Relational discovery in category learning: interactions of learning strategy and task structure

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Abstract: Often failures of problem solving on educational assessments are failures of problem categorization. That is, when reasoners do not properly classify a novel problem they do not know what solution to apply. For example, often physics students do not recognize the underlying commonalities in the relationships among the variables in different problems concerning Newton's laws of motion (Chi, Feltovich, & Glaser, 1981). Addressing this challenge there have been separate lines of research examining 1. how differences in students' learning strategies or cognitive abilities affects their propensity to discover relational commonalities (e.g., Little & MacDaniel, 2015) and 2. how variations in task structure change the likelihood of successful categorization (e.g., Roher & Pashler, 2010). However, relatively little research has examined whether the optimal task structure depends on the learner's strategy or ability. Across several experiments, we demonstrate multiple dependencies between the effectiveness of different task structures on differences in learning strategy.