

Behavioral and Experimental Economics - Report I

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Introduction

This report builds on three central contributions in the field of behavioral and experimental economics. First, the work by Kahneman and Tversky introduces Prospect Theory, showing that people systematically deviate from Expected Utility Theory (EUT). In particular, individuals display the certainty effect, overweight small probabilities, and treat gains and losses asymmetrically (loss aversion). These psychological mechanisms help explain why in our data participants sometimes switch between safe and risky choices in ways that seem incoherent under EUT, but fully consistent with Prospect Theory.

Second, the study by Holt and Laury demonstrates that risk attitudes are not stable but depend on the context and the size of incentives. Their experimental price list method typically reveals substantial *risk aversion*, especially as the stakes increase. In contrast, our results show a stronger tendency toward risk-seeking, likely due to the relatively low monetary stakes in our setting, which is consistent with Holt and Laury's findings about the role of incentives.

Third, Eckel and Grossman provide evidence that individual risk preferences are heterogeneous and can be measured with simpler tasks. Their work highlights that some subjects are consistently risk-averse while others lean toward risk-seeking. Our data confirm this heterogeneity: although the majority of participants appear risk-prone in the price list task, there is still a minority showing patterns of early switching or stable risk aversion, which aligns with their experimental results.

Overall, the findings in this report are coherent with the theories and experimental evidence presented in these papers. Participants do not behave as perfectly rational agents would under EUT; instead, their choices reflect context-dependent preferences, framing effects, and probability distortions, in line with Prospect Theory and the experimental insights of Holt–Laury and Eckel–Grossman.

1 Question 1:

for each of the problems 1, 2, 3, 4, 7, and 8, we calculate the Expected Value (EV) of the lotteries. A risk-neutral subject will choose the lottery with the highest EV.

- **Problem 1:**
 - Lottery A: $0.33 \times 2500 + 0.66 \times 2400 + 0.01 \times 0 = 825 + 1584 + 0 = 2409$
 - Lottery B: $1.00 \times 2400 = 2400$
 - **Choice: Lottery A** (since $2409 > 2400$)
- **Problem 2:**
 - Lottery A: $0.33 \times 2500 + 0.67 \times 0 = 825 + 0 = 825$
 - Lottery B: $0.34 \times 2400 + 0.66 \times 0 = 816 + 0 = 816$
 - **Choice: Lottery A** (since $825 > 816$)
- **Problem 3:**
 - Lottery A: $0.80 \times 4000 + 0.20 \times 0 = 3200 + 0 = 3200$
 - Lottery B: $1.00 \times 3000 = 3000$

- **Choice: Lottery A** (since $3200 > 3000$)
- **Problem 4:**
 - Lottery A: $0.20 \times 4000 + 0.80 \times 0 = 800 + 0 = 800$
 - Lottery B: $0.25 \times 3000 + 0.75 \times 0 = 750 + 0 = 750$
 - **Choice: Lottery A** (since $800 > 750$)
- **Problem 7:**
 - Lottery A: $0.45 \times 6000 + 0.55 \times 0 = 2700 + 0 = 2700$
 - Lottery B: $0.90 \times 3000 + 0.10 \times 0 = 2700 + 0 = 2700$
 - **Choice: Indifferent** (since both EVs are equal)
- **Problem 8:**
 - Lottery A: $0.01 \times 6000 + 0.99 \times 0 = 60 + 0 = 60$
 - Lottery B: $0.02 \times 3000 + 0.98 \times 0 = 60 + 0 = 60$
 - **Choice: Indifferent** (since both EVs are equal)

2 Question 2:

Suppose that a subject follows Expected Utility Theory, and that he/she is risk-averse. Then, in Problem 1 he would choose Lottery B.

In **Problem 1**, the lotteries are:

- **Lottery A:**
 - 33% chance of winning €2500
 - 66% chance of winning €2400
 - 1% chance of winning €0
- **Lottery B:**
 - 100% chance of winning €2400

The **Expected Value** (EV) of each lottery is:

- Lottery A: $0.33 \times 2500 + 0.66 \times 2400 + 0.01 \times 0 = 2409$
- Lottery B: $1.00 \times 2400 = 2400$

Lottery A has a slightly higher expected monetary value, a **risk-averse** individual values certainty more than risky prospects with similar payoffs. This is due to the concavity of the utility function under Expected Utility Theory.

The risk of obtaining zero in Lottery A, even if small (1%), leads a risk-averse subject to prefer the sure gain of Lottery B.

Therefore, the statement is **True**.

3 Question 3:

Suppose that a subject follows Expected Utility Theory, and that he/she is risk-loving. Then, in Problem 2 he would choose Lottery C.

In **Problem 2**, the lotteries are:

- **Lottery C:**

- 33% chance of winning €2500
- 67% chance of winning €0

- **Lottery D:**

- 34% chance of winning €2400
- 66% chance of winning €0

The **Expected Value** (EV) of each lottery is:

- Lottery C: $0.33 \times 2500 + 0.67 \times 0 = 825$
- Lottery D: $0.34 \times 2400 + 0.66 \times 0 = 816$

Lottery C has a slightly higher expected monetary value, and a **risk-loving** individual prefers risky prospects with similar or higher payoffs. This is due to the convexity of the utility function under Expected Utility Theory.

The higher variance and the higher potential payoff in Lottery C lead a risk-loving subject to prefer Lottery C.

Therefore, the statement is **True**.

4 Question 4:

Suppose that a subject follows Expected Utility Theory, and that he/she is risk-loving. Then, in Problem 3 he would choose Lottery A.

In **Problem 3**, the lotteries are:

- **Lottery A:**

- 80% chance of winning €4000
- 20% chance of winning €0

- **Lottery B:**

- 100% chance of winning €3000

The **Expected Value** (EV) of each lottery is:

- Lottery A: $0.80 \times 4000 + 0.20 \times 0 = 3200$
- Lottery B: $1.00 \times 3000 = 3000$

Lottery A has a higher expected monetary value, and a **risk-loving** individual prefers risky prospects with higher payoffs and variance. This is due to the convexity of the utility function under Expected Utility Theory.

Therefore, a risk-loving subject would choose Lottery A.

Therefore, the statement is **True**.

5 Question 5:

Suppose that a subject follows Expected Utility Theory, and that he/she is risk-averse. Then, in Problem 4 he would choose Lottery D.

In **Problem 4**, the lotteries are:

- **Lottery A:**

- 20% chance of winning €4000
- 80% chance of winning €0

- **Lottery D:**

- 25% chance of winning €3000
- 75% chance of winning €0

The **Expected Value (EV)** of each lottery is:

- Lottery A: $0.20 \times 4000 + 0.80 \times 0 = 800$
- Lottery D: $0.25 \times 3000 + 0.75 \times 0 = 750$

Lottery A has a higher expected monetary value, but a **risk-averse** individual prefers lower variance, even if this means accepting a slightly lower expected payoff. This is due to the concavity of the utility function under Expected Utility Theory. Since Lottery D is less risky, a risk-averse subject would choose Lottery D. Therefore, the statement is **True**.

6 Question 6:

Suppose that a subject follows Expected Utility Theory, and that he/she is risk-averse. Then, in Problems 7 and 8 he/she chooses B and D, respectively.

In **Problem 7**, the lotteries are:

- **Lottery A:**

- 45% chance of winning €6000
- 55% chance of winning €0

- **Lottery B:**

- 90% chance of winning €3000
- 10% chance of winning €0

The **Expected Value (EV)** of each lottery is:

- Lottery A: $0.45 \times 6000 + 0.55 \times 0 = 2700$
- Lottery B: $0.90 \times 3000 + 0.10 \times 0 = 2700$

The expected values are the same, but a **risk-averse** individual prefers Lottery B due to its lower variance. This is consistent with the concavity of the utility function under Expected Utility Theory.

In **Problem 8**, the lotteries are:

- **Lottery C:**

- 1% chance of winning €6000
- 99% chance of winning €0

- **Lottery D:**

- 2% chance of winning €3000
- 98% chance of winning €0

The **Expected Value (EV)** of each lottery is:

- Lottery C: $0.01 \times 6000 + 0.99 \times 0 = 60$
- Lottery D: $0.02 \times 3000 + 0.98 \times 0 = 60$

The expected values are equal, but a **risk-averse** individual prefers Lottery D due to its lower variance. This is consistent with the concavity of the utility function under Expected Utility Theory.

Therefore, the statement is **True**.

7 Question 7:

Suppose that a subject is sensitive to (i) the Certainty Effect (for gains), (ii) the Reflection Effect (risk-averse for gains and risk-loving for losses), and (iii) the Endowment/Wealth Effect. In Problems 15 and 16:

Problem 15:

- **Lottery A:**

- 1000€ certain
- plus 50% chance of winning an additional 1000€

- **Lottery B:**

- 1000€ certain
- plus 100% chance of winning an additional 500€

Problem 16:

- **Lottery A:**

- 2000€ certain
- plus 50% chance of losing 1000€

- **Lottery B:**

- 2000€ certain
- plus 100% chance of losing 500€

7.1 a) if effects (i) and (ii) predominate over effect (iii):

- In **Problem 15**, the subject will choose **Lottery B**, because of the **Certainty Effect** and the **Reflection Effect**. The subject is risk-averse for gains and prefers the sure additional gain of 500€.
- In **Problem 16**, the subject will choose **Lottery A**, because of the **Reflection Effect**. The subject is risk-loving for losses and prefers to gamble rather than accept a sure loss of 500€.

Therefore for problem a) I would choose:

- **Problem 15:** Lottery B
- **Problem 16:** Lottery A

7.2 b) if effect (iii) predominates over effects (i) and (ii):

- In **Problem 15**, the subject will choose **Lottery A**, because the worst outcome is still 1000€, and there is a chance to reach 2000€. The subject is less concerned about risk and more about the possibility of higher wealth.
- In **Problem 16**, the subject will choose **Lottery B**, to avoid the possibility of losing 1000€. The sure loss of 500€ is preferred to preserve wealth.

Therefore for problem b) I would choose:

- **Problem 15:** Lottery A
- **Problem 16:** Lottery B

8 Question 8:

Pair	EUT Consistent	Risk Neutral	Risk Averse	Risk Prone
1-2	19	0	0	19
3-4	22	0	12	10
7-8	24	0	19	5
9-10	17	0	12	5
11-12	17	0	10	7
15-16	24	0	11	13

Table 1: Classification of participants' choices according to Expected Utility Theory (EUT), risk neutrality, risk aversion, and risk proneness for selected pairs of problems.

9 Question 9:

Pair	PT & Loss Aversion
3-9	15
4-10	16
7-11	18

Table 2: Number of participants whose choices are consistent with Prospect Theory and Loss Aversion for selected problem pairs.

9.1 Summary of Findings and Concepts

The results of Question 9 highlight decision patterns consistent with Prospect Theory and Loss Aversion. The main behavioral tendencies observed are:

- **Risk Aversion in Gains:** Participants prefer certain gains over probabilistic gains, even when the expected value of the lottery is higher.
- **Risk Seeking in Losses:** Participants prefer risky losses over certain losses, attempting to avoid sure negative outcomes.
- **Loss Aversion:** Losses have a greater psychological impact than equivalent gains. Participants are more sensitive to potential losses and adjust their choices accordingly.
- **Reflection Effect:** A reversal of risk preferences between gains and losses. Individuals who are risk-averse in the domain of gains tend to be risk-seeking in the domain of losses.
- **Probability Weighting:** Participants tend to overweight small probabilities, leading to risk-seeking in low-probability gains and risk aversion in low-probability losses.

The data confirms that participants' behavior aligns with Prospect Theory. These patterns illustrate systematic deviations from Expected Utility Theory, demonstrating how people handle risk differently depending on the framing of outcomes as gains or losses.

10 Question 10:

In this section, I discuss some of the choices participants made that are inconsistent with Expected Utility Theory (EUT), but that can be understood through the lens of Prospect Theory. These so-called "incoherent choices" are quite common in behavioral experiments and reflect the way people actually think about risk, rather than how they should think about it in normative models.

Let's start with the first case, **B-C in problems 1-2**. Here, participants chose the safe option in the first problem but then switched to the risky option in the second one, even though the structure of the two problems is quite similar. This kind of pattern is usually explained by the **certainty effect**. People tend to strongly prefer sure gains over probabilistic ones when certainty is involved, but when the certainty disappears, they often shift toward risk-seeking behavior, even if that creates a contradiction from the point of view of EUT.

A similar reasoning applies to **B-C in problems 3-4**. In this case, the difference lies in the probabilities. In problem 3, people tend to overweight high probabilities and stick with the safer option. But in problem 4, when the probabilities become smaller, there is a tendency to gamble, chasing the larger reward. This behavior reflects what Prospect Theory calls **probability weighting**, where people don't treat probabilities objectively, but distort them in their minds—small probabilities seem larger, and large ones seem smaller.

Moving on to **B-C in problems 7-8**, here again participants preferred the safe option in problem 7 but switched to the risky one in problem 8. The most likely explanation is the **overweighting of small probabilities**. In problem 8, even though the chance of winning the big prize is tiny, people still go for it because rare events are psychologically overestimated.

Interestingly, in the case of **A-D in problems 7-8**, participants did the opposite: they took the risky option in problem 7 and then switched to the safe one in problem 8. This might seem odd at first, but it's actually not unusual. When the potential gain becomes extremely unlikely (as in problem 8), people often think: "Okay, this is too unlikely; I'll just take the safe option." So even those who were willing to risk in problem 7 become more conservative when the odds get extreme. It could also be a kind of pessimism about the outcome, or perhaps just a shift in the way they frame the problem.

Now, let's consider **B-C in problems 9-10**, where participants were given an initial endowment of 4,000€. In problem 9, they chose the safe loss, but in problem 10 they switched to the risky option. This is a classic **risk-seeking behavior in losses**, predicted by Prospect Theory. When faced with the possibility of losing, people are often willing to gamble to try and avoid it, especially when there's even a small chance to get away with no loss.

On the other hand, in **A-D in problems 9-10**, participants took the risky option first and then went back to the sure loss in the second problem. This could be due to **regret aversion**. In problem 10, there is a risk of ending up with an even worse loss, so people may prefer to "cut their losses" and accept the sure outcome rather than take a chance and feel regret if things go badly.

Similar patterns appear in **B-C in problems 11-12**, where participants had an initial endowment of 6,000€. Again, people picked the sure loss in problem 11 but gambled in problem 12. This is consistent with the **overweighting of small probabilities**—when there's even a tiny chance of avoiding the loss altogether, people often take the risk.

Finally, in **A-D** in problems **11-12**, participants first chose the risky loss in problem 11 and then switched to the safe loss in problem 12. This might reflect a kind of **fear of catastrophic losses**. When the potential outcomes are extreme, people tend to become more cautious, even if they were previously willing to take risks.

In conclusion, all these incoherent choices, although they violate the principles of Expected Utility Theory, are very well explained by the psychological mechanisms described in Prospect Theory. People don't process probabilities in a linear way, they fear losses more than they value gains, and their risk preferences can flip depending on how the problem is framed. This shows that human decision-making is not strictly rational, but rather influenced by perception, emotion, and context.

11 Question 11:

To evaluate whether participants maintain the same attitude toward risk across different tasks, we compared their choices in the lotteries with their responses in the pricing questions. Specifically, we checked if participants were consistently risk-averse, risk-prone, or risk-neutral in both settings.

Measure	Count
Total Subjects Analyzed	35
Consistent Risk Attitude	5
Inconsistent Risk Attitude	30

Table 3: Consistency of participants' risk attitudes between lottery choices and pricing tasks.

The results show that only **5 out of 35 participants** maintained a consistent attitude toward risk across both the lotteries and the pricing list. This means that the vast majority of participants—**30 out of 35**—showed different risk behaviors depending on the context.

This finding is not surprising when viewed through the lens of behavioral economics. In theory, according to **Expected Utility Theory**, risk preferences should be stable and consistent across different types of tasks. However, in reality, people often behave differently when they are asked to *choose between lotteries* compared to when they are asked to *assign monetary values to lotteries* (such as in the buying and selling tasks).

Several psychological factors can explain this inconsistency:

- **Framing Effects:** The way a problem is presented influences the decision. Pricing tasks are often framed differently from choice tasks, leading to different behaviors.
- **Endowment Effect:** In the pricing task, participants may demand a higher selling price than the amount they would be willing to pay, even for the same lottery. This asymmetry reflects loss aversion.
- **Probability Weighting:** People might treat probabilities differently when pricing a gamble versus when choosing between options.

- **Task Format:** Choosing and pricing trigger different cognitive processes. Choices often rely on comparative evaluations, while pricing requires more introspection about subjective value.

These results confirm that risk attitudes are not stable traits but rather depend on the task, the framing, and the emotional context. This behavior aligns more with **Prospect Theory** than with classical economic theories, highlighting the complexity of human decision-making under uncertainty.

12 Question 12: Comparison of Price List Behavior

We analyzed participants' responses to the price list contained in the Google Form, where they had to choose between a certain amount of money and a lottery ticket. The pattern of responses was then compared to the standard findings of **Holt & Laury (2002)** and **Eckel & Grossman (2002)**.

Risk Behavior Category	Count
Risk Prone	5
Risk Prone (Late Switch)	19
Risk Averse	4
Risk Averse (Early Switch)	7
Unknown	0

Table 4: Summary of participants' behavior in the price list task.

The results indicate that most participants displayed risk-seeking behavior in the price list task. In particular, the majority (**19 out of 35**) exhibited **Risk Prone (Late Switch)** behavior, meaning they continued to choose the lottery option even at relatively high certain payoffs before switching to the safe option. This suggests a tolerance for risk that goes beyond what classical Expected Utility Theory would predict.

Only **4 participants** consistently chose the safe option (**Risk Averse**), while **7 participants** switched early from the risky to the safe option, showing typical risk aversion behavior in line with the predictions of Holt & Laury (2002). Holt and Laury usually find a tendency toward **risk aversion**, especially when stakes increase, with participants switching early to the safe option.

In contrast, the behavior observed in our data deviates from this pattern, showing a much higher incidence of risk-seeking decisions. This might be due to the lower monetary stakes in the experiment or perhaps a framing effect that made the risky option seem more appealing.

When compared to Eckel & Grossman (2002), who typically use simpler, single-choice risk measures, our results seem somewhat aligned in the sense that their method often reveals a broader spread of behaviors, including both risk-averse and risk-prone individuals. However, in our case, the majority of participants still lean toward risk-seeking, which is not the standard finding in Eckel & Grossman studies where moderate risk aversion is more common.

The data collected through the Google Form shows a distinct preference for risky

options, particularly in the form of **late switching** in the price list task. Compared to Holt & Laury and Eckel & Grossman, participants in our sample appear more risk tolerant, perhaps due to contextual factors such as low stakes, task interpretation, or sample-specific characteristics. These findings reinforce the idea that risk attitudes are not only heterogeneous across individuals but also sensitive to the experimental design.

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