholinguistic research if we aim to minimize unnecessary impact of text type. For the purpose of future research SWAS benefits and drawbacks are then outlined.

We present the adaptation of SWAS into Russian and outline further plans of using this scale in psycholinguistic research of text processing.

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PERCEPTION STUDY OF MULTIMODAL INFORMATION IN VIRTUAL REALITY LEVERAGED BY EYE TRACKING AND VISUAL ANALYTICS

In this work, we propose new methods of analyzing the eye gaze tracks of people perceiving multimodal information in a Virtual Reality (VR) environment. With the advent of VR technologies, the question arises whether the information perception in a virtual environment differs from the one in a physical world. Understanding the potential perception differences is a clue for improving the ergonomics and efficiency of VR, making it suitable for solving business and education tasks.

We conducted an experiment with perceiving the multimodal visual stimuli in VR that has been previously completed in a physical world by Konovalova et al. [Konovalova, Petrova 2022]. The visual stimuli are the posters with an image and a short text (taken from the different commercial advertisements and normalized to look uniformly). The first half of the posters present a story with a single interpretation, while the second half has an ambiguous sense. These posters were presented one by one in a VR environment rendered by the Unreal Engine and demonstrated to the informants via the Vive Pro Eye VR station. The informants' eye gaze tracks were recorded by an embedded Tobii eye tracker.

The subsequent analysis of the recorded data was leveraged by the SciVi ontology-driven visual analytics platform [Ryabinin, Belousov 2021]. The posters were manually segmented into areas of interest (AOIs) according to their content. For the segmentation, Creative Maps Studio vector graphics editor [Chumakov et al. 2021] was used. In addition to the traditional eye tracking metrics [Holmqvist et al. 2011], we propose using the merged eye gaze trajectories, taking into account the eye gaze tracks of each informant from the sample (as for now, we recorded 41 informants balanced by age and gender). Not to lose any data, we propose using fuzzy sets to represent the merged eye gaze trajectory. The trajectory is defined as an array of fixations, wherein each fixation is a fuzzy set of AOIs, whose belonging function represents the number of informants who fixated in the corresponding AOI at the corresponding moment of time.

To visually analyze this fuzzy trajectory, we propose the following rendering techniques:

1. Interactive heatmap representing the belonging function values of each AOI across the fixations.
2. Interactive heatmap of total fixation time for all the AOIs.
3. Chart of fuzzy trajectory drawn on top of the corresponding visual stimulus (poster).
4. Graph of saccades of the fuzzy trajectory with subsequent analysis based on graph modularity calculated by the Louvain algorithm [Blondel et al. 2008].

These techniques allow us to comprehensively inspect the merged eye gaze trajectories for all the posters and reveal their regularities. The following perception peculiarities distinguish unambiguous and ambiguous posters:

1. The ambiguous posters have a longer total dwell time.
2. The gaze trajectory follows in general the "text–image" pattern, but ambiguous posters have more back-and-forth switches.
3. The clustering of saccades reveals the semantic groups of AOIs in the posters.

The proposed methods and implemented software tools proved their viability and efficiency in the eye-tracking-based research within the Digital Humanities application domain.

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VOXEL-BASED MORPHOMETRY IN CHILDREN WITH DYSLEXIA AND HEALTHY CONTROLS: A COMPARISON OF PIPELINES

Introduction. Developmental dyslexia is a reading disorder with a neurobiological origin [Jednorog et al. 2014]. Despite a large body of research, there is no consensus on the cortical structures crucial for impaired reading in children with dyslexia [Jednorog et al. 2014]. The aim of the present study was to clarify the structural gray matter correlates of phonological dyslexia in Russian-speaking children using voxel-based morphometry (VBM). Additionally, the results of two VBM programs (FSL and SPM) were compared to find if they are consistent.

Method. Seventy-five children participated in the study: 40 typically developing children (TDC) (21 boys, Mage = 9,23, SD = 1.21) and 35 children with dyslexia (23 boys, Mage = 9.58, age range = 7.1–11.4, SD = 1.08). Reading skills were assessed with SARS [Kornev 2010] and phonological skills were evaluated with seven subtests of RuToPP [Dorofeeva et al. 2020]. The children had no history of diagnosed neurological and/or psychiatric disorders; had normal vision, hearing and level of non-verbal intelligence. After behavioral data collection, MRI scans of all participants were obtained.

Two identical VBM analyses were performed in FSL and SPM programs. Firstly, gray matter volume (GMV) in TDC and children with dyslexia was compared. Then, we built General linear models (GLM) and included reading and phonological scores as covariates. This analysis was performed in two groups separately and in the mixed group of all children. All GLMs included age, gender and total intercranial volume in SPM as covariates of non-interest; the results were corrected for multiple comparisons.

Results. In FSL TDC had significantly more GMV in the right lateral occipital cortex (8 voxels, p = .05, 34 –82 42). GLM analysis revealed that pseudoword repetition was better in children with greater GMV in the left insular cortex (12 voxels, p = .05, –36 –16 10); children with greater GMV in the left cerebellum (48 voxels, p = .042, –40 –60 –52) performed better at the sound discrimination task.

In SPM TDC had significantly more GMV in the right putamen and right thalamus (44 voxels, p = .015, 14 –16 –10). In the group of children with dyslexia the results at the task on pseudoword repetition were better in children with greater GVM in the right postcentral gyrus (125 voxels, p = .039,

44 –18 28). In GLM analysis of all groups, children with greater GMV in the right thalamus, right putamen (6 voxels, p = .029, 14 –16 –10) and in the right insular cortex (8 voxels, p = .026, 28 15 2) performed better at the task on pseudoword repetition. Children with greater GMV in the right precentral gyrus (12 voxels, p = .019, 9 75 12) and in the right middle frontal gyrus (6 voxels, p = .036, 51 10 28) had better results in the sound discrimination task.

Conclusions. This study confirmed a crucial role of the left insular cortex and the left cerebellum in phonological dyslexia based on new data of Russian-speaking children in FSL program. However, the results were not consistent between FSL and SPM. Thus, the validity of the programs should be further investigated and the results should be cautiously interpreted.

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EYE MOVEMENT CORRELATES OF WORKING MEMORY IN READING: CURRENT STATUS AND RESEARCH PERSPECTIVES

In the past five decades there has been a lot of research on eye movements in reading. It was found that such lexical parameters as word frequency [Rayner & Duffy 1986], length [Juhasz et al. 2008], and predictability in the context [Ehrlich & Rayner 1981] influence how easily a word can be processed during reading. However, some of the eye movements are responsive to the ongoing cognitive processing of stimuli [Rayner 2009]. Therefore, it was recently assumed that eye movements during reading are affected not only by lexical characteristics, but by basic cognitive functions [Luke, Darowski & Gale 2018]. The role of working memory on eye movement characteristics in different reading tasks is not yet discovered.

In the talk a research proposal will be presented for investigating the role of working memory capacity, lexical characteristics and eye movement parameters during different reading tasks. The study includes two measures of working memory capacity: visuo-spatial and verbal n-back tasks. Next, a sentence reading task [Laurinavichyute et al. 2018] using Eyelink 1000+ eye tracking system will be presented. Then, the participants will perform a dual task: reading separate sentences aloud while remembering target words with different lexical properties. The target words are varied by their lexical properties: length of the word and position in the sentence. The dual task is an adaptation of the Reading Span task in Russian [Fedorova & Shirokova 2019]. The results of the comprehension questions in each task will be further analyzed.

The main question of the study is the effect of working memory capacity on eye movements and performance in different reading tasks. We will present the comparative analysis of the main eye movement characteristics (dwell time on the areas of interest, first fixation duration, number of revisits) in each task, correlation analysis between results of the tasks and comprehension performance results. The research is supported by the Centre for Cognition and Decision making, Higher School of Economics. Literature review, theoretical and research hypotheses for an eye tracking study will be included in the presentation.

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FEATURES OF THE FORMATION OF PRONUNCIATION AS A MARKER OF SPEECH DISORDERS MECHANISM

Such phonetic features of speech as distortions in consonants pronunciation (implementation of abnormal speech sound based on articulation not normative for a given language) is due to morphology of articulatory apparatus peculiarities or articulatory dyspraxia (dysfunction of cortical level). Russian logopathology develops a neurological concept of distortions mechanism, associating them with partial disorders of articulatory muscles innervation.

Distortions often affect late genesis consonants: sibilants, formed from 3 and 4 years; vibrant formed by 5–6 years. Formation order of this sounds is due to successive increase in their articulatory complexity. Before formation of normative articulation, they are replaced by articulatory simpler substitutes from normative phonetic system. Appearance of distorted articulation is also possible, technically simpler than target one, but acoustically close to target sound, which leads to fixation of abnormal articulation. In general, development follows principle of "from simple to complex". This is confirmed by frequency distribution of consonant distortions: the more complex the consonant articulation, the more often its distortion occurs in preschoolers population. Distortion formation can be due to both morphological limitations and dyspraxia, which determines the choice of simpler articulation. In children with partial disorders of innervation, distribution of distortions frequency differs from population. In this group, distortions of articulatory simpler sibilants are more common than distortions of complex vibrant: the principle of "from simple to complex" is violated.

The purpose of study was to verify statement about quality difference in distribution of distortions frequency of late genesis consonants in children with partial innervation disorders. The confirmation of postulate substantiates the assumption that articulatory movements predominantly realized by these children are neurologically forced. These movements are inaccessible at early stages of development to most healthy preschoolers, when simple articulatory movements are unavailable for study group. Novelty is in application of formative experiment method, in which dynamics of formation/correction of consonants pronunciation can be traced over 2–4 years. Method allows

to identify not only distribution of distortions frequency in synchrony, but also to discover difficulties in formation of each group of consonants and the qualitative changes in their articulation in diachrony. Study involved 14 preschoolers aged 3–4 years and reached the age of 5–7 years by end. 2 groups of children were identified: in first group (7 children), the order of formation of consonants corresponded to normative one, in second group it was inverted (the formation of vibrant preceded formation of sibilants). Signs of a partial disorder of articulatory muscles innervation were found in 2 children of the 1st group and in all children of the 2nd group. In group 2, pronunciation distortions were significantly more common than in group 1, as well as distortion of sibilant pronunciation (t-test $p < .05$).

Data confirm that inverted order of consonants formation, which contradicts principle "from simple to complex", is due to neurological compulsion of available articulations. Partial disorders of innervation limit access to simple, generally accessible articulations, forcing formation of complex movements. Experiment proves the existence of pronunciation disorders associated with impaired innervation, but not dysfunction of cortical level.

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SCREELING TEST: ADAPTATION AND STANDARDISATION FOR RUSSIAN

Aphasia is a language disorder resulting from a stroke. A detailed diagnostic is an important step for speech/language rehabilitation. In most cases, speech/language pathologists (SLPs) use different tests to detect aphasia and determine its type and severity. Hovewer, previous studies [Hachiou et al. 2017; Rohde et al. 2018] showed that not all published tests were properly standardized, and their materials rarely follow psychometric standards.

Some modern adoptated to Russian tests [Buivolova et al. 2021; Ivanova et al. 2021; Kalinina et al. 2019] have more detailed description of standardization than tools that were developed several decades ago [COR; Tsvetkova et al. 1981; Wasserman et al. 1997; De Russie et al. 1978]. Anyway, modern ones contain disadvantages that limit their application in practice. So, it is necessary to pay attention to the choice of a test for the diagnostics of speech/language disorders.

In our study, we fill this niche and present the Russian version of such an instrument, originally developed for the Dutch language. ScreeLing [Doesborgh et al. 2003] is a screening test designed for detection of language disorders and identifying the core of language deficit. We aimed to identify whether the Russian version of ScreeLing is an effective clinical tool for the diagnostics of language disorders. Second, we estimated whether it allows the specialist to assess the language levels affected in people who suffered from stroke. Thus, the obtained results would be significant for clinical and research practice.

The study involved 97 people with speech disorders (40 women, 57 men, average age — 59 years, SD = 9.98, span = 32–78). The participants suffered one stroke more than 2 months ago. The control group included 41 people without any speech defects (21 women, 19 men, average age — 54 years, SD = 19.8, span = 40–81). All participants completed the tasks of the Russian version of the ScreeLing. All of the control group, as well as 46 people from the clinical group, completed the tasks of the "Rapid Aphasia Test" adapted into Russian [BTA; English, The Aphasia Rapid Test; Azuar et al. 2013; Russian version: Buivolova et al. 2021]. All participants from the clinical group completed the tasks of the tablet version of the Token Test [Akinina et al.

2019], which is considered the gold standard for screening for aphasia in the chronic period.

We compared the results of ScreeLing and the Test Token and found a high Pearson correlation between these results ($r = .73$, $p < .001$, 95% CI [.615, .808]), which indicates a high competitive validity of ScreeLing. To estimate the constructive validity [Greenhalgh 1997] we compared ScreeLing results and the speech therapist's assessment ($rs = -0.58$, $p < 0.001$). It showed that ScreeLing has high sensitivity (0.95), specificity (0.92) and accuracy (0.94). The results of the calculation of the Kronbach alpha showed that the test has consistent variables in the entire section "Phonology", in 2 subtests in the section "Semantics" and in 2 subtests in the section "Syntax". The remaining elements have a low value, that is why the incentives in these tasks should be revised. We also proved that demographic factors do not affect the results of ScreeLing test.

Nevertheless, our study has a number of drawbacks that limit the use of ScreeLing in clinics, however, we continue the standardization process in order to introduce the test into practice in the future.

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PARAMETRIZING NUMBER VARIATION: EVIDENCE FROM RUSSIAN NOUN PHRASES WITH COORDINATED MODIFIERS

Agreement with coordinated structures frequently permits number form alternation. The target agreeing with two conjoined singular nouns copies either plural or singular number feature. In Russian noun phrases with coordinated modifiers, the agreement controller may also demonstrate number variation. If two conjoined singular adjectives have split interpretation, both singular and plural nouns are acceptable. In contrast to previous studies relying on introspection and corpus, we parametrize the number variation based on results of the two self-paced acceptability experiments (Likert scale 1–7). We also compared the human judgements with the sentence probabilities predicted by a neural model for text generation ruGPT-3.

The first study examines the effect of noun morphology and tested 2 factors: the noun number (singular / plural) and the morphological noun type (suppletion and stem alternations / suffix alternations / syncretic forms / regular morphology). The nouns with stem alternations show the preference for singular number which emerges in higher acceptability scores and less reading time. The nouns with suffix alternations demonstrate free variation. Thus, it is stem rather than suffix alternation that influences the number choice. The sentences with syncretic forms receive the highest scores and show no reading delays on the noun since there is no number choice needed. The language model correctly predicts the highest probability of syncretic nouns and assign equal probability to singular and plural forms of the nouns with suffix alternations and syncretic nouns. It fails to predict the preference for singular forms in sentences with suppletion and stem alternations.

The second study examines the effect of the premodifier attributive agreement and tested 3 factors: the premodifier number (singular / plural), the noun number (singular / plural), the case (direct / oblique). The experiment reveals differences between all the agreement strategies and no significant case effect. The premodifier number feature implies the same noun number feature: the plural premodifier and the plural noun, the singular premodifier and the singular noun. The number mismatch is acceptable for the plural noun, but causes significant reading delays, and unacceptable for the

singular noun. The language model correctly predicts the lowest probability of the constructions with the plural premodifier and the singular noun and assigns high probability to constructions with the same number of the premodifier and the noun. It fails to predict the preference for plural premodifier and plural noun in contrast to singular premodifier and plural noun.

The offline acceptability scores and the online reading time demonstrate that the observed morphological and syntactic factors should be considered while parametrizing number variation in Russian noun phrases with coordinated modifiers. The language model ruGPT-3, trained on a big collection of Russian texts, manages to predict correct probability of highly acceptable and highly unacceptable sentences, but assigns incorrect probability values to the cases of variation.

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THE THREE-WAY RELATIONSHIP AMONG SLEEP QUALITY, BILINGUALISM AND COGNITION

Poor sleep quality and insomnia are known to affect cognitive functioning and executive functioning in particular. Deficits in the control of cognitive and emotional processes are well-known consequences of insomnia as defined by influential theoretical models of the disorder [Harvey 2002]. Individuals with insomnia commonly report subjective difficulties in different cognitive functions [Harris et al. 2015], including working memory, episodic memory and some aspects of executive functioning [Cellini 2016].

At the same time, growing evidence supports a beneficial role of bilingualism on this same set of abilities. Substantial behavioral and neuroimaging evidence showing that two languages in the bilingual mind are always activated during language use [Kroll, Dussias, Bice, Perrotti 2015]. Thus, bilinguals must persistently resolve cross-linguistic conflict to achieve successful communication. It requires a special cognitive mechanism of selection, inhibition and switching [Abutalebi & Green 2007]. Bilingual speakers rely on a set of neurocognitive processes known as 'language control', which is managed by a network of cortico-subcortical regions inextricably related to executive control functions [Abutalebi & Green 2007; 2013; 2016]. It is assumed that due to overlap between the mechanisms and brain areas implied in bilingual language control and general executive control, the constant involvement in language selection has consequences for aspects of this executive function, changing the way the domain-general system functions across a wide range of activities, both at the cognitive and at the neural level [Bialystok, Craik, Green, Gollan 2009; Bialystok 2017; Kroll, Dussias, Bice, Perrotti 2015].

We investigated the relationship between these two life experiences, in an attempt to establish whether dual language use may exert a mitigating effect on insomnia-induced executive deficits or, conversely, whether insomnia detrimentally affects beneficial consequences of bilingualism for the mind and brain. 40 Russian-English speaking participants (10 males; mean age = 21,925, SD ± 2,75) performed in an offline study where inhibitory executive control was measured via the Flanker task. Participants' language background was assessed using the Russian version of the Language Experience and Proficiency Questionnaire (LEAP-Q). To obtain an objective measure of L2 proficiency, we administered the Cambridge Language General English

Test and a free-form written translation task. In addition, participants' individual levels of sleep quality were assessed using the Russian version of the Pittsburgh Sleep Quality Index.

Both measures of objective L2 proficiency, as well as L2 age of acquisition, showed a beneficial effect on Flanker reaction times. Conversely, poor sleep quality was associated with worsened performance. Interactions between bilingualism and sleep quality revealed that for all three measures of bilingual experience the beneficial effect only emerged at low levels of sleep quality. We hypothesize that peak cognitive ability among young adults could mask bilingual effects unless a disrupting factor manifests (i. e., poor sleep quality).

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EXPERIENCE IN CONDUCTING AN ASSOCIATIVE EXPERIMENT IN A CHINESE AUDIENCE

Concept studies allow revealing the linguistic consciousness of an entire ethnic community. Many researchers write about what a concept is, about an attempt to define this concept. Z. D. Popova and I. A. Sternin give the following definition: concept is "a discrete mental formation, which is the basic unit of a person's mental code, which has a relatively ordered internal structure, which is the result of the cognitive (cognitive) activity of the individual and society and carries complex, encyclopedic information about the reflected object or phenomenon, about the interpretation of this information by public consciousness and the attitude of public consciousness to a given phenomenon or object. Linguistic consciousness is "external" consciousness, that is, it is expressed by external linguistic means.

An associative experiment is one of the ways to externalize the linguistic consciousness, and the associative fields formed from the verbal reactions of native speakers make it possible to describe the qualities of the images of their consciousness. We tried to conduct a free association experiment with a Chinese audience. The currently relevant concept "covid" was chosen as the concept.

The experiment involved 60 respondents, including 30 women and 30 men, aged 18 to 37. The associative experiment was conducted in the form of an online survey. Based on the analysis of the received reactions to the stimulus words of the concept "covid", all reactions were divided according to common semantic and cognitive features into 7 semantic parameters of the semantic gestalt "covid":

- "Personal protective equipment and control measures"- 181 reactions, frequency index 29 %, is the core of the concept. Thus, the core consists of the following reactions: 治疗 — treat, cure (20), 医生 — doctor (14), 隔离 — isolation, isolate (12), 口罩 — mask (5) etc.;
- The peripheral zones include such associative fields as: "Diseases and complications caused by coronavirus" — 157 reactions, frequency index 25 %. This associative field includes: 病毒 — virus

(41), 新冠 — new coronavirus (24), 新冠疫情 — new coronavirus epidemic (17) etc.;

- "The human condition during the pandemic" — 79 reactions, frequency index 13 %. This associative field includes: 病人 — sick, patient (7), 可怜 — pitiful, unfortunate (4),死亡 — death, die (3) etc.;
- "Politics" — 29 reactions, frequency index 5 % This associative field includes: 美国 — USA (8), 管控 — manage and control (5), 拜登 — Biden etc.;
- "Period of pandemic" — 23 reactions, frequency index 4 %. This associative field includes: 结束 — finish, completion (8), 长久 — long, 早日结束! — finish ASAP etc.;
- "Processes and actions of the virus" — 75 reactions, frequency index 12 %. This associative field includes: 传播 — spread (6), 感染 — get infected (6) etc.
- "Other" — 74 reactions, frequency index 12%. This associative field includes: 音乐 — music (13), 没有 — have not (6), 人数 — number of people (2) etc.

Suggested reactions show that in the minds of Chinese speakers, covid is largely associated with the presentation of remedies and measures of protection.

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SINGLE-SHOT SEMANTIC MAPPING IN THE DEVELOPING BRAIN: THE ROLE OF ARTICULATION IN NOVEL WORD LEARNING

Young children are well-known as successful word learners, which is reflected in very high rates of new word-form acquisition and efficient mastering of the mother tongue or even several languages. This ultra-rapid lexical acquisition mechanism has been dubbed "fast mapping" [FM, Carey, Bartlett 1978]. Despite many studies conducted in this field, neural underpinnings of FM are still debated, and several open questions remain. Could single-shot semantic mapping be sufficient for rapid formation of novel word representations in the developing brain? To what extent does the activation of neural circuits outside the "basic language system" contribute to the word acquisition process in early development? To address these issues, we used ERPs to define brain dynamics elicited by novel words following a single-shot semantic associative learning task combined with sensorimotor (articulatory) training and to estimate cortical underpinnings of this process in the developing brain.

Healthy monolingual Russian preschool children (5–7 y. o.) performed a word-picture associative learning task [Vasilyeva et. al. 2019] accompanied by a brief articulation session. The task employed a counterbalanced set of familiar and novel words presented auditorily in conjunction with novel and familiar images appearing on the screen. A new word's meaning had to be inferred through a single-shot exposure to the novel item by excluding familiar items based on the semantic context. The child had to select the new object defined by the previously unfamiliar word form and then articulate the word form overtly three times. During the articulatory stage, the referred object was not displayed, to avoid the undesirable contribution of explicit learning. Acoustic stimuli were fully controlled dissyllabic (CVCV) word forms of two types: (i) four meaningful Russian words, (ii) four phonotactically and phonologically legal meaningless novel word forms (pseudowords). Visual stimuli consisted of two-dimensional photos of familiar and unknown objects. To define learning-related brain dynamics, passive auditory ERPs to newly learnt words were recorded immediately after the task, with familiar

words and untrained pseudowords used as control stimuli. Cortical sources were estimated using sLORETA algorithm.

ERP results revealed that a single-shot learning task combined with a brief articulatory training leads to significant decrease in fronto-central negativity, with a slight right-hemispheric shift. This decrease was present at 282–322 ms after the stimulus recognition point for both familiar and novel trained words, with no similar effect for control stimuli. sLORETA source analysis indicated that this activity was generated bilaterally in fronto-temporal areas, with maxima in BA21 (previously familiar items) and BA22 (newly learnt items).

Overall, our results demonstrate a rapid and highly plastic mechanism for word acquisition in the developing brain. Single-shot semantic learning task accompanied by brief articulatory training leads to an enhanced memory trace activation for both novel and familiar items, indicating rapid formation of new word form representations and possibly reinforcement of pre-existing ones for familiar words. Further research is needed to study neurocognitive mechanisms subserving efficient integration of perceptual and motor systems in the developing brain and its contribution to the word acquisition processes in early development.

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DIFFERENT TYPES OF ORTHOGRAPHIC MANIPULATIONS WHEN IDENTIFYING ERRORS IN RUSSIAN WORDS

Whether the position of the letter in a word matters for orthographic processing is an important question for psycholinguistics. Previous results are mostly from morphologically simple words, so in this project, we compared roots, prefixes and suffixes on the material of Russian verbs. They differ both in their position and in their morphological properties.

We conducted two lexical decision experiments with priming using the IbexFarm platform. The materials were the same. In Experiment 1 (42 participants), primes were shown for 60 ms to capture early processing stages, in Experiment 2 (41 participants), for 150 ms to study later stages.

To study orthographic processing, so-called orthographic neighbors are often used: words with transposed, substituted, added or deleted letters. The goal is to determine in which positions orthographic manipulations are more noticeable. In our experiments, half of the target words were prefixed verbs (e. g. *zatolkat'*), and the other half were suffixed verbs (e. g. *tolknut'*). They were presented in three conditions: (1) after a prime with a letter substitution in the affix (e. g. *zEtolkat'* or *tolknOt'*); (2) after a prime with a letter substitution in the stem (e. g. *zatIlkat'* or *tIlknut'*); (3) after an unrelated prime, i. e. in the control condition (e. g. *koplunet'*).

For the statistical analysis conducted in the *R Studio*, we used mixed effects linear regressions with random intercepts by participants and by items and Tukey's tests for multiple comparisons. Two factors were tested: the type of the affix (prefix vs. suffix) and the type of the prime (substitution in the affix vs. in the root vs. control condition). In Experiment 1, there were only tendencies, while Experiment 2 yielded significant results summarized below.

Firstly, letter substitutions in the root were more noticeable than in the affix, although previous studies showed that substitutions in the middle of the word are less noticeable. This may be due to the fact that previous studies worked with monomorphemic words. If there are several morphemes, the root morpheme is crucial. Secondly, letter substitutions were in general less noticeable in suffixed words than in prefixed words, and suffixed words were easier to recognize. Potentially, this happens because suffixed words start with the root morpheme that is crucial for recognition.

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MATCHING FEATURES OF CONJUNCTS INCREASE ACCEPTABILITY: IS THIS SYNCRETISM EFFECT?

There are two strategies of agreement with coordinate constructions in Russian: standard agreement (1), in which the predicate takes plural form, and partial agreement (2), in which the predicate agrees with one of the conjuncts. Certain factors may favour one strategy or another. One of the factors that make partial agreement more plausible is matching grammatical features of the conjoined NPs [Sannikov 2008]. We explore whether in this case the acceptability of partial agreement is increased due to the syncretism effect.

Syncretism effect, as defined originally, suggests that certain restrictions are removed in constructions with homophonous (syncretic) forms [Sigurðsson et al. 2008]. In Russian such effect occurs, for instance, in the case of Right Node Raising: when the RNRed noun is syncretic for the two cases (accusative and nominative), the construction becomes grammatical [Asarina 2010].

In the case of predicate agreement with coordinate structures, however, both strategies are possible under any conditions and resolution by syncretism, thus, isn't required. Nevertheless, both conjuncts having identical features allows either of them to be the controller of agreement increasing acceptability in a similar way to what happens in cases of "pure" syncretism effect. Similarly, the experimental study of attraction errors [Makarova et al. 2021] shows that even though in non-syncretic sentences the attraction errors are possible as well [Slioussar et al. 2016] in sentences with syncretic head such errors are significantly more likely to occur.

To establish whether syncretism plays a role in the acceptability of partial agreement with coordinate constructions in Russian an experimental study was conducted. Our main hypothesis stated that the acceptability of partial agreement will be higher for the stimuli with the conjuncts of the same gender. The Russian correlative conjunction *i…i* (see [Pekelis 2013]) was chosen for the stimuli. The design included two independent variables (number of predicate and combination of conjuncts' genders). Likert scale 1–7 was used to measure acceptability.

Statistical analysis was carried out using linear mixed effects models and Tukey's multiple pairwise comparisons. The analysis showed that stimuli with standard agreement have a significantly higher acceptability rate than ones

with partial agreement for any combination of conjuncts. Among the stimuli with partial agreement, the scores of the ones with same gender conjuncts were significantly higher than the scores of the stimuli with the conjuncts of different gender (Tukey test: p-value = 0.0012, SE = 0.540, t-ratio = –3.757, df = 240), hence proving the main hypothesis.

The obtained results allow us to state that matching features of conjuncts influence the acceptability of partial agreement in Russian. Although partial agreement is possible in non-syncretic stimuli as well, matching features significantly increase its acceptability allowing us to propose that this may happen due to the same mechanisms as in cases of syncretism resolution effect while what differs is the initial restrictions or lack of such.

Examples:

(1) *V pesne zvuchal i organ, i baraban.*
in song sounded.SG.M and organ.SG.M and drum.SG.M
'In the song both organ and drums were playing.'

(2) *V pesne zvuchali i organ, i baraban.*
in song sounded.PL and organ.SG.M and drum.SG.M
'In the song both organ and drums were playing.'

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TO SPEAK OR TO READ: SECOND EDITION

Introduction. As several experimental studies have already shown that the format of visual information presentation influence mastering the material [Petrova, Skvortsova 2021; Riekhakaynen, Skorobagatko 2021], it seems relevant to study the role of the oral text format in the processing of multimodal information. In our previous experiment [Zubov, Riekhakaynen 2022], the stimuli were flash talks, in which speakers read a text or delivered a prepared monologue. We did not reveal any difference between reading and speaking in their subjective assessment and in how well participants answered to the questions about the content of the talks. It could be because the participants did not see the speakers, but only heard their voices. Thus, we conducted a second experiment where the stimuli were videos of the speakers.

Methods. We asked two speakers, both having previous lecturing experience, to record short flash talks on similar topics where they delivered prepared monologues but did not read. Then we transcribed their speech and asked them to read the texts and record their reading on video. Thus, we got four stimuli which we presented to participants in our experiment. Each participant got two videos from two different speakers; the format of the presentation (reading or prepared monologue) could be either different or the same within a pair. The order of stimuli presentation was randomized. The participants had to rate each video on three scales (clarity, interestingness and how good the format of presentation was) and answer six questions on the content of the talk. 52 native Russian speakers (M = 21.1; SD = 4.2; 32 female) participated in the experiment.

Results and Discussion. We found significant difference between prepared monologues and reading only in the parameter "Interestingness" ($\chi 2 = 9.71$, $p = 0.046$), but this difference is the result of the fact that reading by one speaker received higher scores than his monologue (Mread = 3.38, Mspont = 2.93), whereas for the other speaker the type of the text did not influence any parameters we checked. Moreover, the talks of the latter speaker received significantly higher scores for the format of presentation than the talks of the former speaker (M1 = 2.59, M2 = 3.46).

To conclude, the results of this experiment supported our previous findings that the type of oral presentation does not influence the acquisition of

the information in the flash talk and its subjective assessment. We assume that the observed differences should be explained by the speakers' individual differences.

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