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Positive Effects of a Developmental Period Without Control

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Abstract

Executive control processes allow task-appropriate behaviour across cognitive domains, yet, children have a long developmental period with little or no control. Traditionally, this is viewed as a negative but necessary consequence of the time taken for prefrontal development and learning control processes. Here we examine a recent model of controlled semantic cognition (<https://biorxiv.org/cgi/content/short/860528v1>) as a test case to present evidence for an alternative (yet perhaps, complementary) view; that a developmental period without control has a positive functional role in learning. Varying the length of a developmental period without control, we identify an optimal period (around one third of the learning time) which allows conceptual learning to happen much faster, without loss of conceptual abstraction ability. This speeding is mediated by the way control interacts with representation regions (deeper multimodal ζ shallower input areas). This has implications for our understanding of controlled semantic cognition and the development of control more generally.