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Performance on the Traveling Salesperson Problem: The role of perceptual cues and theories of intelligence

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Abstract

The Traveling Salesperson Problem (TSP) is a combinatorial optimization problem originally of interest to mathematicians, but more recently used also in the context of cognitive and comparative psychology. Humans perform extremely well on spatial versions of this task, despite its mathematical complexity, making it an appealing tool for the study of spatial and mathematical cognition. We presented participants with three versions of a TSP in navigational space; one that could be solved visually, one with visual distractors, and one that also required the use of memory. The task was preceded by instructions that promoted either a 'growth mindset' or 'fixed mindset' approach. Results indicated that performance on this navigational version of the TSP is generally good, though not quite as efficient as solutions reported in the traditional pencil-and-paper version of the task. The effects of visual distractors and of memory requirements were greater in problems with a larger number of targets. Instructions had no significant effect on performance.