**The effect of statistical learning and general cognitive skills on language processing:  
a structural equation modeling study**

# **Background and aims**

Our research is about how cognitive capacities shape language skills, and especially how statistical learning capacity is related to linguistic skills. Previous studies have shown that statistical learning capacity has a positive relationship with performance on tasks measuring various linguistic processes. However, to our knowledge there is no systematic study on this relationship and on the potential mediating cognitive capacities. In the present study, we investigated this question by targeting multiple statistical learning tasks and indices, multiple linguistic skills, and potential mediating cognitive factors. Specific indices from the statistical learning and language tasks are suitable for measuring predictive processing, so we could investigate the relationship between prediction efficiency in statistical learning and language, as well.

# **Method**

We administered a test battery of statistical learning, mediator cognitive abilities, and language skills with a relatively large pool of adult participants. Statistical learning tests consisted of a speech segmentation and an artificial grammar learning task, and for both tasks, we administered online (*during learning*, measuring prediction), and offline (*post hoc*) tests. For mediator cognitive abilities, we tested processing speed and various measures of short term, working memory and cognitive control. For the language abilities, we examined receptive vocabulary, grammatical structure sensitivity, pragmatic sentence comprehension, the processing of syntactic and semantic violations, and the predictive processing of sentences.

# **Results**

(Bálint)

# **Discussion**

To summarize, both statistical learning and language tasks strongly rely on a shared set of general cognitive abilities. The shared variance between statistical learning and language tasks are mostly explained by these general cognitive abilities. However, offline statistical learning measures contribute to variance in offline (but not online, predictive) linguistic measures even beyond cognitive abilities. There are also some questions raised by our results. First, why is the relationship between offline measures of statistical learning and language abilities stronger than the relationship with offline statistical learning measures? Second, can statistical learning measures be improved to be less confounded by other cognitive abilities? And finally, what are the aspects of language where the relationship with statistical learning is well motivated?