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PROGRAMME

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15.30-18 RESEARCH ON NON-PATHOLOGICAL POPULATIONS session

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18 ROUND-UP

PLENARY LECTURE

Time reference in aphasia

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In Germanic, Romance, Slavic and many other languages, referring to a particular time frame of an event (past, present, future) is done by verb inflection and/or a periphrastic verb form for tense and aspect: *yesterday he walked, today he is walking, tomorrow he will walk*. Other languages, such as Chinese and Indonesian do not use verb inflection but aspectual adverbs as markers of the time frame of the event. Some African languages, like Akan, use grammatical tone to distinguish between past and present time frames.

Aphasia is a language disorder after brain damage that manifests at different linguistic levels, dependent on the size and site of the lesion. In agrammatic aphasia the grammatical problems are most prominent: the sentences of agrammatic speakers are short and simple and many bound and free grammatical morphemes are omitted or substituted. Verbs and verb inflection are particularly vulnerable.

In-depth study to these verb related problems demonstrated that verb forms used to refer to events in the past and completed events (past tense, perfect aspect) are selectively impaired in agrammatic aphasia. However, in languages in which aspectual adverbs are used, reference to the three time frames is equally impaired.

In this presentation I will present a hypothesis why reference to the past is impaired in agrammatic aphasia and present data from a dozen languages to illustrate the effects of this agrammatic aphasia on time reference.

WORKSHOP TALKS

Serbian loanwords in Romani-speaking children's narratives

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The aim of the study is to investigate Serbian loanwords in the Gurbet Romani variety spoken by elementary-school children in Eastern Serbia. All Romani varieties are highly susceptible to loanwords, as almost all Romani speakers are bilingual and enter various types of language contact (Elšik, 2007). The same holds for the area of Eastern Serbia, where extensive language contact between Serbian as a dominant language and different varieties of Romani has been reported (Ćirković & Mirić, 2017), resulting in numerous Serbian loanwords.

The corpus for our research consists of transcripts of conversations with 22 native speakers of the Gurbet Romani variety recorded in 2017 and 2018 in Knjaževac and Minićevo (Eastern Serbia). All speakers are elementary-school students aged 7 to 14, bilingual in Romani and Serbian. The open-ended interview was used as a method of data collection, with questions focusing mainly on traditional culture, children's free time activities, and prominent events from their past.

Code-switching passages were excluded from the analysis, as well as researchers' questions and comments. The corpus of narratives contains 8,736 word tokens (cf. example (1) for a narrative sample). The corpus was manually annotated for parts of speech and the following categories of Serbian loanwords were retrieved (cf. example 2): nouns (personal names excluded), adjectives, pronouns (demonstratives and positive/negative polarity items were found, but there were no instances of borrowed personal pronouns), numerals, verbs, adverbs, conjunctions, prepositions, particles, complementizers, and phrases.

The total of 2,423 Serbian loanword tokens were found, which makes 27.74% of the overall corpus. The quantitative analysis has shown that in the sample of Serbian loanwords conjunctions (29.76%) and nouns (28.11%) are the most frequent, followed by verbs (17.29%) and adverbs (14.49%) (cf. Graph 1). This suggests that both lexical and functional words are borrowed. The most frequent loanword is the conjunction *i* 'and' (19.44% of the loanwords).

The results will be discussed in relation to the following points of the qualitative analysis:

a. Certain loanwords are used together with their Romani counterparts (Serb. *i* – Rom. *thaj* 'and'), while for some of them a Romani counterpart is missing in the sample, although it exists in the language (cf. Serb. *posle* 'afterwards' and *onda* 'then' (Rom. *napal*)). Additionally, certain words are borrowed in order to fill a lexical gap in Romani (*slava* 'Saint Patron's day', *slavil* 'to celebrate').

b. Serbian inflected loanwords (nouns, verbs, adjectives and some adverbs) are morphologically adapted to Romani. For instance, masculine nouns are adapted by

adding the suffix *-o* in Nom.Sg. (*unuko* < Serb. *unuk* ‘grandson’), nouns can be preceded by a definite article (*o mrako* ‘the dark’) or inflected for cases (*drugaricenca*_{inst.Pl.} < Serb. *drugarica* ‘a female friend’); loanverbs are adapted by using appropriate adaptation markers (e.g. *-sard-* or *-salj-* in the past tense: *pričosardam*_{Past.1Sg} < Serb. *pričati* ‘speak’); borrowed adverbs can be compared (the superlative *majfino* < Serb. *fino* ‘nice’).

Further research will compare the data obtained on the sample of children’s narratives with the data from the narratives of the adult Gurbet Romani speakers.

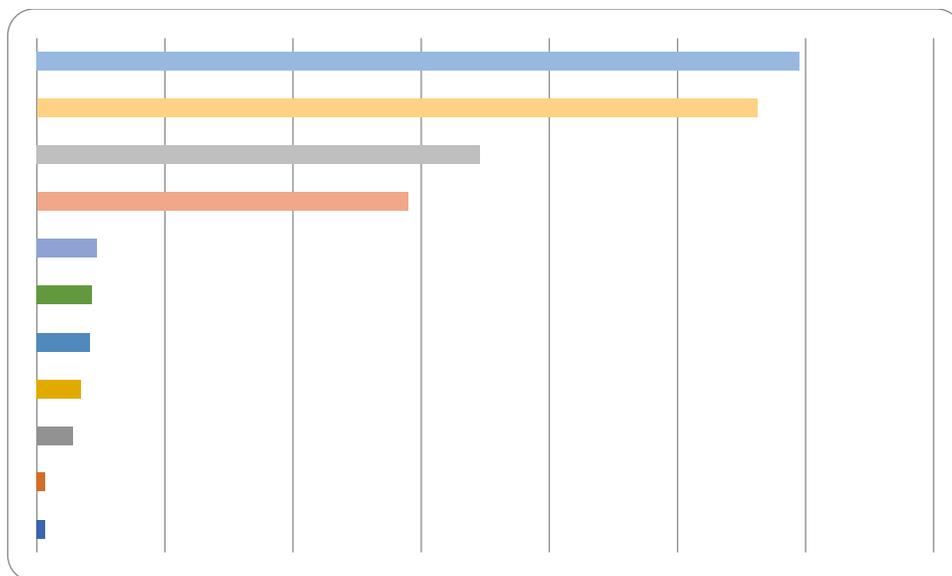
Example 1 (9-year-old girl) (Serbian loanwords are underlined)

Sema me dadesa ando foro, vov dija ma pare i ćindem maje me svara i ondak sa pharrada mi ph
ej mi jakna. Sas kate gijate. Ćhinda la ni džanav sosa i me rovdem i mo dad dija ma pare.
Me xalem len ane prodavnica, i ondak von ka ćinen, i dija ma mi phej kožno jakna, nevi.

‘I was with my father in the city, he gave me (the) money and (I) bought myself my things and then my sister tore my jacket. (It) was here, like that [showing on a sleeve]. (She) cut it I don’t know why and I cried and my father gave me (the) money. I spent it in the store, and then they will buy, and my sister gave me (the) leather jacket, (a) new (one).’

Example 2 (Loanwords are given in italic, with underlined roots in adapted loanwords)

- a. nouns: *škola* ‘school’, *krevetura* ‘beds’, *bicik(l)enca* ‘with bicycles’;
- b. verbs: *misliv* ‘I think’, *slavisardam* ‘I celebrated’, *vozisaljam* ‘I drove’;
- c. adjectives: *mirno* ‘still’, *narandžaste* ‘orange’, *romski* ‘Romani’, *kožno* ‘leather’;
- d. pronouns: (*posle*) *toqa* ‘(after) that’, *ništa* ‘nothing’, *svako* djive ‘every day’;
- e. numerals: *četri kopčura* ‘four stiches’, *prvo razredo* ‘first grade’;
- f. adverbs: *više* ‘more’, *uvek* ‘always’, *ponekad* ‘sometimes’, *svude* ‘everywhere’;
- g. prepositions: *za* ‘for’, *sa* ‘with’, *preko* ‘over’, *prema* ‘towards’;
- h. conjunctions: *i* ‘and’, *ali* ‘but’, *ili* ‘or’;
- i. particles: *baš* ‘really’, *bar* ‘at least’, *možda* ‘maybe’, *da* ‘yes’, *ne* ‘no’;
- j. complementizers: Me drugara but droma phenen maje *jel pričos* ‘My friends many times ask me *if* (we) speak (Romani)’;
- k. phrases: *sneško belić* / *sneško belićura* ‘Snowman(s)’, *nova godina* ‘New Year’.



Graph 1. Serbian loanwords with regard to parts of speech

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Children's production of reflexive and anti-causative verbs – a longitudinal study

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Previous studies have shown that children acquire reflexive verbs quite early (Snyder, Hyams & Crisma, 1995). However, some studies have suggested that the acquisition of verbs that involve A-movement is delayed (Borer & Wexler, 1987; Babyonyshev et al., 2001), whereas the results from other experiments have shown that children have difficulty with alternating transitivity (Brooks & Tomasello, 1999). The present study was designed to test whether there is any difference in the production of true reflexive (e.g. *oblačiti se* 'dress oneself'), lexical reflexive (e.g. *penjati se* 'climb') and anti-causative verbs (e.g. *pokvariti se* 'break') both transversally and longitudinally.

A total of sixty subjects belonging to three age groups (31-42, 43-55, 56-68 months-twenty participants in each group) took part in both experiments. The data collection technique was a structured interview with a verb elicitation task. The children were asked to name the activities presented in the pictures. The number of tested verbs was the same for each verb type (six per group, eighteen verbs in total). The data were analyzed with the Mixed Effects Logistic Regression (GLMER). Three analyses were conducted for each verb type. The dependent variable was verb production coded as target or non-target, and the independent variable was age. Verb length and frequency effects were also examined, as co-variables.

The results of the first GLMER analysis (Table 1) suggest that there is a significant difference in the production of true reflexive verbs between the ages of three and four ($\beta=-1.056$; $z=-2.672$; $\Pr(>|z|)=0.007$), but no significant difference between the ages of four and five ($\beta=0.125$; $z=0.272$; $\Pr(>|z|)=0.785$). The second GLMER analysis presented in Table 2 (lexical reflexive verbs) yielded the same results. The last GLMER analysis (Table 3) shows that anti-causative verbs were produced more accurately at the age of four than at the age of three ($\beta=-1.156$; $z=-3.909$; $\Pr(>|z|)=9.25e-05$), as well as at the age of five than at the age of four ($\beta=0.657$; $z=2.106$; $\Pr(>|z|)=0.035$). Therefore, the results have indicated that true and lexical reflexive verbs are acquired before anti-causative verbs, which confirms the results from previous analyses (Ilić, 2019).

The same experiment was repeated longitudinally after nine months in December 2019. The production of true reflexive verbs was 89% in Group 1 and 97% in Groups 2 and 3. The production of lexical reflexive verbs was 98% in Group 1 and 100% in Groups 2 and 3. The production of anti-causative verbs was 78% in Group 1, 88% in Group 2 and 91% in Group 3. It is expected that the statistical analysis will confirm these results and track the further development of anti-causative verbs, which seem to be acquired after reflexive ones.

Table 1. Differences in the production of true reflexive verbs across ages

Random effects			<i>Variance</i>	<i>SD</i>
Subject : Intercept			.220	.469
Stimuli : Intercept			.162	.402
Fixed effects	<i>Estimate</i>	<i>SE</i>	<i>z-value</i>	<i>p-value</i>
Intercept	2.374	.500	4.744	2.1e-06
Trial Order	.011	.018	.594	.552
Verb Frequency	-.289	.267	-1.084	.278
Verb Length	-.708	.347	-2.036	.041
Age (3-year-olds)	-1.056	.395	-2.672	.007
Age (5-year-olds)	.125	.460	.272	.785

Table 2. Differences in the production of lexical reflexive verbs across ages

Random effects			<i>Variance</i>	<i>SD</i>
Subject : Intercept			.656	.810
Stimuli : Intercept			.978	.989
Fixed effects	<i>Estimate</i>	<i>SE</i>	<i>z-value</i>	<i>p-value</i>
Intercept	6.455	1.431	4.508	6.54e-06
Trial Order	-.185	.094	-1.961	.049
Verb Frequency	-.430	.813	-.529	.596
Verb Length	1.384	.740	1.869	.061.
Age (3-year-olds)	-2.074	.722	-2.873	.004
Age (5-year-olds)	1.219	1.200	1.015	.309

Table 3. Differences in the production of anti-causative verbs across ages

Random effects			<i>Variance</i>	<i>SD</i>
Subject : Intercept			.240	.490
Stimuli : Intercept			.655	.809
Fixed effects	<i>Estimate</i>	<i>SE</i>	<i>z-value</i>	<i>p-value</i>
Intercept	.500	.460	1.088	.276
Trial Order	.016	.014	1.072	.283
Verb Frequency	-.113	.380	-.298	.766
Verb Length	.102	.377	.272	.785
Age (3-year-olds)	-1.156	.295	-3.909	9.25e-05
Age (5-year-olds)	0.657	.312	2.106	.035

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Event Related Potentials in response to syntax errors in a programming language

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The use of digital technology in daily life has seen a large increase over the last two decades. With this increase, programming in educational systems has gained major importance worldwide. Nevertheless, little is known about the skills of computer programming. Some authors have suggested that programming is essentially a language skill (O'Regan, 2012; Paulson, 2007; Fedorenko et al. 2019). They argue that programming languages are increasingly developed to resemble natural languages, with syntax rules that vary among programming languages and have to be obeyed for the code to be executed.

An fMRI study by Siegmund et al (2014) indeed showed that when reading computer code in a programming language, similar brain areas were active as when reading a natural language. This suggests that language processes are involved when reading computer code. However, this study did not look into the specific similarities and differences between processing a natural language versus a programming language. Electroencephalography (EEG) is a good way to look more closely at the timing of language processing in the brain. In natural languages much research has been done on Event-Related Potentials (ERPs) in response to reading or hearing a grammatical violation in a natural language. By studying ERPs in response to syntax errors in a programming language we can compare time-specific processing of errors in a programming language with the processing of similar errors in natural languages.

In the current study we are going to use EEG measurements to look at the ERPs in response to reading syntax errors in Java programming code. We compare ERPs in response to a typical programming syntax error, the use of an incorrect bracket type, with the ERP response to modal verb disagreements in Dutch and English. This allows us to compare the processing of syntax errors in code with grammatical errors in the programmer's native language (Dutch) and their second language (English).

No previous studies have been done with ERPs in response to errors in programming languages, so we do not have a strong prediction of what the effect might look like. However, we expect that the effect in response to Java syntax errors is more likely to be similar to effects in response to syntax errors in English (L2) than in Dutch (L1). This is because English is the programmer's second language, and programming languages are also always learnt as a

second language rather than as a native language. The results of this study will shed more light on the mechanisms underpinning the processing of programming languages, that is, whether the processing of a programming language resembles natural language processing.

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Relating phonological awareness skills to auditory mismatch responses using generalized additive modelling

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The mismatch negativity (MMN) is an event related potential (ERP) component, which is widely considered to be an indicator of auditory discriminatory capabilities (Näätänen et al., 2007) and which often correlates with phonological awareness (PA) and reading proficiency. In an oddball paradigm, the MMN usually peaks around 100-230 ms after stimulus deviancy and is sometimes followed by a long-lasting component named the late discriminative negativity (LDN) from 250 ms onwards. In this work, we are investigating possible interactions of these auditory mismatch components with PA skills in Dutch speaking first graders.

We recruited 40 first grade children who underwent behavioural tests measuring reading-related abilities as well as electroencephalography (EEG) recordings of MMN & LDN responses to changes of consonant and vowel quality, as well as vowel duration. We compare two analyses for this ERP dataset: i) using conventional grand averaging across two groups (average vs. poor PA skills, below 1 SD of the sample mean) and ii) a single trial mixed effects regression using generalized additive models (GAM; Wood, 2017) which investigates the mismatch responses in relation to a continuum of PA skills.

While we expected to find an interaction of MMN with PA skills, we saw that only the LDN is modulated by PA skills. With the conventional analysis we found significant MMN and LDN responses, but no differences between average and poor performers. Using GAMs we found a more fine-grained picture of the underlying nonlinear interactions of PA skills and single trial ERP amplitudes. Our data suggests that an arbitrary dichotomous split of an experimental group into average and poor performers should be avoided, but to rather analyse brain responses in relation to the entire range of cognitive abilities.

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Aphasia beyond Indo-European languages

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Introduction: Up to date, most research in the field of aphasiology has focused on a small subset of Indo-European languages, whereas non-Indo-European languages remain almost unexplored. According to Beveridge and Bak (2011), up to 85% of the studies are based on results from Romance and Germanic languages alone and, although the number of described languages is increasing, data from these languages have not been explored in detail yet or remain unavailable for general use. This means that the wide range of current theories trying to account for patients' performance is based on a very limited subset of outcomes and linguistic configurations. The exploration of different languages can help us refine and/or refute some of the existing, and in certain cases competing, proposals contributing not only to a better understanding of aphasia but also to the design and implementation of more efficient treatments.

Aim: Due to time restrictions, in this presentation I focus on two languages, Greenlandic – a polysynthetic Eskimo–Aleut language – and Standard Indonesian – a zero-marking language from the Austronesian family. These are used to illustrate the importance of language diversity to properly understand different phenomena related to aphasia.

Method: To do so, I focus on the results from Nedergaard et al.'s (2019) study, including spontaneous speech samples of 5 native speakers of West Greenlandic with aphasia, and those from Jap et al.'s (2016), including controlled tasks completed by 11 speakers of Standard Indonesian diagnosed with Broca's aphasia.

Discussion: These studies seem to challenge generally assumed patterns in aphasia. Nedergaard et al. (2019) show that non-fluent aphasia in West Greenlandic is not directly associated with morphological impairment. The authors attribute the patients' pattern of performance to the peculiarities of polysynthetic languages. Similarly, Jap et al. (2016) show that passives can be better preserved than actives when frequency plays an important role in the distribution of these two constructions, as it is the case with Standard Indonesian. Hence, language specific characteristics have a direct impact on the preservation/impairment of certain linguistic aspects and on the communication strategies at work in people with aphasia. This is a clear indicator that multiple factors, not only linguistic but also psycholinguistic, have to be considered to predict patterns of performance in different languages.

Conclusion: The results for Greenlandic and Standard Indonesian challenge prototypical assumptions about language deficits in aphasia opening a window for the evolution of the field towards a better understanding of the underlying patterns of performance of people with

aphasia, the factors to be considered to predict outcomes, and the design of effective treatment methods.

Quantifier spreading errors during pronoun processing in aphasia

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Quantifier spreading refers to a difficulty interpreting quantifier scope during sentence comprehension (Brooks & Parshina, 2019). Although this phenomenon has often been observed in language acquisition studies (O'Grady, Suzuki, & Yoshinaga, 2010; Sekerina & Saueremann, 2015), there is evidence that persons with aphasia (PWA) may as well be prone to quantifier spreading errors (Grodzinsky, Wexler, Chien, Marakovitz, & Solomon, 1993; Philip & Avrutin, 1998; Roca Hoogsteder, 2012). The current study examined sentence comprehension of quantified and non-quantified subjects in Turkish persons with non-fluent aphasia (PWA) using a truth-value judgement tasks in a sentence-picture matching paradigm. A total number of 12 PWA were recruited (8 females, *Age* = 59.7, *SD* = 14.55) who were asked to listen to 24 sentences in two conditions of non-quantified (1) and quantified subject noun phrases (2). In sentence materials, different anaphoric variables in object positions were controlled for (pronoun, reflexive,¹ and R-expression). The task was to decide if the visual depiction presented to the participants correctly described the sentence content. Half of the sentences were correctly depicted in visual images while the other half contained a misinterpreted depiction of the propositional content of sentences (see Figure 1).

(1) Tavşan kendini / onu / maymunu gösteriyor.
Rabbit itself / it / monkey shows.PRESPROG.3SG
'The rabbit is pointing at itself /it /the monkey'

(2) Her tavşan kendini / onu / maymunu gösteriyor.
Every rabbit itself / it / monkey shows.PRESPROG.3SG
'Every rabbit is pointing at itself /it /the monkey'

¹ Note that in Turkish there are two forms of anaphoric elements which function as reflexive (i.e. 'kendi' and 'kendisi'), according to some accounts, the latter behaves as a long-distance reflexive and it can refer to non-local antecedents (see e.g. Kornfilt, 2001). We only included the default 'kendi' reflexive in this study.

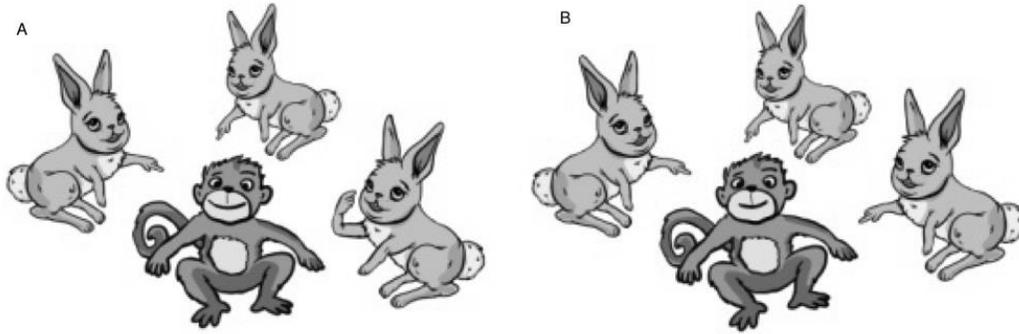


Figure 1. An example visual depiction for incorrect (A) and correct (B) interpretations for the quantified pronoun sentence ‘Every rabbit is pointing at the monkey’.

A set of mixed-effects regression models have shown that the PWA responded equally accurately to sentences with and without quantified subjects overall ($\beta = -0.33$, $SE = 0.29$, $z = -1.12$, $p = 0.26$), however, there were significant effects of Mismatch ($\beta = -1.22$, $SE = 0.47$, $z = -2.55$, $p = 0.01$) and an interaction between Mismatch and Quantifier conditions ($\beta = -1.41$, $SE = 0.68$, $z = -2.05$, $p = 0.04$). This indicates that PWA had difficulty judging the truth value in sentences with a mismatching visual depiction, and this difficulty was greater in sentences with quantified subjects (see Figure 2). Therefore, we confirm that the Turkish PWA were susceptible to quantifier spreading errors. Furthermore, the PWA had an increased difficulty in interpreting sentences with R-expressions in comparison to both reflexives ($\beta = 0.93$, $SE = 0.31$, $z = 2.99$, $p = 0.007$) and pronouns ($\beta = 0.83$, $SE = 0.31$, $z = 2.70$, $p = 0.01$), there were no differences between pronoun and reflexive variables, however. It seems to us that our findings are best accounted for by hypotheses on impaired lexical-semantic processing (see e.g. Choy & Thompson, 2010). However, at this stage we cannot rule out the possibility that reduced visual attention in aphasia may have led to greater amount of misinterpretations.

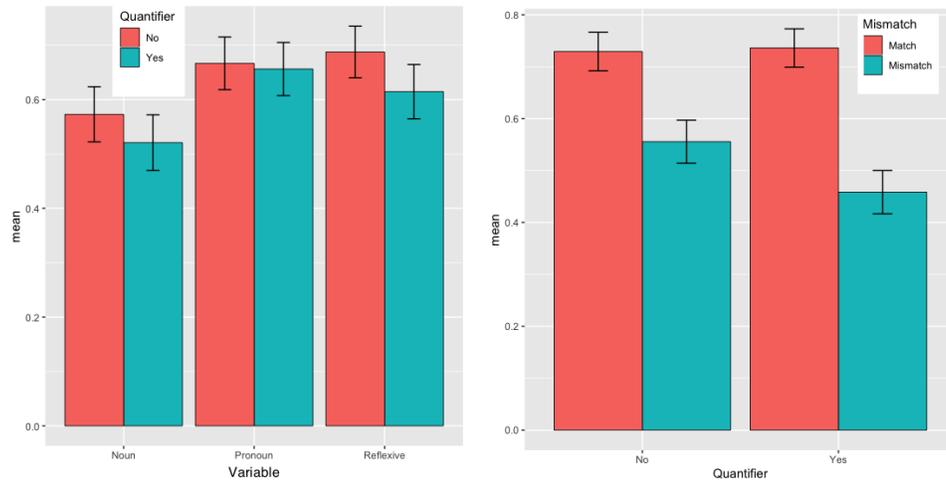


Figure 2. The PWA’s mean accuracy of responses to different variables (left), and to quantified and non-quantified subject pronouns (right).

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Syntactic impairments in Parkinson's Disease - Insights from Italian-speaking patients with Deep Brain Stimulation

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Parkinson's Disease (PD) is a neurodegenerative disorder that affects primarily the motor system, thus causing bradykinesia, rest tremor and rigidity (Postuma et al., 2015). Besides these motor features, cognitive decline is frequently observed in patients (Robbins & Cools, 2014). Language and speech impairments are also reported in PD: the most common condition is hypokinetic dysarthria (Cummings, 2008), but also high-level deficits have been documented (Holtgraves & Giordano, 2017). Concerning the syntactic profile of PD, patients may show a reduction of sentence complexity in discourse production (Illes et al., 1988; Illes, 1989) and difficulties in understanding non-canonical structures (e.g. object-centred relative clauses); impairments in sentence comprehension have been associated with executive dysfunctions (Liebermann et al., 1990; Auclair-Ouellet et al., 2017; Birba et al., 2017) and described as a consequence of the disruption of late syntactic integrational processes (Friederici et al., 2013). Few studies examined the effects of Deep Brain Stimulation (a surgical neurostimulation frequently used for motor symptoms management in PD) on patients' syntactic abilities and the results are mostly contradictory: on the one hand, DBS seems to be positively effective on syntactic production deficits (Zanini et al., 2009); on the other hand, negative outcomes have been addressed both in syntactic production (Batens et al., 2014; Batens et al., 2015) and comprehension (Schultz et al., 2012). Despite these results, the effects of DBS on grammar in PD have not been sufficiently studied.

The aim of the present research is to further investigate how DBS affects syntax in PD, providing for the first time results from a standardized syntactic assessment on Italian-speaking subjects. The study was carried out on a group of 5 cognitively unimpaired Italian PD patients, who had previously undergone DBS (mean age: 66,3), compared to 6 PD patients treated only with medications (mean age: 55,3) and 8 healthy controls (mean age: 58), matched for age and education to the clinical groups. The linguistic assessment was performed using the Italian version of the Northwestern Assessment of Verbs and Sentences (NAVS) (Thompson, 2011; Barbieri et al., 2013), which includes five syntactic tests (Verb Naming, Verb Comprehension, Argument Structure Production, Sentence Production Priming, and Sentence Comprehension). A complete neuropsychological assessment was also administered to PD patients, including Raven's Coloured Progressive Matrices, Verbal Span, Trail Making Test, and Frontal Assessment Battery. PD patients with DBS performed significantly worse than controls only at the Sentence Production Priming test (Kruskal-Wallis Test: $p=.03$; post-hoc: $p=.03$) and

Sentence Comprehension test (K-W: $p=.02$; post-hoc: $p=.02$). In these tasks a significant difference between PD groups was found: DBS patients produced less accurate passive sentences than non-DBS patients ($p = .03$) and showed a major difficulty in understanding object-cleft sentences ($p = .05$). The correlation analysis showed a significant association between passive sentences production and right-stimulation intensity (Spearman's Rho: $.95, p = .01$), bilateral frequency ($.91, p = .03$), Raven's Matrices ($.97, p = .01$) and Verbal Span ($.88, p = .05$), whereas object-cleft sentences comprehension was significantly correlated with executive functioning tests (TMT^{B-A}: $-.89, p = .04$; FAB: $.92, p = .03$) and patients' daily levodopa dose ($-.92, p=.03$). Despite the small sample size, these findings support the hypothesis that DBS might affect the syntactic production of PD patients. However, the role of cognitive decline cannot be entirely ignored even in cognitively unimpaired PD patients. Indeed, the association highlighted between passive and object-cleft sentences and other cognitive domains offers new perspectives in the research on neural correlates of syntax.

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Syntactic and prosodic realisation of focus asymmetries in Turkish

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Background: Focus realisation in Turkish has been investigated from multiple perspectives, including the syntactic hypothesis, which contrasts the most frequent transitive subject-object-verb canonical word order with all other syntactically non-canonical word orders (Erguvanli, 1984; Kennelly, 1999; Göksel & Özsoy, 2000); the prosodic hypothesis of focus realisation through pitch contour modulation (Özge & Bozşahin, 2010); and the dual hypothesis, which integrates syntactic and prosodic assumptions (İşsever, 2003). Notably, experimental studies have not found conclusive evidence for any of these hypotheses, and three major focus asymmetries remain unclear (Gürer, 2014): focus scope, with narrow foci on single constituents and broad foci on entire clauses; the focus type encoding communicative role, with information focus expressing previously non-presupposed novel information, and identificational focus, which relates to possible antecedents in context; and argument hierarchy, which encodes the asymmetry between subject and non-subject foci (Skopeteas & Fanselow, 2010).

Objective: This study aims to provide a data-driven description of focus realisation in naturalistic Turkish speech by specifically investigating the ways of encoding focus types (information vs. identificational focus), focus scope (narrow vs. broad focus) and argument hierarchy (subject vs. object focus) by re-evaluating syntactic and prosodic contributions.

Methods: In the present experiment, 26 native speakers of Turkish produced 120 focus constructions each by answering auditorily presented *wh*-questions targeting broad sentence foci and narrow object and subject foci. The discourse context was manipulated for focus types through the presentation of alternative answers to the *wh*-questions and simultaneously presented animations. The participants' answers to these triggers were recorded and transcribed for word order analysis. Furthermore, by-word mean fundamental frequency and by-word mean intensity measures as acoustic correlates of prosody were obtained and statistically analysed.

Results: The results show that neither focus scope nor focus type modulated word order, with no significant effect of focus scope (singularity with broad foci only occurring in canonical word order) or focus type ($p > .05$), whilst argument hierarchy exhibited a significant effect on the answer's word order ($p < .001$). Regarding prosody, the results summarised in Tables 1 and 2 indicate that fundamental frequency was an acoustic correlate of focus scope, argument hierarchy and focus type. Intensity was also found to be an acoustic correlate of focus scope and argument hierarchy, whereas focus type did not affect intensity.

Discussion: The results of this study support the elimination of an explicit focus position and syntactic strategies for focus types or focus scope in Turkish. Word order was only affected by argument hierarchy, with subject foci being observed more often in the non-canonical object-subject-verb word order, while object foci were mostly found in the canonical subject-object-verb order. In contrast to previous experimental investigations on read speech, through utilising our experimental paradigm to elicit natural speech, we provide evidence for fundamental frequency (focus scope, target and type) and intensity (focus scope and target) as acoustic correlates of focus and focus asymmetries in Turkish, highlighting potential methodological issues in focus studies.

Table 1 Generalised additive model analysis p -value results by constituent for canonical Subject-Object-Verb answers

	Focus scope			Argument hierarchy			Focus type					
	S	O	V	S	O	V	S	O	V	S	O	V
							Focus on Subject			Focus on Object		
<i>f0</i>	< .001	< .001	.033	.008	< .001	.018	.015	.465	.969	.036	.972	.359
<i>dB</i>	.461	< .001	.249	< .001	.005	.145	.943	.721	.620	.677	.928	.133

Note. *f0* = Fundamental frequency; *dB* = Intensity; S = Subject; O = Object; V = Verb; significant p -values in bold for clarity.

Table 2 Generalised additive model analysis p -value results by constituent for non-canonical Object-Subject-Verb answers

	Argument hierarchy			Focus type					
	Object	Subject	Verb	Object	Subject	Verb	Object	Subject	Verb
				Focus on Subject			Focus on Object		
<i>f0</i>	.803	< .001	.987	.006	.004	.989	.824	.175	.624
<i>dB</i>	.263	< .001	.071	.439	.079	.602	.871	.204	.311

Note. *f0* = Fundamental frequency; *dB* = Intensity; significant p -values in bold for clarity.

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Exploring fine restrictions in the derivation of deverbal adjectives in Greek

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The present study explores restrictions in the derivation of Greek deverbal adjectives formed with the suffixes *-simos*, *-menos* and *-tos*. Previous research (Alexiadou, 2018; Anagnostopoulou, 2003; Anagnostopoulou, & Samioti, 2013) has shown that each of them cannot combine with certain verb categories, such as unergative verbs, thus, the ungrammaticality of the following formations, **trex-simos*, *trex-menos*, *trex-tos*, from *trexo* ‘run’. By using a large number of pseudowords containing *thematic violations*, created by the combination of these suffixes with verbs that are not normally combined with (e.g. *ksekino* ‘begin’ [causative/inchoative] < *ksekinisimos*, *ksekinimenos*, *ksekinitos*) and *categorical violations*, created by the combination of these suffixes with nominal instead of verbal roots (e.g. *limni* ‘lake’ [no verb] < *limnisimos*, *limnimenos*, *limnitos*), as well as *novel words* (e.g. *diigoume* ‘narrate’ [transitive] < *diigisimos*, *diigimenos*, *diigitos*), previous psycholinguistic research has shown that processing of thematic violations occurs at distinct timeframes (Author, 2007) and at distinct brain locations (Neophytou et al, 2018) than that of categorical violations. However, their thematic violations were strictly based on unergative verbs and their categorial violations were based on nouns.

The current research seeks to further investigate acceptability patterns of thematic and categorial violations using verb roots of various categories (causative, inchoative, causative/inchoative, subject and object experiencer verbs, state, unergative, transitive, ditransitive, perception verbs, ditransitive). 76 native speakers of Greek were asked to decide whether 501 words containing violations were real in Greek. Results showed that the novel words were more acceptable (acceptance rate: 37%), followed by words with thematic violations (acceptance rate: 28%), and by categorial violations (acceptance rate: 9%), confirming previous psycholinguistic results. However, when it comes to **thematic violations**, for the suffix *-simos* the most acceptable verb category is causative verbs (acceptance rate: 0,54%), (e.g.: *skotono* ‘kill’ < *skotosimos*), for *-menos* is that of subject experience psych verbs (acceptance rate: 0,47%), (e.g.: *anisicho* ‘worry’ < *anisichimenos*), and for *-tos* is unergative verbs (acceptance rate: 24%) (e.g.: *perpato* ‘walk’ < *perpatitos*). When it comes to **novel words**, the most acceptable combinations were with ditransitive verbs for both *-simos* (acceptance rate: 49%) and *-tos* (acceptance rate: 35%), (e.g.: *eksigo* ‘explain’ < *eksigisimos*, *eksigitos*), whereas for *-menos* the most acceptable category was with transitive verbs (acceptance rate: 47%), (e.g.: *diigoume* ‘narrate’ < *diigimenos*). Results indicate that there

is a range in the acceptability of both thematic violations and novel words depending on the base verb category. Moreover, what was classified as violations, based on theoretical grounds, was occasionally more acceptable than novel formations. This will be discussed in light of theories suggesting that verbs at the spectrum of change of state, such as causatives, cannot be combined with *-simos* (Alexiadou, 2018), and state verbs, like subject experiencer psychological verbs cannot be combined with *-menos* (Anagnostopoulou, 2003).

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Left periphery in neglect dyslexia

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Neglect dyslexia is a lateralized visuo-spatial attention disorder, occurring after right brain damage. These patients commit errors in reading left side of sentences (i.d. omissions and substitutions). Syntactic structure can modulate patients' reading performance. The left periphery (LP) is a particular informative structure as it represents the interface between pragmatics and syntax. Topic and Focus are the two central projections of LP. Recently, Abbondanza et al. (2018) have shown that neglect dyslexia patients take an advantage for sentences containing Topic and Focus, in comparison to sentences with canonical word order of subject, verb and object (SVO). The aim of this work was to investigate the anatomical underpinning of LP advantage. Eleven Italian-speaking right brain damage patients with acquired neglect dyslexia were required to read aloud 103 sentences (Abbondanza et al. 2018), divided for syntactic structures. Group 1 had 66 LP sentences with Clitic Left-Dislocation Topics and Contrastive/ Corrective Foci. Group 2 had 37 control sentences, mainly with SVO. Patients' percentages of errors (omissions or substitutions) were compared between LP (Group 1) and SVO (Group 2) sentences. Voxel-based lesion symptom mapping (VLSM) technique was used to explore the lesion underpinning the influence of LP, measured as the discrepancy of error percentages between Group 1 and 2. Repeated T-test between Group 1 and 2 sentences was statistically significant.

The participants' percentage of errors show that more mistakes were made overall in SVO sentences (mean $20.77\% \pm 12.27$) in comparison to Topic and Focus structures ($15.89\% \pm 8.96$). VLSM analysis showed that right brain lesions in the middle and superior frontal lobe and anterior and middle cingulate cortex seem to correspond to smaller discrepancy between Group 1 and 2 sentences (in the sense of similar percentages of errors). Thus, these structures seem to be relevant area for the LP activation and benefit (i.e. fewer errors in percentage for Group 1 than Group2).

In conclusion, the present study shows that the LP attraction may orient the attention of patients with neglect dyslexia, improving their reading performance. Additionally, this benefit from LP activation seems to require an intact functioning of brain areas in the frontal lobe. This finding is consistent with the hypothesis that LP, despite its syntactic complexity, has a pragmatic function with a powerful attraction on attention.

Psychological latent structure of 2100 words - The relevance of perceptual component in the semantic description of language

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In the past decade, with the increasing popularity of the embodiment theories (Barsalou, 1999) researchers started to collect measures that are related to sensory-motor experience with an object represented by the word. The need for sensory-motor measures came from embodiment explanations of mental representations of concepts, where representations are simulations of previous sensory-motor experience with a concept. In other words, the neural pathways and brain zones that are active during the perception of an object, are stimulated when we are only thinking about it. Lynott and Connell (2009; 2013) were the first authors who published sensory norms for English words. They defined perceptual strength of word as the extent to which is possible to experience it with the particular sense (to what extent we can experience something by vision, touch, smell, taste and hearing). Recently, Serbian (Filipović Đurđević, et al., 2016), Russian (Miklashevsky, 2018) and Dutch (Speed & Majid, 2017) norms were published and the cognitive relevance of those measures was recorded. For example, it was found that the strength of perceptual experience of words predicts lexical decision latencies over and above concreteness and imageability (Connell & Lynott, 2012; Filipović Đurđević et al, 2016).

In the present study, more than 500 participants rated 2100 Serbian nouns on twelve dimensions: perceptual strength for five sensory modalities (vision, hearing, smell, taste, and touch), concreteness, imageability, context availability, familiarity, emotional valence, arousal and age of acquisition. We defined perceptual strength as the extent of being able to perceptually experience an object by relying on individual sensory modality. Since we want to explore whether the experience with an object is crucial for conceptual representation, we also collected per-modality ratings for actual perceptual experiences as introduced in Filipović Đurđević et al. (2016). All dimensions were rated on a seven-point scale, except for the age of acquisition (AoA) for which participants evaluated at what age they had learned the given word. We analysed the data with the principal component analysis (PCA) as we wanted to explore whether is possible to extract the perceptual component as a separate attribute of the semantic word space.

The PCA analysis revealed the change in the latent structure depending on which perceptual strength ratings were included in the analysis. When the perceptual ratings were based on

possible experience (table 1), three components were extracted, explaining 72% of the variance. The first component contained visual, tactile, olfactory and gustatory modality, as well as concreteness and imageability. The second component contained semantical features: AoA, Familiarity and Context availability. The third factor was loaded with emotional valence, arousal and auditory modality. In the PCA analysis with the perceptual strength ratings based on real experience (table 2), four components were extracted, explaining 77,6% of the variance. The major difference was due to additional extraction of the olfactory, gustatory modality and auditory modality as the separate component.

Our results showed that perceptual information is the relevant latent attribute of the semantic word space. It remains to conduct behavioural experiments to explore the cognitive relevance of these measures.

Table 1. Rotated component solution of the first PCA analysis

	Component		
	1	2	3
Touch possible	,921		
Concreteness	,878		
Imageability	,877		
Smell possible	,865		
Visual possible	,859		
Gustatory possible	,753		
Familiarity		,898	
Context availability		,838	
AoA	-,520	-,688	
Arousal			,747
Auditory possible			,669
Emotional valence		,498	-,533

Table 2. Rotated component solution of the second PCA analysis

	Component			
	1	2	3	4
Imageability	0,927			
Concreteness	0,92			
Visual experienced	0,795			
Touch experienced	0,759		0,39	
AoA	-0,62	-0,6		
Familiarity		0,882		
Context availability	0,357	0,819		
Gustatory experienced			0,797	
Smell experienced	0,452		0,717	
Auditory experienced		0,377	-0,6	
Emotional valence		0,359		0,801
Arousal				-0,78

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Conceptualization of endpoints with preposition *do* 'by/until' in Serbian

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If we read a book until the third chapter, do we read two or three chapters? If we have to submit documents until June 15, is the last day for submission June 15 or June 14?

For native speakers of Serbian, these seem to be difficult questions to answer. This paper looks into the construction [verb]+do+[endpoint] (Example 1 and 2) and examines composite structure of endpoints as a possible factor that affects processing and understanding of this construction.

Prototypical meaning of a prepositional phrase with *do* 'to/until' is an endpoint of a movement. Landau and Jackendoff (1993) explain that for nouns used in locational expressions 'only very coarse geometric properties are represented' and thus they are usually treated as certain geometric types, while prepositions specify which of these types are to be invoked in the processing of these expressions. Endpoints are important concepts in language – speakers tend to differentiate several endpoint types and remember them better than beginning points (Regier & Zheng, 2007). According to Matovac (2014), an endpoint that appears with the preposition *do* 'to/until' is typically conceived as a point because the meaning of this preposition requires the trajectory only to establish contact with the landmark.

This study investigated cases with composite endpoints in the target construction [verb]+do+[endpoint]. It is assumed that composite structure of endpoints interferes with the reduction of endpoints to a simple point in the process of conceptualization. Four concepts were chosen for stimuli: month, day, chapter and episode. Month and day represented concepts with well-defined composite structure (a month consists of an exact number of days and a day consists of an exact number of hours), while episode and chapter were examples of endpoints with looser composition. The hypothesis was that nouns with well-defined composition would show more resistance to being conceptualized as a point, since their composite structure is an important part of their meaning. This resistance was measured by the inclusion of the endpoint in the range of the action.

The data was collected by a questionnaire from 174 subjects. The questionnaire required participants to judge whether the endpoint of the action was in the beginning of the endpoint or at its end. Namely, they had to decide if the length of the endpoint was included in the range of the action specified by the verb (see Appendix). Inclusion implies that mere contact with the endpoint is not enough and its length has to be considered. Consequently, the endpoint is processed as a line or a volume rather than a point.

R (R Core Team, 2019) and lme4 (Bates, Maechler, Bolker & Walker, 2015) were used to perform a generalized linear mixed effects analysis of the relationship between the compositeness of endpoints and inclusion of the endpoint in the range of the action. The results show that the endpoints with well-defined composition are indeed included significantly more often in the range of the action compared to the endpoints with looser composition.

Examples

- 1) Radove treba predati do 15. juna.
papers-ACC.PL should submit-INF until 15th June-GEN
'The papers should be submitted by June 15th.'
- 2) Pročitao je knjigu do trećeg poglavlja.
read-PERF is-AUX book-ACC until third-GEN chapter-GEN
'He read the book until the third chapter.'

Appendix: Instructions of the questionnaire and one example question (English translation)

In this test, there are seven short passages. After each passage you will see 3 statements. Please read the texts and choose all the statements you consider to be correct. It is possible that all statements are correct as well as that all statements are wrong.

- 1) First class of the semester will be on March 5th. There are no presentations on the first class, students should only read the textbook until the third chapter. During the class, the professor will be explaining the theoretical introduction and there will be a theoretical discussion.
 - a. For the first class of the semester, it is not necessary to prepare at all.
 - b. One part of the first class will be theoretical discussion.
 - c. For the first class, students should read three chapters.

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