

The Cognitive Components of Complex Planning

Xinlei (Daisy) Lin

NYU, NEW YORK, New York, United States

Wei Ji Ma

New York University, New York, New York, United States

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.