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Novel methods for measuring the cost of cognitive control in a patch foraging task and a demand selection task with Stroop

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Abstract

Evidence suggests exerting cognitive control carries an intrinsic cost and that individual differences in subjective costs may account for differences in everyday control allocation. We developed two novel methods for quantifying an individual's subjective control cost and examined their relationship. We modified a standard patch foraging task so that subjects (N=18) had to complete a control-demanding task (N-Back) to travel between patches. We predicted subjects would accept diminishing rewards in a patch to avoid control demands, and used the Marginal Value Theorem to quantify the amount of reward forfeited. In a second task, we estimated how many word-reading Stroop trials subjects would complete to avoid a (control-demanding) color-naming trial. We found that most subjects treated control as costly (i.e., made demand-avoidant choices) in both tasks, and that there was a significant positive correlation between the estimated costs across tasks within a subject.