The Cognitive Components of Complex Planning

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Abstract

Planning in complex environments is crucial in everyday life, yet the underlying cognitive abilities remain unclear. We investigated this through an online experiment (n=476) where participants completed nine cognitive tasks: Raven's Matrices, Mental Rotation, Corsi Block Task, Change-Detection Task, Pattern Recognition Task, Wisconsin Card Sorting Task, a complex two-player game called Four-in-a-Row, and two simpler planning tasks. We found moderate correlations across most metrics, aligning with existing literature on cognitive interconnectivity. Notably, performance in the Four-in-a-Row game significantly correlated with all other tasks, implying a shared cognitive basis for planning, regardless of task complexity. Additionally, latent variable analysis revealed distinct factors underlying planning in different state spaces, with working memory capacity playing a crucial role in navigating larger spaces. These findings shed light on the cognitive architecture of complex planning.

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