Conceptual Prerequisites for Proportional Analogy

Shuyuan Yu
the Ohio State University, Columbus, Ohio, United States

Ho-Chieh Lin
The Ohio State University, Columbus, Ohio, United States

John Opfer
The Ohio State University, Columbus, Ohio, United States

Abstract

Analogy plays an important role in cognitive development, but children often need cognitive supports to draw correct ones. Here, we examined the role of conceptual knowledge in proportional analogies, which are often depicted as a simple exercise in pattern completion. In Study 1, adults and children (N = 321) completed 4-term analogy tasks featuring letters, lines, integers, or fractions. Performance was lowest for fractions, and strongly impacted by educational background. In Study 2, we conducted an educational intervention focusing on either conceptual knowledge, procedural knowledge, or both for 3rd-to-5th graders (N = 343) using a pretest-training-posttest design. Children with poor pretest magnitude knowledge were more likely to fail analogical reasoning, and training on conceptual knowledge that fractions denote magnitudes improved children's analogies. Together, these studies indicate that knowledge of fractional magnitudes is important to proportional analogy.

In J. Culbertson, A. Perfors, H. Rabagliati & V. Ramenzoni (Eds.), *Proceedings of the 44th Annual Conference of the Cognitive Science Society*.