Predictiveness and Reward Effects on Attention can be Explained by a Single Mechanism

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Abstract

In order to learn efficiently, organisms must learn how to distribute their attention to the available cues. Traditionally, most experiments on attention learning have involved discrete outcomes (e.g. no food vs. one food pellet, or category A vs. category B). A basic finding is that cues receive attention in proportion to how well they predict such outcomes. However, more recent research has shown an apparently independent effect of outcome value on attention (Le Pelley, Mitchell, & Johnson, 2013), in which cues associated with large rewards receive more attention than those associated with small rewards. It has been suggested that a separate *derived attention* mechanism - in which attention is based directly on association strength - is necessary to explain this result (Le Pelley, Mitchell, Beesley, George, & Wills, 2016). As our primary experimental contribution, we use modified versions of this design to replicate the value effect and show that it can be reversed by manipulating the rewards given for incorrect choices. Our simulations show that CompAct - a model in which cues compete for attention on the basis of their relative predictiveness - can account for both of our empirical results. The derived attention theory, in contrast, incorrectly predicts that cues associated with large rewards will always receive more attention. We conclude that we do not need separate mechanisms to account for predictiveness effects and value effects on attention.

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