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Dynamic Strategy Selection in Active Function Learning

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Abstract

We test whether people flexibly shift their sampling strategy for learning a functional relationship, based on the strategy's perceived effectiveness. While general-purpose heuristics such as gathering information evenly across the environment may often approximate optimal sampling policies when opportunities for learning are sparse, these strategies may systematically fail when much of the environment is uninformative. Across several different classes of arbitrary smooth functions, participants (N = 89) made sampling choices that were initially consistent with a simple heuristic, but shifted their sampling strategy when this heuristic failed to be informative. People were subsequently more accurate at approximating the true function for smoother functions that can be more easily predicted by sampling evenly, $t(645.3) = 6.803$, $p < .001$; nevertheless, while individuals vary considerably, aggregate judgments across all functions are very accurate, suggesting that people show inductive biases in active learning, but effectively learn when to adjust their policies.

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