

The relationship between analogical problem solving and analogical reasoning

Nicole Israel

Abstract

Analogical problem solving occurs when a previously acquired source solution strategy is retrieved and applied to an isomorphic target problem based on shared structural correspondences. In addition to being seen as an effective and frequently implemented heuristic strategy, it also plays a vital role in facilitating creative thinking and learning and is widely utilised as a key instructional mechanism in a range of teaching contexts. Despite its clear importance, empirical evidence regarding the links between analogical problem solving and a range of other factors, including those located within the individual problem solver, remains limited. This includes the nature of the associations between analogical problem solving as a heuristic strategy and other forms of reasoning using analogy. As such, there is a need for further research that serves to clarify and extend conceptual understandings of these relationships and to identify predictive patterns; this could contribute meaningfully to both theory development and application. The focus of the current study was thus to explore the associative and predictive links between analogical problem solving and different forms of analogical reasoning in the South African context. More specifically, the study examined solution rates for two different forms of analogical problem solving (directed and open analogical transfer) as well as the associations between these and verbal and non-verbal analogical reasoning, heuristic strategy preference (including preference for an analogical approach), and several demographic variables (gender, home language, type of schooling, and socioeconomic status). Predictive models with each form of analogical transfer as the outcome variable were also created. The design of the study was quantitative, non-experimental, correlational, and cross-sectional, and the data was collected using a series of tasks and self-report measures designed to capture the constructs of interest. Following piloting, a final sample of six-hundred and fifty-eight undergraduate university students was obtained for the main study. Statistical analyses were used to address the research questions; these included one-way ANOVAs, t-tests, Chi-squared tests of association, and logistic regression. The results obtained from the analyses suggested that rates of analogical transfer in the South African context were slightly lower than those typically observed internationally; a significant and positive relationship between the two forms of analogical transfer assessed in the study was also identified. Analogical problem solving was found to be significantly, positively, and weakly associated with analogical reasoning, and was unrelated to a preference for utilising analogy as a heuristic strategy. A number of important distinctions in analogical transfer performance on the basis of the various demographic variables were also identified. Taken together, these findings provide a unique and novel set of insights into the phenomenon of analogical problem solving; their implications augment existing theory and serve as a base for innovative future work in the field.