

What Do People Expect from Expected Value?

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Background

Expected value plays a crucial role in nearly all theories of decision-making under risk. Despite its importance, the assessment of expected value by decision-makers is not well understood. Most theories recognize that during decision-making, the probability, essential for evaluating expected value, often becomes distorted. Our goal is to investigate the impact of probability distortions on the perceived expected value of a lottery. One particularly effective way to alter people's task representation is by employing the well-established psychological concept of framing.

Manipulation

Participants were introduced to a fictional casino game involving two decks (cards valued 5-100, total 20 cards). One card was drawn per trial to determine a reward. Participant's goal was to evaluate each of the presented bets. They were asked to do this in one of four ways, depending on the condition:

Direct (D): Participants were instructed to estimate the expected value of the draw using the weighted reward values. They were given instructions and examples but they were asked only to estimate rather than precisely compute the values.

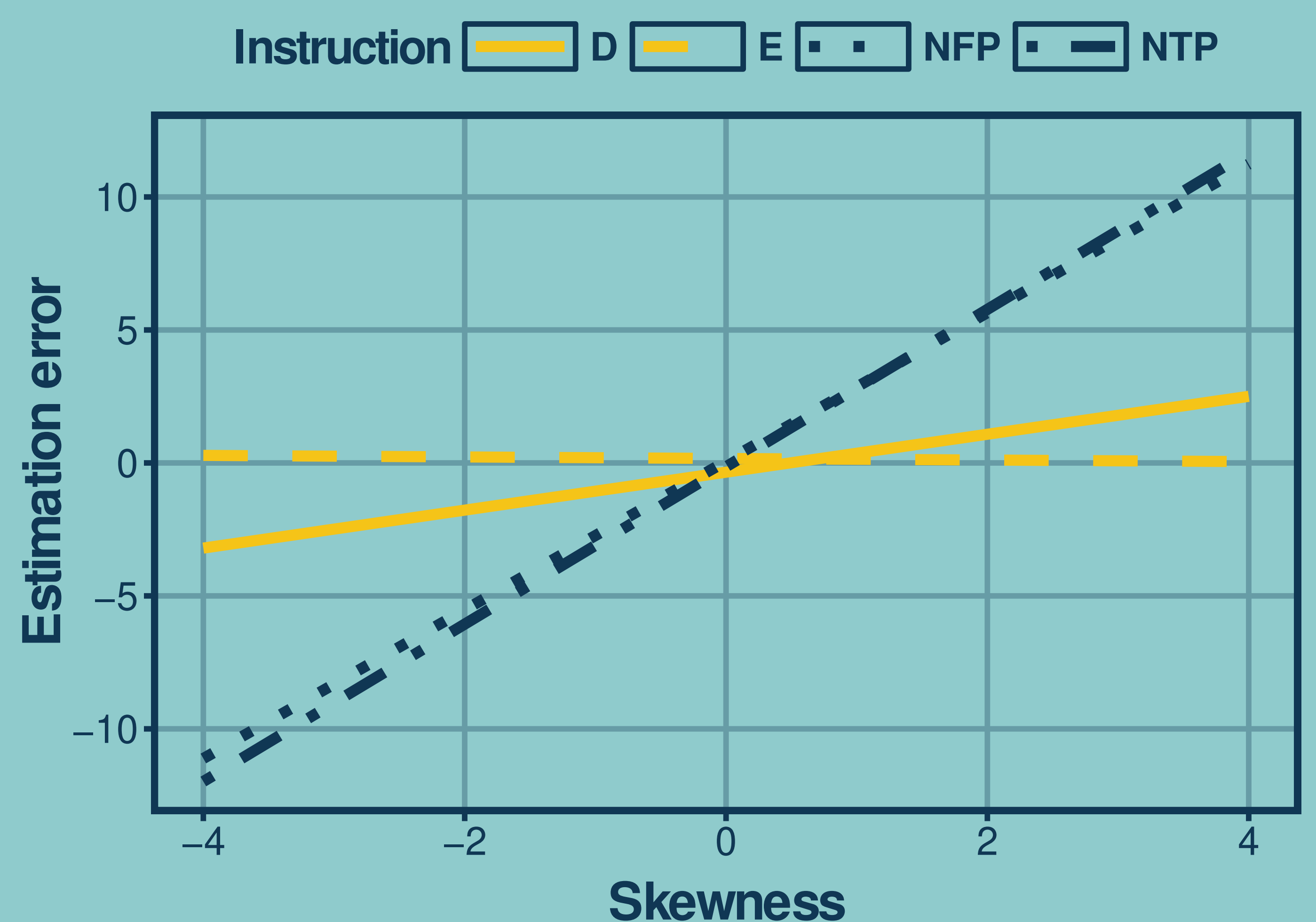
Estimative (E): Participants were asked to estimate the average outcome over many draws from the given bet (e.g., 1,000), without any calculation guidance.

Narrative 1st-Person (NFP): Participants were asked to assess a value of a card such that when they were given a choice between the presented bet (prior to drawing a winning card from it) and the assessed card (sure amount of money on the card), the choice would be most difficult to them.

Narrative 3rd-Person (NTP): Same as above, but framed as advising a casino on what value would make the choice most difficult for other players not for the participant personally.

Results

Only skewness influenced the estimated value of the bet while variance/sd was proved not to be connected to the dependent variable.



In the estimative condition the estimated value of the lottery did not depend on skewness ($p = .824$). In the narrative first-person, narrative third-person, and direct conditions the influence of skewness on the error in value estimation significantly positive (respectively $p < .001$, $p < .001$, $p = 0.047$). Also in both narrative conditions (first and third person) the probability neglect was larger than in estimative (both $p < .001$) and direct (both $p < 0.001$) instruction conditions.

Our findings challenge the common assumption that variance is central to decision-making models, showing that skewness plays a crucial role in estimation errors, while variance has no impact. Additionally, instructional framing significantly influences probability distortion.



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