Dyslexia, Rhythm, Language and the Brain

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Recent insights from auditory neuroscience provide a new perspective on how the brain encodes speech. Using these recent insights, I will provide an overview of key factors underpinning individual differences in children's development of language and phonology, providing a context for exploring atypical reading development (dyslexia). I will describe a neural oscillatory "temporal sampling" framework for linking amplitude rise time discrimination to linguistic development by children, drawing on data from dyslexia studies. I will show that sensitivity to the amplitude modulation (AM) structure of infant-directed and child-directed speech is key to individual differences in phonological development, and that this AM structure contains acoustic statistical cues to different phonological units. Children with dyslexia are relatively insensitive to these amplitude modulation cues and speech rhythm patterns. This lack of rhythmic sensitivity is related to the atypical neural encoding of amplitude modulation patterns in speech via neuronal oscillatory entrainment. I will finish by describing how I am currently extending the temporal sampling framework to oral developmental language disorders.

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