Working Memory and Crystallized Knowledge in Visual Analogy

Robert G. Morrison
Loyola University Chicago, Chicago, IL, USA

Matthew Kmiecik
Loyola University Chicago, Chicago, IL, USA

Jessica L. Irwin
Wayne State University, Detroit, Michigan, USA

Nash Unsworth
University of Oregon, Eugene, OR, USA

Lara L. Jones
Wayne State University, Detroit, MI USA

Abstract: Developmental, neuropsychological, and computational studies have suggested the importance of both relational knowledge and working memory in analogical reasoning. In this study, we investigated the extent to which individual differences in working memory (WM) and crystallized knowledge (Gc) predicted accuracies on a visual analogy verification task. In the task participants were asked to compare geometric shapes varying in several parametric dimensions (Sweis, Bharani, & Morrison, 2012). Across problems we varied the problem difficulty by factorially manipulating relational complexity and relational distraction. As in many studies of matrix reasoning, both WM and Gc composite measures were reliably correlated with overall visual analogy performance. However, only WM, but not Gc, predicted the effect of relational complexity on visual analogy performance. We believe these results further confirm the importance of working memory as a distinct neurocognitive resource necessary for processing relationally complex analogies.