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Modeling Causal Learning with the Linear Ballistic Accumulator

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Abstract

Learning causal relationships is critical in our daily lives. To learn these causal relationships, one strategy we may use is the positive testing strategy (PTS), in which we attempt to confirm a hypothesis about the causal relationship. Also, we may use the expected information gain (EIG) strategy to distinguish between multiple hypotheses. Here we use an experimental paradigm in which subjects decide which of two causal patterns underlies a four-node causal system (Coenen, Rehder, & Gureckis, 2015) and fit the Linear Ballistic Accumulator (LBA) model to our data to investigate the precise mechanisms of different age groups using these strategies. We find that children and the elderly use PTS more than other groups. Yet, comparing drift rate and relative threshold parameters, we find no evidence for biases in strategy selection across age groups, but find that the elderly are more cautious when choosing a strategy.