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KNJIGA SAŽETAKA  
BOOK OF ABSTRACTS





Pripremu i izdavanje ove knjige sažetaka omogućilo je  
Ministarstvo prosvete, nauke i tehnološkog razvoja Republike Srbije



## **Approaches to the research of language function**

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**Heterogeneity of language abilities in ASD: More evidence for the ALI/ALN distinction from an investigation of finiteness**

It is widely known that linguistic and cognitive abilities in ASD are extremely heterogeneous, ranging from severely impaired to intact. Studies often include participants with a range of abilities, or concentrate on higher-functioning individuals with ASD; however, such results are difficult to interpret or are not representative of all the population with ASD. One way of controlling for this heterogeneity is to distinguish between individuals who have relatively spared language ('autism language normal', ALN) and those with an established language impairment ('autism language impaired', ALI) (Kjelgaard and Tager-Flusberg, 2001). In this talk we review our research showing clear differences in the linguistic profiles of the population with ALN and that with ALI on several aspects of grammar, with children with ALI showing severe deficits in binding, passives and most recently, production of finiteness marking.

Keywords: autism spectrum disorders, autism with impaired language, autism with normal language, finiteness, tense marking

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**Neurodynamical Models of Embodied Cognition**

Research on grounded cognition suggests that the processing of a word or concept reactivates the perceptual and/or motor representations associated with the referent object. Such reactivation then

interacts with the ongoing cognitive computation. It is interesting to note that the effects of motor or online grounding are generally stronger and more robust when compared to perceptual or offline grounding. The aim of this study is to show how the theory of complementary brain processes explains differences between online and offline grounding as manifestations of different cortical circuits designed to solve complementary tasks (Grossberg, 2000; 2009). We suggest that perceptual grounding arise from the neural network designed to achieve stable category learning as elaborated in the adaptive resonance theory (ART). It affords fast learning without catastrophic forgetting by comparing sensory (bottom-up) data with learned (top-down) expectations. If the input pattern matches with one of the previously learned codes (categories) it is recognized as a familiar pattern. On the other hand, if there is a mismatch between the input pattern and the learned code, a reset signal is triggered that removes the currently active category representation and initiates a search for another category that may provide better match with the input. Previously, we suggested that the same top-down pathway that is needed to stabilize learning is also used during conceptual processing to reactivate perceptual patterns associated with concept (Domijan & Šetić, 2016). We showed that a mismatch between top-down expectation and bottom-up sensory data activates a reset signal that slows execution of the current cognitive task thus producing interference effect in incongruent condition (i.e., in condition where sensory data such as perception of blue color do not agree with the expectation produced by the concept such as word RED). Also, we showed that congruent condition does not produce any effect because top-down pathway is modulatory and cannot directly activate sensory nodes without direct sensory stimulation. Here, we demonstrated that online or motor grounding arises from the neural circuit designed to control arm movement. Such circuit does not need reset signal to correct its errors and top-down pathway to its nodes does not need to be modulatory. Therefore, words and concepts that activate motor plans will produce interference in incongruent as well as facilitation in congruent experimental condition. Consequently, online grounding will be more robust and stronger when compared to offline grounding which exhibits only interference. We conclude with the suggestion that further progress in studying grounded cognition will benefit from considering established neurocomputational mechanisms that can support such complex cognitive phenomena.

**Keywords:** grounded cognition, perception, motor control, neural model

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### **Text and sentence processing in the lab and in the wild**

I will present my work on sentence and text processing, two lines of research which are at the same time closely related and fundamentally different. The close relation lies, among other things, in the fact that sentence and text processing are adjacent levels of processing, with particular impact of sentence level phenomena on text processing. The fundamental difference is in the approach: I study sentence processing in strictly controlled experiments and text comprehension using a more naturalistic setup.

My sentence processing research uses relatively strictly controlled and hence rather artificial sets of sentences to compare models based on different operationalisations of predictability – lexicalised and syntactic surprisal – with models based on locality, which predict that sentences where syntactic heads occur more closely together will be easier to process. In an eye-tracking experiment with Danish double-object constructions, we find clear effects of locality and much more marginal effects of lexicalised surprisal.

Some operationalisation of predictability is also necessary in the more naturalistic approach I use to study text comprehension. This involves eye tracking of participants reading texts which are largely authentic but where certain constructions have been manipulated. I will outline this approach and briefly describe experiments that compare the processing of typically recommended constructions such as actives and sentential constructions, with parallel, supposedly more problematic constructions like passives and nominalisations. My experiments show no difference in reading time between recommended and problem constructions, and I hypothesise that this is because differences between constructions in themselves matter less than whether the chosen construction fits the information structure of the sentence in its context. However, the lack of experimental control in the text comprehension experiments may also be contributing to the absence of effects, so I am currently working on a more controlled approach that still retains some level of ecological validity. I will present initial results of an experiment that uses sentence-by-sentence reading of short texts where target sentences fit into a 2\*2 design of givenness of agent/theme and active/passive construction, thus testing the hypothesis that information structure matters more than type of construction.

The main focus of my talk will be on discussing and comparing the methods and their pros and cons, also considering particularly challenging issues such as how to foster and measure an appropriate level of text comprehension and how to work with text predictability.

**Keywords:** text comprehension, sentence processing, predictability

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### **What can we learn from children's "mistakes"?**

Experimental paradigms impose certain pragmatic demands on the participants in a way that they have to understand and follow the experimenter's instructions and behave accordingly.

During the experiment participants' mistakes are expected and treated either as random and excluded from further analysis, or as revealing of the phenomenon that is investigated. Although prepared for the former, experimenters working with pre-schoolers are also often faced with mistakes of different nature.

Because of their intensive cognitive and language development, pre-schoolers are a very interesting population for psycholinguistic researchers, but also require careful preparation of the experimental procedure. It includes taking into account the children's comprehension of the instructions and the situation in a way that is different from that of adults, in a way that is communicatively and pragmatically more relevant to them. As long as the experimenter is capable of predicting pre-schoolers' understanding of the task and adapting it accordingly, the experimental procedure will work. However, sometimes their different perception of the task and its pragmatic characteristics becomes obvious only during, or even after the experiment, when the responses are analysed. If left undetected, these mistakes may influence the results and lead to wrong conclusions about the investigated phenomenon.

We will illustrate the influence of pre-schoolers understanding of the pragmatics of a task on their performance through the "mistakes" they made in three different experimental procedures we have used: the non-word repetition task in estimation of phonological abilities, the naming task in the human body parts vocabulary assessment, and the choice task in testing verbal aspect comprehension. In the non-word repetition and naming task, the original instructions created for adults were partly adapted for pre-schoolers, but nevertheless some children understood the task in an unexpected way. In the choice task, the experimental procedure and instructions were the same as for adults, and it seemed that children followed them successfully. However, the qualitative analysis revealed that some of children's mistakes were probably the result of their susceptibility to pragmatic characteristics of the task, instead of insufficient comprehension of the verbal aspect semantics.

We will argue that any task with complex pragmatic properties and metalinguistic use of language is a prolific ground for children's mistakes and that the following questions should be considered: are we as experimenters always sensitive to pre-schoolers' understanding of the pragmatics of our tasks, and to what extent is it allowed to adapt the task instructions and the procedure while ensuring that we are targeting the same phenomenon in pre-schoolers and adults.

*Keywords:* preschool children, experimental procedure, pragmatics, mistakes



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