PROJECTION BIAS RELATIVE TO RISK UTILITY

BY:

AARON COLEMAN
ROCKY OTZIZUL
SCOTT CRICKS
SEAN WANG

Introduction

Our experiment assesses the risk utility between participants, varying in age, social class, weight, race, etc. between an initial assessment (survey) and an assessment a month later. Our participants will initially fill out a survey to gauge if they consider themselves to be risk-averse, risk-seeking, or risk-neutral. One month later, our participants will be given two decisions on what "gift" they would like to choose.

The "safer" gift is receiving a $20 gift card to a restaurant of their choice, whereas the riskier gift is to participate in a physically demanding obstacle course (like Wipeout, or for a more local example, One Army Gladiator Dash) for the chance to win front row tickets to an artist of their choice. The participants will make this decision sober/not under the influence of any drugs.

We think that this experiment is important to conduct because multiple times people will declare themselves to be a certain characteristic or do certain actions. One simple and more relatable example is saying "I will go to the gym this week" and then not going to the gym this week. In this case, an initial respondent might initially say they are risk-seeking, which implies they'd be willing to endure an obstacle course. But then, one month later; when presented with the two options, the risky option in this experiment being an obstacle course, they select the gift card after a few seconds. Other concepts I think play out would be present bias and people's time preferences. For example, maybe a participant who was more risk seeking, when given the two options, says "Nah, I want a gift card".

Furthermore, We also think the "risk" being one that requires physical activity will add an interesting twist; the main economic concepts of risk seeking we've seen were taking gambles or

investments. A more "real life" approach would make analyzing more economic concepts of risk possibly simpler.

Hypothesis and Analysis

Hypothesis 1: The percentage of people who choose the obstacle course risk in the hypothetical will be less than the percentage of people who choose the obstacle course risk in the real-world scenario.

To test hypothesis one, we will first divide the total number of participants who chose the obstacle course over the total number of participants in both scenarios. To compare the two percentages, we will construct a one-tailed t-test at a p-value of .05 to determine if there is a statistically significant difference. We believe that projection bias will cause some people to choose the obstacle course in the hypothetical but not in the real-world scenario. When they are taking this survey in a calm setting, we believe that the participants won't be able to accurately project which decision they would make if they had to go through with the decision they chose. We believe that once the stakes become real, people will become more risk-averse and more likely to choose the safe option of taking the gift card. In a hypothetical, people will be more willing to take on risks because they will never have to face the consequences of that choice. As mentioned in Projection Bias in Predicting Future Utility (Loewenstein, 2003), people's emotional state at a current moment will impact how they think they would act in future situations. Because of the calm and relaxed environment they are taking the survey in, we believe participants will overestimate their perceived utility of the obstacle course option because in their current state, they will overestimate their risk tolerance.

Hypothesis 2: The difference between the percentage of people who choose the obstacle course in the hypothetical and the percentage of people who choose the obstacle course in the real-world scenario will be different for men and women.

Once the data is collected we will group the results based on a variety of factors to evaluate our hypothesis. For this hypothesis, we will compare responses between men and women to determine if there is a difference in projection bias between genders. After grouping the data by gender, we will divide the number of participants who chose the obstacle course over the total number of participants for both scenarios. We will then compute the difference between the real-world scenario and the hypothetical scenario for both men and women. This effectively measures the projection bias of each gender. If there is a large difference between the obstacle course choice in the hypothetical and real-world scenario, this indicates projection bias exists. After that, we will perform a two-tailed t-test to evaluate whether there is a statistically significant difference between men and women. Although there is no previous research we could find regarding projection bias differences in men and women, experiments like Gender Differences in Performance Predictions: Evidence from the Cognitive Reflection Test (Ring Et al., 2016) show a difference in the predictive abilities between men and women. We believe these differences will also be present in projection bias and that the differences in state will impact one gender more than the other.

Hypothesis 3: As a person's cognitive ability increases, they are less likely to change their decision when moving from a hypothetical to a real-world choice.

As a part of the survey, participants will complete some questions to evaluate their cognitive ability and logical reasoning. We will use this to evaluate whether cognitive ability has an impact on projection bias. We will test this hypothesis by creating a linear regression model with the percentage of questions they got correct on the cognitive ability quiz as the predictor variable and whether they switched their choice on their real-world choice as the response variable. We will use dummy variables to represent the response variable with 0 representing no change between the hypothetical and real-world choice and 1 representing a change in their choice. If the p-value for the cognitive ability quiz score is less than .05 and the slope coefficient is negative, this indicates that a higher cognitive ability will decrease the effects of projection bias. We believe that a higher cognitive ability will lead someone to better understand the risk of the choice that they are making, regardless of their current state. Although projection bias will still exist for people with high cognitive ability, we believe it will impact their decision-making less than those with low cognitive ability.

Background Literature

There are a few different papers in behavioral economic literature that align with the variable aspects of our research proposal. These sources are very intuitive and explain the ideas behind projection bias and risk utility. Our experiment and these pieces of literature share a lot of similarities while simultaneously allowing us to add more knowledge to this field of study.

To start off, the paper, In text:"Wouldn't it be nice? Predicting Future Feelings" by George Loewenstein gives a brief overview that people overall are not good at predicting their emotions in future situations. He believes that the general population have this "impact bias" that causes humans to overestimate intense emotions relative to future events. This may seem true at

the time to people but they actually experience a "duration neglect" in which they forget that their current emotions fade away over time causing them not to feel the same way at the time of the event. They also do not focus on the confounding factors surrounding that event which can cause them to feel a certain way that time, referring to "focalism". Loewenstein uses the example of someone winning the lottery. People tend to think they will be extremely happy winning but the reality is many people return to a baseline level of happiness after winning. This relates to our study and what we are trying to achieve due to the fact that we are studying self-assessments of risk utility projection for the future. We want to see if they evaluate correctly on a decision they will make one month later.

Another source that is similar to our study is, In text: "Projection Bias in Predicting Future Utility" by George Loewnstein. This piece of literature assesses the emotional misleading idea that people place on themselves relative to future events. Loewnstein highlights the aspect in people and how it can lead them to making mistakes in decisions, specifically financial ones. An example highlighted in this paper is explaining how a person might be in a good mood at the time of the assessment and think they will stay in that mood but later on actually change emotional states. The author explains that people can improve upon their decision making by recognizing this state of projection bias. This literature relates to our paper as it highlights projection bias in present assessment relative to future events.

The source, in text:"Affective Forecasting" by Daniel Gilbert also is quite similar to what we are trying to achieve in our research. The idea of affective forecasting relates to the prediction of future emotions in certain individuals. Gilbert says in his paper that people are usually inaccurate in what they think they will feel in the future. This is where the idea of projection bias comes in. Similar to the source "Projection Bias in Predicting Future Utility" by George

Loewnstein, Gilbert believes that if individuals were to recognize this inaccuracy, they will better be able to understand their emotions in the future. This relates to our study as we believe that individuals will inaccurately predict their future risk utility at a future event.

The source, in text:"Who takes risks when and why? Determinants of Risk Taking" by Figner & Weber also relates to certain aspects of our study. This paper highlights different factors that play into people's risk utilities in making decisions. Figner and Weber highlight that people of different ages, socioeconomic status, cognitive abilities, and more play into those who are more risk seeking and risk averse. In our proposal, we have highlighted that in our group of chosen participants, there will be a lot of diversity and varying factors for those involved including the aspects described previously (age, gender, and etc.).

Lastly, the literature, in text: "Prospect Theory: An analysis of decision under risk" by Kahneman & Tversky highlights the evaluation of risk based decisions. This paper indicates that individuals are said to evaluate risk based on psychological matters and their idea of loss and gain utility. Kahneman and Tversky mention that individuals tend to value potential losses over potential gains. This means that people are more likely to stick to a safer option and be risk averse so that they do not have to experience loss as it would hurt them more than the potential idea if they gained off the riskier option. This relates to our study as we are giving our participants the option to take risks to gain a bigger prize. We can evaluate their decision making and evaluation on why and if they would take the risk.

Relevance and Knowledge Contribution

Overall, our study has a lot to bring to the table and can very well contribute the excellence of economic literature already present. Our study of projection bias of risk utility is

new and can change the space of behavioral and psychological economics. We believe that we can highlight new aspects and reasons behind why people project different ideas on risk from present time relative to future events. Our design also allows us to study the level of gain and loss between individuals when they actually make the decision in the future. We can turn our hypothetical idea into factual evidence and make it relevant throughout the world of economics. Our idea to assess our participants' predictions for the future and to highlight the bias in that prediction will allow us to study humans in other fields rather than just projection bias and risk utility. We can also evaluate other psychological to economic thinking amongst individuals such as emotion tracking, other decision making experiences, and so much more. Our knowledge that we are making present in this research will bring a new level of understanding to the world of economic literature and provide a new perspective on projection bias in risk.

Research Design

The study will assess risk utility among a diverse sample of individuals aged 18 and older, representing varying social classes, races, genders, education levels, and physical and mental states. The primary outcome variable is risk-taking behavior, measured as the binary decision to participate in an obstacle course (risky option) or to accept a $20 restaurant gift card (safe option). Secondary outcomes include the utility participants assign to each option, measured using a 10-point Likert scale, and changes in risk preferences between the initial and follow-up assessments.

The study will employ a single-treatment design in which all participants receive the same treatment to avoid introducing confounding factors that could affect the clarity of the results. The primary focus is on assessing participants' overall risk utility and decision-making

patterns over time without the influence of varying interventions. Providing differential treatments, such as monetary rewards instead of concert tickets, was excluded to maintain consistency and ensure that participants' perceived utility of the reward remains comparable. Differences in how individuals value money versus concert tickets could introduce variability unrelated to the central research question, potentially skewing results.

Under this approach, all participants will be presented with the same choice scenario: whether to undertake the obstacle course to win front-row concert tickets to an artist of their choice or opt for a $20 restaurant gift card. This uniform treatment design eliminates the potential confounds of varying reward structures or motivational interventions, allowing for a clearer evaluation of risk preferences, changes over time, and demographic or cognitive predictors of decision-making.

To ensure the study is adequately powered to detect meaningful effects, we conducted power calculations with the following parameters: a standard deviation of 0.45 (reflecting an expected effect size smaller than a balanced 50/50 distribution), an alpha of 0.05, and a beta of 0.1, corresponding to a 90% power level to minimize the likelihood of Type II errors. Given the study's hypotheses and design, we opted for a two-tailed test to account for potential effects in either direction, requiring a total sample size of 210 participants.

A one-tailed test would have required a sample size of 172 participants, but the more conservative two-tailed approach ensures robustness in testing for differences in risk utility and decision-making over time. The total sample size of 210 ensures the study can detect significant effects, even under the assumption of moderate variability in responses and a relatively smaller effect size. This careful balance between statistical power and practical feasibility strengthens the validity of our findings.

Conclusion

We believe we will fail to reject our hypotheses. Despite this experiment centering around a physical test, we think it will be relevant to economic fields. The difference between the replies and actions of male and female participants builds on trends discovered in articles like Gender Differences in Performance Predictions: Evidence from the Cognitive Reflection Test (Ring Et al., 2016), which can be used to further explain differing attitudes towards economic and business proposals between genders, such as why certain investors might turn down an investment opportunity. The results of participants who showed present bias/inconsistent time preferences in their results could help us be more precise when dealing with others, so that we reduce the likelihood they may agree with something only for their subsequent actions to not quite agree - aka their present bias. Readers of our results might be motivated to think more diligently about choices they make concerning a balance of potential risk and rewards. Some confounding variables in our experiment might be physical health, i.e the weight of some participants or if they have allergies.

Appendix

Study Overview

Our objective is to study whether our participant's self assessments of their risk-taking

tendencies align with their actual behavior in a future event involving making a decision on risk.

This is to research the idea of projection bias in individuals relative to their risk utility.

Demographics within our participants

-   Age, Gender, Socioeconomic Status, Cognitive Ability, Personality Traits

    This is to ensure there is a broad amount of differences between our participants to

    exclude any confounding variables in our study and also to establish credibility.

Stimuli

We would put an advertisement on a billboard inviting participants to come and help out with an

experiment. There would be an incentive listed on the ad for participants to become more

interested.

The advertisement would say, "Come help out with an experiment that could change the future!

Have a chance to claim a prize!"

Survey Given to Participants

1. How risky do you believe you are as a person? (1-10)?

2. How likely are you to take financial risks such as investing in the stock market? (1-10)?

3. How likely are you to engage in activities that involve uncertainty? (1-10)?

4. How likely are you to make social risks such as asking someone out on a date or speaking in public? (1-10)?

5. How likely are you to take physical risks such as participating in extreme sports or skydiving? (1-10)?

6. If you had the opportunity to take a high risk-high reward job offer, would you take it? (1-10)?

7. How confident are you in your ability to predict future behavior in risky situations? (1-10)?

8. How accurate do you think you are in your self-assessments in general? (1-10)?

9. Do you value potential gains and potential losses equally? (1-10)?

10. When you're in a more emotional mood (stressed/happy/sad), are you more likely to make riskier decisions? (1-10)?

11. If you were presented with the same choice to take a risky challenge, how likely would you be to respond accurately in a month from now? (1-10)?

12. What is your name (First, Last)?

13. What is your email address?

The average of the sum of answers to the first 11 questions will act as the quantitative measurement to each individual surveyed. This will be studied to the measurement created at the later date (when a risk decision is made).

Risk Taking Scenario (1 month later)

- Option 1: Claim a $20 gift card with no strings attached. (safe and guaranteed)

- Option 2: Complete an obstacle course (similar to tv show "wipeout") and if completed without falling, participants will be able to claim front row concert tickets to an artist of their choice. If the obstacle course is not completed, participants will receive nothing. (risk and large reward)

Participants will be observed in a controlled environment to ensure consistency in task setup and presentation.

Study Design and Methodology

Within-Subject Design

Each participant serves as their own control by completing a self-assessment questionnaire and then making a risky decision at a later date.

- Independent Variables: Risk Assessment, Time (1 month), Risk Decision
- Dependent Variables: Risky Taking Behavior, Projection Bias
- Controlled Variables: Participant Demographics/Traits

Statistical Analysis

- Paired T-Test: to compare participants self-assessed risk preferences relative to their actual risk behavior

- Logistic Regression: to test whether demographic variables or other aspects of participants affect the relationship between self-assessed utility and risk behavior

The projection bias evaluation will be the difference between participant's self-assessed risk levels compared to their actual risk behavior. We will be able to identify patterns and wrong predictions between tendencies and decision outcomes.

Ethical Consideration

- Informed Consent: All participants will be informed of the nature of the experiment where they would be able to withdraw from the study at their own convenience.

- Debriefing: After completing the task and all studies are final, all the participants will receive an email regarding a detailed explanation of the purpose of the research created.

- Confidentiality: All the information used in the study will be kept confidential and anonymized. This information includes their name, email address, risk statistics, and more.

Hypothesis

Participants will be shown projection bias as their self-assessed risk preferences will not align with their behavior shown a month after the survey. This study aims to contribute to the understanding of how projection bias influences risk utility and more importantly how it can affect different decision-making contexts.

Works Cited

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