**A LOOK AT STATISTICAL LANGUAGE LEARNING AND HOW IT RELATES TO THE EMERGENCE OF LANGUAGE AND READING DISORDERS**

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**Objectives:** Our ability to learn language relies on becoming sensitive to structural patterns in speech, a process known as statistical learning (SL). SL has been found to be impaired in children with reading and language disorders; however, research on SL abilities in children with a broad range of language disorders is largely unexplored. Studies looking at SL have mostly used offline behavioural measures. These measures do not capture SL as it occurs and excludes important information, such as the time course of learning. In this study, neuroimaging and behavioural measures are being used to investigate SL in 8 to 12-year-old children with a range of reading and language abilities. The goal of the study is to explore how SL predicts patterns of deficit in multiple language modalities to provide a more complete picture of how SL influences language and reading development. The hypothesis is that children who have poor language profiles will also have poor SL abilities. In addition, this would confirm that deficits in SL play a role in the emergence of language disorders.

**Method:** We will be looking at 40 participants with a range of language and reading abilities, including children who have been diagnosed with dyslexia (also known as Reading Disability) and Developmental Language Disorder (previously known as Specific Language Impairment). The participants are English monolingual 8 to 12-year-olds, with normal or corrected-to-normal vision, no history of hearing impairment, or other neurological or psychiatric disorders. Participants are given a battery of language and cognitive tasks to determine their reading and language proficiency. Children’s brain activity is monitored with electroencephalogram (EEG) while they complete auditory and visual SL tasks. For the auditory task, participants passively listen to a 6-minute speech stream composed of four trisyllabic nonsense words. Participants then complete memory tasks to assess implicit and explicit learning of the novel language. For the visual task, participants observe a successive stream of aliens on the computer screen for 4.5 minutes. Each alien has distinct features and are grouped into “families” of three aliens. SL is assessed with an explicit forced choice recognition task.

**Results:** Results are pending, as we have only tested a small number of participants (*n* = 4). We anticipate that language performance will be positively correlated with the auditory and visual SL tasks. Therefore, if participants have poor language and reading abilities, they will also have poor SL abilities. This would demonstrate that SL is associated with the emergence in language disorders.

**Discussion/Conclusions:** Studying the neurocognitive mechanisms involved in language learning will provide us with key insights on the emergence of language disorders. This research will provide behavioural and neuroimaging data on the underlying mechanisms of language disorders, which will inform neurocognitive theories of language learning. The information gathered from this study could enhance diagnosis and treatment of language and reading disorders.

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