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Children's inquiry learning strategies may depend on their prior conceptual knowledge

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Abstract

The present study explored how children's prior conceptual knowledge affects their inquiry learning strategies. 139 elementary school children performed a pretest on water displacement. Then, they evaluated whether seeing the outcome of four different experimental setups would help them learning something about water displacement. The experimental setups compared two spheres of different sizes and materials and were designed in such a way that children's preferences indicated either an effect-producing or a controlled testing strategy. We conducted probabilistic modeling of children's prior beliefs and formed six belief clusters based on a hierarchical clustering algorithm. While children tended to evaluate all experiments as helpful, the pattern of preference indicated an effect-producing strategy for children with a clear misconception and a controlled testing strategy for children with an uncertain or correct belief. This finding, although exploratory, suggests that prior knowledge may explain why children sometimes succeed and sometimes fail in conducting informative experiments.