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The numerate brain: development, enculturation and individual differences

How do we process numbers? A growing body of evidence has demonstrated the existence of a system for the representation and processing of numerical magnitude (the total number of items in a set) that is shared between species, can be detected very early in development and is associated with neuronal activation of the parietal cortex. However, most of this work has been conducted with adult participants and comparatively little is known about the processes of ontogenetic brain specialization for number and how cultural symbols become represented in the brain over the course of learning and development. In this talk, I will discuss evidence from a series of behavioral and brain imaging studies that have examined the developmental trajectories of basic number processing. Specifically, I will discuss developmental changes in the behavioral and neuronal markers of basic number processing. Moreover, I will review a series of brain imaging studies that aim to disentangle the interactive effects of maturation and development on the cortical representation of numerical magnitude. Finally, I will ask whether basic numerical magnitude processing matters for children's development of arithmetic skills at both behavioral and brain levels and discuss the educational implications of this work.