

Forest or trees? Developmental change in local-global analysis, from childhood through young adulthood

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When performing two (or more) different tasks on the same set of stimuli, one crucial cognitive component of flexibility is needed. Several studies on flexibility have recently shown activation of the prefrontal cortex (PFC) when switching between tasks. It is argued that the initial activation of responding to a stimulus is affected by the dominance of the stimulus features. That is, the perception of (hierarchical) stimuli includes the compound (global) as well as the constituent (local) level of structure, and either the local or the global structure is processed dominantly. It is suggested that if one is instructed to focus attention to the non-dominant aspect of processing, this affects the ability to flexibly switch tasks. In this experiment we examined the development of the dominance of local versus global processing of hierarchical stimuli (i.e., the global stimuli were big squares or big rectangles, and consisted of local elements of small squares or small rectangles). Moreover, we examined the development of the ability to switch between local and global task sets, in relation to the dominance of processing. Four age groups (7 years old, 11 years old, 15 years old, and 21 years old) performed on a local-global switch task. In two blocks, participants learned to respond to a local and to a global task set respectively. Finally, in a third block, participants were to switch between series of  $n=4$  local stimuli and series of  $n=4$  global stimuli. It was found that all age groups performed more accurate and faster to global stimuli, although this effect decreased with age. When switching between local and global task sets, it was found that switch costs per se decreased, but this effect was not modulated by the local or global response rules. The results are interpreted vis-à-vis the development of prefrontal cortex systems.

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