Brain and Language acquisition

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Language is the most critical ability of human being to interact with the world. Children begin the process of language acquisition naturally with the supports of brain development. Educational neuroscience is an emerging scientific field that brings together researchers from cognitive neuroscience, psychology, education, computer science, and other disciplines to explore how research findings from these areas can inform our understandings about teaching and learning.

In this lecture, I will introduce the event-related potentials (ERPs) technique and the ERPs components, such as MMN, N170, and N400, that could be used to reflect orthographic, phonological, and semantic processes. Then, I will present two sets of studies to show how ERP studies can advanced our understanding of the cognitive and neural bases of language acquisition. The first one is a series of longitudinal and cross-sectional MMN studies in infancy and early childhood to explore the developmental milestones of Mandarin lexical tone acquisition and to investigate whether the developmental changes in speech perception may predict subsequent language and reading developmental. The second one is using the lexicality effects on N400 to investigate the acquisition of orthographic knowledge in children with or without Chinese dyslexic. The potential applications for the early identification of dyslexic children and the evaluation of reading remediation will be discussed.