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Bayesian-like Decision-Making Behavior in Visual Search

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Abstract

Extensive research from both sensorimotor and perceptual domains has shown that people make decisions by combining prior and current information according to their relative uncertainties, following Bayesian statistics predictions. However, less is known about visual search, a task that requires people to determine the presence/absence of a search target (T) amongst distractors (Ls). Here, we examined decision-making behavior in a visual search task which manipulated the target prevalence rate (prior: 25% or 50%) and the portion of the display that was visible (sensory information: 0%, 30%, or 60%). Participants' (N=56) decision-making behavior qualitatively reflected Bayesian predictions, relying more on the information that was less uncertain. When no items were visible, participants were highly accurate in making present/absent decisions based on the prevalence rate learned through feedback. But when provided sensory information, participants' decision-making was more strongly influenced by visibility. Thus, reliance on sensory information may dominate priors in visual search.