

Title: Categorisation Meets Prospect Theory: Distorted Perceptions of Probabilities and Outcomes Crossing Categorical Boundaries

Authors:

Alina Ferecatu, Dan Schley

Abstract:

We investigate the impact of numerical categorisation on Prospect Theory. Prospect Theory models how people distort objective probabilities and outcomes, and documents behavioral regularities such as diminishing sensitivity to increasing outcomes (the value function), a tendency to overweight low probability events, and a tendency to underweight high probability events (the probability weighting function). When describing a prospect, which is a combination of an outcome and its probability of occurrence, objective values and probabilities are often represented numerically, therefore additional distortion may arise due to how people encode and categorise these numbers. One example of such categorization is the well-documented left-digit effect, which is a tendency to focus on the leftmost digit of a number and not pay sufficient attention to the remaining digits. For instance, an objective value of 435 tends to be underestimated, and seen as “400 and something.” The left-digit bias is present in various contexts, including pricing (e.g., 99-cent pricing). We demonstrate that this categorisation effect is present when people evaluate both outcomes and probabilities of prospects, leading to additional distortion in both the value and the probability weighting functions. We build and validate a categorisation-based Prospect Theory model, integrating models of left-digit bias (DellaVigna 2009, Lacetera et al. 2012, Strulov-Shlain 2021) and the Prospect Theory model. We document an increased sensitivity to changes in subjective values and probability weights when crossing categorical boundaries, leading to discontinuous jumps in values and weights. As next steps, we plan to validate our model on multiple data sets spanning different literatures from finance, economics, and marketing.