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Investigating the Explore/Exploit Trade-off in Adult Causal Inferences

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Abstract: We explore how adults learn counterintuitive causal relationships, and whether they interpret evidence and discover hypotheses by incrementally revising beliefs. We examined how adults learned a novel, unusual causal rule when given data that initially appeared to follow a simpler, more salient rule. Adults watched a video of blocks placed sequentially on a detector that activated when a block was a "blicket", then were asked to determine the underlying causal structure. We contrasted two causal learning problems. In both cases, one rule could be used to determine which objects were blickets; in the first problem this rule was complex, but could be found by making incremental improvements to a simple and salient initial hypothesis. The second problem's rule was simpler, but to adopt it, participants had to ignore initial beliefs. Our results provide some of the first evidence for an inference trade-off analogous to the "explore-exploit" trade-off in active learning.