Developmental Trajectories of Working Memory Updating from Early Childhood to Adolescence: A Meta-Analysis

Ye Song
The Hong Kong University of Science and Technology, Hong Kong, China

Chen Cheng
The Hong Kong University of Science and Technology, Hong Kong, China

Abstract

Working memory updating, the process of replacing outdated information with new data, is a crucial cognitive function for learning that develops significantly throughout childhood and adolescence. However, the developmental trajectory and task-specific patterns remain inadequately understood. This meta-analysis examined 64 studies (N = 22,572 participants) investigating working memory updating performance across five age groups (3-17 years) using various updating paradigms. Results revealed a significant positive developmental trend, with the most substantial improvements occurring between the ages of 3 and 8 years. Additionally, task-specific analyses demonstrated various developmental patterns, with keep track tasks—the selective updating of relevant information from specific categories while discarding irrelevant data—showing the most pronounced age-related improvement. Together, these findings suggest that working memory updating follows a systematic developmental progression, influenced by task-based variations, offering valuable insights into cognitive development and potential applications for educational practices

In D. Barner, N.R. Bramley, A. Ruggeri and C.M. Walker (Eds.), *Proceedings of the 47th Annual Conference of the Cognitive Science Society*