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Does choosing a product lower people's willingness to sell it?

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Abstract

This thesis attempts a different experimental method to test for choice-induced preference change, combining the use of lotteries as products with objective value with a quantifying question in the form of requesting a minimum sale price for the lotteries. The objective of this method is to simultaneously avoid the methodological bias other papers on the topic have been accused of, while still providing results in a form that can be easily measured and tested. The treatment and control groups did show significantly different results in some models, but the results overall lacked the consistency necessary for a direct conclusion to be drawn on their basis, possibly due to the small sample size.

Keywords: Choice, cognitive dissonance, preference, free-choice paradigm

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Introduction

According to the traditional view of economics, individual preferences are stable, consistent and rational (Richter, 1966). They cannot be observed directly, but they can be revealed through the choices of the individuals in question. Both academic experiments and business ran surveys often rely on this fact in order to gauge subjects or customers' attitudes towards different products, asking them to rate products, choose between multiple options or offer a maximum price they would be willing to pay for said item.

While this framework is simple and useful, it does not always fit with the observable reality of human behaviour. The particular issue that this thesis wished to analyse is the mere choice effect, a long debated topic in the field of behavioural economics. This effect is noted to occur when the subject is forced to make a difficult decision between multiple products that they believe to be similar in value. Following such a choice, experiments have found that subjects would value the product they chose higher than they did before facing the decision, while the rejected product's perceived value would be lower.

Given that experiments are usually meant to reveal pre-existing preferences rather than change them, this effect could pose a challenge for future experimenters to avoid, as well as casting into question the results of older studies that do not take it into account. On the more practical side, such an effect may also be of interest to people whose jobs involve running cost-benefit or risk analysis for various companies, as their studies into their customers might affect those customers' attitudes (e.g. Andreoni & Miller, 2002; Deb et al., 2012) .

The first economic studies into the topic were conducted by Brehm (1956), who found proof in support of the mere choice effect in his subjects. His experiments consisted of three stages: asking the subjects to rate eight articles, then making a choice between the articles, and finally rating them again. By comparing the first round of ratings with the last, Brehm found evidence of altered preferences, which he attributed to cognitive dissonance. Further experiments, both by Brehm and other experimenters(e.g. Gerard and White, 1983 ; Nakamura and Kawabata, 2013), would replicate the results using similar methods. These results would later come under criticism in a paper by Chen and Risen(2010), who found that a selection bias present in those experiments may have influenced the results. As a result of this bias, the paper claimed the results would have found evidence for the mere choice effect even if it were not present.

As such, this thesis was intended to test for the existence of the mere choice effect while avoiding the potentially biased experimental method that Chen and Risen criticised. The method used in this thesis was inspired instead by Alós-Ferrer and Granic (2021), whose experiment was also designed to avoid the same issue. In particular, the usage of lotteries as an objective storage of value was found to be a useful one for construction this experiment. This thesis wished to expand on that foundation by introducing a more direct method of quantifying the exact change in value.

Assuming this thesis found evidence in favor of the mere choice effect, it would provide further backing against the revealed preference framework, which still retains its popularity in spite of the many challenges it has received. Beyond economic theory, further proof about the existence of the mere choice effect would improve the chances of it being used or avoided in real life contexts, such as in marketing or political campaigning.

Literature review

The original studies into the existence of the mere choice effect were based on the free choice paradigm, based on Brehm's (1956) experiments and most of them found significant evidence for the effect. Using ratings, rankings or monetary values, experimenters would present the subjects with a number of products or locations and try to determine their attitudes towards these different products. Once the products were rated, ranked or valued, subjects would be forced to choose between products that had been paired up, before being asked to value the initial products one again. They expected that the products chosen in the second stage would be valued higher than they had been before the choice was made, while the products that were rejected would be valued lower, and that the change would be more significant the more similar the two products' valuation was in the first stage.

Those experiments were based around the psychological theory of cognitive dissonance which is a process that is said to occur when individuals are asked to make difficult decisions (Festinger, L., 1962). In order to ease the mental effort of making such a choice, the decision maker would subconsciously improve their own opinion of the product or idea that they chose, while lowering the one of the rejected choice.

This same theory was the basis for this thesis' own hypotheses, which are very similar to the original, with the exception of a lack of regard for the similarity between products' values. Our experiment only provided the subjects with one pair of two products, so it would not be possible to make a comparison with other pairs.

H1: Subjects from the treatment group will, in stage two, demand a higher price for the lottery they chose in stage one, compared to the subjects from the control group that choose that same lottery in stage three.

H2: Subjects from the treatment group will, in stage two, demand a lower price for the lottery they rejected in stage one, compared to the subjects from the control group that reject the same lottery in stage three.

These two hypotheses also naturally give rise to a third, more general hypothesis. Since we expect that the valuation of the chosen lottery will rise and that the value of the rejected lottery will lower in kind, we would logically expect the overall difference between the two valuations to increase even more significantly.

H3: Subjects from the treatment group will, in stage two, select prices for the two lotteries that are further apart in value compared to subjects from the control group that chose the same lotteries.

By testing these three hypotheses, this thesis hoped to investigate its overall research question, which was "*Do subjects' choices affect their willingness to sell?*". There is also an important distinction to be made here, however. While the hypotheses and the underlying theory behind our experiment are the same as for the Brehm-style experiments, the actual method differs quite a lot. This is the result of a very important study in the topic of the mere choice effect, which severely undermined the results of these older studies.

Chen and Risen(2010) showed that many of these studies suffered from selection bias, and that their results could actually be explained under the revealed preference model. They also showed alternative explanations for the results that we previously attributed to cognitive dissonance, claiming that subjects were learning of their own preferences from the choices. In the same paper, they also offer an idea for the ideal experiment design: making subjects believe they made a choice, but secretly having it be predetermined. Sharot, Velasquez and Dolan (2010) did use such a design, but unfortunately for the purposes of this thesis, that required deception, so it cannot be incorporated it here.

Another study that provided evidence for the existence of the effect, but whose tactics we cannot use, is Izuma et. al(2010), who found evidence of choice-induced preference change by scanning people's brains during the choice itself. While useful as backing for the potential existence of the effect that this thesis intends to test for, we lack both the technology and the knowledge necessary to run such an experiment.

Alós-Ferrer, Granić, Shi and Wagner (2012) provide an example of an experiment that specifically avoided the selection bias criticism. Their main strategy was to avoid making people directly choose between the two alternatives they wanted to compare, and instead making them choose one over the other indirectly. The purpose of this indirect choice is to prevent people from revealing extra information that would bias the results. They created pairings of products (a,b), with a being rated just a bit higher than b, and then had people make choices between (a,h), where h was a product they rated higher than a, and between (b,f), where f was a product the subject rated lower than b. Their results did show a significant effect of choices on ratings as well as on response times, but the process would be too difficult for this thesis to replicate.

Alós-Ferrer and Granic (2021) also ran a different experiment to verify the existence of the mere choice effect, by using lotteries, which are a more objective store of value. People were asked to make a choice between two lotteries where one was clearly superior, and then a second choice between one of the lotteries from before and another lottery of equal value. This experiment did not find any significant evidence for the existence of the mere choice effect.

In spite of the results, the paper provided an example of an experimental method that avoided the criticisms of bias without resorting to deception or overly complicated pairing mechanisms. This thesis chose to follow in its footsteps, using lotteries as products with objective enough values that we can create two similar enough to make it a difficult decision for the subjects, while expanding upon it by more directly quantifying the effect.

Methods

Table 1, the chances and rewards that each lottery offers.

Lottery name	x	y	u	v
Chance A	56% 3.60€	62% 3.20€	60% 4.20€	50% 3.90€
Chance B	44% 1.20€	38% 1.40€	40% 1.30€	50% 1.20€

Table 2, comparison of the two groups' tasks

Control Group	Treatment Group
1. Easy Choice(u,v)	1. Hard Choice(x,y)
2. Lottery Ticket Sale(x,y)	2. Lottery Ticket Sale(x,y)
3. Hard Choice(x,y)	3. Easy Choice(u,v)

All of the data that this thesis is based on came from an online experiment using the online tool Qualtrics. The subjects that took part in the experiment were asked to choose between pairs of lotteries and to offer the price for which they were willing to sell their tickets to said lotteries. The lotteries, as seen in Table 1, had two possible outcomes, each with their own probabilities and monetary outcomes. For example, if a subject were to choose lottery x over lottery y, they would have a 56% chance of earning 3.60 Euros or Dollars(depending on the currency they chose at the start) and a 44% chance of earning 1.20 Euros or Dollars. Crucially, four random subjects were chosen to receive the money they earned from one random stage of the experiment, using the random lottery incentive system (Cubitt et al, 1998) to ensure that subjects offered their full attention to every stage.

The reason for using lotteries and willingness to sell rather than rankings or ratings of products, is that these have objective monetary value and are more reliable than the usage of binary choices for determining preferences (Cason & Plott, 2014). The traditional, Brehm-inspired method would require participants to rank the products first, in order to then allow the experimenters to form suitable pairs for the later choice task. Given the criticisms of bias that have been levelled at said experiments and the difficulty of implementing them online, the experiment was instead turned into an online survey relying on pre-made pairs of lotteries and a between-subject design. Since the lotteries have an objective value, we can ask people to make choices between them while knowing that those choices will be difficult enough to trigger cognitive dissonance.

Subjects in this experiment went through three stages, with the first and third stages containing one binary question each and the second stage containing two questions that required them to write their answer, in the form of an amount of money. The only difference between the control and treatment groups was the order of said stages, their contents were otherwise identical. Subjects could also choose to use USD or EUR currencies, but that had no influence on the randomization process. In the following, I will describe these three stages in more detail.

The first stage that the control group faces, and the third for the treatment group, is called the "easy choice". In order to control for the act of making a choice, regardless of what the choice contains, and to serve as a sanity test (Abbey & Meloy, 2017), we have created this stage, where the participants make a choice between two lotteries(the previously mentioned u and v) where one of the lotteries is obviously superior to the other.

While this choice does not factor as a variable into any of our models, it serves two important purposes in the course of the experiment. First of all, it stands as a control for the 'hard' choice, as the theory behind the mere choice effect states that only a difficult choice between relevant options should lead to a change in the subject's preferences; if the preferences were to change as a result of any arbitrary choice, that would imply a different, undetected effect was at fault for the modification. Secondly, we can use this decision as a sanity or attention test, to verify that our subjects are not simply choosing randomly or without understanding what is asked of them.

The difficult choice served as the third stage for the control group and the first stage for the treatment group. In contrast to the easy choice, this stage features lotteries that are very similar in utility(see x and y in the table above). The choice here is meant to be difficult, although the low rewards offered may prevent subject from thinking too deeply about the value of the (discussed further in the limitations section).

The second section for both groups was the lottery ticket sale. Participants were presented with the x and y lotteries, and asked what would be the minimum amount of money they would accept in order to sell their tickets for each of the lotteries. If the mere choice effect is present, we would expect to see significant differences between subjects' valuations of the lotteries, as the treatment group should value their chosen lotteries higher than the subjects that did not have to make the difficult choice, while lowering their valuations of their rejected lotteries below the control groups' own.

This is the section that this thesis is particularly interested in, as the other papers it is inspired by did not feature similar tasks. It uses the Becker, DeGroot, and Marschak (1964) method to elicit willingness to sell. It is also the only section that directly quantifies the effect, since the other stages only feature binary choices, and as such the only one whose value can be easily used for statistical modelling.

For the purposes of answering the hypotheses, the subjects were divided into two groups, a control group and a treatment group. There was no difference in the actual tasks assigned to the two groups, only in the order that they were done, as can be seen in Table 2. The control group went through the easy choice, then the ticket sale, and only at the end the hard choice. The treatment group, on the other hand, was presented with the hard choice first, then the ticket sale and ended with the easy choice.

To test the first hypothesis, that "*subjects from the treatment group will, in stage two, demand a higher price for the lottery they chose in stage one, compared to the subjects from the control* *group that choose the same lottery in stage three,*" the experiment had to have both groups make the difficult choice, but only one of the groups could do so before the stage where they stated their price for the lottery. It is important to note here that this thesis compares the parts of each group that made the same choice in the difficult choice: members of the treatment group that chose lottery x are compared with members of the control group that also chose that lottery, and the same applies for the members that chose lottery y. For this first hypothesis, the value being compared is the price asked in the second stage for the lottery chosen in the hard choice stage.

A similar logic had to be followed for the second hypothesis, that "*subjects from the treatment group will, in stage two, demand a lower price for the lottery they rejected in stage one, compared to the subjects from the control group that reject the same lottery in stage three.*" The only difference was that, instead of looking at what lottery the different members chose, the thesis instead looked at their valuation of the lottery that they rejected. As such, when studying members from both groups that chose lottery x, the thesis is interested in the price they asked for lottery y.

Finally, the third hypothesis, "*subjects from the treatment group will, in stage two, select prices for the two lotteries that are further apart in value compared to subjects from the control group that chose the same lotteries,*" requires a simple extra step. Instead of comparing the values, this hypothesis compares the distance between the values, or in other words the difference between the price asked for the chosen lottery and the price asked for the rejected lottery by the subjects.

Testing this hypothesis is particularly important in case of low magnitude coefficients for the other two dependent variables. Even if the valuation of the chosen lottery is only insignificantly increased and the valuation of the rejected lottery is not decreased too significantly, as long as the difference between the two is significantly increased we can still claim to find some evidence of the mere choice effect.

In order to best test these three hypotheses, all the models present in this thesis use the valuation of a lottery, the chosen lottery for H1 and the rejected lottery for H2, or the difference between the valuations, for H3, as a dependent variable. In total, 21 models based on OLS regression (Peck et al., 2012) were used to test for mere choice effect, mostly differing in the dependent variable and the sample they were run on. To simplify the presentation, they have been divided into sets of three models based on the sample on which they were tested.

The variables in the models will be as follows: ValueX and ValueY are the amounts that the subjects were willing to sell lotteries x and y for, respectively; ValueDiff is the difference between the price asked for the chosen lottery and the price asked for the rejected lottery; TC was the group variable, equal to 1 if the subject was part of the treatment group and 0 otherwise; Currency was a control for the different currencies, since the experiment allowed people to choose between USD and EUR for their monetary values; Ro is a dummy variable that is only equal to 1 if the subject is Romanian, which is a control necessary due to potential bias as a result of gathering subjects by way of personal social media; Student is another dummy, equal to 1 if the subject stated they were a student; Statistics is the last dummy, which represents their knowledge of statistics, equal to 1 if the subject probably or definitely studied it before, and 0 otherwise; finally, C was the intercept, since we expect there to be some base value larger than 0.

The first three models used the entire dataset as a sample. Unlike in the models that will follow later, these three use the valuations of the chosen(ValueC) and rejected(ValueR) lotteries without stating whether said lottery is x or y, as the sample contains all the subjects, regardless of their choices in the experiment.

ValueDiff=ValueC-ValueR

Model 1.1: ValueC=C+TC+Currency
Model 1.2: ValueR=C+TC+Currency
Model 1.3: ValueDiff=C+TC+Currency

The next step was to divide the sample into subjects that chose x and subjects that chose y. While this reduced our sample size considerably, it also allowed for an easier comparison between groups, with only two variables being considered outside of demographics.

In order to calculate the significance and control for the effects of different conditions, the thesis used three models aimed at the people who chose lottery x, regardless of group or choice in the easy stage, with the only difference between them being the dependent variable:

Model 2.1: ValueX=C+TC+Currency
Model 2.2: ValueY=C+TC+Currency
Model 2.3: ValueDiff=C+TC+Currency

This thesis then presents the same models, ran for the subjects that chose lottery y. This time, the first two dependent variables are switched, since the chosen lottery was y, thus it was both more consistent and easier to understand if the value of the chosen lottery remained the first in the set. We will continue this trend for all y-sample models that follow after.

Model 3.1: ValueY=C+TC+Currency
Model 3.2: ValueX=C+TC+Currency
Model 3.3: ValueDiff=C+TC+Currency

All 6 of the above were also ran on a smaller sample, removing the subjects that made the inferior choice in the easy stage, those who chose lottery v over u. The group that made the right choice will be referred to as the attentive or rational group, since their choice is the one that was completely superior in terms of utility. Since the number of potentially inattentive subjects is worryingly high, the thesis cannot rely only on these models of the attentive subjects, as the sample size will be far too small.

Model 4.1: ValueX=C+TC+Currency
Model 4.2: ValueY=C+TC+Currency
Model 4.3: ValueDiff=C+TC+Currency
Model 5.1: ValueY=C+TC+Currency
Model 5.2: ValueX=C+TC+Currency

Model 5.3: ValueDiff=C+TC+Currency

Another six models were also constructed along the same structure as the first two sets, only with added demographic variables, meant to control for the various differences in demographics. Since this was an online experiment that involved an international sample of various ages, occupations and experience with statistics, it was worth creating special models for these in particular.

Model 6.1: ValueX=C+TC+Currency+Ro+Student+Statistics
Model 6.2: ValueY=C+TC+Currency+Ro+Student+Statistics
Model 6.3: ValueDiff=C+TC+Currency+Ro+Student+Statistics
Model 7.1: ValueY=C+TC+Currency+Ro+Student+Statistics
Model 7.2: ValueX=C+TC+Currency+Ro+Student+Statistics
Model 7.3: ValueDiff=C+TC+Currency+Ro+Student+Statistics

Before moving on to the participants, it is important to state the two assumptions underlying this experiment, both of which have to do with the construction of the lotteries.

The first assumption is that lotteries x and y, which are the subject of the hard choice, are similar enough in utility that the subjects consider it a difficult choice and are equally likely to vote for either. The original paper that constructed the pair (Alois-Ferrer & Granic, 2021) tested them on a UK sample; our sample is much more diverse and difficult to test on, so this thesis is force to assume that they will have similar enough utility functions for the same to apply. The choice being difficult is a necessary requirement for cognitive dissonance to appear, and a balanced sample, with an equal split of x and y preferring subjects, is preferable in order to have two smaller sample of equal size.

The other important assumption is that lottery u is clearly superior to lottery v, and should be chosen by almost every participant. Aside from being a control question to make sure that the difficulty and relevancy of the choice matters, the easy choice is also meant to serve as an attention test. Subjects that choose the inferior lottery v either possess strange utility functions, or were not paying sufficient attention to the task at hand. It is not inherently preferable to completely remove those who failed this attention test, due to the already small sample size, so a number of models were instead ran on a 'rational' subsample, which included only subjects that chose lottery u.

Participants

All participants were gathered from the internet, with two primary sources: posting the survey on SurveySwap, which is an online platform for sharing surveys used mostly by students and a few businesses, and sending the link via Whatsapp, a social media platform used mostly for communication either one-on-one or in private groups. While the data is anonymous, the structure of the platforms leads to a large demographic difference between the two groups, with the former containing mostly students and the latter containing significantly more employed individuals; the former are also much more spread out across the entire world, from South America to Asia, while the latter is mostly comprised of people from Romania, the Netherlands and the United Kingdom.

Regardless of how they were reached, all subjects completed the same survey, randomization notwithstanding. Figure 1, seen below, may be helpful to better understand the explanation that will follow. The survey in its entirety is also present in the appendix. Subjects were first presented with a consent form, then a quick explanation of what lotteries were and how the experiment would proceed. They were also informed about the possibility of being rewarded: 4 random participants, out of those who left their email addresses, would be selected to receive a reward based on their choice in one of the four questions they faced. They were then asked to choose whether they would prefer to use Euros or US Dollars in the questions, with a large majority picking the former.

They were then faced with a choice(Hard choice for the treatment group and easy choice for the control group), followed by being asked about the two lotteries' values, and finally the last choice (the easy one for the treatment group and the hard one for the control group).

Here they were also asked various demographic questions, including nationality, age, employment status, whether they had studied statistics before and email addresses for those who signed up for a chance to receive a prize based on one of their choices. At the end, there was a short debrief explaining the various groups and the objective of the experiment.

Figure 1, diagram of survey

```
                Consent Form
                     |
   Explanation of lottery system & reward
                     |
             Choice of Currency
                     |
               Randomization
                |         |
       Easy Choice     Hard choice
                |         |
        Ticket Sale    Ticket Sale
                |         |
       Hard choice     Easy Choice
                     |
           Demographic Questions
                     |
                  Debrief
```

Data

There were 119 responses to our survey, 35 of which came from SurveySwap, while the other 84 were reached through various social media platforms such as Whatsapp. 99 of participants chose to use Euro, while 20 chose USD instead. Both of these groups were then sorted into the Control and Treatment groups. For simplicity's sake, we will not be considering the Euro groups as separate from the Dollar groups, relying instead on the Currency variable to control for potential biases.

Of the 119 responses, we chose to keep 71, as the rest either exited the survey before finishing it, thus failing to answer all of the questions, or gave answers in the lottery sale stage that far exceeded what one could consider a rational amount, including answers well above 10 EUR or below 1 EUR. These few outliers were removed in order to not bias the overall results. More exactly, any price above 5 EUR or USD, which is higher than even the combined amount of both lottery outcomes, was removed, as well as any price below 1 EUR or USD, rounded down from the lowest lottery payout of 1.20.

Furthermore, as a surprisingly high number of the respondents chose the inferior option in the easy choice, a separate subset of 'attentive' or rational subjects was created, consisting of only 39 participants.

Table 3:

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
LotteryA	71	2.275	0.739	1	2	2.5	4
LotteryB	71	2.392	0.711	1	2	2.9	4
TC	71	0.535	0.502	0	0	1	1
Currency	71	0.789	0.411	0	1	1	1
Choice	71	0.366	0.485	0	0	1	1
Rational	71	0.549	0.501	0	0	1	1
Ro	71	0.268	0.446	0	0	1	1
Student	71	0.577	0.497	0	0	1	1
Statistics	71	0.535	0.502	0	0	1	1
LotteryChosen	71	2.371	0.763	1	2	2.8	4
LotteryRejected	71	2.297	0.688	1	2	2.7	4

In Table 3, shown above, are shown the descriptive statistics of the participants and the explanatory variables. Id is not important here, and the rest have been explained in more detail in the previous Method section. To reiterate, TC, Currency and Choice are dummy variables representing the group(treatment or control), currency choice and hard choice of the participant; ValueX and ValueY are the valuations given to the two lotteries, while LotteryChosen and LotteryRejected are the valuations of the chosen and rejected lotteries. The EC variable wasn't included in the dataset for the test itself but we will discuss its implications shortly.

Most of the statistics are within our expectations, with ValueX and ValueY being close enough in value to provide a difficult decision. More thorough tests on those two variables will be presented in the Results section. The randomization also provided near equal numbers for the treatment and control groups, as evidence by the value of the TC variable. We will discuss the demographic data in more detail shortly.

One variable that did not fall within our expected values was Choice; in spite of the two lotteries being valued at very similar prices, significantly more people chose lottery y than x. Due to the fact that this bias is not as pronounced in the rational sample, one possible explanation would be that less attentive subjects assumed it to be better at a glance without serious consideration.

Table 4: Demographics

Age	**Number of Participants**
18-25:	55
26-35:	11
36-45:	1
46-55:	17
Under 18:	3
Gender	
Female	48
Male	38
Non-binary	2
Employment Status	
Employed	27
Self-Employed	6
Student	51
Unemployed	2
Statistics Experience	
Definitely not	17
Probably not	7
Might or might not	10
Probably yes	15
Definitely yes	40

Looking at demographics, specifically the four questions with a limited number of answers, since the nationality answers were very diverse by contrast, we can see a number of trends. For one, the vast majority of subjects are students, which also explains why the number who have studied statistics is so high. Gender wise, the sample leans female but is still fairly well balanced; the variable was not included in the demographic model, as there is no reason to expect gender would influence the impact of the mere choice effect. Finally, the age category is clearly dominated by the 18-25 interval, which, like the high number of students, is logical given the methods used to gather subjects- SurveySwap is a platform used primarily by students, and they are also more likely to be found on social media.

This has a few important implications, especially the student and statistics factors: people who have recently studied similar topics may be more likely to realise the purpose of the experiment, and they are certain to be more familiar with the concept of lotteries and elicited values. There is also the possibility that student volunteers may have different risk preferences from other groups (Cleave et al., 2012). This is why those two variables will be included in the demographic regression, albeit in a more limited fashion- a 'Student' variable that only judges whether a subject is a student or not, and a 'Statistics' variable that is equal to 1 when the subject probably or definitely studied statistics before.

On the subject of nationalities, there are far too many to meaningfully display, but the single most common one was Romanian, which is to be expected given the social media circles it was advertised in. While literature on the topic of different nationalities' risk aversion is inconclusive (Bartke & Schwarze, 2008; Hsee & Weber, 1999), it is also the case that the vast majority of the Romanian participants came from social media and that many were at least acquaintances of the author, so it would be considered wise to control for the variable to check for potential bias, which is why we added a 'Ro' variable to the demographic models. All it does is check whether the subject's stated nationality is Romanian.

Results

Assumptions

Before we look at our hypotheses, it is worth looking at the assumptions we started with. In the Methods sections, we stated two important assumptions for this experiment to be successful. The first was that the hard choice had to be a difficult choice where the difference between the values of the two lotteries were small enough that people would be equally likely to select either; the second was that the easy choice would have one lottery that was evidently superior and thus, should be chosen by the vast majority of participants.

The easiest way to test the first assumption is to look at the valuations that people gave to the lotteries. If they were constructed correctly, then subjects should not value one much higher than the other, even with the mere choice effect in play. In fact, in order to ensure that it does not confuse our results, we will compare the valuations of x by people who chose x with the valuations of y by people who chose y; if the mere choice effect is present, it should affect both equally.

The result conforms with the expectation, as the t test returns a t-value of -0.181 and a p-value of 0.8573, which means we cannot reject the null hypothesis: the two lotteries were valued at identical prices. While this does not necessarily prove that the choice was difficult enough to trigger cognitive dissonance, it does provide some evidence. The actual choices, however, do not conform, with only 26 subjects choosing lottery x compared to 45 for lottery y.

As for the second assumption, the results are not at all supportive: of 107 subjects that answered the question, 31 chose the clearly inferior option. While the exact cause of this effect is hard to pinpoint, it may prove to be a problem in judging the final results. More detail on this matter will be found in the Limitations section. As noted before, the group that answered 'correctly' will be considered the rational sample, and we will run six extra models on that specific, but small, sample.

Overall, the second assumption is not clearly supported by the evidence, while the first has mixed support, with y being chosen more than x in spite of the two being valued the same by subjects. In order to deal with the former, six extra models were constructed, using only the sample that chose the superior lottery in the easy choice stage. This limited sample creates further problem, which will be discussed later in this section.

Hypothesis

In regards to our first hypothesis, it presents a greater challenge than the assumptions: *Subjects from the treatment group will, in stage two, demand a higher price for the lottery they chose in stage one, compared to the subjects from the control group that choose the same lottery in stage three.*

According to the theory behind the mere choice effect (Festinger, 1962), subjects that chose a lottery in the first stage should place extra value on it in the following rounds; by contrast, those who are asked their valuation before making the choice should not be inclined to ask for a higher price, even if they select that same lottery in the third stage. The revealed preference framework, by contrast, would expect there to be no significant difference between the valuations, as the underlying preferences have no reason to change in-between questions.

Before we move on to testing the hypothesis, it is worth looking at the other statistics, particularly the divide between subjects that chose lottery x and those that chose lottery y.

Table 5: Statistics of subjects that chose x

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
LotteryA	26	2.348	0.858	1	2	2.9	4
LotteryB	26	2.407	0.724	1	2	3	4
TC	26	0.654	0.485	0	0	1	1
Currency	26	1.000	0.000	1	1	1	1
Choice	26	1.000	0.000	1	1	1	1
Rational	26	0.692	0.471	0	0	1	1
Ro	26	0.269	0.452	0	0	0.8	1
Student	26	0.538	0.508	0	0	1	1
Statistics	26	0.615	0.496	0	0	1	1
LotteryD	26	−0.059	0.519	−2	0	0	1

Table 6: Statistics of subjects that chose y

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
LotteryA	45	2.233	0.667	1	2	2.5	4
LotteryB	45	2.384	0.712	1	2	2.8	4
TC	45	0.467	0.505	0	0	1	1
Currency	45	0.667	0.477	0	0	1	1
Choice	45	0.000	0.000	0	0	0	0
Rational	45	0.467	0.505	0	0	1	1
Ro	45	0.267	0.447	0	0	1	1
Student	45	0.600	0.495	0	0	1	1
Statistics	45	0.489	0.506	0	0	1	1
LotteryD	45	0.151	0.489	−1	−0.03	0.4	2

While being fairly comparable for the most part, there are a number of important distinctions between Tables 5 and 6. The first is N, the sample size: the latter has 45 subjects, which is almost double Table 5's 26. This will be an important point later when discussing the power of the various models.

Another important difference is TC, the variable that tells us whether the subject is in the control or treatment group. 65.4% of the subjects that chose x came from the treatment group, which is higher than expected but not necessarily problematic, especially given the low size of that sample.

Currency also provides an interesting observation, as all of the subjects that chose x also chose to use EUR. Given that the vast majority of participants did choose EUR (as seen in Table 3) this is not a particularly worrying fact, but it will mean that the Currency variable will be automatically removed from models that use that sample.

Before moving on to the models, it is worth comparing the elicited values of the chosen lotteries for the treatment and control groups. Based on the theory behind the mere choice effect, we would expect the treatment group to value their chosen lottery higher than the control group does, while potentially also having a lower value for the lottery that they rejected.

Figures 2 and 3 display the box plots for the prices asked for the chosen and rejected lotteries, separated into the control and treatment groups. For the chosen lottery, the plot shows a slightly higher median and a significantly higher third quartile in the treatment group than in the control group, which is in line with our expectations based on H1, but the first quartile is around the same for both. The rejected lottery plot also displays a lower median and a lower third quartile for the treatment group, as H2 would suggest, but the first quartile is almost identical for the two groups. Overall, it serves as a small bit of evidence in the first and second hypotheses' favour, falling in line with some of the general expectations of what the plot should look like if they were true, even if not to a level where it would be considered statistically significant.

Figure 2

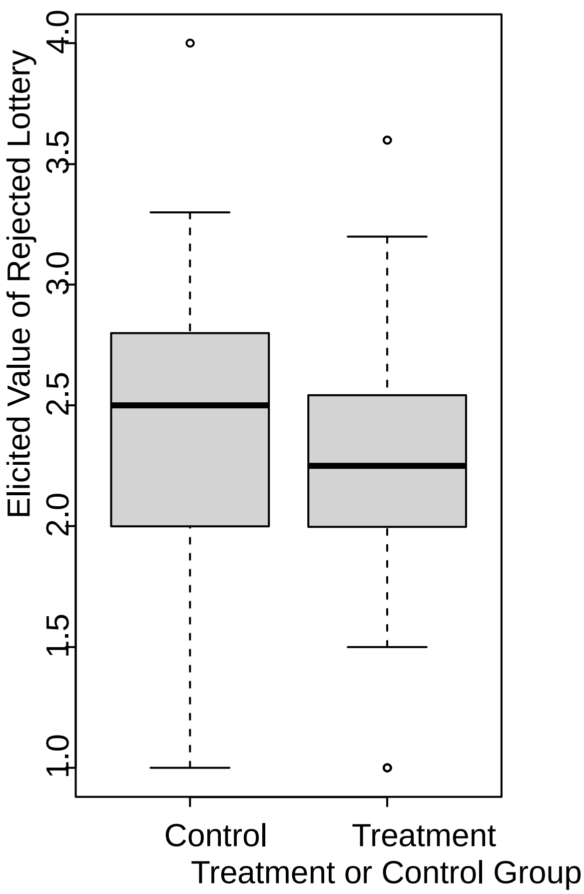
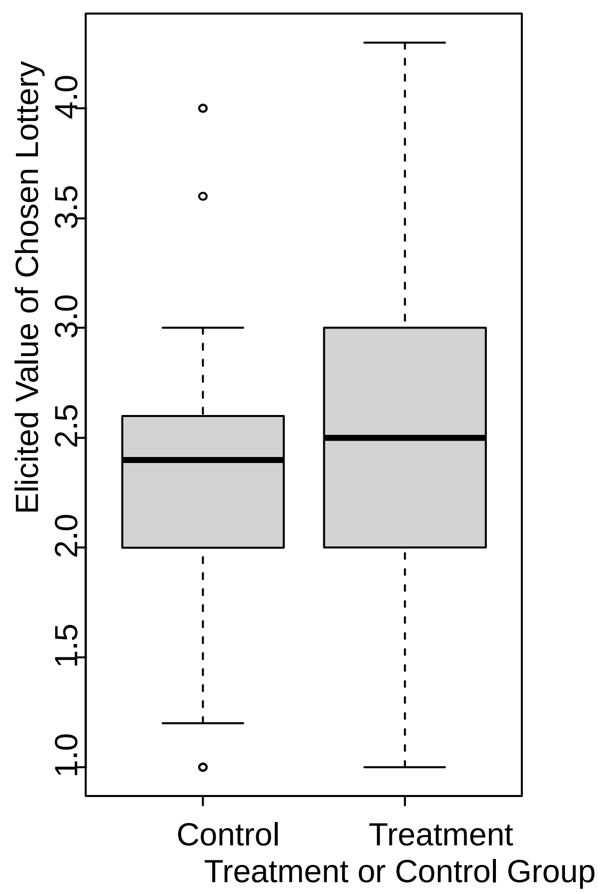


Figure 3



Running two Welch (1947) two-sample t-tests on the valuations of the lotteries in the two groups, we get p-values of 0.5652(for chosen lotteries) and 0.6235(for rejected lotteries). The first test compares the means of the lottery valuations of the chose lottery in the treatment group to the same thing in the control group. The mean of the former is equal to 2.420, while the latter's is 2.314. Our hypothesis is that the two are statistically identical, while our alternative hypothesis is that they are different; with a t-value of -0.578 and a p-value of 0.5652, we fail to reject our hypothesis of the two being identical. The 95 percent confidence interval is -0.4703310 to 0.2590998.

Our other test looks at the valuations of the rejected lotteries, once again comparing those given by the treatment group with those of the control group. The former's mean is 2.259, while the latter has a mean of 2.314. Like in the previous test, the null hypothesis is that they are equal, while the alternative is that they are not. The t-value of 0.493 and p-value of 0.623 means that we once again cannot reject the null. This test's 95 percent confidence interval is between -0.2501946 and 0.4142807. As such, we do not have enough proof to show that the means of either pair are significantly different.

For the purposes of testing this hypothesis, we will use the previously mentioned sets of models, applied to four different sub-samples: the subjects that chose x, the subjects that chose y, the subjects that chose x and u, and the subjects that chose y and u.

First, we have the results of the first three models, seen in Table 7, which include irrational subjects but do not control for demographics. The sample for the first three is made up of the subjects from the control and treatment group, regardless of their choice in the experiment. This is the largest sample, but none of the coefficients derived from it are not significant. While the signs of the coefficients are in line with our expectations (positive on the chosen lottery, negative on the rejected lottery and even more positive on the difference than on the chosen) they are still too small to serve as evidence.

This is not as detrimental to the hypotheses as it might appear at first glance, as our hypotheses are very specific in comparing only the groups that chose the same lottery. This first set of models was meant to offer an overview of the entire sample, and the information is still largely in line with our expectations for the whole sample.

Table 7: Entire sample

	Dependent variable:		
	LotteryChosen	LotteryRejected	ValueDiff
	(1)	(2)	(3)
TC	0.115	–0.066	0.181
	(0.183)	(0.164)	(0.120)
Currency	0.173	0.287	–0.114
	(0.224)	(0.200)	(0.147)
Constant	2.172***	2.106***	0.067
	(0.227)	(0.203)	(0.148)
Observations	71	71	71
R^2	0.014	0.033	0.043
Adjusted R^2	–0.016	0.004	0.015
Residual Std. Error (df = 68)	0.769	0.687	0.503
F Statistic (df = 2; 68)	0.466	1.157	1.532

Note: *p<0.1; **p<0.05; ***p<0.01

Which is why, for the next models, we have split up the sample into two groups: those who chose lottery x and those who chose lottery y. As such, the sample for the next three is made up of the subjects from the control and treatment group who chose lottery x in the hard choice section of the experiment, regardless of their answer in the easy choice.

The results of these particular models(Table 8) are not at all in line with our expectations, however. The group variable is not shown to be significant in any of the three models in this set. Based on this data, we do not find evidence to support the existence of any mere choice effect in this particular sample. More explicitly, for the group that chose lottery x, there is no significant effect of placing the choice before eliciting the value of the lottery as opposed to the other way around; not on the valuation of the chosen lottery(ValueX), the rejected lottery(ValueY), or the difference between the two valuations(ValueDiff). The 'C' and 'R' stand for Chosen and Rejected lotteries, respectively and will also be used for the next models

One important thing to note here, which will keep repeating in all models that use the lottery x sample, is that currency does not appear. This is because all the subject that selected x also selected EUR, so it was automatically removed from the regression. We will continue to add it regardless, just to maintain consistency.

Table 8: Sample that chose x

	Dependent variable:		
	ValueX(C)	ValueY(R)	ValueDiff
	(1)	(2)	(3)
TC	−0.250	−0.346	0.096
	(0.357)	(0.296)	(0.217)
Currency			
Constant	2.511 ***	2.633 ***	−0.122
	(0.289)	(0.240)	(0.176)
Observations	26	26	26
R^2	0.020	0.054	0.008
Adjusted R^2	−0.021	0.014	−0.033
Residual Std. Error (df = 24)	0.867	0.719	0.527
F Statistic (df = 1; 24)	0.488	1.362	0.196
Note:	$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$		

The next three models, which draw upon the sample of people that chose lottery y, fall more in line with our first and third hypotheses: this time, both the first model (which has the valuation of chosen lottery y as a dependent variable) and the third (which uses the difference between valuations) find a significant effect of group placement. While the latter is significant at a higher confidence level, both are still significant and positive, which is good evidence in favor of two of our hypotheses.

On the other hand, there is no significant negative effect on the value of the rejected lottery; instead we find an insignificant positive effect, the opposite direction compared to the expectations set by H2. As such, while two of our hypothesis are supported, the other is insignificantly contradicted.

It is also worth mentioning that this second sample is larger than the first, which means that significantly more subjects chose lottery y than x in the larger group, which includes potentially inattentive subjects. While this is somewhat worrying, the rational sample will serve to allay some of those fears, as there the distribution is much more equal. This data shows the necessity of a separate set of models that only look at the part of the sample that showed coherent preferences during the easy choice.

Table 9: Sample that chose y

	Dependent variable:		
	ValueY(C)	ValueX(R)	ValueDiff
	(1)	(2)	(3)
TC	0.359 *	0.051	0.308 **
	(0.212)	(0.204)	(0.145)
Currency	0.285	0.261	0.024
	(0.225)	(0.216)	(0.153)
Constant	2.026 ***	2.035 ***	−0.009
	(0.221)	(0.212)	(0.150)
Observations	45	45	45
R^2	0.083	0.034	0.098
Adjusted R^2	0.039	−0.012	0.055
Residual Std. Error (df = 42)	0.698	0.671	0.475
F Statistic (df = 2; 42)	1.892	0.730	2.292
Note:	*p < 0.1; **p < 0.05; ***p < 0.01		

The next three models(Table 10) are, again, based on the portion of the sample that chose lottery x in the hard choice, but now also limited by them choosing lottery u in the easy choice. The results in this model are actually quite opposite of the ones observed in the previous one: H2 is supported by the data, with the valuation of rejected lottery y being significantly lower in the treatment group, but both the chosen lottery's and the difference between their valuations also being lower in the treatment group. While the magnitude of the difference coefficient is very small and insignificant, the coefficient the chosen lottery is significantly negative, which is completely contrary to our expectations.

Before we cast any serious judgements, however, it is important to note that this sample is the smallest of all the models. Only 18 participants chose both x and u, which means the results are far less powerful than that of the previous set of models, which had 45 subjects in its sample.

Table 10: Rational sample that chose x

	Dependent variable:		
	ValueX(C)	ValueY(R)	ValueDiff
	(1)	(2)	(3)
TC	-0.688^{*}	-0.672^{**}	-0.016
	(0.374)	(0.275)	(0.317)
Currency			
Constant	3.100^{***}	3.120^{***}	-0.020
	(0.318)	(0.234)	(0.269)
Observations	18	18	18
R^2	0.175	0.272	0.0002
Adjusted R^2	0.123	0.227	-0.062
Residual Std. Error (df = 16)	0.711	0.522	0.602
F Statistic (df = 1; 16)	3.389^{*}	5.986^{**}	0.003
Note:	$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$		

The following set of models (Table 11) also have a somewhat small sample (21 subjects), as they concerned with the sample that chose lotteries y and u. Their results are much more in line with our expectations: while the positive effect on the valuation of lottery y and the negative effect on that of lottery x are insignificant individually, together they lead to a significant impact on the distance between the two valuations.

As discussed in the Methods section, it is within expectations for the chosen and rejected lotteries to have the right sign but too small a magnitude to be significant on their own. With the two effects combined, however, the difference between the two is positive and significant, providing some support to H3.

It must again be stressed that this is a small sub-sample of only 21 subjects, which means less power than most of the other models, but it is the more attentive part of the sample, which answered as expected in the easy stage.

Table 11: Rational sample that chose y

	Dependent variable:		
	ValueY	ValueX	ValueDiff
	(1)	(2)	(3)
TC	0.120	−0.150	0.270*
	(0.206)	(0.206)	(0.135)
Currency			
Constant	2.430***	2.467***	−0.037
	(0.110)	(0.110)	(0.072)
Observations	21	21	21
R^2	0.018	0.027	0.174
Adjusted R^2	−0.034	−0.024	0.130
Residual Std. Error (df = 19)	0.426	0.427	0.280
F Statistic (df = 1; 19)	0.340	0.529	3.996*
Note:			*p < 0.1; **p < 0.05; ***p < 0.01

Finally, it's time to discuss the last six models(Tables 12&13), which include certain demographic variables. These were added both to control for potential biases, as well as to ensure the randomization was done correctly.

This first set of models(Table 12) uses the participants who chose lottery x as a sample, including the potentially inattentive subjects, but also checks for demographic variables. The three dummy variables added are Ro(1 for Romanians in the set), Student(equal to 1 for students) and Statistics(1 if the subject has probably or definitely studied Statistics before). While none of the variables appear significant, it is worth looking at the coefficients.

The coefficient of TC is negative for the valuations of both chosen and rejected lotteries, but slightly positive for the difference between the two. This is not in line with H1, but it does ever so slightly support H2 and H3.

By contrast, the demographic variables all have positive, if insignificant, coefficients in the first two models. The Statistics variable the largest coefficient in the first and third models, while the Student variable is most influential in the second model and notably the only negative one in the third model.

Table 12: Sample that chose x, with demographics

	Dependent variable:		
	ValueX	ValueY	ValueDiff
	(1)	(2)	(3)
TC	−0.212	−0.282	0.070
	(0.366)	(0.312)	(0.215)
Currency			
Ro	0.204	0.109	0.096
	(0.414)	(0.353)	(0.243)
Student	0.058	0.306	−0.248
	(0.379)	(0.323)	(0.223)
Statistics	0.522	0.150	0.372
	(0.368)	(0.314)	(0.216)
Constant	2.079***	2.305***	−0.226
	(0.437)	(0.372)	(0.257)
Observations	26	26	26
R^2	0.134	0.116	0.182
Adjusted R^2	−0.031	−0.053	0.026
Residual Std. Error (df = 21)	0.871	0.743	0.512
F Statistic (df = 4; 21)	0.812	0.688	1.168
Note:	*p < 0.1; **p < 0.05; ***p < 0.01		

The final three models(Table 13) are based on the sample that chose lottery y, only once more with demographics attached. Here, we see an even more significant impact from the addition of the demographic variables: unlike in the third set of models, which used the same sample but no demographics, the variable based on the group is only significant in the model that uses difference between values as a dependent variable. Previously, it had also been significant, if at a lower confidence level, for the model formed around the elicited value of the chosen lottery. H3 is still significantly supported, but H1 is less well supported.

It is important to note that this is not due to a reduction in the size of the coefficient, which actually grew, or an increase in the variance, which grew very little; the increase in the number of variables merely made it harder for any coefficient to qualify as significant. Like in the other set of models that used this sample, the rejected lottery's valuation is insignificantly higher in the treatment group, which is the opposite of what we would expect based on H2.

Table 13: Sample that chose y with demographics

	Dependent variable:		
	ValueY	ValueX	ValueDiff
	(1)	(2)	(3)
TC	0.370	0.049	0.321**
	(0.220)	(0.206)	(0.150)
Currency	0.188	0.072	0.116
	(0.262)	(0.245)	(0.178)
Ro	0.228	0.413	−0.186
	(0.283)	(0.266)	(0.193)
Student	−0.118	−0.118	−0.0001
	(0.225)	(0.211)	(0.153)
Statistics	−0.027	0.083	−0.109
	(0.224)	(0.210)	(0.153)
Constant	2.109***	2.082***	0.027
	(0.276)	(0.259)	(0.188)
Observations	45	45	45
R^2	0.112	0.109	0.125
Adjusted R^2	−0.002	−0.006	0.013
Residual Std. Error (df = 39)	0.713	0.669	0.486
F Statistic (df = 5; 39)	0.984	0.950	1.116

Note: *p < 0.1; **p < 0.05; ***p < 0.01

To summarize our overall results: The first set of models did not find significant evidence in support of any of the three hypotheses, but the coefficients did have the expected signs. From the second set we got correct signs for H2 and H3, but not for H1, and still no statistical significance. In the third set we found statistical support for H1 and H3, but H2 had the opposite sign on its coefficient and was insignificant. In the fourth set, we found statistical evidence for H2, but also statistical evidence against H1 and no significance on H3. The fifth set had significant evidence for H3 and insignificant but supportive evidence for H1 and H2. The sixth set did not find any statistical evidence, but H2 and H3 at least had the expected sign, while H1 did not. Finally, the seventh set had statistical evidence for H3, almost significant evidence for H1 and the wrong sign for H2.

Discussion

Research question recap

Before we discuss our results in full, it is worth restating the objective of this thesis. Our experiment was meant to test for the existence of the mere choice effect, using the medium of lotteries and quantifying the result by directly asking the subjects to offer their sale price. We had three hypotheses: H1, that members of the treatment group would ask higher prices for their chosen lotteries than members of the control group that chose the same lotteries; H2, that members of the treatment group would state lower prices for the rejected lotteries compared to subjects from the control group that also rejected those lotteries; H3, that the difference between the prices asked for the lotteries would be larger in the treatment group than in the control group, as a result of H1 and H2.

We divided people into two groups, a treatment and control group, and presented them with the same three questions, only in reversed order. The treatment group was offered the hard choice first, which was meant to induce cognitive dissonance and thus bring about the mere choice effect. If the hypotheses were accurate, we would expect them to ask higher prices for their chosen lotteries, lower prices for their rejected lotteries, and thus have a larger difference in prices.

The control group by contrast, only made the hard choice after offering their prices. As such, the mere choice effect would not have kicked in until after the final stage, and it thus should not have any impact on the prices asked for in the second stage.

There were also two assumptions underpinning the larger experiment, both of which proved to be less accurate then expected. The assumption that lotteries x and y were similar enough in utility that subjects would find the choice difficult, and that the two would thus be chosen in about equal numbers, was essential for establishing the presence of cognitive dissonance in the subjects.

The second assumption, that lottery u would be seen as clearly superior to lottery v and thus be chosen by all but a few subjects, was meant to ensure that the control group still faced a choice. This would help establish that it was not just any choice that influenced the preferences of the subjects, but the explicit mere choice effect of a difficult choice between relevant objects. It was also meant to serve as a sanity test, to ensure subjects were not making arbitrary choices and were offering their full attention to the task at hand.

Result discussion

Table 14: Results on Hypotheses

Set	H1	H2	H3
1- full sample, 71 subjects	Insignificant, correct sign	Insignificant, correct sign	Insignificant, correct sign
2- Chose x, 26 subjects	Insignificant, wrong sign	Insignificant, correct sign	Insignificant, correct sign
3- Chose y, 45 subjects	Significant, correct sign	Insignificant, wrong sign	Significant, correct sign
4- Chose x and u, 18 subjects	Significant, wrong sign	Significant, correct sign	Insignificant, wrong sign
5- Chose y and u, 21 subjects	Insignificant, correct sign	Insignificant, correct sign	Significant, correct sign
6- Chose x with Demographics, 26 subjects	Insignificant, wrong sign	Insignificant, correct sign	Insignificant, correct sign
7- Chose y with Demographics, 45 subjects	Insignificant, correct sign	Insignificant, wrong sign	Significant, correct sign

Table 14 shows the overall results of the models, as well as the impact they have on the hypotheses. None of the seven sets of model found significant results for every hypothesis, with some findings that downright contradict our hypotheses. The fourth set, for example, finds that the treatment groups valued their chosen lotteries significantly less than the control group, which goes completely against our expectations. The second and sixth sets also find similar, if less significant results, for H1. The third set is the only one to find significant evidence to support H1.

H2 is not directly and significantly contradicted by any of the sets, but it is also only significantly supported by the fourth set, which also found the opposite of H1. Four out of six sets find only insignificant evidence in favor of this hypothesis.

As stated before, H3 was meant to be the safer hypothesis, in the occasion that the other two hypotheses were found to only receive insignificant evidence. The results fall in line with that expectation, finding significant evidence in favor of H3 in 3 of the 7 sets, as well as insignificant evidence in 3 other sets. Only one set, the fourth, found any support against H3, but there are reasons to doubt the power of that model.

The fourth set, which looked at strictly rational subjects that chose lottery x, only had a sample size of 18, which is the lowest in the entire dataset. As such, its power is very low, and the same can be said of some of the other sets: the second, fifth and sixth sets all had sample sizes below 30 (26, 21 and 26, to be precise), which means they are not very persuasive, regardless of their results. By contrast, sets three and seven have 45 subjects each, while the first set has 71.

Looking at those three sets alone presents a very different picture of the results: one of the three finds significant evidence for H1, two of them find significant evidence for H3 and none of them significantly contradict any of the three hypotheses. The only contrasting evidence found is against H2, in the third and seventh sets, none of which is statistically significant. Overall, those three sets that use larger sample sizes seem to be closer to the results that our hypotheses would suggest.

The results of the sets with smaller samples cannot simply be discarded, however, so the conclusions of the experiment remain mixed and inconclusive. This is largely in line with results of previous economic experiments by Alós-Ferrer and Granic (2021), who also found little to no evidence for the existence of the mere choice effect when using similar methods. Unlike the old experiments using the Brehm(1956) model or the ones using blind choice (Sharot et al, 2010) the results found here do not provide solid support for the existence of the mere choice effect, but they do avoid the issue of selection bias that Chen and Risen(2010) criticised.

Limitations

The first and arguably most important limitation of this study was its small sample size. While the original 119 participants would still have been a small group compared to other studies of this type, the 71 that offered actually meaningful contributions were an even smaller sample. Even with such a simple test, it would be recommended for this test to be done on a much larger scale, preferably with more control over the participants. For an α of 0.05, a β of 80% and a d of 0.2, we would have need a minimum of 126 subjects, which is more than we managed to gather even before removing the outliers.

This ties into the second big issue, which was the reward offered. With the limited resources available, the experiment could only offer a maximum of 20 Euro to the participants, divided to four random subjects based on their choices and only to those who voluntarily offered their email addresses. This was possibly too little reward, both in terms of chance to win and the sum they could win, for subjects to put considerable cognitive effort into their choices. This is a fairly likely reason for the high number of unfinished or unreasonable answers to the questions in the survey.

A third problem that must be addressed is the nature of the sample itself. The subjects that participated were a diverse group from many different countries, with many different occupations and of a variety of age ranges. While some attempts were made to control for those factors, particularly in the demographic variable models, the fact remains that the lotteries were designed for subjects from the United Kingdom, not from Romania or Asia. The currencies offered, Euros and US Dollars, also likely did not cover the entire sample's preferences. Some bias may also be present as a result of the recruitment process, particularly among those recruited via social media- the social circle of the author may not serve as representative sample of the population as a whole.

One possible explanation for why the second hypothesis, in particular, failed to provide evidence is that the mere choice effect is being counterbalanced by the mere exposure effect: the treatment group was exposed to the x and y lotteries in the first stage, and as such may have valued them both higher out of familiarity. The literature on the subject is considerable and concrete (Monahan et al, 2000; Zajonc, 2006), but if the mere exposure effect were the only one affecting the experiment, the values of both lotteries should have increased at the same rate, without the difference between them increasing.

As a suggestion for anyone that would try to recreate and improve upon the experiment, the overall sample would likely be the most important thing to keep in mind. Restraining the sample to a more easily understandable category, such as students from one country or even a particular university, would help simplify many of the processes. Having the subjects physically in the room may also lead to a better quality of answers, preventing the high number of failures in the attention test and the outliers in the lottery ticket values. Physical presence also may lead to higher valuations in general (Bushong et al., 2010).A larger or more consistent reward would also be a great incentive to make subject take the experiment seriously and offer honest answers to the questions.

Conclusion

This thesis set out to explore an experimental method that combined lottery-based binary choices with a direct elicitation of subjects' willingness to sell, in order to try and test for the presence of the mere choice effect. The analysis on the data from the experiment offered a number of results, with some models offering clear evidence in favor of some of the hypotheses, while others found either no evidence or evidence that contradicted the hypotheses. While the larger sample results seem to favor the mere choice effect, the current results are too inconclusive to serve as decisive proof. As such, based on this data alone, this thesis must conclude that, to the extent that it exists, the mere choice effect does not have a significant, stable impact on subjects' attitudes.

Since many economic experiments and market analyses rely on the well established revealed preference framework, the fact that it continues to apply rather than be disturbed by potential choice-induced preference change is a good result for the entities that employ it.

The experiment had some clear issues, ranging from the low sample size to the high failure rate on the attention test and the unbalanced choices leading to unequal samples for the models to analyse. A more strict experiment, with subjects under observation or presented with better incentives, may be necessary for better conclusions to be drawn.

It is also entire possible that this experiment failed to cause cognitive dissonance in its subjects, that perhaps lotteries are too objective and close to amounts of money for subjects to value them subjectively. Given the success of some other papers on the subject of the mere choice effect (Sharot et al, 2010) it is plausible that this experiment simply employed the wrong method to observe the effect.

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Appendix- Experiment Questions

Welcome,

This survey is part of my Master's Thesis at the Erasmus University Rotterdam. It is meant to investigate how people decide in situations of risk. The survey should not take more than 6 minutes to complete and your entrance is completely voluntary. At any time, you may choose to stop the survey and leave with no consequence.

Please consider your decision carefully. Four randomly selected participants will earn a monetary reward from taking part in this survey. The amount ranges between 1.2 and 4.2 (EUR or USD) and will depend on your decisions in the survey. More details will be provided later on.

P.S.: This survey contains credits to get free survey responses at SurveySwap.io

Before moving on, you must agree that you are voluntarily entering and consent to your answers being used for data analysis purposes for my master thesis. I promise to treat your data confidentially and in compliance with the latest GDPR regulations. If you have any questions, please contact me at 620437gl@eur.nl:

In the survey, you will be presented with decision scenarios. The scenarios include risky choice options over monetary amounts. Please consider your decisions carefully. Each of your decision may have an impact on your earnings from taking part in this survey.

Four randomly drawn participants will actually receive the monetary amount from one of the decision scenarios. That is, four participants will first be drawn at random. Then, for each participant I will randomly draw one of the decision scenarios. Your decision and the outcome in this decision scenario will determine your earnings. Please leave your e-mail address at the end of the survey if you wish to participate in the random draw to win the money.

This survey uses a concept called "lotteries"; these are somewhat different than the common use of the term. A lottery is simply a set of possible outcomes, with each outcome having a monetary value and a probability attached to it. These outcomes are exhaustive (one of them will happen) and mutually exclusive (only one of them can happen). As such, every participant in a lottery will be assigned exactly one of the outcomes of that lottery.

For example, if a participant were to enter a lottery where they have an 80% chance of winning 2$ and a 20% chance of winning 3$, a computer would generate a random number between 1 and 100; if the number is equal to or higher than 80, the person would receive the 3$, but if it is lower they would only receive a 2$ prize.

Would you prefer to use EUR or USD in the decision scenarios? This will also set the currency for the amount of money you can win from participating in the survey.

- EUR
- USD

(This is where randomization occurs.)

(For the Control group)

Which of the following two Lotteries would you choose to participate in?

- 60% 4.20€, 40%1.30€
- 50% 3.90€, 50% 1.20€

In the following, we would like to know how much money certain lottery tickets are worth for you. Simply state the smallest amount you would be willing to accept in order to give up the ticket. To determine your reward from this task, the computer will randomly draw a price that ranges between the two amounts of money you can win from the ticket. Let's call this price "?".

-If "?" is below your stated smallest amount, this means you value the ticket more than "?", so you will keep the ticket. We will play out the lottery to determine your reward.

-If "?" is above your stated smallest amount, this means you value the ticket less than "?", so you will receive "?" for sure as a reward (and give up the ticket).

Notice that you either receive "?" as reward or you play out the lottery ticket.

You own a lottery ticket, with a 56% chance of earning 3.60€ and 44% of earning 1.20€. What would be the minimum amount of money someone would have to pay you for you to give them your lottery ticket?

Answer:

You own a lottery ticket, with a 62% chance of earning 3.20€ and 38% of earning 1.40€. What would be the minimum amount of money someone would have to pay you for you to give them your lottery ticket?

Answer:

Which one of the following Lotteries would you rather participate in?

- 56% 3.60€, 44% 1.20€
- 62% 3.20€, 38% 1.40€

(For the Treatment group)

Which one of the following Lotteries would you rather participate in?

- 56% 3.60€, 44% 1.20€
- 62% 3.20€, 38% 1.40€

In the following, we would like to know how much money certain lottery tickets are worth for you. Simply state the smallest amount you would be willing to accept in order to give up the ticket. To determine your reward from this task, the computer will randomly draw a price that ranges between the two amounts of money you can win from the ticket. Let's call this price "?".

-If "?" is below your stated smallest amount, this means you value the ticket more than "?", so you will keep the ticket. We will play out the lottery to determine your reward.

-If "?" is above your stated smallest amount, this means you value the ticket less than "?", so you will receive "?" for sure as a reward (and give up the ticket).

Notice that you either receive "?" as reward or you play out the lottery ticket.

You own a lottery ticket, with a 56% chance of earning 3.60€ and 44% of earning 1.20€. What would be the minimum amount of money someone would have to pay you for you to give them your lottery ticket?

Answer:

You own a lottery ticket, with a 62% chance of earning 3.20€ and 38% of earning 1.40€. What would be the minimum amount of money someone would have to pay you for you to give them your lottery ticket?

Answer:

Which of the following two Lotteries would you choose to participate in?

- 60% 4.20€, 40%1.30€
- 50% 3.90€, 50% 1.20€

(End of randomization, both groups have the same questions from this point onwards)

What is your employment status?

- Employed
- Unemployed
- Self-Employed
- Student
- Other
- Prefer not to say

What gender do you identify as?

- Male
- Female
- Non-binary/ third gender
- Prefer not to say

How old are you?

- Under 18
- 18-25
- 26-35
- 36-45
- 46-55
- 56-65
- Over 65

Have you studied statistics before?

- Definitely not
- Probably not
- Might or might not
- Probably yes
- Definitely yes

What is your country of origin?

Answer:

If you want to have a chance to win a monetary reward based on one of your lottery choices, please write down your email address below. Four people will be randomly selected for the reward. If you do not want to participate, please leave it blank.

Answer:

In this test you were placed in one of two groups. Both of them faced the same 4 questions, but they were presented in a different order. One group faced an easy choice, followed by the two lottery selling questions, and ending with a difficult choice, while the other had the difficult choice first, then the two lotteries, and the easy choice at the end.

The purpose was to see whether the difficult choice had an effect on the price they put on the lottery in the second and third question, while the easy choice was merely to control for impact of unrelated choice.

Thank you for your time.