Choosing Poorly: Reward-Induced Strategy Shifts in Estimating the Probabilities of Conjunctions and Disjunctions

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Abstract: Human estimates of the probabilities of combinations of events show well-established violations of probability theory, most notably the conjunction and disjunction fallacies. These violations have led researchers to conclude that the rules of probability are too complex for most people to use, and that cognitively-easier approximations such as averaging are used instead. Unlike previous work that has assumed that individuals use only a single combination rule, we collected repeated estimates of conjunctions and disjunctions and investigated whether individuals consistently used a single rule or used a repertoire of rules in a trial-by-trial Bayesian analysis. When not incentivized, most participants were best described as randomly selecting a combination rule on each trial, and the correct rule was the most often used. Despite this, when incentivized to use their single-best strategy participants were more likely to use the incorrect averaging rule. People do not seem to understand their own strategies well.