

Framing Zero

(Studying effects of framing of zero on bet estimations)

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Abstract

Abstract The importance of framing in how agents evaluate bets and decisions has been well studied and established. Our work is with regards to a specific framing. The point of this study is to ascertain if the framing of “nothing” changes the evaluation of bets where it is used.

The study examines four different framing of “nothing” and tries to look at their effect on decisions made by the participant. We establish that framing of a bet influences the participants’ perception of the bet.

1. Introduction

According to normative decision theory the principle of invariance stipulates that the way options are presented should not affect the decision maker. This means that if the same choices are worded differently and offered to the same person, then the person should always choose the same option regardless of how the choices are presented to them. Extensive studies in the field of Behavioral Economics have shown us how the principle of invariance does not hold as people show inconsistent behavior due to reasons like Affect Heuristics and Reference Point [2]. However, there had been limited research into the effects of “framing of zero” or how “nothing” is framed in the context of decision making problems in economics, before Wardley and Alberhasky (2021). We would like to extend their work on the framing of zero, and address certain limitations observed in the literature.

Tversky and Kahneman (1986) [1] showed how “alternative descriptions of a decision problem often give rise to different preferences, contrary to the principle of invariance that underlies the rational theory of choice”. Specifically, in their Problems 3 and 4, they saw a huge shift from risk averse to risk seeking behavior when the same choices were presented as a perceived loss instead of a perceived gain.

We highlight the fact that different people can have varying levels of risk-averseness, both in the context of gains and in the context of losses. Therefore, we have used Problems 3 and 4 of Tversky and Kahneman to categorize people into 4 different groups based on their preferences, and then studied the effect of framing of zero for people belonging to the same group. We believe that this allows us to draw conclusions within each category as there is some amount of similarity in the intrinsic risk-averseness of people belonging to the same category.

Hypothesis 1: (Weak Hypothesis for Framing of Zero)
There will be differences within each class for the different framings of zero, highlighting that there

is indeed some effect caused by it.

Hypothesis 2: (Strong Hypothesis for Framing of Zero)

Loss Aversion would cause people to show more risk seeking behavior when the same condition is framed as “no loss” or “lose nothing” as opposed to “win nothing” or “gain nothing”. This hypothesis stems from the reference point and affects heuristic explanations.

1.1. Framing options being studied

We also explore different ways to frame “nothing”:

- “Gain nothing”
- “Lose nothing”
- “Win nothing”
- “No loss”

1.2. Previous Work

Previous work on the matter namely “Framing zero: Why losing nothing is better than gaining nothing” has explored this exact question. We have criticisms about the methodology in the work and our contributions lie in our proposed fixes to the methodology and scoping of the research question. Furthermore, we extend the study of the paper to include other kinds of framing.

1.3. Criticism of previous work

When it comes to comparing framing of nothing and comparing bets, the work of Batemen et al. [3] is of relevance.

The study uses a Lickert scale to compare different bets. Participants that rate a particular bet haven’t seen the other bet. The study then goes on to compare the Lickert scores of these two groups.

We challenge the usage of these scores on absolute value because there is no baseline to ground those scores in. Without a baseline the scores of different people are not fit for comparison. The sample consists of different individuals asked to assign scores to a bet, an implicit assumption is made here that different people will be using a similar base-line to assign numbers. We challenge this assumption because the numbers on the Lickert scale do-not represent anything tangible and therefore are not be used as cardinal quantities that can be compared across people. If the Lickert scale is to be used here then a baseline should be established across people before the actual bet judgements are asked to be made so that all scores on the Lickert scale are normalized according to the established baseline.

The paper being referred to uses the “mean” of Lickert scores to make their comparisons across groups. This is typically considered bad practice because Lickert scores are ordinal and therefore taking the median is more appropriate.

Our contribution addresses these problems by getting rid of the usage of the Lickert score altogether and providing a baseline for comparison of different questions (as is detailed in the methodology section. We try to remove that ambiguity by asking people to make actual decisions to see the difference in framing. However, it is important to note that we are not going for the exact problem statement as Bateman et al.

2. Methodology

Philosophically, the questionnaire has been divided into two parts:

- Part 1: Categorization: Every participant will get the same set of questions in part 1. The point of these questions is to establish categorization classes. The questions in this part of the form are to establish the general risk-taking tendency of the participant. A class is made for each configuration of possible answers to carry out the analysis for part 2. Classes will be made according to responses in part 1. Two participants making the same set of decisions in part 1 will be put in the same class.

It is deliberate that part 1 has no framing whatsoever.

Questions:

1. (a) Probability 100% : +INR 5,000
(b) Probability 50%: +INR 10,000. Probability 50%: INR
2. (a) Probability 100% : -INR 5,000
(b) Probability 50% : -INR 10,000. Probability 50%: INR 0

The four classes that are made based on the responses are:

- Class 0: 1A2A
 - (a) Risk Averse for Gain
 - (b) Risk Averse for Loss
 - Class 1: 1A2B
 - (a) Risk Averse for Gain
 - (b) Risk Seeking for Loss
 - Class 2: 1B2A
 - (a) Risk Seeking for Gain
 - (b) Risk Averse for Loss
 - Class 3: 1B2B
 - (a) Risk Seeking for Gain
 - (b) Risk Seeking for Loss
- Part 2: A participant can randomly get one of four possibilities in part 2. Each possible version of this part corresponds to the framing options being studied (as highlighted in the introduction section). All versions of Part 2 will have the same bet, just framed differently. The participants will be prompted to make a decision in the bet.

The responses in part 2 will be compared to each other in the context of the response in part 1. That is, we will be looking at the distribution of choices made in part 2 on a per class basis: the classes of which will be established by the responses in part 1.

Framed questions:

1. Gain Nothing
 - (a) 20% chance to gain INR 200 vs 80% chance to **gain nothing**
 - (b) 100% chance to gain INR 40
2. Lose Nothing
 - (a) 20% chance to gain INR 200 vs 80% chance to **lose nothing**
 - (b) 100% chance to gain INR 40
3. No Loss

- (a) 20% chance to gain INR 200 vs 80% chance of **no loss**
- (b) 100% chance to gain INR 40
- 4. Win Nothing
 - (a) 20% chance to gain INR 200 vs 80% chance to **win nothing**
 - (b) 100% chance to gain INR 40

This data collection for the study was carried out via online forms. There were 4 different forms created, one for each framing. A website was hosted with a button to start the survey, which randomly redirected the participants to 1 out of the 4 forms. The forms were circulated among college students, which was not limited to students from our college. Thus, the demographics for our study is college students of the age group 18-22. The results from each of the forms were compiled and studied.

3. Results

	Gain Nothing	Lose Nothing	No Loss	Win Nothing
Class 0	1,7	11,9	7,7	7,8
Class 1	7,7	10,11	10,5	7,9
Class 2	6, 0	2, 3	3,0	3, 5
Class 3	5, 2	1, 5	4, 1	3, 0

Thus, out of the 16 categories that the participants got categorized into (first into 1 of 4 based on random allocation of form, and then further into 1 out of 4 based on their responses to the first 2 questions), each category has at least 3 participants.

The above information has been visualized into 4 separate graphs based on the 4 classes for better understanding. The bar graphs have been normalized to show the proportion of participants for each framing within each class who preferred Option A (risk seeking) and Option B (risk averse). Since the number of participants vary in each class, there is a number at the top of the bar graph depicting the exact count of participants within the class who received the corresponding framing and chose the respective options.

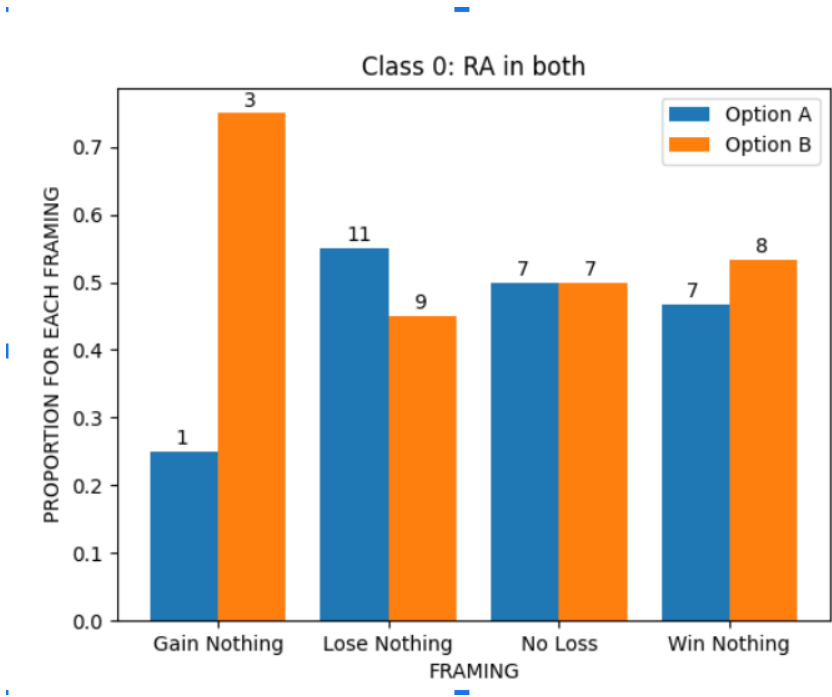


Figure 1. Graphs of people who were risk averse in both

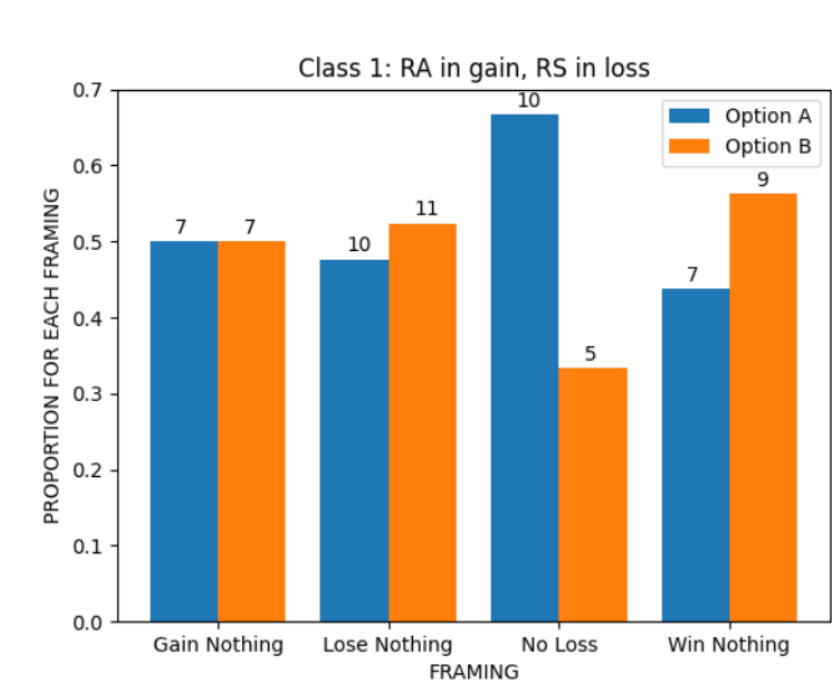


Figure 2. Graphs of people who were risk averse in gain but averse in loss

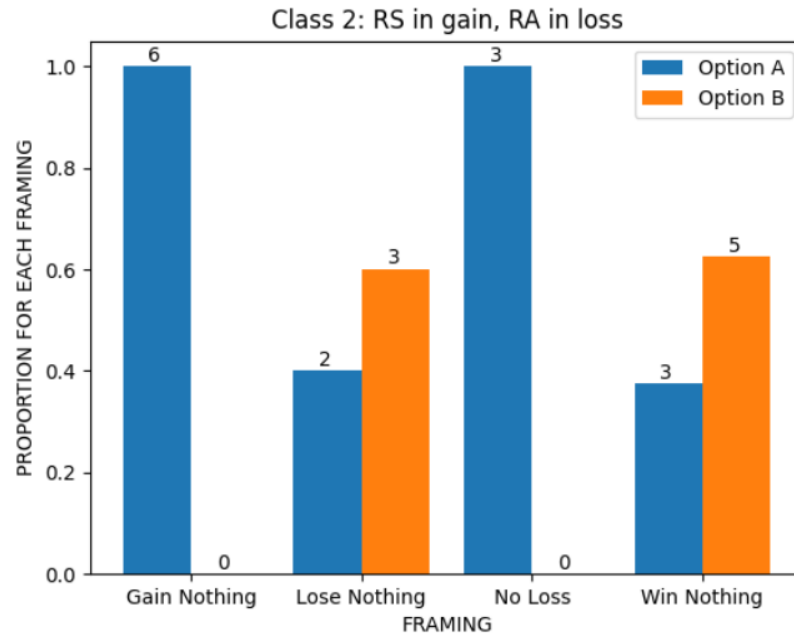


Figure 3. Graphs of people who were risk averse in gain but seeking in loss

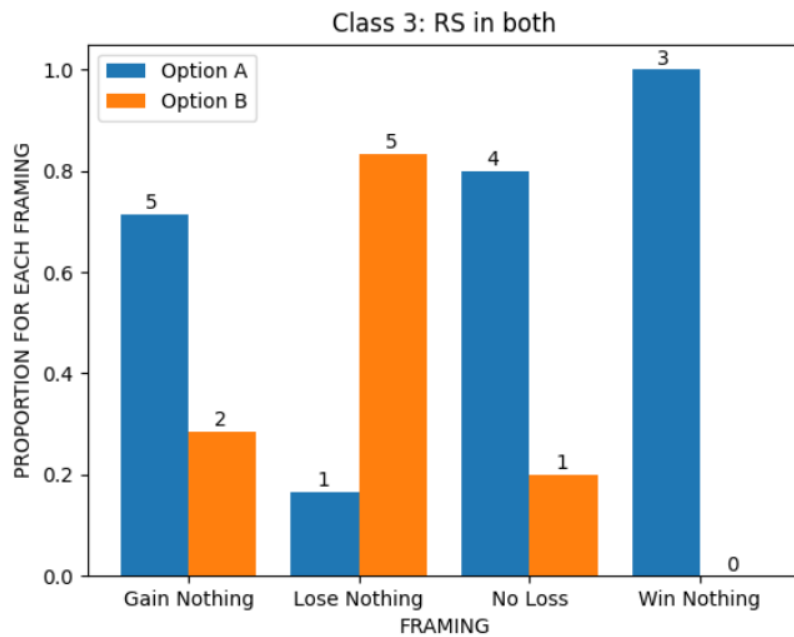


Figure 4. Graphs of people who were risk seeking in both

4. Analysis

The purpose of the classes is to group people with similar risk-taking attitudes together. The classification / baseline questions are devoid of any framing whatsoever such that they can be used to gauge risk-taking attitudes. While looking at the graph of each of the classes we notice that the proportion of people that take a particular option in the framings differs heavily with framing. That is the framing effect is visible in the data.

The variance of proportion of people that took option A (that is the risk taking alternative) in each class:

- Class 0 (Risk Averse in both): 0.017
- Class 1 (Risk Average in Gain, Risk Seeking in Loss): 0.010
- Class 2(Risk Seeking in Gain, Risk Averse in Loss): 0.125
- Class 3(Risk Seeking in both): 0.127

5. Discussion

The intra class variance highlights that there is possibly some effect that framing of zero has on the responses of participants. The intra class analysis shows non-zero variance of the data on different kinds of framings. This implies the standing of the first hypothesis i.e. framing has an effect on the decisions made by people. People in the same risk taking class make different decisions based on the framing. In other words, people with similar risk taking attitudes respond differently to different framings being studied here.

The inter class analysis shows a switch in the effect of framing for different classes. For example, in the “Gain Nothing” framing, while there is risk averseness for Class 0, which is in agreement with Hypothesis 2, there is an even split in Class 1, and a statistically significant dominance of risk-seeking behavior in Class 2 and Class 3. Similar switches in the effect of framing have been observed in the “Win Nothing” and “Lose Nothing” framings of zero, that appear to falsify Hypothesis 2.

The presence of the hypothesized strong framing effect is observed to a certain extent only in the “No Loss” framing, where there is no class that prefers risk averse behavior. While there is an even split in Class 0, there is a statistically significant preference of the participants for the risk-seeking option when the negative aspect (80% chance of no loss) is framed as “No Loss”. Therefore, it can be argued that Hypothesis 2 stands only for the framing of “No Loss”.

6. Limitation

The study suffers from some limitations that have been elaborated upon in this section. Firstly, our assumption that the first 2 questions are enough to categorize the risk-averseness of people can be challenged. However, we believe that there is some benefit to categorisation, which makes it better still than an uncategorised study.

In order to achieve objectivity, we have replaced the Lickert scale with a binary decision problem. This has created a lack of granularity in our results, limiting the scope of our analyses. We argue that the trade-off is a necessary one in order to achieve a more robust conclusion.

Our study also suffers from a sparsity of data, which has been further aggravated by the splitting of responses into 4 categories with 4 sub-categories each. The implications of this cause our study to be very sensitive to noise and outlier responses.

References

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