The Fourth Saint Petersburg Winter Workshop
on Experimental Studies of Speech and Language (Night Whites 2018)

We are very pleased to welcome you to The Fourth Saint Petersburg Winter Workshop on Experimental Studies of Speech and Language (Night Whites 2018) dedicated to studying the mysteries of human language function.

The workshop is hosted by Saint Petersburg State University, Russia, on February 26 - 27, 2018. The talks and posters focus on topics broadly defined as experimental studies of human language including (but not limited to) psycholinguistics, neurolinguistics, cognitive neuroscience, computational modelling of linguistic processes, neuropsychology, experimental phonetics, etc. Four keynote lectures are given by:

- Victor Kuperman, McMaster University, Canada
- Giacomo Rizzolatti, University of Parma, Italy
- Antoni Rodríguez-Fornells, University of Barcelona, Spain
- Gabriella Vigliocco, University College London, United Kingdom

As can be seen from the programme, this workshop is bringing together researchers working on language for an event that transcends disciplinary boundaries to give a snapshot of the current state-of-the-art in this diverse field and encourage new contacts, ideas and collaborations.

We wish to thank the Faculty of Liberal Arts and Sciences of Saint Petersburg State University for their hospitality in hosting this event.

The Organising Committee:
Prof. Tatiana Chernigovskaya, Saint Petersburg State University
Prof. Kira Gor, University of Maryland
Dr. Andriy Myachykov, Northumbria University and Higher School of Economics, Moscow
Dr. Tatiana Petrova, Saint Petersburg State University
Prof. Yury Shtyrov, Aarhus University and Higher School of Economics, Moscow
Dr. Natalia Slioussar, Higher School of Economics, Moscow, and Saint Petersburg State University
Keynote lectures
Word learning and word representation

Victor Kuperman

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Psychological science has recently experienced a crisis of replicability, i.e., a failure to repeat many of well-established experimental effects. A set of solutions offered to overcome the crisis includes open collaboration of multiple research groups and labs, while sharing experimental designs, data and analyses. I will present two collaborative projects in psycholinguistics, which coordinate data collection and analyses across multiple research sites and languages.

The first project examines the role of spelling errors in acquisition and recognition of orthographic representations. We argue that homophonous errors (инocent or самалет) can weaken the mental representation of conventionally spelled forms (innocent or самолет) by creating alternative, competing representations. The amount of competition, and the effort of recognizing correct forms, is expected to be greater if the spelling error is relatively frequent. We examine this effect in native and non-native (German and Finnish) speakers of English, and native speakers of Hebrew, using eye-tracking and lexical decision tasks. Across languages, populations, and tasks, we demonstrate that a greater competition between the correct and incorrect spellings leads to more effortful responses to correct words. We also reveal interactions between the spelling competition effect and individual differences in language proficiency in both native and non-native speakers. Taken together, the results suggest that spelling errors are not merely an outcome of deficient orthographic representations, but also their cause: learning spelling is actively disrupted by individual experience with alternative, substandard forms.

The second project takes as a point of onset a recent observation that readers of languages as different as English, Finnish, and Chinese, require the same amount of time (measured through eye-movements) to read sentences that have identical content (Liversedge et al., 2016). Our parallel eye-tracking study of English and Hebrew speakers reading similar texts from Wikipedia confirmed this result, as did our analysis of an eye-movements corpus of English and Dutch reading of the same novel (Cop et al., 2016). Sentences that were matched for their content took the same amount of time to read, despite vast differences in the orthographic and linguistic systems of respective languages. Our study took this observation one step further and demonstrated that any fragment of an English text that has the same number of words as an average English sentence (18) will be read in the same amount of time as a fragment of a Hebrew text with the same number of words as an average Hebrew sentence (14). This means that languages are optimized to process an equal amount of information (measured here as the number of words) in roughly the same time, regardless of the content. We explore implications of this finding from the viewpoint of information theory and extend it over other pairs of languages.

Critically, both projects are made possible through coordinated planning and data collection at multiple research sites. I will conclude with an invitation to students and researchers to join these collaborative efforts.
The intrinsic reward of language learning

Antoni Rodriguez-Fornells

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During the last decade, we have accrued important knowledge regarding the neural networks involved in the hard process of language acquisition. However, it is still unknown which are the neural process underlying the human drive to learn a language. Recent theoretical models have proposed that during human evolution, emerging language-learning mechanisms might have been glued to phylogenetically older subcortical reward systems, reinforcing human motivation to learn a new language. Supporting this hypothesis, we recently showed that adult learners exhibited robust functional MRI activation in the ventral striatum —a core region of reward processing — when successfully learning the meaning of new words. These results provided the first neural evidences of the important role of reward and motivation during language learning and supporting the idea that the strong coupling between neocortical language regions and the subcortical reward system provided a crucial advantage in humans for successfully acquire linguistic skills. Furthermore, we recently showed that successful language learning (without the presence of external feedback) boosted also the activation of reward-memory circuits [substantia nigra/ventral tegmental area complex (SN/VTA), and the hippocampus (HP)]. Thus, intrinsic driven learning seems to be strongly coupled with subserving reward-memory processes needed to ensure future recall success. We believe this intrinsically motivated-learning mechanism might be crucial for boosting formation of long-term memories, specially in our everyday lives, as we continually acquire new knowledge in the absence of any obvious immediate reward.

A key question for the future is whether tapping into intrinsically rewarding forms of learning might be a more effective educational strategy than relying on external feedback and incentives. A second critical issue is to which extent the implication of this reward-learning intrinsic mechanisms could predict the success of the process of learning a new language (considering the contextual and sociolinguistic factors surrounding the learning experience). This could be crucial for improving the design of educational programs - for example, in teaching foreign languages - and also for improving the recovery of verbal skills lost after stroke.

References


Word Learning and its Implications for Language Acquisition. Current Biology, 24, 2606-2611.


Iconicity as a bridge between language and the world

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Most research in psycholinguistics, linguistics and neurobiology of language investigate language as unimodal (speech and/or text) and assumes that linguistic forms are arbitrary symbols. I will present an alternative approach to the study of language that takes language as a multimodal phenomenon where messages are conveyed by the linguistic content but also by gestural and prosodic cues, for spoken languages, just like they are conveyed by multiple articulators (hands and face) in signed languages. By broadening the lens to multimodal language, iconicity in communicative forms becomes visible and common (e.g., in the gestures and/or in the prosody). I will present studies in spoken (English) and signed (British Sign Language, BSL) languages that investigate the role of iconicity in language development; and studies using iterative learning to assess whether iconicity emerges and is maintained during simulations of cultural evolution.
Oral and poster presentations

(in alphabetical order)
Neuroplasticity of language: Mismatch Negativity elicited by pseudowords before and after language training

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Neurophysiological correlates of language processing were measured before and after language training. The mismatch negativity (MMN) was recorded in the distracted oddball paradigm to a word and pseudowords.

We used the multi-stimulus passive oddball paradigm. There are two experiments (before and after training) with three conditions: one standard stimulus and two deviant stimuli and the reversed design in two other conditions. Thus, the MMN responses were elicited by deviant items, but the critical variable determining the MMN response - the standard-deviant acoustic-phonetic contrast - was identical in all three conditions. Language training was provided for one week, twice per day. The participant listened to audio-recorded information about pseudowords fictitious meaning assigned to them. EEG was recorded before and after the learning interval.

No significant main effects were found for the standard stimulus in both experiments. Event-related potentials were successfully calculated for the standard and deviant stimuli in all experimental conditions and for the all stimuli the mismatch negativity responses were obtained. After one week of language training the significant main effects for MMN mean amplitude and latency to pseudoword were shown. Meaningless pseudowords after semantization demonstrated significantly enhanced MMN responses.

The results support our hypothesis that the meaningless stimuli lead to a significantly more pronounced MMN response after language training. Furthermore, the MMN latency is shorter and the amplitude is bigger for the same pseudoword stimuli after the training of assigned meaning, suggesting that meaningless items show neuroplastic changes transforming to meaningful ones.

The work was supported by the Russian Foundation of Humanity (project # 15-06-10806).

Keywords: neuroplasticity of language, MMN, word memory traces.
The role of letter position for visual word processing: an experimental study on Russian

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Experiments with orthographic neighbors are one of the main methods to study letter processing during visual word recognition. We study the role of letter position for lexical access. Although this factor is expected to play an important role, it did not reach significance in the previous experiments (e.g. (Grainger, 1988) using four-letter Dutch words).

We conducted a masked priming lexical decision experiment on Russian. All primes were nonce words, five-letter targets were real nouns in nominative singular or nonce nouns. Two factors were manipulated: whether the prime was a one-letter substitution neighbor of the target (experimental vs. control condition); whether the substituted letter in the experimental condition was word-initial, word-final or word-medial (e.g. rivan, disan, divap, and sifar for the target divan ‘sofa’).

All substitution primes decreased response latencies compared to the control condition, as in many previous studies with nonce neighbor primes. Surprisingly, the substitution in the beginning increased the size of the priming effect compared to the middle of the word, and there was also a tendency between word-final and word-medial position in the same direction. This partially replicates our findings from a previous experiment with real word primes (Slioussar & Alexeeva, 2017), in which the priming effect was found to be more pronounced for word-final letters than for the middle-letters (word-initial letters were not included). Together, these results show that, although word-initial and word-final letters are known to be more salient in perceptual tasks, they might be less important for candidate activation during lexical processing.

*Keywords*: substitution neighbors, visual word recognition, letter position.
Interactive Analysis of Syntactic Disambiguation During Reading in Russian

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Eye movement parameters were studied during reading locally (with early, E and late, L closure), globally (G) ambiguous sentences with ambiguity of feminine relative clause in Russian (globally ambiguous paradigmatic case Someone shot the feminine servant of the actress who was on the balcony translated from Russian), and unambiguous sentences (U) with one interpretation of feminine relative clause. The total reading times while reading L and E but not G were significantly longer than in reading U. Shorter total reading time some phrases of G in comparison with reading similar phrases of E and L is determined by lower regression frequencies and consequently fewer fixations for rereading these phrases. Therefore structural analysis when reading G occurs faster than reading E and L that indicates the absence of additional difficulties in G disambiguating. We found longer total reading times the second noun (N2) of noun phrase and the relative pronoun (RP) when reading L in comparison with E. Apparently this fact can be explained by additional verification of the result of L disambiguating (in favor of late closure) since in Russian the early closure dominates. We assume that in disambiguating E readers rarely reread the N2 and subsequent RP as a less likely choice after structural analysis. Supported by Russian Foundation of Basic Research (project No. 15-04-05745).

Keywords: syntactic ambiguity, reading, eye movements.
Bilingualism in light of understanding a third language: Access to the Spanish language by Russian-Romanian bilinguals

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Bilingualism is a complex process involving a variety of characteristics, among which we can distinguish a particular system of a language as well as the ability to use it in communication. Apart from the mere fact of acquiring the knowledge of a second language, bilingualism also implies the development of specific linguistic structuring and brain functioning different from those of a monolingual individual. This fact is crucial at the time of access to a third language and it has been studied by analysing the comprehension ability of bilingual informants to refer to a third language without its prior learning and by comparing the acquired results with those obtained by monolingual individuals. Being an experimental research, it was based on the creation of corpuses with their subsequent transformation into questionnaires for our hypothesis assessment. Thus, the involved hypothesis considered bilingualism between two different language families (e.g. Russian-Romanian, i.e. Slavic and Romance) manifesting higher understanding results in a language from one of the language families involved (e.g. Spanish) in comparison with monolinguals presenting one of the languages considered in bilingual informants (i.e. Russian and Romanian monolinguals). This particularity in understanding involves the difference in the way of thinking and analysing the acquired linguistic data resulting in a more effective capacity for understanding even in comparison with the monolingual individual presenting the same language family as the target language. The specification of brain organization and the analysis of linguistic data are due to the creation of specific psycholinguistic strategies by the bilingual individual.

*Keywords*: bilingualism, multilingualism, psycholinguistics.
Orthographic manipulations and word reading

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Reading proficiency improves with practice as intricate processes that support reading ultimately become automatic. The color-word Stroop, a popular measure of inhibition, is a task that relies heavily on reading proficiency. Research shows that orthographic manipulations (i.e., changing letter positions in a word) have an effect on the word’s readability. To investigate the degree of interference based on orthographic effects a computerized version of the color-word Stroop was created. In addition to the standard condition color-word (i.e., orange) letter positions: First/Last letter in place (e.g., onagre) and Scrampled (e.g., ragoen) was modified. A first study was conducted with a developmental sample that includes children (7 -16 years) and adults (N=151). Results suggest that performance of both children and adults is hindered the most for incongruent conditions regardless of whether the word had a correct or incorrect spelling, however it was most facilitated only when the words were congruent with ink-color and spelling. To investigate whether this effect is observed in the Russian language, English-Russian adult bilinguals completed an English and Russian version of this task. Results show evidence in whole-word reading regardless of correct and incorrect spelling. These findings contribute to the understanding that of the relation among, inhibition, interference control, orthography and reading.

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Keywords: color-word Stroop, orthographic manipulation, development.
Internal state terms as the animation glue in narrative plot: Investigation of dyslexics and typically-developing children

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Development of narrative competence, i.e. transition from personal to fiction stories, bridges the gap between child's mimetic mind and mediational mind (Nelson 1996) and serves as a primary background for early literacy prerequisites (McCabe 1996). Internal state terms (ISTs), an integral part of narrative macrostructure, take part in mentalisation of human behavior and development of literate style that forms a crucial aspect of school-based discourse (Pearson 2002; Curenton & Justice 2004). This is extremely important for diagnosis and treatment of literacy impairments; however, ISTs in atypical populations still lack comprehensive studies.

The present study focuses on differences between dyslexic (DY) and typically-developing (TD) children with respect to production of ISTs in story-telling and retelling. The subjects of the experiment were 12 Russian-speaking monolingual DY children (mean age 9 years 9 months); the control group consisted of 12 Russian-speaking monolingual TD peers. The subjects performed two tasks, i.e. story-telling and retelling according picture sequences. The order of tasks was counterbalanced with regard to story complexity and narrative mode.

First, storytelling according the more complex sequence in 1st session revealed a gap between the groups: the DYs tended to use less (P<0.08) ISTs than the TDs. Second, Anova analysis highlighted significant effect of story complexity, narrative mode, and order of tasks on the ISTs production in the DY group; among these factors, the order of tasks seems to have the strongest influence.

The results of the study call for discussion on significant limitations in the DY children's mentalisation of narrative protagonists' behavior.

Keywords: narrative analysis, narrative mind, internal state terms.
Experimental Visualization of Literary Characters in Online Novels

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Literature has never been designed to be genuinely visible. Recently, technical development such as the creation of e-books and their potential to connect hypertexts digitally broadens the possibilities of contemporary authorship (Breitenbach: 2010).

The double novel Gut gegen Nordwind (2007) and Alle sieben Wellen (2009) by the Austrian Daniel Glattauer reminds of the traditional literary form epistolary novel while at the same time creating the illusion of digitalism and the use of contemporary media as the novel is written as a series of emails sent between the two protagonists. This example demonstrates fictional digitalism, which does not necessarily improve on the visibility of literature (Baumgarten: 2013).

In 2013, German Torsten Rohde first created his fictional character Renate Bergmann on Twitter. Becoming quite popular soon after the release of the account, Rohde built his first novel. This example represents the emerging potential of social media to influence the development of literary fiction and (analogue) publishing.

Cathy’s Book, a sponsoring-based American novel, plays with the readers and immediately incorporates them into the narrative. The work complex e.g. holds accounts on Facebook, MySpace and YouTube as well as other websites. The active presence of a literary entity on social media major contributes to the visibility of the narrative.

The planned talk aims to compare these experimental forms of literary visibility in contact with digital media. Main focus will be put on the reciprocity of the participating media in order to augment the visibility of each other and the new (sub)genres in-between.

Keywords: Image Linguistics, Intermediality, Multi-Modality.
Neural correlates of conceptual shifts


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The theory of concept types and determination (Löbner, 2011) posits that noun concepts can be classified into four concept types (CT) with corresponding preferred determiner types: sortal (a stone) + indefinite, individual (the sun) + definite, relational (his ear) + possessive, and functional (his father) + possessive. If a given concept is combined with an incongruent determiner, it is shifted to the respective type: a stone (sortal) - his stone (relational). Our behavioral work on CT-shifts (Brenner, 2015) demonstrated an overall facilitatory CT congruence effect (‘the sun’ is processed faster than ‘his sun’) that we assumed to be triggered by a facilitation of post-lexical NP construction.

Based on our previous results we predicted that a CT shift should not be perceived as a syntactic or semantic violation. We tested this prediction in two ERP studies employing a memory task (1) and a wellformedness judgment task (2). The processing of congruent and incongruent CTs (e.g. the sun vs. his sun) was compared to the processing of morphosyntactic and semantic violations in control conditions. Whereas the control conditions elicited classic electrophysiological violation responses (N400, LAN, & P600), CT-incongruences, as predicted, did not. Instead they showed a novel response pattern that needs further investigation.

Our findings suggest that the difference between CT-congruent and CT-incongruent determination is not perceived as a violation of the semantic or morphosyntactic structure of the determiner phrase. The reported novel effect rather indicates that it is easier to build up and interpret a CT-congruent NP.

Keywords: ERP, semantics, concept types.
Professional Self-image Modelling (on the material of psycholinguistic experiment)

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Research of a profession image/image of professional activity is of great scientific interest as its results possess both theoretical and practical value (Kaler et al., 1989; LeCroy & Stinson, 2004; Scherz & Oren, 2006). Attention to the professional activity of a teacher is characteristic for pedagogues who focus their attention on methodical aspects of pedagogic discourse, as well as for psychologists and sociologists who consider relationship between a teacher and students from the point of view of their psychological attitudes and social practices.

The array of research questions in these spheres is singularly wide, although practically all of them ignore the fact that a university teacher is to be a scientist at the same time, and one’s educational activity is often determined by scientific notions. Moreover, educational activity is closely connected with certain social institutions (universities, faculties, chairs etc.), the place of its realization, emotions accompanying the activity and so forth. Professional activity in general, and especially that of a university teacher, finds its reflection in the whole personality structure, and in attitude to life as such. Our research task is to reconstruct a complex self-image of professional activity of a university teacher of linguistics.

The research material includes the results of a directed chain associative test with multiple reactions. The informants were Russian university teachers of linguistic subjects and master students of linguistics. Experimental data processing implied semantic classification of the reactions and their statistical analysis. The research was carried out in the “Semograph” information system at the stages of gathering the experimental data, classification of reactions, and compiling statistical tables.

The research results demonstrate that the nucleus of the profession self-image is formed by the EDUCATIONAL ACTIVITY and SUBJECT DOMAIN semantic fields. However, the structure of professional activity image rearranges depending on the informants’ qualification. The usage of Correspondence Analysis gave an opportunity to specify configurations of semantic fields which create the profession image for each of the three qualification groups considered. It was discovered that semantic fields are distributed in two-dimensional feature space which the following axes: OX - the qualification axis (masters, associate professors and professors) and OY - the subjectivization/objectivization axis which registers the informants’ reactions from subjective emotions/interpretations/evaluations to their objectivization in activity and, further, in this activity results (articles, textbooks, monographs etc.). In this case intellectual activity is understood beyond the scope of final objectivization (e.g., in form of scientific articles). It is much wider and encompasses not only scientific activity as such, but can be interpreted as a certain LIFESTYLE.

Keywords: self-image of profession, linguist, educational activity, subject domain, semantic analysis, statistical analysis.
Brain dynamics during online lexicalisation of novel written words: influence of phonological and semantic factors

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Readers often encounter novel words for which they have no previous experience and no semantic reference. The availability of previous knowledge has been found to be a critical factor in the formation of memory traces for novel written words, allowing faster reading automatisation. Here, we investigate neural correlates of this advantage and the extent to which novel word lexicalisation depends on availability of previous knowledge. We used EEG to record brain activity during visual exposure to 24 novel orthographic Spanish word-forms, repeated in six different trials each. Participants were sub-divided into three equal groups which, prior to EEG recordings, received either training on (1) just phonology of novel words, (2) both phonology and meaning, or (3) received no training. The results showed an advantage in early orthographic processing when both phonological and semantic information about words was available, as indicated by a P200 enhancement already during the first visual exposure to these stimuli, as opposed to those that were not trained or trained only phonologically. However, lexico-semantic acquisition seems to benefit from previous exposure independently of its type, as similar N400 reduction was found during the first visual encounter with stimuli trained in phonology and with phonology-meaning combination. Stimuli whose phonology had been experienced prior to EEG recording showed a higher change in the amplitude of both P200 and N400 components through visual repetitions. Overall, these results reflect the key role of phonology in the build-up of new orthographic representations, at least for a phonologically transparent writing system.

Keywords: ERP methodology, reading, novel word learning.
How Finnish morphology confuses the L2-speaker

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Finnish morphology is notoriously difficult for L2 speakers. The rich inflectional paradigms and the abundant compound possibilities enforces anybody who wishes to be even a moderate proficient language user in Finnish to quickly develop morphological knowledge and awareness in this language. The current study investigates to what extent this development is complicated by morphophonological variation in the inflectional paradigms. That is, in Finnish the word stem frequently changes when it is combined with inflectional suffixes, e.g., tauko 'break' => tauolla 'at the break' or sota 'war' => sodan 'the war's'. These changes obscure the stem and may make the decomposition process - segmenting the morphologically complex word into constituent morphemes (tauo+lla; as Finnish-speakers usually do, see Bertram, Laine, Karvinen, 1999) - very complex.

The current study tested 38 native speakers and 34 L2-speakers in a visual lexical decision experiment including monomorphemic nouns (e.g., kaupunki 'city'), inflections without stem changes, e.g., loma 'holiday' => lomalla 'on holiday') and inflected words with stem changes (e.g., tauolla 'at the break'). The results showed the standard delay in inflectional processing but this delay was enlarged in case of stem changes for both L1 and L2 speakers. However, whereas for L1 speakers the error rates were low across conditions (1 to 2 %), L2-speakers made much more mistakes with inflections including stem changes than for monomorphemic nouns or ‘normal’ inflections. The results underline the notion that sophisticated ideosyncratic language peculiarities greatly confuse the L2-speaker and that these peculiarities require extra attention in educational settings.

*Keywords*: Finnish, morphology, L2 speakers.
A Contrastive Study of Verbless Sentences in Russian and English Parallel-Corpora

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Although the absence of the verb has fascinated linguists for ages, the difficulty of automatic processing has meant that most analyses have relied on fragmented data. Overcoming the typical problems of fixed annotation and verb-centric syntactic modeling (Landolfi et al. 2010), this paper presents a new method of verbless sentence extraction. Verbless sentences are investigated through parallel-text corpora (Stolz 2007) in English and Russian with the aim of uncovering the semantic and pragmatic factors associated with the absence of the verb.

Cross-linguistic differences make it particularly relevant to compare Russian, a language that permits the most liberal use of verbless sentences among the Indo-European family, with English, known for its dependency on the verb phrase (Kopotev 2007). The present study combines corpus methods with the parallel-text approach to contrastive linguistics developed by Guillemin-Flescher (2003). Following the latter, we rely on the principle that re-occurring translation patterns reveal linguistic constraints that would otherwise remain hidden. The results are based on a 150,000-word specially created corpus, which includes Dostoyevsky’s Russian dialogue centered Brothers Karamazov, Pinter’s English play The Caretaker, and several translations. Automatic verbless sentence extraction was developed using Trameur (Fleury & Zimina 2014) and the data was aligned by paragraph. Characteristic elements of verbless sentences for each language were found using statistical corpus tools. Translation correspondences were manually annotated for antecedent-based verbal ellipsis (McShane 2000), information structure (Lambrecht 1994), predication (Hengeveld 1992).

While establishing statistical significance of expected verbless sentence frequency differences between Russian and English, the results surprisingly reveal English overrepresentation of antecedent-based ellipsis. Verbless sentences are overwhelmingly non-elliptical, associated with direct speech and statistically characterized by informal markers. Information structure analysis of translation correspondences, shows an English trend of activating contextually implied topics, particularly over distances. Predication transformation findings imply that the verbal/non-verbal dichotomy is inadequate for a cross-linguistically stable definition of predication.

Keywords: verbless sentences, parallel-corpora, Russian-English.
Cross-language activation in deaf LIS (Italian Sign Language) - Italian bilinguals

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The present study investigates the visual word processing in deaf bimodal bilinguals who are proficient in Italian and Italian Sign Language (LIS). In particular, the research addresses the parallel activation of LIS phonology in a reading task adapting the paradigm proposed for the first time by Morford et al. (2011). Deaf bimodal bilinguals and a control group of hearing Italian native speakers judged the semantic relation of Italian written words; critically, half of the stimuli has a covert phonologically related translation in LIS. To narrow down the possibility of a strategic translation during the task, the time available for lexical processing has been controlled using a short SOA (300ms). The results are consistent with previous studies and show that bimodal bilinguals were significantly slower to judge semantically unrelated pairs if the translation equivalents in LIS were phonologically related. A significant effect of LIS covert phonology on the error rate was also found in the semantically unrelated condition. These results and the use of a fast rate of presentation of the stimuli indicate that bimodal bilinguals’ lexicon is cross linguistically integrated, with phonological representations of the signed lexicon associated with the orthographic representation of the vocal one.


Keywords: bimodal bilingualism, cross-language activation, deaf readers.
Verbal working memory in individuals with autism

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Previous research showed that working memory (WM) associates with solving problems, focusing attention, learning and developing abstract thinking (Williams, 2005). In turn, violation in WM leads in impairment in performing of these tasks and decrease of effectiveness of cognitive functions. All aforementioned difficulties were found in individuals with autism. In particular, Williams’s research shows that differences in the functioning of working memory are more associated with spatial WM, while the verbal WM does not practically differ in norm and pathology. However, other works revealed that individuals with autism have some problems in resolving of linguistic WM tasks (Minshew, Goldstein, & Siegel, 1995), where participants had a deal with remembering of sentences. Thus, the issue about verbal WM in individuals with autism is still unresolved. The aim of the current work is to examine whether verbal WM has differences in norm and pathology and whether various tasks give different results. The series of experiments was conducted to test verbal WM (N-back tasks). Experiment 1 (N-back letter task) replicated the experiment of the study by Williams (2005). To understand whether there is a difference between remembering a set of letters without any semantic content and meaningful words the experiment 2 (N-back word task) was carried out. We expect that the verbal WM in individuals with autism and in individuals without any cognitive impairment could differ in word task, while in letter task results in two groups of participants will be the same. The data obtained can be useful for understanding the features of the processing and remembering information by individuals with autism.

Keywords: verbal working memory, autism, language processing.
Characteristics of Russian binomials: frequency, word order, irreversibility, abstractness

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Formulaic utterances, i.e. pre-fabricated multiword units, are part and parcel of everyday communication as they account for between 20% and 50% of adult native language (Siyanova-Chanturia, 2015). Recent studies have focused on various types of multiword units including formulaic sequences, idioms, and collocations. Our research is aimed at investigation of one particular type of above mentioned expressions - binomials (e.g. king and queen, here and there in English, война и мир, север и юг in Russian).

Despite being profoundly investigated in the European linguistic tradition, binomials have been scarcely targeted by the Russian researchers. In this study we looked at various parameters of such units, namely their frequency, word order, reversibility or irreversibility, and the degree of abstractness. For research purposes such methods as subjective estimations and psycholinguistic questioners was used. The data on frequency have been taken from Russian National Corpus. The data on other parameters have been collected via questioners. A group of 50 Russian native speakers took part in the study.

The report will represent the obtained results and provide a definition of binomials in the Russian language.

Keywords: formulaic language, binomials, Russian language.
Creativity in Slang Emergence: A Case Interpretation of Indo-Aryan Languages

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Contrary to the situation present in other parts of the world, the Indian subcontinent with its different language communities, such as Hindi, Bengali etc. still maintain some Asian lingua-cultural conservatism while handling slangs. The research critically reflects on the linguistic processes involved in the emergence and interpretation of slangs in the multilingual Indian community. It further posits that to appreciate this one has to understand the domain (real or media based data) specific cognitive processes involved in the slang creation, slang formation processes, constraints in the coinage of new slang expressions and some taboo in their usage. Chiefly, it is interesting to understand the verbal repertoire vis-à-vis slang usage in the children who are placed differently in the Asian social structure. The study will attempt to answer three questions:

1. When does the emergence of slangs occur in the verbal repertoire of children in the community?

2. How do they start the interpretation of the same?

3. What cognitive processes are involved and the level of creativity required in both activities?

Following the above questions, the research will aid in developing a critical framework to approach slang. If slangs can adequately be understood at a socio-cultural and practical level, then it might lead to natural language formalizations. Enunciation of rules for machines will recover the deletion in those places which further leads to a better understanding of the natural language by the machine, therefore, the work will facilitate the development of better understanding of slangs in basic human language behavior.

Keywords: Slangs, Linguistic Behavior, Cognitive Processes.
Effective Methods of Corpus Based Approach to Language Learning

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Researchers have cited a wide range of application of corpora. During the learning process observation of students in language lab, IIT Ropar, this paper illustrates its potential in the form of web accessible resource (such as narrative records, articles and dictionaries) for bridging the gap between the English learning strategies and the learners. To assist them with different aspects of English such as their grammatical, syntactic and prosodic. Additionally, a Need Analysis of the learner for easy availability of specialized corpora such as speech corpora, video recorded and 3D corpora facilitated a multimodal analysis allowing for better comprehension of the facial expressions, gestures and emotions during linguistic performance.

Based on this a framework was prepared, which could be summarized under the following points: The students developed proficiency in English through speech corpora but their progress in writing skill remained slow. For which different texts having sophisticated writings were chosen with different sentence patterns, use of words in different context and semantic values and much more. The automated annotated corpus proved helpful to the learners with their POS classification and accuracy. The grammatical features and the use of particular word such as Wh-words or adjectives in a sentence which were subject to be in the field of errors were automatically put to correction by analyzing the frequency of the words in the corpus. The feedback from the learners after introduction of these corpora was satisfying. Thus, the study will summarize future possibilities for better integrated corpus based approaches to learning.

*Keywords:* Speech corpora, Prosodic analysis, Language learning.
Visual perception in preschool children with different levels of language disorders

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The specificity of participation of parvo- and magnocellular visual processing pathways in image formation in preschool children with atypical development and different levels of language disorders has been studied.

In comparison with typically developing children, children with autism spectrum disorder (ASD) and children with mental retardation (MR) and I-II degree of global language disorder (GLD) had significantly higher thresholds of contrast detection during sequential change.

While studying the thresholds of visual objects global motion, it was found that assessment of global direction of moving objects is significantly lower in MR and ASD children with I-II degree of GLD, as compared with III-IV degree of GLD.

In the study of global motion thresholds based on the stationary object orientation, significant differences were found only in ASD children with I degree of GLD.

In the study of children’s ability to identify the form of a visual stimulus when changing its color, size and location, it was found that in MR and low ASD children with II degree of GLD, the time to recognize a figure significantly increased only with the increase in the number of possible locations of the target object among the demonstrated figures. Children with high ASD (I degree of GLD) demonstrated an absence of an ability for invariant detection of the object shape relative to the change in object properties.

These data may indicate a correlation between severity of visual processing deficit with the level of the child’s overall language development.

Keywords: visual perception, atypical development, levels of language disorders.
We report the results of the study on acquisition and development of the noun case paradigm in L2 Russian. Anna Denissenko (UPF, Barcelona) elicited a large number of texts from adult Spanish-Catalan learners, and we selected and digitalized 196 texts by participants with A1-C1 proficiency levels, aged 18-69, and created a database that was used in this study. Russian has six cases, three nominal declensions with subclasses, three genders, and two numbers. A single ending carries information about all these characteristics. We propose that some language-specific grammatical factors, such as ambiguous forms of case endings, multiple endings within one case, verbal government and prepositional government, play a greater role in the acquisition than others.

The only study on the acquisition of the whole Russian case system is Rubinstein (1995). Rubinstein analysed case errors according to the principles of the Error Analysis (EA) framework (Corder, 1981), and concluded that over time the quality of case errors did not change but their quantity did. In our study, we analysed both nouns with case errors (822 forms) and grammatically correct nouns (5980 forms) to avoid the main criticism of the EA framework focusing only on errors. Our results show that the quantity of case errors gradually declines along with the change of their quality. The acquisition of different cases over time can be traced in the distribution of both correct forms and errors. At the beginner level, learners tend to overuse nominative and locative (prepositional) cases and to underuse dative, genitive and instrumental. At the advanced level, the case system of learners shares some patterns with the system of native speakers (Slioussar & Samojlova 2015).

Keywords: language development, case system, Russian morphology.
NP-type and RC-type in Attachment Ambiguity Resolution

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The ambiguity of modifier attachment to a complex noun phrase is widely discussed cross-linguistically (Grillo et al. 2014), and although certain languages are claimed to favour either high or low attachment, the structure of the complex NP (Gilboy et al., Pynte 1998) can also affect attachment preferences.

According to Spanish and French data, complex NPs like $N_1$ with $N_2$ provoke low attachment while in sentences with genitive NPs like $N_1$ of $N_2$ RCs are usually attached high. According to Gilboy et al., argument structure affects thematic role assignment which determines parsing.

We present Russian data which are not compatible with this explanation: no LA preference in $N_1$ with $N_2$ in a questionnaire study (significant HA-preference for animate NPs and no significant preference for inanimate ones). This distribution can be explained if RC-type is taken into account.

In English, French and Spanish studies RCs in all the stimuli were restrictive as they were not separated from a complex NP by a comma. As soon as in $N_1$ with $N_2$ constructions $N_1$ already has a restrictive modifier $N_2$, RC tends not to be attributed to $N_1$. However, in Russian both restrictive and non-restrictive RC are separated by a comma, which is a source of another kind of ambiguity. The distribution is 50/50 for inanimate NPs (RC can be attached high if it is non-restrictive and low if it is restrictive), while for animate NPs $N_2$ can both be a restrictive modifier and express accompaniment relation, which increases the share of HA interpretations.

Keywords: sentence processing, ambiguity resolution, modifier attachment.
Rapid acquisition of novel word meaning through auditory-motor associations


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Despite the impressive progress achieved recently in the study of brain mechanisms of speech and language, the current understanding of the processes that implement assigning meaning to novel words is limited. We developed an experimental procedure that allowed investigating acquisition of word meaning by way of rapid associative trial-and-error learning. Eight pseudowords were presented to the participants; four of them were assigned to left and right hand and foot movements, while the other pseudowords did not require actions and were used as controls. Participants were instructed to learn the relations between the pseudowords and actions through the trial-and-error motor learning procedure. Auditory feedback was delivered on each trial informing whether response was correct or erroneous. Magnetoencephalogram was recorded during passive listening of the pseudowords before and after learning. The cortical sources of the magnetic evoked responses were reconstructed using distributed source modeling (MNE software). Neural responses to newly learnt words compared to control pseudowords were significantly enhanced in temporal and frontal cortical regions surrounding the Sylvan fissure of the left hemisphere. This activation was inversely related to the number of trials needed for participants to reach the learning threshold. Thus, our findings revealed a neural signature of rapid associative learning of word meaning and highlighted the role of sensory-motor transformation for association-grounded word semantics. Supported by RFBR grant 17-29-02168.

Keywords: word meaning, action words, magnetoencephalography.
Probing connections between morphologically related words

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It was shown that access to the base word depends on the properties of its derivatives, most notably on the morphological family size (e.g. Moscoso del Prado Martin 2004). Evidently, this effect is due to the fact that derivationally related words are connected in the mental lexicon. We explore the role of different factors in the relative strength of such connections.

In Russian, verbs can be derived from other verbs by prefixation and by suffixation. Prefixed verbs tend to preserve all inflectional properties of the base verb except for its aspect, but their semantics is often only partly predictable. Suffixation always changes the verb’s inflectional class, but allows for a much lesser semantic variability than prefixation. We looked at the suffixes -va- used for secondary imperfectivation and -nu- deriving semelfactives.

To explore whether suffixed or prefixed verbs have a stronger connection to their base verb in the mental lexicon, we conducted a masked priming lexical decision experiment with three conditions: a suffixed prime, a prefixed prime and an orthographically and semantically unrelated prime (control). We found that suffixed primes produced significantly shorter response latencies compared to the control condition than prefixed primes did. Thus, regular and predictable semantic correspondences are more important than shared morphological features (the forms of prefixed and base verbs literally coincide except for the prefix).

We are currently running a follow-up experiment with nonce verb primes having nonce prefixes and nonce suffixes to tease apart a potential role of position in these findings.

*Keywords:* morphologically related words, mental lexicon, Russian.
Grammatical gender mismatch under nominal ellipsis: effects of mismatch type and grammatical number

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For grammatical-gender languages such as Russian, Greek, or German, it is proposed that certain nominals, including nouns indicating profession or nationality (German examples: Kellner/Kellner-in, ‘waiter/waitress’; Italiener/Italiener-in, ‘Italianmasc/Italianfem’”) exhibit an asymmetry under nominal-predicate ellipsis (e.g. Bobaljik & Zocca, 2011). For this class of nouns, gender mismatch under ellipsis is assumed to be licensed with masculine but not with feminine antecedent predicates (e.g., Spencer is a waiter and Katherine is too[mascantecedent-femellipsis]/ #Katherine is a waitress and Spencer is too[femantecedent-mascellipsis]). This can be explained in terms of markedness: masculine (unmarked) forms do not impose a gender/sex presupposition, while feminine (marked) forms presuppose female referents. We tested the asymmetry-proposal in an experiment on German. All experimental items comprised an antecedent clause with a nationality noun as nominal predicate and a gender-mismatch ellipsis. There were 2(mismatch type: mascantecedent-femellipsis/femantecedent-mascellipsis) x 2(number: singular/plural predicate [e.g. ‘Mr Turini is Italian … too.’ / ‘Mr Turini and Mr Bacco are Italians … too.’]) conditions. The participants’ task was to rate the items on a scale ranging from 1 (“very bad”) to 7 (“very good”). Consistent with the asymmetry-proposal, the ratings were significantly higher in the mascantecedent-femellipsis condition compared with the femantecedent-mascellipsis condition. However, there was also a significant interaction, which is inconsistent with the markedness explanation: Whereas number did not affect the ratings in the femantecedent-mascellipsis condition (Mediansingular = Medianplural = 2), it did affect the ratings in the mascantecedent-femellipsis condition (Mediansingular = 3; Medianplural = 4). In our presentation, we will discuss possible alternative explanations of this finding.

Keywords: grammatical gender, ellipsis, presupposition.
We report two self-paced reading studies on the ambiguous forms (heteronyms) of Russian nouns, differentiated in speech through word stress, e.g. uCHItelja.TEACHER.GEN/ACC.SG and uchiteLJA.TEACHERS.NOM.PL. Since word inflection is a reliable cue to syntactic role assignment, the ambiguity affects the level of morphology and of syntactic structure. However, numeric advantage of the GEN over the NOM and the ACC and word order canonicity pre-empt two different syntactic parses (OVS vs SVO) when the heteronym is sentence-initial. We inquired whether the parser is aware of the multi-level ambiguity and whether the two conflicting factors (morphological and syntactic) can prime parallel access to several structural parses.

Twelve quadruples with animate and 12 with inanimate heteronyms were embedded in locally ambiguous sentence frames. The heteronymic condition was contrasted with the control one, where inflectional ending specified the noun’s morphology (muzikanta.musician.GEN/ACC.SG vs muzikanty.NOM.PL). The processing pattern in the control condition confirmed the facilitatory effect of the canonical SVO word order. In the heteronymic condition, animate and inanimate nouns patterned differently. The difference was consistent across the experiments. For inanimate nouns, there was a clear-cut reaction time advantage of NOM.PL used as sentential subject. For animate nouns, no difference between the heteronymic forms was observed. To provide a unified account of heteronym processing, several possibilities are discussed. To avoid being garden-pathed, the parser might activate the greatest number of syntactic alternatives possible. They converge in one stress pattern in inanimate nouns, but spread across two stress patterns in animate nouns. Alternative explanations will also be provided.

Keywords: ambiguity resolution, inflectional morphology, Russian.
Towards Cephalic Annotation: Do We Turn to Change the Posture?

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Within the framework of our corpus resource “Russian Pear Chats and Stories” (Kibrik, forthcoming), cephalic annotation has some tiers in ELAN with two of them being the most elaborated: tagged head movements and head postures. The head movements are defined on a formal basis of their kinetic production, and tagged like Up, Down, Turn Right/ Left and etc. The head posture in our terminology is a position, preserved for some time period in all three axes or in the local neutral position. The period encompasses various movements (gestures, adaptors and posture change movements) and the motionless or rest states.

We also distinguish the posture changes: they are the movements, aimed at transition of the head from one local neutral position to the other; they differ from each other in changing at least one of the axes. The amplitude of a change facilitates the posture change detection.

Here we present a two-way process how to define a posture and a posture change. On the one hand, we proceed from the components of different channels which can prompt us the boundaries. Thus, the posture changes and the eyes movements seem to correlate, and we may suggest their semantic synonymy as gestures. On the other hand, some particular head gestures do not fall into any other category but a posture change, like head turns. Often the posture is changed when the head turns, which may be due to the change of the communicative situation, or to the turn-taking moment in discourse, or to the physiological needs of the neck.

Research underlying this paper is conducted with support of grant #14-18-03819 from the Russian Science Foundation.

Keywords: cephalic annotation, head turn, posture change.
The written sentence processing in good and poor readers: an impact of two distinct task designs on the ERP study results


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The study aimed to explore ERP correlates of metaphoric/literal sentence processing during reading in Russian young adults (“good” and “poor” comprehenders according to their off-line reading text comprehension assessment). Two ERP-experiments with the different design were conducted. In both experiments the subjects made a categorical decision about 3-4 word sentences: is it’s meaning metaphoric or literal one. The parts of sentences were presented in two steps: 1 - the initial 2-3 words (1st stimulus – context); 2 - the key word (literal or metaphoric - 2nd stimulus). In Experiment1 literal and metaphorical phrases were presented, the instruction was “to categorize the whole sentence”; in the Experiment 2 - stimuli were literal, metaphorical and distractors, instruction - “to categorize the last word”. ERP amplitude differences relevant to sentence meaning judgment were revealed for both the 1st and the 2nd stimulus (240-340 ms in Fp1, F7, Fz; and Pz) in “good” readers, and only for 2nd stimulus (220-380 ms-F3) in “poor” readers in Experiment1. For the 1st stimulus more negativity on 370-530 ms was revealed in “good” comprehenders vs “poor”. We presumed that “good” comprehenders made an inference about the sentence figurative meaning right after the 1st stimulus presentation contrary to “poor” made it only after the 2nd stimulus. The distractors and more focused instruction in Experiment2 blocked an early inference and prevent the relevant ERP between group distinctions; only the late ERP components after the 2nd stimulus distinguished 2groups. It seems, that good and poor comprehenders differed by their inference making strategy in sentence reading. Supported by RFBR grant No15-06-08349.

Keywords: ERP, reading, comprehension.
Representation of phraseological nominations with spatial meanings by the gradual etalon method

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The perception of space and orientation in it are basic human psychical abilities. The designation of spatial relations and their fixation in language are very important. The importance of spatial representations in language is indicated by the fact that the sets of synonymous within them are quite large. In the number of cases the distance in these sets is represented not by separate lexemes but by phraseological units that are rather figurative and expressive and can belong to different styles of language.

The purpose of this research was to establish whether the phraseological nominations with spatial meanings 'far' and 'close' are consistently arranged in a certain order on the mental spatial map of native speakers of the Russian language. To achieve the results we conducted a psycholinguistic experiment using the gradual etalon method offered by V.Y. Shabes (Shabes 1989). The conducted research allows to draw the following conclusions.

Native speakers show the graduated standard of distances represented through phraseological units. This graduation standard is stable and manifests itself in experiments with different groups of informants conducted by different methods.

In the gradual etalon "far - close" could be underlined zones that are formed by certain means (ways). Only the middle zones are coded through the designation of definite or indefinite distances. The body, its movements and orientations are represented in coding close zones in language, while distant zones are coding through unknown territories and unknown mythological worlds.

* * *

Keywords: psycholinguistic research, gradual etalon, distance.
Inflection and case are differently represented in the brain: An fMRI study of the recognition of case-inflected nouns

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While there is growing evidence that inflected words are morphologically decomposed in lexical access, the behavioral and neurophysiological correlates of morphological decomposition (aka affix stripping) have not been disassociated from the correlates of the processing of different inflected word forms as members of the inflectional paradigm. The present fMRI study uses a visual lexical decision task to dissociate the processing of inflection (overt: -a vs. zero: -ø) and case (citation form: the nominative case vs. oblique form: the genitive case) in the recognition of Russian nouns. Reaction times were significantly longer in response to oblique-case than citation-form nouns indicating additional costs in the processing of oblique cases. The analyses of the changes to the BOLD signal established an increased activation for overtly inflected compared to zero-inflected nouns in the left inferior frontal gyrus (BA 44/45/47), the core part of left perisylvian language network. Together with an effect of an increased BOLD signal for overt inflection in the oblique case compared to the citation form, this suggests a greater involvement of morphological decomposition in the recognition of oblique-case inflected nouns. The study established the neural correlates of case: the genitive (the oblique case) engaged more the left inferior frontal gyrus (LIFG), the area involved in morphological decomposition, while the nominative case (the citation form) engaged more the bilateral lexico-semantic network. The effect of inflection is interpreted as evidence of morphological decomposition, while the effect of case is interpreted as evidence of psycholinguistic reality of case hierarchy in the inflectional paradigm.

Keywords: fMRI, morphology, case.
The order of acquisition of spatial prepositions in Russian

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In Russian the location of the object is expressed by both prepositions and cases. Prepositions are acquired gradually (Leikin 1998). The purpose of this research is to study the age of acquisition of spatial prepositions and the order of this acquisition (the first stage described in (Grabovskaya 2015)1). Two experiments were conducted: experiment on comprehension and experiment on production. Our expectation is to find the difference between ages which indicates the acquisition of the preposition. All respondents are Russian monolingual native speakers. The stimuli were a modified set of pictures from (Bowerman & Pederson 1992); some of the children participated in the experiment twice with a one year delay, the results from the second year are analyzed separately. The comprehension test had 35 participants (18 male; 20 children – 3 years old, 15 – 4 years old), 7 of them participated in the test twice. The study focused on the comprehension of the prepositions pered ‘in front of’, nad ‘above’ and za ‘behind’. The results were analyzed using logistic regression with age and gender as predictors; paired Student’s t-test was used to compare the results from the two stages of the experiment. Analysis using R indicates a significant difference between ages for the comprehension of pered ‘in front of’ (0,00846 **) which means the new level of acquisition of pered ‘in front of’ by 4 years. The prepositions nad ‘above’ and za ‘behind’ are not acquired by 4 years. The test on production had 37 participants 5-6 years old (analysis in process).

The author would like to thank Tatyana Nikitina for helpful advices during the work on this project.

Keywords: language acquisition, spatial prepositions, Russian language.

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Before or after? The position of grammatical category markers triggers different learning processes

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Findings from artificial language learning studies suggest that succeeding category markers facilitate acquiring knowledge about categories (e.g., gender) more than preceding markers (e.g., Ramscar, 2013). This can be explained by the discrimination learning account of Rescorla and Wagner (1972), which predicts an order effect for category learning: succeeding category markers trigger *discriminative learning* which is important for *category discrimination* and preceding category markers trigger *associative learning* which is better for within-category *item discrimination*. However, this order effect only makes a difference for not clearly distinct (*non-transparent*) categories. In a learning simulation and three behavioral artificial language learning experiments, we tested how category and item learning are affected by the position of category markers and the transparency of the categories. For this, we built an artificial language around a set of nouns. Nouns were categorized along two dimensions: a highly transparent semantic category (plants, animals, random objects) and a non-transparent stress category (stress on 1st, 2nd and 3rd syllable). Training on succeeding markers facilitated learning of features of the non-transparent stress category but not of the transparent semantic category. At the same time, training on succeeding markers made noun item discrimination more difficult. On the other hand, training on preceding markers facilitated noun item learning. Our results suggest that detailed sequential aspects of the input sequence, as well as the transparency of feature sets, determine the triggered learning process. These findings are not only relevant for L2 acquisition research but also for a better understanding of diachronic processes in language evolution.

*Keywords*: artificial language learning, discrimination learning, morphology.
This paper seeks to answer a question how native French speakers perceive emotional speech of Russian children and to find out whether there are universal and specific patterns in perception of emotional speech in an unfamiliar language. For this purpose, the perceiving experiment was carried out using the corpora of Russian Emotional Children Speech. All recordings of children’s speech were cut into short chunks and presented to auditors. The participants of the experiment were adult native French speakers currently living in France. They do not know Russian and do not have children. It means that there was no lexical or motherhood/fatherhood experience support and all listeners relied only on their hearing. The experiment was aimed to find out how many chunks with emotional speech would be recognized correctly when the listeners rely only on prosody while segmental level of information is not present. In the end of the experiment the similar and different patterns of assessing emotions in children’s speech were revealed. This study will help to understand better the nature of emotions’ perception while a lexical and segmental levels are still unknown. Despite the linguistic nature of this research, the results could be used in speech synthesis or machine recognition of emotional speech.

Keywords: emotional speech, children's speech, speech perception, cross-language studies.
Weight effects and variation in word order in Icelandic and Faroese

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Various studies on Heavy NP Shift (HNPS) in English converge on the conclusion that the frequency of HNPS is not only determined by the heaviness of the displaced object, measured in the number of words. The relative heaviness of the object vs. the word string between the main verb and the object plays a significant role as well (Hawkins 1994, Wasow 1997, Stallings & MacDonald 2011). This paper presents the results of two surveys on HNPS in Icelandic and Faroese, where speakers evaluated sentences with shifted subjects and direct objects. The NPs were all shifted across a VP-modifying PP and the length of the NP and the PP was controlled. The results show that HNPS with both subjects and direct objects is acceptable to most Icelandic speakers and to some Faroese speakers, although Faroese speakers clearly prefer shifted objects to subjects. The survey also revealed that different factors contribute to how speakers of these two languages evaluate sentences with shifted arguments. For Icelandic speakers it is important that the NP is relatively heavier than the PP it shifts across, whereas Faroese speakers do not seem to be sensitive to this factor. Also, a number of speakers of both languages accept shifted NPs that cannot be considered long and are even relatively shorter than the PP. This tells us that for some speakers it is perfectly acceptable to shift NPs that would generally not be considered heavy at all.


Keywords: variation, syntax, word order.
IPA Symbol Equivalents for Lithuanian and Latvian Monophthongs

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The use of the International Phonetic Alphabet (IPA) is guided by some principles, one of which is “when two sounds are very similar and not known to be employed in any language for distinguishing meanings of utterances, they should, as a rule, be represented by the same symbol. Separate symbols or diacritics may, however, be used to distinguish such sounds when necessary” (IPA 1999). Since Lithuanian and Latvian languages belong to the Baltic branch of Indo-European language family, to the group of Eastern Baltic languages, these two languages often are placed next to each other as particularly close languages; phonological systems of vowel phonemes are quite similar in both languages. Though, some experimental studies show that, despite of the common Baltic origin, different IPA symbols for some corresponding (very similar) Lithuanian and Latvian vowels are to be used. Could such very similar vowel phonemes of different languages of the common Baltic origin be so of a different quality? A question may be answered by analysing the spectral characteristics and various distinctive features based on the results of the experimental research of the sounds of the contemporary Baltic languages to choose as accurate symbols (equivalents) of the IPA for all the Lithuanian and Latvian vowel phonemes as possible.

Since IPA (revised to 2015) system is very useful in comparative linguistics, the main aim of this report is to provide and explain the choice of the IPA equivalents for the monophthongs of the contemporary Baltic Standard languages.

Keywords: Baltic languages, vowels, IPA.
The influence of word boundary on consonant duration in Russian

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Variation of consonant duration is governed by a number of factors. Thus, consonants tend to be longer in prosodically strong vs. weak contexts, in stressed vs. unstressed syllables. Prosodic boundaries also have an effect on consonant duration. At absolute ends of large prosodic units - utterances and intonational phrases - consonants experience a significant lengthening effect when the boundary is marked by a pause. However, if there is no pause, the lengthening effect is either absent or very small.

This paper explores the question of whether consonant lengthening is observed at boundaries of smaller prosodic units - clitic groups (word plus its adjacent clitics). The study is based on the 30-hour speech corpus CORPRES containing read speech recorded from 8 speakers.

Our study shows that the word-beginning lengthening effect depends on the word’s stress pattern. When the stress falls on the first syllable, the first syllable’s consonant gets significantly longer compared with the word-medial position (which is not true for the syllable’s vowel). Word-beginning lengthening effect might be observed in unstressed syllables as well, but it on a less regular basis. Word-final lengthening effect seems to be absent in phrase-medial position, i.e. when the word is not followed by a pause.

Keywords: prosody, consonant duration, Russian.
Speaking and listening in face-to-face multichannel communication

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Although language production and comprehension are parts of one and the same linguistic capacity, they have been studied separately for a long time. A key issue in modern (psycho)linguistic research is how the two processes are related, or whether transitions from thought to language and vice versa are accomplished by a single or two separate systems. Instead of traditional accounts that adopt the “cognitive sandwich” perspective, Pickering & Garrod (2013) proposed an integrated theory of production and comprehension. Recent work on the functional neuroanatomy of language also suggests that the brain areas involved in language processing are mostly the same for speaking and listening (Menenti et al. 2011).

In line with these studies we explore the production-comprehension relationships on the basis of our new resource “Russian Pear Chats and Stories” (Kibrik 2018). In communication, interlocutors combine verbal structure, prosody, eye gaze, as well as facial, head, hand and torso gestures to produce integrated multichannel discourse. All of these communication channels are employed simultaneously and in conjunction with each other (Kress 2002; Kibrik 2010; Müller et al. eds. 2014). Moreover, during the process of face-to-face communication, each interlocutor performs the roles of speaker and listener simultaneously. For example, a speaker, while producing speech at a given moment, simultaneously monitors the listener’s kinetic behavior (nods, gaze, manual gestures). Communicative actions of the interlocutors thus form a complex and heterogeneous network that necessarily must be credited a capability to involve simultaneous and multidirectional thought exchange.

The evidence of the multichannel resource suggests a cognitive architecture that integrates language production and comprehension.

Keywords: multichannel communication, production, comprehension.
Computational Investigation of Linguistic Markers in Discourse of Political Adversaries via Interpretation of Recurrent Neural Network

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Cognitive-discoursive paradigm puts forward discourse of a community as the major unit under analysis. A community discourse can be analyzed through texts written by participants of the community since it is expressed in those texts in various ways. For large communities, sheer amount of texts generated limits the ability of human researcher to comprehend unique features of a discourse. But modern Machine Learning algorithms are able to process large amount of texts thus aiding the human researcher in investigation. We offer a modern word-level Recurrent Neural Network-based approach for unsupervised detection of discourse-specific linguistic markers: specific phrases, word sequences, metaphorical models and separate words. The first phase of our research is collecting a large corpus of three text types: writings of Russian pro-government and opposition activists and neutral texts without political coloring. The neutral corpus serves as control group. The second phase is training the model to classify the texts until it reaches near-human performance (measured by comparing its output to labels made by human participants). And the final phase involves interpretation of trained model to highlight the exact kinds of words that model links to a class. We suggest our approach for revealing implicit intents and linguistic markers and claim that it is universal for any kind of discourse.

Keywords: neural networks, political discourse, linguistic markers.
Predictive processing in Russian: evidence from EMEG

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Predictive processing provides a potential framework to conceptualise language comprehension as probabilistic inference given incomplete input. However, the degree to which we pre-activate upcoming words in natural language processing remains disputed. Here we present two EMEG experiments asking whether constraining grammatical context facilitates predictive pre-activation of upcoming words’ relevant linguistic properties.

The first experiment focused on Russian subject-verb agreement, where the form of an agreement marker is determined by the preceding subject. We compared these with contexts where free Russian word order allows the subject to follow the verb making the suffix form less predictable. Using univariate and RSA techniques we show that predictability changes the way that otherwise identical suffixes are processed in the bilateral temporal cortex.

A second experiment investigated whether and when grammatical constraints can pre-activate words’ grammatical and lexical features. Participants listened to Russian sentences with target words whose grammatical category (noun or verb) was either constrained or unconstrained by the preceding context. Nouns contained derivational suffixes, while verbs contained inflectional suffixes. Only unconstrained inflectional forms produced post-suffix left-fronto-temporal activity, suggesting decompositional processing. In the constrained contexts listeners accessed the target’s morphological form before suffix onset leading to early activation of verb subcategorization information in the left temporal areas. These results suggest that context may facilitate predictive access to a word’s lexico-grammatical properties while also determining the processing strategies applied to an incoming verbal or nominal stem.

Together these experiments provide novel insights into how grammatical constraints in Russian language can be used to investigate the predictive nature of linguistic processing.

Keywords: predictive-processing, Russian, morpho-syntax.
Articulatory changes due to the musical performance situation: evidence from French Lyric Singing

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Articulation in French lyric singing is discussed by many scholars. One of the most discussed topics is the articulation of the consonant /r/, for which uvular and alveolar variants both exist nowadays in French vocal speech. The choice of one of the variants mentioned above is done by a singer consciously and in advance. Therefore uvular or alveolar model of /r/-articulation is supposed to be maintained during the performance of the whole piece. Nevertheless, deviations from this chosen model of articulation are very often observed in performances: in on stage performances as well as in studio recordings. Such changes may be caused by the stressful situation coupled by technical - musical or articulatory - difficulties. Combination of musical and phonetic contexts is thus of special interest for an interdisciplinary analysis. In order to consider the impact of these contexts on /r/-articulation, left and right vowel(s) and consonant(s), as well as the melodic line declination or inclination were analyzed. 90 French art songs interpreted by 20 French male and female operatic singers were chosen for this purpose. The results of the study show the difference between male and female singers’ articulation of the consonant /r/ in different phonetic contexts. At the same time there is a more obvious parallelism between male and female groups in occurrence of the articulatory changes in various musical contexts.

Keywords: articulation, French lyric singing, phonetic contexts.
Attention span in simultaneous interpreting
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Simultaneous interpreting was more than once labeled as one of the most requiring jobs there is. In our study we hypothesize that simultaneous interpreters would have a larger attention span than a control group performing a similar demanding task. Simultaneous interpreters (N=7) and the control group (N=17) were instructed to shadow the speaker in a video sequence where he was giving a speech surrounded by 20 different objects, to press a button when looking into the camera and to press another button when the speaker pronounced proper names creating a situation of significant cognitive load similar to one experienced by simultaneous interpreters. Both groups were later presented with a recall test (20 target stimuli, 40 distractors) and comprehension questions. We did not find any difference in recall test performance between the groups (U Mann-Whitney, p=0.13), but interestingly interpreters were worse at identifying distractors than the control group (mixed-effects linear model, p=0.042) and better at identifying target stimuli (p=0.054, Task type X Picture type interaction, p=0.03). Moreover, both groups were making more mistakes in target stimuli identification compared to distractors (p<0.001). The results could be an indication that interpreter perception filters are tilted towards accumulating more incoming information than those of a person without simultaneous interpreting training.

The study was supported by Russian Foundation for Humanities, grant number 15-06-10894_a and RFBR, grant number 16-06-00501_a

Keywords: simultaneous interpreting, attention span, cognitive load.
The strategic reading brain development: eye-tracking study of text reading in typically-developing and dyslexic children

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There is a variety of publications on elementary mechanisms of word reading, while just a few studies have been devoted to the natural reading. The goal of our complex multimodal explorative project is to construct a multidimensional developmental model of a text processing in the natural reading. The current eye tracking study of the natural text reading is part of the major project includes 3 minor projects (fMRI-study, ERP-study and Eye-tracking study) with the same participants.

Two scientific expository and two fiction narrative texts were presented to the subjects of the study, i.e. 43 9-11- and 12-14 years typically-developing (TD) and dyslexic (DY) children with normal nonverbal intelligence. The standard reading score in dyslexics was 1,5 standard deviation below mean (Kornev, Ishimova 2010). The reading time was unlimited. Then, the natural reading was followed by answering comprehension questions. During all the experiment, and eye gaze movements were registered.

Statistical analysis of the variety of oculomotor measures revealed multiple significant distinctions between the DYs and TDs in both age groups. As for text processing strategies, the DYs were not sensitive to the text type, in contrary to the TDs. For the first time, the distinctions in the low level of the gaze movement control was revealed in the DYs’ saccades It’s velocity was significantly lower than in the TD peers, especially in the oldest age group.

Keywords: dyslexia, text processing, eye tracking.
Syllabification strategies in Russian: new experimental evidence

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Anna Ābele in her article “On the problem of a syllable” raises some questions that seem to stay unchecked since 1924, when the article appeared. Among them, there is a hypothesis that syllabification is language-specific, i.e. there is a predominant tendency of syllabification in every language. A. Ābele argues that open syllables are prototypical in Russian, and if presented, for example, a nonword *rtapastla Russian speakers will divide it into open syllables.

To check this assumption we asked 180 native speakers of Russian to divide into syllables 34 disyllabic Russian words with CVCCVC structure (such as mostik ‘small bridge’) and 55 words and nonwords of different syllable structures as fillers (*rtapastla being among them).

Only 62% of participants used only one strategy in the experiment, the most popular being not the one predicted by A. Ābele, but the one when a consonant cluster in the middle of a word is divided into two parts and the consonants go to different syllables. These results contradict the hypothesis of A. Ābele and support the previous findings of Vinarskaya & Kasevich (1977). The most interesting results we got for trisyllabic words and nonwords where there were several strategies used. For some words (such as aktrisa ‘actress’ or *tastrakot) at least two strategies are competitive, whereas for the others (otvjortka ‘screw driver’ or *rtapastla) there is a predominant one when a consonant cluster is divided as CC-C.

The research is supported by the grant #16-18-02042 from the Russian Science Foundation.

Keywords: syllabification, psycholinguistic experiment, Russian.
Speech and rhythm perception and reproduction in children with posterior fossa tumors

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Temporal coding is important aspect of information coding in the brain and crucial in the perceptual processing of speech (Luo & Poeppel, 2007). Goswami (2011) suggest that in children with dyslexia auditory rhythmic entrainment is also likely to be impaired. Children with brain cancers and treatment after (radiation and chemotherapy) demonstrate speech problems among other symptoms. Posterior fossa tumors (PFT) affect cerebellum and brain stem structures. These areas play role in sensory-motor synchronization and speech production. The aim of this study was to reveal associations between speech problems and audio-motor synchronization in children after PFT treatment. Our sample consisted of 14 children diagnosed with medulloblastoma (the most frequent pediatric cancer localized in posterior fossa) (mean age 12.43.3 years) and 14 neurologically healthy children (controls) (mean age 11.32.9 years). Neuropsychologist examined all children to identify their speech characteristics. Then children were asked to perform audio-motor synchronization tasks: to synchronize their taps with the metronome sounds with a frequency of 40, 60, 90 and 120 beats per minute. Mean inter-tap-intervals (ITI) and its standard deviation and variation were analyzed with a special software. Our results suggest that PFT patients demonstrate more pronounced speech slowdown, difficulties with speech processing, they spoke without intonations, and have rhythmic dyspraxia (difficulties in rhythm perception and reproduction) compared to control group. Brain cancer patients have significantly higher ITI standard deviation and variation, which means poorer audio-motor synchronization ability. These results allow us to expect that audio-motor synchronization training with sound cues could help children improve their speech characteristics.

Keywords: posterior fossa tumors, speech, rhythm.
Age and sex difference in brain regions functional connectivity during reading Russian and English texts in adolescents

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The study is devoted to investigation of the age and sex differences in the formation of functional systems providing verbal functions in adolescents. Despite a large number of psychological, psychophysiological and neurophysiological studies, verbal activity cerebral organization in adolescence have not been sufficiently studied.

We study the process of functional integration of different cortical areas during reading of Russian and English text in adolescents 12-13 (N=48, 20 male) and 15-17 (N=37, 15 male) years old. Using the cross-correlation analysis of EEG matrix, the contribution of each cortical area in the spatial synchronization of biopotentials (SSBP) was assessed.

Age and sex differences of SSBP in adolescents were revealed during reading Russian and English texts compared to the rest wakefulness with eyes open. Age differences (12-13 vs 15-17) of brain spatial interaction patterns are more pronounced in female then in mail groups. Sex differences manifested in different levels of spatial synchronization of brain biopotentials in the left temporal regions and bilateral parietal regions. In boys during reading statistical intrahemispheric connections of central, parietal and occipital-parietal regions bilateral were more pronounced, whereas in girls interactions of temporal regions of the left hemisphere to the posterior temporal and frontal regions of both hemispheres were more pronounced. When reading texts in English, sex differences were more pronounced.

*Keywords*: EEG, reading, adolescents.
It’s all about the base: Age effects on morphological processing

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Recent large-scale studies show that language processing is strongly influenced by accumulated linguistic experience of an individual (see Keuleers, Stevens, Mandera, & Brysbaert, 2015; Kuperman & Van Dyke, 2013, for example). In this study, we demonstrate that prior linguistic experience, as measured by both frequency of use and age of the participant, modulates lexical knowledge, as indexed by accuracy in a lexical decision task, (see Ramscar, Hendrix, Shaoul, Milin, & Baayen, 2014, for discussion). Using a large dataset by Keuleers et al. (2015), we focused on suffixed bimorphemic English words. Lexical decision accuracies to over 8,000 such words were averaged over participants across seven age groups, from 10 to 60 years. A central measure of interest was the log ratio of the base and the derived word frequency (e.g., frequency of boy over frequency of boyhood, see Hay, 2001), interpreted as an index of the relative importance of the whole derived word and its base as cues towards that word’s meaning. Results of the generalized linear mixed-effects model showed a statistically significant non-linear interaction between age group and our frequency measure, after controlling for length and orthographic similarity. Specifically, the functional shape of the effect suggested that the base becomes an increasingly less influential cue over lifespan, and older readers are more resilient towards morphological cues when recognizing derived words. This is the first study to demonstrate that accumulation of linguistic knowledge leads to a gradual emergence of resilience to morphology as a processing strategy.


*Keywords*: morphological complexity, language processing, linguistic experience.
Spatial mapping of verbal tense forms in the Russian language

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It has been repeatedly demonstrated that carriers of different languages comprehend time using different spatial metaphors (Boroditsky, 2011). The Chinese use the vertical axis: time flows for them "from top to bottom". And the carriers of some Australian languages comprehend time in geographical coordinates: the past is always located in the east, and the future is in the west. All these effects, however, were shown using the paradigm of explicit reasoning about the order of events: people were asked about earlier and later events in terms of spatial coordinates. In this study, the goal is to determine whether the strategy of spatial time mapping is preserved with the implicit processing of words expressing different temporal references, verbs of past and past time. The eye-tracking method is fundamental in our work because it allows implicit identification of automatic cognitive processes. The study involved 32 people, native speakers of the Russian language. The results showed that our hypothesis concerning the Russian language and the representation of temporal forms in the mind of the native speaker works with the exact opposite. The view of the subjects while listening to the past tense verbs was directed to the left and up, contrary to our hypothesis. We do not know what exactly this effect is related to, perhaps it is a kind of reconstruction of events in the mind of a person. For further confirmation of the existence of this effect, further studies based on other languages are needed.

Keywords: eye-tracking, space, languages.
Reactivation of syntactic traces in the Visual World paradigm?


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In a Visual World eye-tracking experiment, we contrasted wh-filler-gap dependencies (1-2) with Scrambling (3-4) in the context with multiple potential referents and investigated which fillers and when listeners reactivate at the gap.

On Monday, a boy and a girl walked past the teacher. Suddenly the boy pushed the girl, which surprised the teacher. He expelled both from school. Nobody realized,

(1) kogo₂ malchik v ponedelnik tolknul₂ - who-ACC boy-NOM (on Monday) pushed
(2) kogo₃ malchik v ponedelnik udivil₃ - who-ACC boy-NOM surprised
(3) kto₁ devochku₂ v ponedelnik tolknul₂ - who-NOM girl-ACC pushed
(4) kto₃ devochku₂ v ponedelnik vygnal₂ - who-NOM girl-ACC expelled

... at school.

According to the active filler strategy (AFS, Frazier, 1987), the processor postulates a gap immediately at encountering a filler, therefore, the looks toward the filler should increase starting at the wh-operator. We found that in every condition at and after the verb, participants directed their gaze to the questioned referent, i.e., (1) the girl; (2) and (4) the teacher, and (3) the boy. While these results are compatible with the AFS in the wh-dependencies (1-2), they do not support reactivation of the scrambled NP the girl in (3-4).

Two explanations are possible: either the scrambled NP, in contrast to the gapped NP, does not leave a trace that gets reactivated, or eye movements reflect pragmatic rather than syntactic processing, i.e. participants are just fixating the referent of the clause across all conditions.

Keywords: syntactic traces, syntax, Visual World.
The present study explored whether high-functioning children with autism spectrum disorder (ASD) can process complex sentences with different mental state verbs correctly forming inferences about the truth/false/uncertainty value of their sentential complements. Very few experiments were designed to specifically look at this particular ability in children with ASD using a paradigm other than a classic false-belief task. We expected to find that children with ASD will be able to make some but not all the inferences correctly demonstrating greater difficulties associated with non-factive conditions. A group of 15 high-functioning children with ASD were compared with a control group of 20 typically developing classmates on a sentence-picture-matching task. The materials included 32 pictures illustrating 32 mental state verbs presented in a sentential context and further subdivided into 16 factive (e.g., Alex knew that it was raining outside) and 16 non-factive (e.g., Alex thought that it was raining outside) conditions. Accuracy and justification of choices represented the two dependent variables of interest. The results indicated significant difference in performance between the two groups. Children with ASD performed considerably worse than the control group in both accuracy and justification of their choices. The present study asserts that Russian children with ASD are able to make some but not all the inferences from various mental state verbs correctly differentiating between truth and false/uncertainty value of their complements. Surprisingly, the overall performance was not affected by the condition which contradicts general developmental trajectory well established among typically developing children.

Keywords: mental state verbs, autism.
Predicting cloze task results with language models

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When reading or listening, people can anticipate upcoming words based on the previous context — thus, each word has a degree of predictability that is usually measured by the cloze task (Taylor, 1953). Being convenient, this task is criticized for its biases and the lack of reliable information about very unprobable continuations, which may affect the processing difficulty, according to the surprisal theory (Hale, 2001; Levy, 2008). To overcome the limitations of the cloze task several studies turn to corpus data and language models to quantify predictability (Smith and Levy, 2013). Although corpus probabilities are sometimes used as a substitute for cloze, we still don’t know how well they match both cloze data and readers’ online predictions. A predictability model that better matches cloze probabilities may provide better results in predicting readers’ behaviour and may be used as an alternative to the cloze task. This study aims at investigating the performance of two language predictability models (an n-gram model and an LSTM recurrent neural network) and the correlation between their predictions and cloze probabilities. We found that models’ perplexity influences the correlation between cloze and models’ probabilities and that low-predictability words show better correlation, which means that answers that no human managed to guess correctly also have low corpus probability. Overall, the neural network model has lower perplexity than the 5-gram model and produces probabilities that are more similar to cloze task results (Pearson correlation is 0.59; Spearman correlation is 0.95 — if we include zero probabilities).

Keywords: predictability, cloze probability, neural networks.
Gender Variation in Russian Expressive Forms

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It is usually assumed (Corbett 1982, Hippisley 1996, Rice 2005 among others) that Russian evaluative suffixes are not able to contribute to a choice of the syntactic gender of resulting nouns. Papers that account for the gender change only mention this possibility with no analysis (Savchuk 2011, Sichinava 2011) or assume that a suffix changes the lexical gender of a noun in 100% of cases (Wiltschko & Steriopolo 2007). However, even in dictionaries (Zaliznjak 1977) one can see that evaluative forms have variation in gender.

I performed web-search of non-standard expressive forms and it showed variation in gender with every suffix that would pattern the resulting expressive noun to a different declension class than its base noun. This is not at all surprising considering the previous work on declension classes and gender (Corbett 1982, Tarasenkova 2010 among others).

I propose that neither syntactic gender nor declension class cannot completely define each other. Instead they both contribute to the final form and gender of the resulting expressive noun.

To test possible factors that may contribute to the gender assignment I conducted a written survey. Participants were asked to complete a simple text with adjectives that would fit best the style of the text (folktale). The lexical gender was changed in 60% of cases. As expected, declension class had significant impact on the choice of a suffix, but did not determine it completely. Lexical masculine gender was changed significantly less often than feminine.

Keywords: gender, variation, Russian.
Effect of different social situations on prosodic characteristics of speech

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It has long been noted that people’s speech behavior depends on social roles in the dialog. It is also widely discussed that people adapt to each other in various dimensions during the conversation. This phenomenon is called entrainment. This paper investigates entrainment in pitch, speech rate and pauses in two different situations: a conversation between two friends and a conversation between a teacher and a student. The data collected for this study consists of dialogs between Russian native speakers - students and a teacher. The speakers play task-oriented games.

As entrainment is a rather complex phenomenon, it was studied with respect to multiple levels using several measures (the approach proposed by J.Hirschberg and R.Levitan). This approach allows to determine when exactly entrainment occurs and how it changes over the course of the dialog.

The results showed evidence of entrainment in the data. As predicted, entrainment appeared to be an interlocutor-dependent phenomenon. Moreover, it was found that entrainment correlates to success of communication: speakers become more like each other when they successfully implement the task.

Levitan R., Hirschberg J. (2011) Measuring acoustic-prosodic entrainment with respect to multiple levels and dimensions

*Keywords*: entrainment, speech prosody, success of communication.
Do older age and cognitive load increase reliance on “good-enough” language processing?

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According to the “good-enough” approach to language comprehension, language users do not always engage in full algorithmic processing of linguistic input (Ferreira et al., 2002). Rather, we often form shallow and superficial representations based on heuristics such as lexical content of the sentence and world knowledge. But so far, little is known about what factors trigger increased reliance on “good-enough”, over algorithmic, language processing. In this study, we tested two such potential factors: aging and cognitive load. Younger and older adults read sentences and answered binary-choice comprehension questions. In the high cognitive load condition, sentences were presented word-by-word, placing high demands on working memory; in the low cognitive load condition, sentences were presented as a whole. Stimuli included semantically plausible sentences, where syntactically correct parsing is also the most probable parsing based on lexico-semantic cues, versus semantically implausible sentences, where syntactic parsing is in conflict with semantic cues (e.g., “Я окликнула дочку учительницы, работающую в школе”: semantically, it would be most plausible that the teacher works at school but the correct syntactic parsing is that the daughter works at school). We used the difference in comprehension accuracy in semantically plausible and implausible condition as a proxy for reliance on “good-enough” language processing. In our current sample (n=48), reliance on good-enough language processing is increased both by older age and by higher cognitive load, with no interaction between these two factors. Data from a larger sample will be available by the time of presentation.

Keywords: good-enough language processing, healthy aging, cognitive load.
Interlocutors prefer to report (rather than withdraw) their answers when they face uncertainty in informal contexts (e.g. conversation with friends) as being informative is regarded important. In formal contexts (e.g. a job interview) people tend to be equally likely to report or withhold their answers in an attempt of being as accurate as possible. The option of preferentially withholding instead of reporting answers in this context was disregarded in our previous study, presumably because participants considered unacceptable not to provide any answer in a job interview. The aim of this research was to further study the underlying decision making process in answer selection. In one experiment participants answered difficult questions, placed in different contexts, and decided in the specificity and report options of their choices while their eye movements were recorded. We found discrepancy between the behavioural results and the proportion of fixations in the possible alternatives challenging the gaze cascade model. In the formal context there were no differences between single reported and plural withheld answers but the former attracted more fixations suggesting that it was the default option although participants opted equally for both trying to increase accuracy. In the informal context, single reported answers attracted a higher amount of fixations but the plural reported was significantly more selected suggesting that participants opted for being informative in this context but also that they tried to maintain the accuracy of their answers. Our results highlight the relevance of using unbiased measures to study the underlying processes in sharing information.

Keywords: informativeness-accuracy trade-off, conversational pragmatics, eye-tracking.
The effect of L2 proficiency on reading performance in Russian-Chinese and Chinese-Russian late bilinguals

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The aim of the study is to investigate the effect of L2 proficiency on reading performance in late bilinguals learning to read in a different writing system. Russian and Chinese writing systems are dissimilar in the way the sounds of the language are represented in writing. Russian Cyrillic is an alphabetic writing system utilising a phoneme-grapheme correspondence, in which there is a limited set of graphemes representing different sounds of speech. On the other hand, each character in the Chinese logographic system encodes not a single phoneme but rather a morpheme or an entire word, thus increasing the total amount of units used in writing. In order to establish how bilinguals adapt to reading in writing systems that are based on different underlying encoding principles I set up an experiment in which 31 Russian-Chinese and 28 Chinese-Russian bilinguals with varying degrees of proficiency in L2 read both in Chinese and Russian. Four eye movement measures (average fixation duration, average progressive/regressive saccade length, frequency of regressions) were recorded using an SMI RED 500 eye-tracking system. The results indicate that the average fixation duration of Russian-Chinese bilinguals decreased as their proficiency in L2 increased. Three saccadic measures remained constant across participants of all levels. The Chinese-Russian bilingual group showed no effect of L2 proficiency on any of the four eye movement measures. Such a result could in part be explained by an early and extended exposure to alphabetic writing systems such as the English alphabet and the Chinese Pinyin.

*Keywords:* L2, reading, eye movements.
Measuring the lexical component of language faculty (creating and testing test batteries)

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The research is aimed at creating a tool for measuring the lexical component of the language faculty, which determines the ability of a person to operate with vocabulary units in speech production and perception. One of the most recognised tests revealing the level of lexical ability is Mill Hill Vocabulary Scale. One of the tasks of our research is to standardise MHVS for the Russian language. Tests can be standardised in different ways. The most popular methods are translation, partial replication and adaptation. Although MHVS was successfully translated into French (by J.J. Deltour) and Spanish (M. I. Panizo), for the Russian language, we went for replication of the original test due to discrepancies in semantic-functional features of the lexicon. Translation of the test may decrease the validity of the test.

The report describes partial replication and localisation (adaptation) of the test based on the original methodology. It reveals the principles of selecting words, options for deviating from the initial test, organisation of the test, and the results of the pretests.

Diagnosing abilities of the formed sets were tested in the preliminary tests conducted with pupils of the third, fifth, sixth and eighth grades located at different stages of the development of their language ability. The report presents the statistics obtained from during the testing.

Keywords: language faculty, vocabulary scales, Russian language.
Evaluative Categorization of the Russian syncretic derivatives

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The research is aimed at the study of Russian syncretic derivatives evaluative categorization rules. Semantically Russian syncretic derivatives (stukach (a stool pigeon); vorchun (a grumbler); kopusha (a dawdler) etc.) combine both nominative and evaluative components of which the latter can be either dominantly positive or negative or both, which makes them difficult to categorize in terms of their dominant positive or negative charge without a context. A category decision experiment was conducted to reveal how evaluative categorization depends on the derivatives’ dominant evaluative charge (factor 1) and context conditions (factor 2). The context conditions were designed to prime either positive or negative charge of a derivative. The results showed that both conditions define the direction of evaluation (factor 1 - F(1,56)=65.74, p <.05; factor 2 - F(1,56)=41.17, p<.05) but work independently (F(1,56)=0.29, p>0.5). The interaction of the two factors was obtained only in their influence on the time of evaluative categorization (F(1,56)=14.73, p<0.05) which means that the reaction time depended on the charge of both a derivative and an adjective preceding it (context factor). Thus, average time of categorization in case of derivatives with positive semantics in the context with the preceding negative adjective is significantly higher than in case of negative adjective and negative derivative while positive adjective does not influence either positive or negative derivatives. The obtained result evokes to the discussion a so-called negativity bias effect which is based on the assumption that people process negative information with more cognitive effort.

Keywords: categorization, evaluation, a derivative.
The specifics of text perception and understanding by the students with mental retardation

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The sustainable potential (SP) in the frontal regions of the brain in children with the primary language disorders (PLD) and light learning disorders of cerebral-organic genesis (LLD) was registered. 30 children (20 boys and 10 girls) aged 4 to 7 years (5,5 ±1,1 years) were participants. Assessment of the SPs changing of the brain in symmetrical prefrontal lobes of the left and right hemispheres (Bradmann area F9), was carried out using a miniature liquid carrying out silver chloride electrodes. In children with PLD of the 2nd and 3rd levels alone in a quiet state there was a high level of coherence activity in the frontal regions of the right and left hemispheres, whereas the shift of the functional state entails a reduction in the level of this consistency. In children with a combination of the PLD and the LLD any changes of the consistency levels of activity of the hemispheres in these areas during the transition from one state to another were not revealed. In children with a combination of the PLD and the LLD the activity of the right hemisphere was significantly higher compared to children with PLD. Our data are more in line with the hypothesis about less lateralization of the brain functions in children with speech disorders.

**Keywords:** sustainable potential, primary language disorders, left and right hemispheres.
Development of the Text Reading Strategies: The Eye Tracking Study in 9-11- and 12-14-years Children

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During the reading acquisition, children master both the decoding and the text processing skills. The last one is related with an elaboration of some particular strategies. This issue is not well studied.

The current eye tracking study is devoted to a development of the text processing strategies in the scientific vs narrative texts reading. The study involved 40 children of two groups of age: 9-11- (24 children) and 12-14-years (16 children). In this study, eye movements were recorded by using an eye tracker system SMI RED500, while children read two scientific texts and two narratives. The eye movement fixations and saccades measures were analyzed.

Statistical analysis revealed differences between the groups in the spatio-temporal characteristics of oculomotor behavior. In particular, we found that the elder children used progressive saccades of longer amplitudes. Apparently, this is a consequence of their ability to anticipate and to analyze more information in a unit of a time. The elder children demonstrated more mature ability to monitor the concordance between their inferences in some passages and the whole context of the text. For example, in 93% of them, the first continuous reading was followed by rereading of the most important fragments, in contrary to 60% of the same cases in the younger group. Children of the younger group usually read the text only in a continuous manner. Apparently, text processing strategies in 9-11-years children is still not sufficiently developed in comparison to the participants from the elder group.

Keywords: children, strategies of reading, eye tracking.
Emotion and Joking Events in a Preschool EFL Story-Telling Task

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This research investigates the use of emotion in the interactive talk of preschool students at an international preschool in Tokyo, Japan. The focus is on the ways students use humor through a storytelling task.

Students were recorded daily over one school year. These recordings were then transcribed using Computer Language Analysis software (CLAN). The transcriptions were analyzed using *joking events* (Čekaitė & Aronnsson, 2004) as a signifier of the underlying emotional intent in speech.

The analysis gives support for the improvement of language pedagogy in regards to feedback, joking, and behavior management. Subsequent turns indicate the alignment of emotion between teacher and student. This appears to result in the awareness of correction indicated by uptake. Next, the data shows ways in which students develop in group joking contrasting the notion of humor universals. Finally, it is difficult for a teacher to understand what language constitutes pro-social or anti-social teasing. Conversation analysis may be a useful diagnostic tool for skillfully addressing this difficult matter. The findings all serve as potential directions for further research.


*Keywords*: Conversation Analysis, Language Development, Language Socialization.
Brain oscillations in developmental dyslexia


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Developmental dyslexia is characterized by deficits in speech processing, phonological and morphological awareness skills. The Lexical Quality hypothesis suggests that the lack of tight integration of orthography, phonology, and lexico-semantic information consequently leads to poor reading and comprehension. Recent studies suggested that theta frequency band is functionally related to early orthographic and phonological processing and retrieval of lexico-semantic information. But little is known about brain oscillation dynamics associated with reading in dyslexics.

In this study we use event-related time-frequency analysis to investigate the awareness of morphological representations in dyslexics. Age-matched typically developing and dyslexic children were asked to verify whether a visually presented target word matched the preceding spoken word in a homophone verification task. The semantic congruency of the heterographic homophone pairs was manipulated.

Results found that incongruent word pairs elicited greater theta power than congruent ones in the anterior regions. However, semantic congruency effects were only found in the control group, and absent in dyslexic readers. In addition, dyslexic children elicited larger theta power than controls over the whole scalp, particularly in the anterior left region.

In line with previous findings indicating the role of theta band in ambiguity resolution and early orthographic processing, we suggest that greater theta power reflects increased overall effort in lexical retrieval and semantic processing in dyslexia. Furthermore, the lack of congruency effects in dyslexic readers may suggest a weak integration between orthographic form, lexical semantic functional networks and working memory.

Keywords: brain oscillations, language, dyslexia.
The present study focuses on the methods of eliciting semantic information relevant for a listener while processing spoken word. In the experimental part of the study, 90 native Russian provided essential semantic features for each of 10 concepts expressed by Russian nouns: sobaka ‘a dog’, chelovek ‘a man, a person’, rubashka ‘a shirt’, etc. While processing the data we obtained from different participants, we regarded as denoting one semantic feature the words of the same lexical unit and of the same root. Then, we ranked the features we got for every concept according to their frequency.

The aim of the corpus study was to check the assumption that the words which the native speakers of Russian used for describing the semantics of each of 10 stimuli occur in the nearest lexical context of these words in everyday speech. The results of the analysis of the contexts from the Spoken subcorpus of The Russian National Corpus (http://www.ruscorpora.ru/searchspoken.html) support the hypothesis.

In our presentation, we are going to discuss some prospects of the study, e.g. does the verbal semantic representation of a concept depend on the contextual associations this word has in the mental lexicon? Are these associations different from the associations obtained in a standard associative experiment? Can context patterns form the verbal semantic representation of a concept so it can be obtained by statistical tools?

The research is supported by the grant #14-18-02135 from the Russian Science Foundation.

Keywords: semantics, nouns, spoken word recognition.
Choosing between various syntactic possibilities during sentence production does not seem a complicated task. However, the number of possible structures can be numerous. Especially in languages with a free word order, like Russian. Which mechanisms underlie this decision making process is what we are trying to find out in our line of research.

It is well established (see recent review by Tomlin and Myachykov, 2015) that shifting attention towards one of the referents during visually mediated sentence production increases a probability of structuring the sentence in a way to reflect this shift. In English language, it is a probability of choosing passive structure over active when patient is cued (Myachykov et.al, 2012; Pokhoday et al., (under review)), in Russian it is mentioning the cued referent first (Myachykov and Tomlin, 2008). Those studies however focused solely on manipulating visual attention of the participants. In our research, we want to expand those findings to other modalities. We use primes from visual, auditory and motor modalities.

On Night Whites 4 we will report results of our most recent study. In that study, we looked at how manipulation of attention by visual, auditory and motor cues affects syntactic choice of Russian language speakers. We will report results of the three experiments conducted on the premises of Higher School of Economics, Moscow.

The study has been funded by the Russian Academic Excellence Project '5-100'.

Keywords: attention, priming, syntax.
Factors influencing referential choice: cross-linguistic study and neural-network modeling

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When speakers decide to mention a referent they choose a particular linguistic expression, thus making referential choice. This choice depends on the activation level of the referent in mental representation of the speaker. Numerous studies have shown that this level depends on various factors such as grammatical and information-structural roles of the antecedent, distance to antecedent, presence of other referents in discourse etc. However, the results of the studies are often controversial, and the impact of each factor still remains undefined - mostly because factors are manipulated separately. Moreover, experiments on different languages emphasize the impact of different factors. In the present study we analyze the influence of several factors in coherent oral discourse on the material of two languages. The subjects (25 English-speaking, 25 Russian-speaking) were asked to watch a short black-and-white film at the same time describing the events happening there to a partner, who was unable to see the screen. The referential expressions chosen by the speakers were analyzed with respect to the list of aforementioned factors. Cross-linguistic comparison showed a difference in goal and source thematic roles. English speakers tend to use pronouns more frequently for goal referents than source referents in contrast to Russian speakers. The neural network (NN) modeling of referential choice (only Russian-speakers' texts were used) showed that no single factor plays the decisive role in the process. The effectiveness of NN learning process depends on the coherent interplay of all these factors, which underlines the complicated dynamic nature of the referential choice process.

Keywords: reference, referential choice, anaphora.
Is Free Recall in Pure vs Mixed Lists a Function of Orthographic Transparency? Evidence from Early and Late Acquired Pictures and Words

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Previous research examining the influence of age of acquisition (AoA) on free recall yield contradictory evidence to findings in lexical tasks, e.g. naming, which typically show an advantage for early over late acquired items across numerous languages (see Johnston & Barry, 2006 for a review). In contrast, late acquired items are reported to be better recalled than early items in particular under mixed lists (Dewhurst, Hitch & Barry, 1998). This effect was attributed to the more ‘distinctive encoding’ of low frequency, late acquired words compared to high frequency, early acquired words. Until most recently these phenomena were limited to English but evidence from Turkish (Raman, et al, under review) and Russian (Volkovyskaya, Raman & Baluch, in press) pose a challenge to existing accounts. In a 2x2x2 mixed design experiment we set out to revisit Dewhurst and colleagues’ work in a highly transparent orthography, Turkish, and one in which encoding for all words is totally regular and therefore considered as ‘equidistinctive’. In a novel consideration, pictures of the words were also added as stimuli given that pictures are semantic entities and completely neutral of encoding. A total of 80 participants were recruited from Yeditepe University; 40 were assigned to the picture and 40 to the word condition in which stimuli were presented in either a mixed or a pure list. Findings from Turkish lend some support to findings in English and the impact of orthographic transparency, AoA, Frequency and list type on episodic memory will be discussed within current theoretical frameworks.

Keywords: orthographic transparency, free recall, AoA.
Presupposition triggers jointly convey two pieces of information, a main content and a backgrounded content, the so-called presupposition. For instance, the factive verb *Paul knows that Mary throws the ball* communicates the main content that Paul knows X and presupposes X. Previous theoretical research has suggested that presuppositions are peripheral, secondary or given information (van der Sandt, 1992) in the flow of discourse or presented as such (Saussure, 2013). Due to their backgrounded character, presuppositions are not at stake in discourse linking (Ducrot, 1972, Jayez, 2010). The current study investigates whether the backgrounded criteria of presuppositions makes the information conveyed less salient. Using the grip force sensor technique - hand-related pressure variations of action verbs are measured (e.g. Fak et al., 2010) - four conditions were compared:

1. Paul knows that Marie *throws* the ball. (Assertion)
2. In the park, Marie *throws* the ball. (Factive)
3. Paul thinks that Marie *throws* the ball. (Non-factive)
4. For her lunch, Marie *prefers* Chinese food. (Non-motion)

The results indicate that the hand-related action verb of the presupposition of a factive verb construction triggers a significantly lower grip force compared to an assertion, but activates a significant higher grip-force than the non-motion condition, whereas the non-factive condition elicits no grip force activation - similar to non-motion condition. This suggests that (i) backgrounded content elicits different activations than asserted content and (ii) the information conveyed by a presupposition is included in the situation model, consequently triggering some motor reaction, which is not the case of a non-factive construction.

*Keywords*: experimental pragmatics, grip force sensor, presupposition.
Perception of diminutive suffixes: context and social factors

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The report presents the results of studies the perception of suffixes with emotionally-valued semantics. The authors consider the perception of suffixes outside the context and under the influence of the estimated context semantics. The influence of gender differences on the perception of such units is also considered.

Two experimental series were conducted. In the first experiment, target design units were pseudo-words with diminutive suffixes outside the external context. In the second experiment, these same stimuli were placed in positive and negative contexts. We attracted an equal number of men and women as respondents to measure the influence of gender factors on the revealed differences in the perception of diminutive suffixes.

The statistically significant differences in the perception of groups of suffixes correlated with the grammatical grouping of the diminutives were revealed.

Also sociocultural gender differences in the processing of incentive semantics have been identified. Statistically significant differences in the processing of words with suffixes of negative semantics by male and female respondents are revealed. In addition, female respondents prefer to choose the extreme values of the positive and negative spectrum.

The location of words in contexts predictably affects the perception of diminutives: the unit is evaluated more positively or more negatively in accordance with the evaluation meaning of the sentence. However, the overall pattern of differences in the processing of suffix groups is preserved. Contextual influence reduces sociocultural differences in the perception of these units.

Keywords: diminutive suffix, emotionally semantics, context.
Computer-aided research of ESP class materials: vocabulary potential and learning opportunities

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The present study investigates the potential and resourcefulness of teacher-created pedagogical materials for English for Special Purposes (ESP) class taught to Russian undergraduates majoring at Chemical Technology in National Research Tomsk Polytechnic University. Specifically, it focuses on the vocabulary analysis contained in ESP corpus, mainly, its distribution across the corpus for acquisition of basic engineering, academic and specialized vocabulary. The motivation behind the study is concluded in the fact that ESP instructors are linguists, non-native English speaking teachers who teach the language of Chemistry in English and, therefore, they often have to rely on their intuition during the text selection and material development process. Thus, to determine the extent to which the vocabulary contained in the texts is professional and appropriate for ESP class, corpus software has been used to run the analysis (Range program). In the course of the study, the distribution of specialized vocabulary contained in ESP materials was then compared with the corpus of authentic materials used in ESP class. The results demonstrate insufficient level of text materials for professional lexis acquisition and are discussed to highlight the need for pedagogical materials to include texts of varying vocabulary types, and to optimize specialized wordlist.

Keywords: English for specific purposes, vocabulary acquisition, computer-aided research.
Sentence reading in poor and good adult readers: fMRI study


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The study aimed investigation of reading mechanisms in adults (27 persons mean age 19.5±0.8[SD] years old) with different levels of written text comprehension (below 16 percentile — 13 “poor” comprehenders, above 94 percentile — 14 “good” comprehenders) using fMRI. The main objective was to analyze brain mechanisms of sentence comprehension, while classifying them by literal and metaphoric meaning. SENTENCE reading compared to gaze FIXATION in group of “good” comprehenders was characterized by significantly increased BOLD signal in the MFG BA46 of the right hemisphere and marginal activation level in the IFG, BA9 in the left hemisphere. In group of “poor” comprehenders the same task increased BOLD signal in the left hemisphere (IFG, BA9). Activations of the frontal areas were accompanied by BOLD signal increase in parietal-occipital cortex in both groups with more spread activation in group of “good comprehenders”. Within group results were obtained through T-tests with p<0.001, FWE corrected.

On behalf of psychological data the Group of “good” comprehenders was able to read significantly (z=-2.3; p<0.05) more items in self-paced mode (mean time for sentence reading 1237±167ms[SD]) than “poor” comprehenders (mean time for sentence reading 1463±194ms[SD]) and gave higher percent of the correct answers (z=2.0; p<0.05) during discrimination of the phrases. We suppose “good” comprehenders made judgment about metaphoric/literal meaning relied more on simultaneous processing more relevant to activation of the right frontal areas, while “poor ” comprehenders presumably evolved formal logic decision processing relevant to the frontal lobe zones activation in the left hemisphere.

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Keywords: text comprehension, sentence reading, fMRI.
Automated analysis of narratives by people with aphasia, healthy speakers, and second language learners

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In the present study the theoretical aspects of narrative discourse production are considered as a basis for automated classification of spoken discourse. Four groups of speakers were examined: three groups of native speakers of Russian, namely, neurologically healthy monolinguals (HS for Healthy Speakers) and people with fluent and non-fluent aphasia (PWA for People with Aphasia), and second language learners of Russian (SLL for Second Language Learners). The narratives by PWA and HS are taken from the Russian CliPS corpus and the ones by SLL were collected for this study. The practical steps towards the task of automated classification were (1) performing an automated analysis of texts and calculating the values of various textual parameters (among them features of lexical diversity and density, acoustic and “physical” features of texts); (2) applying the algorithms of machine learning classification to the data. A number of algorithms were tested and the most successful are neural network, extra trees classifier, and random forest classifier.

The best accuracy in the binary classifications was achieved between the texts by HS/PWA, HS/SLL and people with fluent aphasia/SLL. The latter observation has led to the suggestion that the external features of spoken discourse by SLL resemble those by people with non-fluent aphasia. For the multiclass classification the most successful opposition is HS/two groups of PWA.

Results show that the automated classification task can indeed be performed on the material of narrative spoken discourse but requires further refinement.

Keywords: aphasia, second language acquisition, machine learning.
Language as a Handicap

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Two strategies of language acquisition, two cognitive strategies, and two types of culture development are traditionally associated with the phenomenon of brain asymmetry in humans. The existence of one of the strategies (analytical, logical) is usually conditioned by the predominance of the functioning of cortex of the left hemisphere. Another strategy (holistic, intuitive) is associated with reliance on the functions of the right hemisphere.

Our purpose is to substantiate the existence of two cognitive and language strategies based on other neuropsychological mechanisms, rather than the prevalence of left- or right-hemispheric functioning. In accordance with proposed point of view, differentiated strategies were built evolutionarily on two basic mechanisms of adaptation of organism to environmental conditions: perception of environmental stimuli and behavior change in accordance with them. The prevalence of one strategy in the individual development of man is ensured by the prevalence of one of these mechanisms at the level of functioning of cerebral cortex.

The conclusions are based on a series of longitudinal observations for 2-4 years of the development of preschoolers with diary and audio recordings and annual testing (basic motor functions, linguistic processing, estimation of certainty of information and other).

The study proves a connection between two basic biological functions and abilities to categorization or to independent decision-making. The substantiation of the relationship between the basic mechanisms of interaction of the organism with environment and the formation of not only cognitive styles of individuals but also various linguistic systems and cultures is presented.

The research was carried out with the financial support of the Russian National Foundation (grant 14-18-03668 “Mechanisms for the Acquisition of Russian and the Development of Communicative Competence at the Early Stages of Child Language”).

Keywords: language acquisition, cognitive strategies, cortical mechanisms of language, cognition and behavior.
Morphological regularity and processing difficulty in a lexical decision fMRI study on Russian

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Although it is well known that left-lateralized fronto-temporal brain system is responsible for processing of complex language forms, many basic questions are still open, e.g. whether there are qualitative differences in the processing of morphologically regular and irregular forms. Verbs cannot be simply divided into regular and irregular in Russian — there are many verb classes that differ in frequency, productivity, paradigm complexity etc., which allows exploring the nature of regularity.

A recent fMRI study (Slioussar et al., 2014; Kireev et al., 2015) took two verb groups: the most frequent productive AJ class and the least frequent non-productive classes, which can be called the most regular and the most irregular, and demonstrated that morphological regularity and processing complexity effects can be teased apart. Activity of the left inferior frontal gyrus (LIFG) was greater for production of irregular verbs, but its connectivity with temporal lobe was relatively increased when regular verbs were produced.

We conducted a lexical decision fMRI study, adding a third verb class — the I class (productive, but not default). Firstly, we demonstrated that the effects of interest are the same in production and in comprehension. Secondly, the analysis revealed a processing difficulty effect, which gradually increases from the AJ class to I class and then to irregular verbs, and, interestingly, an effect that can be associated with defaultness (AJ vs. I and irregular verbs).

The study was supported by the Russian Science Foundation grant # № 16-18-00041.

Keywords: morphological regularity, fMRI, lexical decision.
Gender and Declension in Agreement Processing

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We report a self-paced reading experiment studying how the inflectional class (declension) a noun belongs to and its gender influence the processing of gender agreement in Russian. About 46% of Russian nouns are 2nd declension masculine (syn ‘son’), 29% are 1st declension feminine (zhena ‘wife’), 18% are 2nd declension neuter (okno ‘window’), 5% are 3rd declension feminine (mat’ ‘mother’), 1% are 1st declension masculine (djadja ‘uncle’), and 1% are classified as irregular (Slioussar & Samojlova, 2015). Thus, most consonant-final Nom.Sg forms are masculine, and most feminine Nom.Sg forms end in -a/ya, with 3D feminine nouns being less usual.

The experiment included 36 target sentence sets. Sentences in one set contained the same six words except for the first one, the subject noun (2D-M / 1D-F / 3D-F, balanced in frequency and length) and the second one, the verb form (M or F). This yielded six conditions, three of them with an agreement error.

Agreement errors were noticed significantly later with 3D-F nouns than with 1D-F or 2D-M ones. However, error-related delay on subsequent words was more pronounced for M subjects than for F ones (both 1D and 3D). The latter result suggests that predictions we make about predicate gender are stronger for M subjects (see also (Slioussar & Malko, 2016) for agreement attraction). The former shows that interestingly, the speed of error detection is at least partly independent from that, being affected by inflectional regularity: 3D feminine nouns ‘look like’ more frequent masculine ones, so the error is noticed later.

Keywords: gender agreement, inflectional class, reading.
How interference guides the missing VP effect in German

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Multiple center-embeddings lacking one of the verbs are occasionally perceived as grammatical. There has been much debate about the underlying mechanisms leading to this missing-VP effect in sentence processing. Various models account for this effect, blaming memory overload and structural forgetting (Gibson & Thomas, 1999), language statistics (thereby accounting also for cross-linguistic differences, Vasishth et al, 2010, Frank et al, 2016) or interference during integrating the clause-final verbs (Häussler & Bader, 2015).

Investigating the missing-VP effect in German, we conducted an eye-tracking reading study. The sentences contained a cascade of three verb-final clauses: [...] [CP1 [CP2 [CP3 ... VP3] VP2] VP1]. Sentences were either fully grammatical or lacked either VP2 or VP1. To investigate whether subject number agreement can help verb integration, the highest subject and the corresponding VP1 were either singular or plural.

We found longer reading times in ungrammatical sentences missing a VP during later processing. Further differences in the reading times between the ungrammatical conditions suggest that readers found it harder to detect a missing VP2 than a missing VP1.

Interestingly, 25 of our 48 participants stated post-experiment that a part was missing and the sentence was ungrammatical. While there was no main number effect, this group showed susceptibility to the number manipulation. For the grammatical and the missing-VP2 sentences, plural conditions were read faster than singular conditions suggesting that the plural specification of VP1 speeds up the identification of the attachment site. We will discuss how these findings are best explained in terms of interference accounts.

Keywords: missing VP effect, sentence processing, eye-tracking.
Clock-wise or Counter Clock-wise: which way to take to better interpret a picture?

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Some pictures like Peter Blume’s *The Rock* (1948) combat facile interpretation. The main hypothesis of the paper tested experimentally, is that the interpretation of *The Rock* depends on the direction of the eye movement of the viewer. It might be either optimistic or tragic, depending on which of the two Golden ratio spirals the viewer would follow: a clock-wise or a counter clock-wise one. A scared, yet horrific monumental rock serves as the fulcrum of the composition, juxtaposing contrasting images, referring to both decay and rebirth. A revolutionary style building under construction, is on left-hand side of the picture. A bombed ruin of a traditional brick family home is on the right-hand side. The rock is surrounded by men of different age and races working hard. Some animal bones are placed on the left of the rock, a bright red flower is on its right. The atmosphere of ambiguity is strengthened by the image of a woman kneeling on the ground with her arms outstretched toward the rock or the sky that might stand for praying as well as cursing. According to Peter Blume, *The Rock* symbolizes “the continual process of man’s rebuilding out of a devastating world”. For this interpretation to be possible the viewer should follow the clock-wise Golden Ratio spiral starting at its center and finishing at the building under construction. Choosing the second option the viewer would come to the idea of tragic futility as the central one of the picture.
Reading ‘sky’ and listening to high pitch: cross-modal mapping between tone and word meaning

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It has been shown that auditory features such as high and low pitch could be mapped into visual stimuli such as dots presented in upper and lower parts of the screen (Evans & Treisman, 2010). Such findings demonstrated the ability of the brain to combine information, coming from different perceptual sources and to employ the modality combination for enhancing of the performance. The purpose of the current study was to test whether perceptual features such as high and low pitch would be linked with words that do not convey spatial meaning, but have referents in the typical locations in the space (e.g. ‘moon’ and ‘grass’, up and down word, respectively). Participants were shown up and down words in the center of the screen with simultaneous presentation of auditory stimuli (high or low pitch). The procedure was Stroop-like in the sense that people had to judge whether word was printed in the blue or green color. Results revealed that word meaning and pitch were incorporated, participants were significantly faster in the condition when up word and high pitch were presented in comparison with the condition when they saw up word and listen to low pitch. Thus, the results suggest a linkage of ‘real’ auditory modality and visual modality, simulated by word meaning, in other words, simulated and actual perceptual experience. Moreover, it seems that the link is activated automatically since the instruction was given about the color and not about the word semantics or peculiarity of the pitch.

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Keywords: cross-modal mapping, embodiment, language processing.
Men in black and green: testing a link between perceptual and conceptual knowledge

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Previous studies demonstrated a link between abstract concept and physical metaphor, existing due to activation of conceptual knowledge during color perception (Meier, Robinson & Clore, 2004). It was suggested that conceptual knowledge about particular color based on cultural and linguistic experience is activated and affected processing of words (positive/negative words in black and white color). In the set of the research in this field, the issue about automaticity of the perceptual/conceptual link is still unresolved. Different studies provided mixed results. Meier et al. (2004) showed the aforementioned link only in semantic categorization task, while Sherman & Clore (2009) demonstrated it in a simple Stroop task.

The current research was aimed to examine whether color (associated with positive/negative emotion) would affect the processing of emotion-laden words (positive/negative) in various types of tasks. Four experiments were conducted. In the pretest green was evaluated as ‘good’ color and black as ‘bad’. In the first experiment modified Stroop task was employed, where participants’ attention was drawn to external characteristic of the words (font color). In the second experiment, lexical decision task was used, where deeper level of word processing was required. In the third experiment, semantic categorization task was taken, when participants had to judge whether word means color or not.

None of the experiments showed significant results, that is why the forth experiment is planned now to investigate the same effect when the task is directed to positive and negative semantics distinction. In this experiment, participants are asked to discern positive and negative word semantics. We predict that this task can draw participants’ attention to particular features of semantics and create a strong interaction between color and word.

Keywords: color perception, emotion-laden words, language processing.
Different phonological and phonetic viewpoint to Lithuanian affricates

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The affricates in Lithuanian language (/dz, dz/, ts, tsi, dʒ, dʒi, tʃ, tʃi/) are composite sounds, merging sequences of plosive and fricative elements. Decomposition of affricates into sequences of consonants (of the type /t/ + /ʃ/, /d/ + /ʒ/) would complicate the syllabic structure of Lithuanian language and its medial consonant clusters. Although in auditory terms affricate is treated as one phoneme, in affricates the phases of plosion and friction can be differentiated. In this presentation monophonemic phonological interpretation and two acoustic cues - spectral peak’s frequency and relative intensity - obtained for the affricates of Lithuanian language will be analysed. The aim of this presentation is to research the affricates in order to determine the essential spectral differences and the effect of palatalization, voicing, manner and place of articulation, as well as the effect of speaker’s gender.

The recording material consists of isolated CVC syllables pronounced in zero context by Lithuanian native speakers (males and females). Data processing was performed using the software PRAAT, MS EXCEL and SPSS. The results indicate that spectral peak’s frequency displays the effect of palatalization, manner and place of articulation, as well as the effect of speaker’s gender. The results also show the correlation between relative intensity and voicing: the values obtained for the voiced affricates are higher in comparison to their voiceless counterparts.

*Keywords:* Lithuanian language, affricates, experimental phonetics.
Experimental study of expressive noun semantics cognitive processing by men and women

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In this study we tested the following hypothesis: 1. Cognitive processing of expressive words differs from cognitive processing of neutral units. It can be manifested in differences in the reaction time to these stimuli. 2. Men`s and women`s cognitive processing may be different while performing different kinds of tasks due to the fact that men and women use expressive words in speech in different ways. 3. The perception of expressive stimulus will be influenced by the referential correlation of expressive words.

To test it we conducted 3 experiments using the E-Prime software. All of the conducted experiments had a standard procedure, categorization was used as the task in all the experiments. 3 factors were manipulated: expressiveness (expressive/non-expressive), subject sex (male/female), referential correlation of the stimulus (animate/inanimate; male prime/female prime).

In the first experiment as expressive stimuli we use words with various diminutive suffixes, in the second and in the third experiments metaphorical names of the person were used.

The results of the conducted experiments showed:

- Expressiveness can be a parameter that affects the perception of linguistic units, however, in this case a type of expressiveness has influence.

- When performing cognitive tasks of different kinds, a significant factor is the stimulus referential correlation, regardless of the type of this correlation.

- Men and women differ in the perception of expressive units, but they're influenced by different factors. At the same time men are more sensitive to changes of the factors and their interaction.

Keywords: expressiveness, gender, experimental study.
AoA is a unique psycholinguistic variable because of its link to the semantic architecture of the mental lexicon (Brysbaert, Wijnendaele & de Deyne, 2000). The role of AoA on free recall has been examined in English (Coltheart & Winograd, 1986; Dewhurst, Hitch & Barry, 1998) and recently in Turkish (Raman, Raman, Ikier et al, in press) with contradictory outcomes. While an overall advantage was found for late acquired items in English, the contrary was reported in Turkish. The present study extends Raman et al study to monolingual Russian and bilingual Russian (L1) – English (L2) speakers in order to understand the extent to which AoA affects free recall. Participants were allocated to either picture or word condition and subsequently to either pure list or mixed list condition in a mixed design experiments. Both monolingual Russian (N=42) and bilingual (N=40) Russian (L1) - English (L2) data show a robust main effect for AoA in free recall irrespective of list type for words and for pictures and no significant interactions. Overall, early acquired words and pictures had an advantage over late acquired items. These findings are contrary to what has been reported in the literature for monolingual English speakers but in line with findings for Turkish. Implications will be discussed within current models of AoA and memory.

**Keywords:** Age of Acquisition, monolingual Russian, bilingual Russian-English, free recall, pictures and picture names.
Mental Processing of (Non-)Metaphoric Pain Language in Chronic Pain and Healthy Populations: Interactions between word comprehension and individual pain experience

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How do we communicate our pain to others? This question is faced by many sufferers of chronic pain, and many patients and doctors report communication issues - especially in situations where no reference to direct physical injuries or tissue damage can be made. Neurolinguistically, this question is directly linked to understanding the brain mechanisms behind word meaning encoding, storage and comprehension. An influential view posits that language comprehension involves mentally simulating sensorimotor properties of experiences or entities to which words refer. However, it is unclear whether such an account can explain our comprehension of pain-related words since pain experience is internal to each particular individual; yet, we seem to understand pain language even when we lack first-hand physical experience. This is often done via metaphors - chronic pain sufferers describe their pain in terms of physical damage (“burn”, “cut”) even though it did not occur. Here, we tested the hypothesis that the meaning of pain words is encoded in brain areas involved in experiencing real pain; leading to a prediction that word processing should modulate nociception itself. In a priming task, we asked participants (typical subjects and chronic pain sufferers) to read sentences containing literal and metaphoric pain descriptors, and then separately rate thermal pain stimuli. Confirming our hypothesis, we found that pain language comprehension significantly modulates participants ability to accurately assess pain intensity - an effect which was further modulated by individual pain history. We discuss our findings within the larger debates in semantic theory, and their relevance to clinical practice.

Keywords: comprehension, semantics, nociception.
Rhetorical structure as a factor of referential choice: in search of an optimal measurement

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One of the factors affecting the choice of referring expressions in discourse is the proximity of the current mention of a given referent to its previous mention(s). It can be measured in terms of discourse units that immediately follow one another (linear distance, LinD), as well as in terms of hierarchical, or rhetorical structure of discourse (rhetorical distance, RhetD). RhetD takes structural complexity of discourse into account, and cannot be derived from plain linear discourse structure. In certain instances, RhetD differs from LinD significantly, and may provide a good explanation for failed pronominalization at small LinD, and vice versa. However, it is unclear how RhetD should be calculated for its effects to be captured with sufficient precision. I apply machine learning techniques to test various calculation options against data from the WSJ MoRA 2015 corpus (Kibrik et al. 2016). The corpus uses rhetorical structure annotation from the RST Discourse Treebank (Carlson et al. 2002) without alterations to the original annotation conventions. Kibrik and Krasavina (2005) suggest the following possibilities for adjustment of the current RhetD calculation rules:

1. Symmetrical structures, i.e. structures with a coordinate nucleus-nucleus relation. Contribution of such structures to overall rhetorical complexity is unclear, and may be counted either the same way as for asymmetrical structures or differently.

2. Different types of rhetorical relations allow for a differentiated weighing, depending on the level of assumed processing simplicity.

Adjustments to calculation rules yield a higher efficiency of RhetD as a factor for predicting the type of referring expressions.


**Keywords:** generation of referring expressions, rhetorical structure, mathematical modeling.
Lost in the evidence: variability of statistical results in clinical linguistics

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In empirical research in the field of clinical linguistics, characteristics of the sample and the choice of statistical methods can influence authors’ results and conclusions considerably. The variability of results depending on these two factors is demonstrated in this presentation by means of several examples taken from our studies. First, statistical evidence is provided for all three theoretically possible hypotheses on the link between language competence and voice disorders in German preschoolers: children with voice disorders score significantly (a) higher or (b) lower than their unimpaired peers in the validated language tests, (c) there is no statistically significant difference between children with and without voice disorders. Although the same statistical methods and comparable language tests are used in these three calculations, characteristics of the sample result in different conclusions. Second, the influence of the imputation on the predictive power of linguistic tests is demonstrated. Imputation is the insertion of values to stand in for missing data in the statistical analysis. Results of the sophisticated imputation methods are to a certain extent variable and can therefore influence the outcome of statistical tests considerably. Third, one of our studies on the link between stuttering and language skills of German preschoolers is utilized to demonstrate the influence of the sample size on the authors’ conclusions regarding this link. The range of possible conclusions can vary from “quite strong” to “non-existent”. Our considerations demonstrate the importance to critically reflect upon potential shortcomings of research practice.

Keywords: clinical linguistics, evidence-based research, statistics.
The specifics of text perception and understanding by the students with mental retardation

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The problem of misunderstanding is particularly relevant for children with intellectual disabilities. In the study 60 people aged 15 to 19 years (20 of them with preserved intellect, and 40 students with reduced intelligence). In accordance with the International classification of diseases and behavioral disorders of the 10th review their official clinical diagnoses were F83 - mixed specific disorders of psychological development and F70 - mild mental retardation.

The method of eye movements registration was used and iView XRed 250 system (SMI, Germany) with a sampling rate of 250 Hz. A comparison of the peculiarities of perception and understanding of texts in a standard format and placed in a column was made. The number and duration of saccades and fixations, time of viewing/reading, the "zone of interests", the subjective assessment of understanding of presented stimuli, key concepts observed in the responses of the examinee were assessed. The students with mental retardation compared with normally developing peers had the worst indicators of duration of the text reading and the accuracy of it understanding. All students better read and understood the text in a column. But those of them who have reduced intelligence had difficulties in the gaze fixation on some words and could not mobilize the efforts. The correlation between the subjective rating of understanding and the number of words in the description of the plot of the texts and between the number of fixations and the number of words in the annotation content were found out.

**Keywords:** perception, understanding, mental retardation.
Transcranial direct current stimulation (tDCS) is a non-invasive brain stimulation method that has a high potential to be combined with behavioral aphasia treatment. One theory that can guide the choice of tDCS target areas is the interhemispheric competition hypothesis - namely, the activity of the right hemisphere can be maladaptive in the chronic stage of aphasia (Coqcuyt et al., 2017).

Previous research shows that inhibitory stimulation of the right hemisphere is beneficial (e.g., Kang et al.) but there are few studies where it is combined with excitatory stimulation of the left hemisphere. Moreover, no study has yet compared it to both necessary control conditions (separate stimulation of the left and right hemispheres).

The aim of our study was to examine the effects of bilateral tDCS, compared to left excitatory and right inhibitory stimulation. The study used two linguistic tasks, namely, lexical decision and sentence comprehension because they may be lateralized to a different extent and thus show different effects of stimulation targeting the interhemispheric balance. The participants were 49 healthy young Russian speakers.

We found no significant effect of stimulation: no improvement in accuracy or reaction times in either task, compared to sham (placebo). Thus, the study lends no support to the interhemispheric competition hypothesis or to beneficial effects of tDCS in the healthy population. Still, a follow-up study is necessary to test whether the same tDCS settings might still be effective in patients with aphasia.

Data collection is currently in progress; data of 72 participants will be available by the time of presentation.

Keywords: tDCS, interhemispheric competition.
Processing Verbal Texts and Infographics: Evidence from Russian


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Comparative psycholinguistic studies of the processing of verbal and non-verbal information become more and more popular nowadays. However, no experimental evidence for the comparison of processing infographics and texts have been provided so far. Our two-level study is the first step towards filling in this gap.

At the first stage, by comparing the lists of keywords our participants provided for several infographics and their verbal “translations”, we chose 4 pairs where the lists of keywords for the text and infographics were congruent. Then, we conducted an eye-tracking experiment (using the eye-tracker EyeLink 1000+) aimed to compare the online processing of the chosen infographics and verbal texts. Each of 22 participants read 4 different texts (two in infographics and two verbal ones) and had to answer 5 questions after each text and estimate whether the information was difficult or easy to read and understand.

The results did not show any fundamental differences in the processing of a verbal text and infographics (i.e. in the overall duration of reading, number and duration of fixation, general patterns of eye-movements). However, for 3 out of 4 pairs of texts analyzed, we got more correct answers and lower estimation of difficulty for the infographic form than for the verbal one. Further analysis of the infographics allowed us to put forward some recommendations on how to make infographics more perceptually effective.

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Keywords: infographics, text processing, eye-tracking.