

# Probability Weighting as Evolutionary Second-best

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## ABSTRACT

The economic concept of the second-best involves the idea that multiple simultaneous deviations from a hypothetical first-best optimum may be optimal once the first-best itself can no longer be achieved, since one distortion may partially compensate for another. Within an evolutionary framework, we translate this concept to behavior under uncertainty. We argue that the two main components of prospect theory, the value function and the probability weighting function, are complements in the second-best sense. Previous work has shown that an adaptive S-shaped value function may be evolutionary optimal if decision-making is subject to cognitive or perceptive constraints. We show that distortions in the way probabilities are perceived can further enhance fitness. The second-best optimum involves overweighting of small and underweighting of large probabilities. Behavior as described by prospect theory might therefore be evolution's second-best solution to the fitness maximization problem.

