

DEBIASING FRAMING EFFECT:
ANALYTICAL PROCESSING AND EXPLICIT WARNING

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION
IN
THE DEPARTMENT OF BUSINESS ADMINISTRATION

SEPTEMBER 2015

Approval of the Graduate School of Social Sciences

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ABSTRACT

DEBIASING THE FRAMING EFFECT: ANALYTICAL PROCESSING AND EXPLICIT WARNING

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September 2015, 96 pages

The various debiasing methods of framing effect have been under investigation on different subject profiles for the last two decades. The purpose of the current study is to investigate the separate effects and as well as the interactions of two debiasing methods on risky-choice framing: encouraging analytical processing and giving explicit warning. A questionnaire consisting of gambling tasks was filled by the subjects who were randomly selected METU undergraduate students from different departments. A Framing Effect Susceptibility Ratio (FESR) was calculated for each subject and the results did not indicate any significant difference in magnitude of framing effect between students from quantitative-based departments and social science-based departments in the control group. Separately applied debiasing methods and also their interaction failed to result in a steady decrease in the susceptibility level of framing effect in both student groups. Further research with students from less number of departments can be conducted and goal framing can also be investigated in the future with the same debiasing methods used in this research.

Keywords: Framing effect, debiasing method, risky choice framing, decision analysis

ÖZ

ÇERÇELEVEME ETKİSİNİ ÖNLEMELİK: ANALİTİK DÜŞÜNME VE AÇIK UYARI

Akbulut, Ezgi
Yüksek Lisans, İşletme Bölümü
Tez Yöneticisi: Doç. Dr. M. Sinan Gönül

Eylül 2015, 96 sayfa

Çerçeveleme etkisini önleyen çeşitli metotlar farklı katılımcı profilleri üzerinde son 20 yıldır araştırılmaktadır. Bu tezde, katılımcılar analitik düşünmeye teşvik edilerek ve açık uyarı sunulurken, bu iki yöntemin risk tabanlı çerçeveleme etkisi üzerindeki ayrı etkileri ve etkileşimleri incelenmiştir. Orta Doğu Teknik Üniversitesi'nin farklı bölümlerinden rastgele seçilmiş lisans öğrencileri tarafından doldurulan şans oyunu içerikli anket üzerinden, her katılımcı için Çerçeveleme Etkisi Duyarlılık Oranı (ÇEDO) hesaplanmıştır. Çalışmanın sonuçlarına göre, kontrol grubundaki matematik ağırlıklı bölümler ile sosyal bilim bölümlerinden gelen öğrenciler arasında kayda değer bir duyarlılık farkı gözlemlenmemiştir. Ayrıca, analitik düşünme ve açık uyarı yöntemlerinin ayrı ayrı ve etkileşimli sunumları incelendiğinde, tüm katılımcı grupların üzerinde iki yöntemin de çerçeveleme etkisini azaltan bir etkisi bulunmamıştır. İleriki dönemlerde bölüm çeşitliliğinde kısıtlamaya gidilebilir. Ek olarak, bu çalışmada kullanılan metotlar gelecekte amaç çerçeveleme üzerinde de incelenebilir.

Anahtar Kelimeler: Çerçeveleme etkisi, azaltıcı yöntemler, riskli tercih çerçeveleme, karar analizi

In the beloved memory of my father, to whom I am proud to be her daughter

To my mother, who always gave her endless support and love to me

ACKNOWLEDGMENTS

First of all, I would like to express my deepest gratitude to my thesis supervisor Associate Professor M. Sinan Gönül for the continuous support of my thesis, for his patience and guidance. I appreciate his encouragement and valuable advice throughout my thesis period. I could not have imagined having a better supervisor for my thesis.

Besides my advisor, I would like to thank to my thesis committee members, Prof. Özlem Yılmaz and Asst. Prof. Ayşe Kocabıyıkoglu, for their insightful comments and contributions.

My sincere thanks also go to METU students for their contribution and support to my thesis.

Last but not least, I would like to thank to my family, who always believed in me and gave me their endless encouragement whenever I needed.

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CHAPTER 1

INTRODUCTION

1.1 Bounded Rationality and Framing Effect

Decision making is a part of life. We make decisions everyday consciously or automatically. These decision tasks may be as simple as to deciding on the brand of yoghurt to buy for dinner, or very hard as to choosing which treatment to take to treat a fatal liver cancer. Whether the decision process is straightforward or complicated, the decision maker evaluates the available options and chooses the one with maximum value or utility, in favor of being rational (Lovett, 2006).

On the other hand, the rationality of human decision-making has its limitations. Simon (1956) argued that due to limited cognitive capacity and time pressure, a human mind is adapted to find quick and easy ways (heuristics) to make decisions. His analyses resulted in a term called “bounded rationality”, which redefines the human mind as being partly rational. When there is risk and uncertainty, the decision-making process becomes complicated and human mind switches to use heuristics as short-cuts, which leaves room for cognitive biases. Cognitive bias is a type of error in judgment and decision making that may occur due to cognitive limitations, emotional motivations and/or environmental factors (Wilke and Mata, 2012). When people use faulty cues to make interpretations about the

external world, the result may be an irrational decision. Experts have been investigating these biases and their current & prospective debiasing methods. This study focuses on one of these cognitive biases; the framing effect.

When people face with a decision problem that includes risk and uncertainty, they evaluate the options with respect to their perception of risk and then find a solution. However, rather than the risk perception, the problem itself stimulates the solution to that decision problem. Going back to the sample decision problems in the beginning, let's assume you go to supermarket to buy yoghurt. You read the label on the package as "80% non-fat" and decide to buy that yoghurt. If the label says "20% fat", would you be still willing to buy that brand? Similarly, imagine that you are a patient suffering from a fatal liver cancer. Your doctor offers you to undergo a critical surgery, which has a mortality rate of 95%. You evaluate this offer and reject it because the mortality rate is too high. If the doctor mentioned it as "survival rate of 5%", would you still reject the surgery?

In each scenario above, the given options are logically equivalent; yet different decisions are made based on the way the information is "framed". Framing effect, named by Kahneman and Tversky (1981), occurs when the judgments and decisions are influenced with respect to the description of options, either positively or negatively. Proven by Asian Disease Problem of Kahneman and Tversky (1981) (which will be described in detail in Chapter 2 of this study), people are more likely to take risks when the decision alternative is presented in a negative frame (loss-frame) but in contrast, they avoid risk when a positive frame (gain-frame) is used.

The judgments of people are manipulated by message framing in various areas such as marketing, health-decision making and finance. Some sample cases where message framing is used can be given as purchasing goods and services (Gamliel and Herstein, 2007; Ganzach and Karsahi; 1995), receiving health-care services (Meyerowitz and Chaiken, 1987; McCarthy and Salovey, 2003; Maheswaran and Meyers-Levy, 1990) or following the stock market (Steul, 2006; Glaser et al., 2007). Our decisions are constantly manipulated and we are not aware of this situation unless we are informed about the concept of message framing and relevant debiasing methods. Message framing is implemented in many fields in our lives and thus, the development of debiasing methods will be beneficial for bounded-rational human minds.

Debiasing methods depend on based on the notion that framing effect is caused by description of the problem and by the personal characteristics of the individuals (Tversky and Kahneman, 1981). Regarding this aspect, experts concentrate on the structure of the problem and personal differences in order to develop efficient debiasing methods. One such method by Cheng and Wu (2010) is presenting warnings to the individuals about the gain or loss frame, which aims to arouse the decision maker's attention directly on the formulation of the problem. Another research conducted by Thomas and Millar (2011) concentrates on personal characteristics of decision makers and concludes that increasing analytical processing is also effective on debiasing framing effect. (Other methods are presented in detail in Chapter 2.). In the literature, these two methods give successful results for debiasing framing effect as well as other debiasing methods (Cheng and Wu, 2010).

Therefore, the main purpose of my study is to compare the debiasing effects of these two methods. I would like to monitor their influence separately and also investigate their combined debiasing effect when they are implemented at the same time.

The second motivation of this study is the gaps in the literature about investigated participant profiles on framing effect. Age differences (Kim et al., 2005) and diversity of professions (Christensen et al., 1995) are specifically analyzed in framing effect literature. Since diversity of professions has a moderating effect on framing effect, the type of university education people receive to reach this profession may also have a significant effect on framing effect. Hence, in addition to the investigated profiles above, this study will investigate the effect of the type of education that undergraduate students have. In this thesis, students from quantitative-based departments such as engineering and natural science departments will be compared with students from social-science based departments such as business administration and sociology in terms of susceptibility to framing effect. I would like to examine whether there are significant differences between quantitative-based students and verbal-based students in terms of level of susceptibility to framing effect.

1.2 Organization of the Thesis

This thesis consists of five main chapters. The first chapter gave a brief introduction to the concept of heuristics, framing effect and its debiasing methods.

A review of literature research about decision-making under risk and uncertainty will be provided in Chapter 2. Considering the scope of this thesis; expected value theory, expected utility theory and prospect theory will be briefly explained. After that, the description of framing effect and detailed information about the three main types of framing effect will be given. Lastly in this chapter, the debiasing methods of framing effect in the literature will be introduced which are classified under five titles.

In Chapter 3, the methodology of the study will be provided. Characteristics of participants, design & structure of the questionnaire and setup & procedure of data collection will be explained.

Within Chapter 4, data analysis & results will be described. Framing Effect Susceptibility Ratio (FESR) will also be introduced in this chapter. The comparison of two groups as well as the comparison of debiasing methods within each group will be included in this chapter.

Lastly, in Chapter 5, a general discussion will be presented including limitations of the study and further research suggestions.

CHAPTER 2

LITERATURE REVIEW

2.1 The Route to Framing Effect: The Underlying Decision Theories

How do we make decisions between two choices, when there are probabilities given for each and the rewards are different? How do we evaluate each event and which approaches do our minds take, consciously or heuristically? Three theories of decision making under risk and uncertainty answer these questions: expected value theory, expected utility theory and prospect theory.

To understand the expected value theory, the following monetary outcomes with their probabilities are given:

- a. A 70% chance of winning 100 TL, or nothing
- b. A 40% chance of winning 240 TL, or nothing

Expected value theory weights each outcome with its probability and then calculates the value of each choice given. The expected value of choice a and choice b is 70 TL ($0.7 \times 100 + 0.3 \times 0$) and 96 TL ($0.4 \times 240 + 0.6 \times 0$), respectively. Considering these results, the theory states that the choice with higher expected value, in this case, choice b, must be selected.

On the other hand, Bernoulli (1954) defends that people do not wish to maximize their expected value. He proves his idea in the St. Petersburg paradox: “Suppose that there is a game of tossing a fair coin. The coin is tossed until there is heads. If the first toss shows heads, then the game ends and you receive \$2. If the first toss lands on tails and second toss lands on heads, the game ends and you receive \$4. With each toss until the heads come up, the payment doubles. Therefore, how much money would you be willing to pay to join this game?”

From the perspective of expected value theory, people should be willing to give a large amount of money because as illustrated in Figure 1 below, the reward is growing and the expected value of each toss is \$1, which goes to infinity. In reality; however, people are willing to give only a few dollars for this game and Bernoulli’s interpretation is that after one point on the game, the upcoming tosses would contribute only very little to the utility (defined by Kahneman (2011) as “the psychological value or desirability of money”) that would accumulate if the game ended at that point. This idea is the basis of diminishing marginal utility of gain.

Following this interpretation, Bernoulli calculated a utility function; where the utility level changes with different levels of wealth. Table 1 shows this utility function from a wealth of 1 million to 10 millions. To illustrate, adding 1 million to a wealth of 3 millions brings 48 utility points, whereas adding 1 million to a wealth of 7 millions only brings 6 utility points. In his book, Kahneman (2001) asks another monetary decision question:

Which one would you choose?

- a. Equal chances to have 1 million or 7 million

b. Have 4 million with certainty

Toss	Coin	Reward	Expected value
1 st toss	H	\$2	$1/2 \times \$2 = \1
2 nd toss	T – H	\$4	$1/4 \times \$4 = \1
3 rd toss	T – T – H	\$8	$1/8 \times \$8 = \1
...	...	...	...
n th toss	T - ... - T - H $\underbrace{\hspace{1.5cm}}$ (n-1) times	$\$2^n$	$1/2^n \times \$2^n = \1

Figure 1 - Illustration of St. Petersburg paradox

This question includes a risky option (Choice c) and a sure option (Choice d). Both choices have equal expected values of 4 million but according to the utility function given at Table 1, they have different utility points of 47 ($0.5 \times 10 + 0.5 \times 87$) and 60, respectively. Expected utility theory reports that people make choices with respect to the maximum utility they gain. In this case, the sure option is selected, which also implicates the risk averse behavior.

Table 1 - Utility function of Bernoulli (Adapted from “Thinking, Fast and Slow” by Kahneman D., 2011, p.273)

Wealth (millions)	1	2	3	4	5	6	7	8	9	10
Utility units	10	30	48	60	70	78	84	90	96	100

However, there are contradictory cases to expected utility theory as well. In his book *Thinking, Fast and Slow*, Kahneman (2001) mentions one example with the following case:

Today Jack and Jill each have a wealth of 5 million.

Yesterday, Jack had 1 million and Jill had 9 million.

Are they equally happy? (Do they have the same utility?)

Expected utility theory answers this question with a certain “Yes”, since 5 million of wealth corresponds to the same value in the utility function, but this theory basically ignores what Kahneman entitles as “reference point”. In real life, Jack loses 4 million and he is devastated while Jill wins 4 million and she is happy. Hence, the initial stage must be within knowledge to expect the reasonable utility of an amount of wealth.

The summary of the theories above is that rational decision makers evaluate the options based on the probability of their occurrence according to expected value theory whereas expected utility theory addresses the evaluation with respect to the weight of utilities. (Hardman, 2009).

After detecting the lack of reference point in Bernoulli’s expected utility theory, Kahneman and Tversky (1979) developed Prospect Theory. This theory states that value is a function of two aspects: the asset position (reference point) and the magnitude of the chance (in positive or negative direction) from that asset position.

The decision process has two phases in prospect theory. First, the decision maker structures outcomes, probabilities and uncertainty of the decision problem by coding whether the options are gains or losses according to a reference point (editing stage) and then evaluates the choices with respect to subjective values and weighted probabilities (evaluation stage). Evaluation is fundamental because it leads to adapting the reference point, which is mostly the status quo or sometimes the expected outcome. Besides evaluation,

Kahneman and Tversky (1979) emphasized the principle of diminishing sensitivity and loss aversion to develop the famous value function in Figure 2:

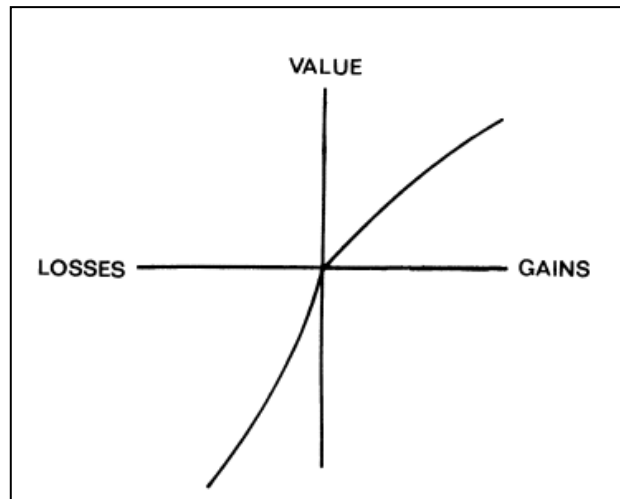


Figure 2 - The illustration of the value function. (Adapted from “Rational choice and the framing of decisions”. Tversky, A., & Kahneman, D. , 1986, *Journal of Business*, p259.)

Prospect theory states that subjective values differ among decision makers and attributes, but as illustrated in Figure 2, the value function is commonly an S-shaped function, which is not symmetrical. The value function is concave above the reference point and convex below it. To illustrate, the difference in value between gains of \$50 and \$100 is greater than the difference between gains of \$950 and \$1000. This relation is the same in the loss condition. In addition, the shape of the value function stands for the fact that “Losses loom larger than gains” (Tversky and Kahneman, 1991). The negative feeling of an amount of loss is greater than the pleasure of gaining the same amount.

The treatment of probabilities is another difference between expected utility theory and prospect theory (Tversky and Kahneman, 1981). In expected utility theory, the utility is multiplied by the probability of the outcome (p) whereas in prospect theory, the value of the outcome is multiplied by a decision weight $\pi(p)$, which is a nonlinear function of p .

The requirement of this function is to explain the big impact of small probabilities on decisions and to account for the certainty effect (Hardman, 2009). Decision weights are not probabilities, they only measure the effect that probabilities have on preferences.

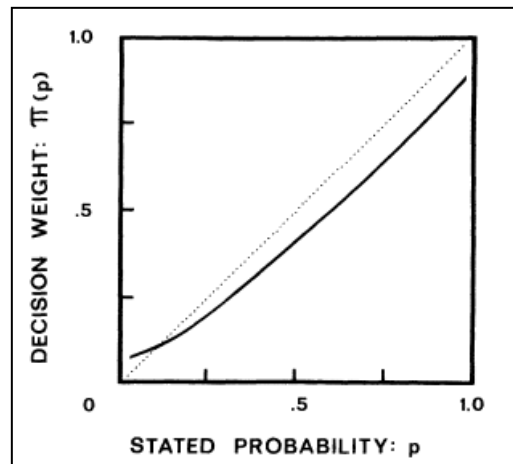


Figure 3 - The illustration of the weighting function. (Adapted from “Prospect theory: An analysis of decision under risk”. Kahneman, D., & Tversky, A., 1979, *Econometrica: Journal of the Econometric Society*, p.283.)

Figure 3 above illustrates the weighing function. According to this function, the impossible events are excluded, which is $\pi(0) = 0$ and the function is not proper on endpoints. $\pi(p) > p$ for low probabilities and $\pi(p) + \pi(1-p) \leq 1$ for high probabilities. In other words, low probabilities are overweighted while moderate and high probabilities are underweighted (Tversky and

Kahneman, 1981). This hypothesis supports the fact that small probabilities have greater impacts.

Soon after developing the value and weight function, Tversky and Kahneman (1992) originated a “fourfold pattern” of risk attitudes. Fourfold pattern indicates that decision makers are risk averse for gains of high probability and losses of low probability, whereas they are risk seekers for gains of low probability and losses of high probability. The low probability case clarifies the popularity of lotteries and gambles; people who hope for large gain purchase lottery tickets, even when the chance of winning is very small. In contrast, people sign up for burglary insurance even when the probability of burglary is quite low. On the other hand, the risk aversive behavior of people on gains of high probability is what Bernoulli explained: People have the fear of disappointment on gambles with a high chance of gain. Lastly, prospects including losses with high probability lead people to be risk seekers. Fatal disease patients are examples to these people, who accept to take the rare treatments with a very low success rate.

There are still some cases that contradict with prospect theory. Birnbaum (2006) presented gambles on his participants and he observed conflicts on editing stage. Additionally, Tversky and Kahneman (1981) remarks that the value and weighting functions are not universal; the S-shape function does not include the behaviors of all individuals. Nevertheless, this value function accounts for one of the cognitive biases in the literature: framing effect.

2.2 Framing Effect

Rational decisions associate two axioms (Kahneman and Tversky, 1984): The first one is dominance, which requires the condition that if prospect A is as profitable as prospect B in all aspects and better than prospect B in at least one aspect, then A should be preferred over B. The second axiom is the invariance axiom, which states that the preference of the prospects should be independent of the way they are presented. However, Kahneman and Tversky (1981) proved that the invariance axiom can be violated. When the information is framed differently on a given problem, choices are different. This decision bias is named as “framing effect” and Kahneman and Tversky (1984) demonstrated this effect with their famous Asian Disease Problem. They gave their participants a scenario in which an unusual Asian disease was going to kill 600 people in USA and the two alternative programs were proposed for the treatment with the following scientific estimates:

If Program A is adopted, 200 people will be saved. (72%)

If Program B is adopted, there is one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved. (28%)

Which of the two programs would you favor?

The percentages in the parentheses exhibit the proportion of participants choosing each treatment. The expected values of both options are the same; however, the percentages show that the majority of the participants chose the sure option of saving 200 people. After that, the same story is followed by the prospects with different descriptions:

If Program C is adopted, 400 people will die. (22%)

If Program D is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die. (78%)

Program C and Program D, in fact, are the same options with Program A and Problem B. Verbal description is the difference between these pairs. If the options are presented in terms of lives saved, participants mostly prefer the sure option, whereas the participants switch their choices to the risky one (Program D) if the options are presented in lives lost. The results of Asian Disease Problem point out that when the choices are presented in a gain frame, people are inclined to show risk-averse behavior. On the other hand, for loss-framed choices, risk-seeker behavior is mostly common. This main aspect of framing effect can be explained with the S-shaped value function of prospect theory: The concave part of the curve for gains depicts that a sure gain of \$250 is more preferable than a 50/50 chance of gaining \$500. Similarly, the convex part of the curve for losses indicates that a 50/50 chance of losing \$500 is more preferable than a sure loss of \$250.

The thinking style of an individual is the cue to explain the reason for susceptibility to framing effect. Dual process theory states that there are two distinct types of thinking: heuristic and analytical thinking. The two types are commonly named as System 1 and System 2 (Stanovich and West, 2000) in the literature. System 1 thinking is automatic, rapid and intuitive in a way that it examines the problems automatically with less cognitive effort. On the other hand, System 2 thinking is known with its rational, analytic and controlled attributes. System 2 is slower compared to System 1 and requires more cognitive effort. Stanovich and West (2000) concluded that System 2 is more likely to be adapted by people with high analytical intelligence. McElroy and Seta (2003) investigated the susceptibility to framing effect with

the perspective of dual-process theory and they pointed out that people are more susceptible to framing effect when they adapt System 1 thinking; however, this susceptibility was eliminated between people when they adapt the analytical processing style of System 2. Their explanation for this result is that System 1 thinking has a holistic processing style and it relies on the contextual cues, which automatically lead the decision maker to make implications about the problem or task. In this case, System 1 is more sensitive to the way the problems are framed.

There are three types of framing effects defined (Levin, Schneider and Gaeth, 1998) in the literature. First one is risky-choice framing, which occurs when the choice between the sure and risky options in a given problem changes according to the problem description. Second one is attribute framing in which the favorability of a product or an event changes when a given attribute of that product or event is framed differently. Third and last one is goal framing, which affects the appeal of a behavior when the consequences of that behavior is framed differently. The following section gives detailed information about each type of framing.

2.3 Types of Framing Effect

2.3.1 Risky Choice Framing

Risky choice framing basically stands for one's willingness of taking risk, depending on whether the outcome is mentioned in terms of losses or in terms of gain. The most recognized illustration in the literature for this type of framing is Kahneman and Tversky's (1981) Asian disease problem, which was mentioned in the previous section. The decision task includes two options; one with a *sure* gain/loss, the other with a given *probability* of gain/loss of a greater amount than the sure option. Both of the options have the same expected value; however, people showed a risk-averse behavior by mostly choosing the certain outcome in the gain-framed version. Alternatively, most of the people selected the risky choice in the loss-framed version which implies a risk-seeking behavior. This tendency implies that people are more inclined to take risks in order to avoid a loss than to achieve a gain (Levin, Gaeth, Schreiber & Lauriola, 2002; Kahneman and Tversky, 1979). The basic visualization of risky choice framing is shown in Figure 4.

Rather than Asian Disease Problem, there are various studies in the literature that supports the tendency explained above. On the other hand, inconsistent findings also exist. Some of the reasons for the diversity of the findings are the individual differences (Mahoney et al., 2011), different risk perceptions & the domain where the risk is presented (Blais and Weber, 2006) and the differences in thinking style (Shiloh, Salton and Sharobi, 2002).

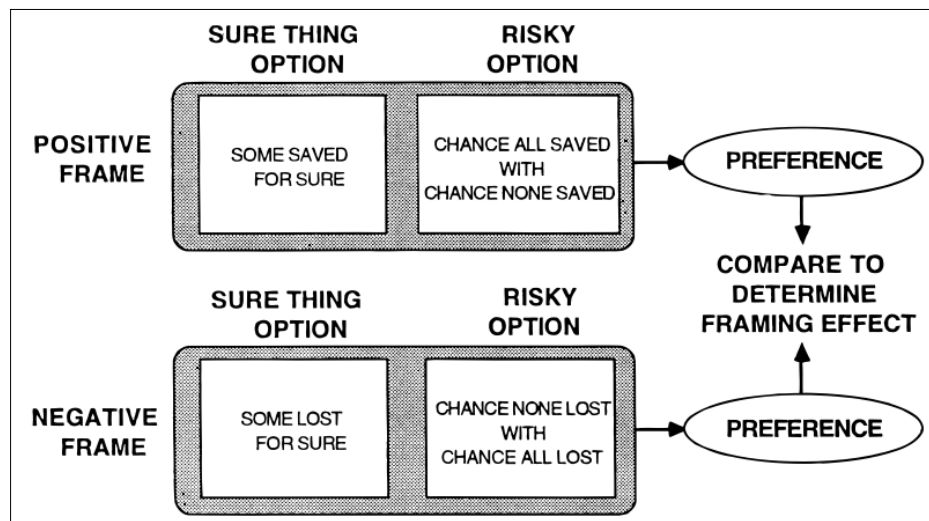


Figure 4 - The standard risky choice framing paradigm (1998) (Adapted from “A new look at framing effects: Distribution of effect sizes, individual differences, and independence of types of effects” by Levin, I. P., Gaeth, G. J., Schreiber, J., & Lauriola, M. (2002), *Organizational behavior and human decision processes*, 88(1), 411-429.)

2.3.2 Attribute Framing

Attribute framing occurs when the favorability or unfavorability of an object or event depends on the negative or positive expression of a specific attribute of the object or event. The most renowned study of attribute framing in the literature belongs to Levin and Gaeth (1988), in which consumers were offered ground beef with labels on either “75% lean” (positive frame) or “25% fat” (negative frame) and it was observed that the “75% lean” ground beef is more favorable than the negatively-framed one. This is because positive statements call for positive affiliations and negative statements call for negative affiliations. However, in the second part of same experiment, the consumers also tasted the labeled-beef and in this case the framing effect was decreased when compared with the first condition. Levin and Gaeth

explained this as the result of combination of source of information: Labels and the experiential information are balanced when combined in cognitive process and the effect is averaged. The visualization of attribute framing is shown in Figure 5.

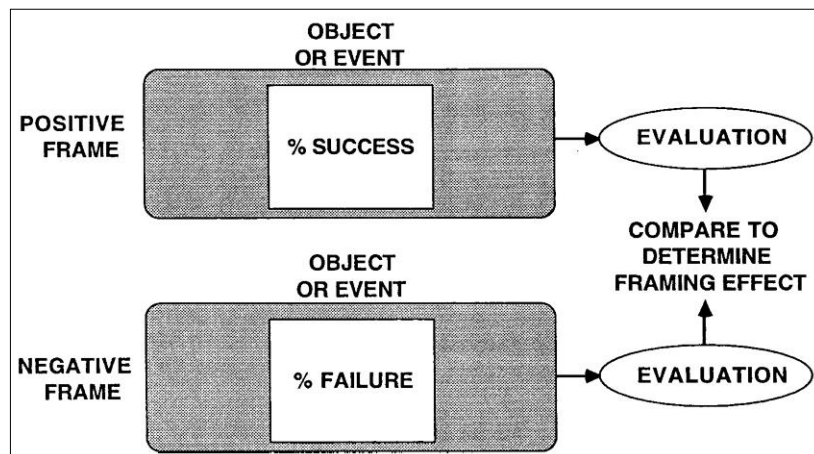


Figure 5 - The standard attribute framing paradigm (1998) (Adapted from “A new look at framing effects: Distribution of effect sizes, individual differences, and independence of types of effects” by Levin, I. P., Gaeth, G. J., Schreiber, J., & Lauriola, M. (2002), *Organizational behavior and human decision processes*, 88(1), 411-429.)

Attribute framing is also used in cases where the positive and negative frames are described as success and failure rates. Linville, Fischer and Fischhoff (1993) emphasized the effect of condom use with success and failure rates of preventing HIV infection. Another application of describing the frames as success/failure rates is observed in a study, where a favored surgery decision is underlined with survival rate (as the success and failure rate) instead of underlining the mortality rate (Wilson, Kaplan and Schneiderman, 1987).

Resource allocation is also an area where attribute framing is observed. In a recent study conducted by Gamliel and Peer (2010), fairness of the health

care resource allocation principles are discussed and the allocation seems to be more fair in positively framed situations (i.e., people who receive the resource) than in negatively framed situations (i.e, people who do not receive the resource).

Although there are various studies in the literature for the attribute framing, for some scopes the evaluations show no attribute framing. Marteau (1989) did not observe any framing effect on women's decisions about abortion, which is an example of strongly-held attitude. Levin, Schnittjer & Thee (1988) found that the participants who received the statement of "65% of the students had cheated during their college time" rated cheating activity higher than the participants who were given the statement of "35% of the students had never cheated"; however, when participants were asked whether they would change their own answers in an exam or turn in a cheater, the framing effect was not found. This was a case where high-level of involvement is needed. In addition, attribute framing is observed when the performance of others are defined with respect to the percentage correct or percentage wrong (Levin et al, 1985). However, as a result of overconfidence, when the participants estimated their self-performance, no framing effect occurred (Snizek, Paese & Switzer, 1990). Framing effect failed to affect the results in self-evaluation topics.

There are some differences between risky choice and attribute choice framing (Levin, Schneider & Gaeth, 1998). The first difference is that in risky choice framing, the choices presented are independent from each other. Choosing between the option with certain outcome and the risky option shows different intentions. In attribute framing, however; the choices are

complementary. When a key attribute is positively (negatively) framed and the object or event is accepted (rejected), the second choice is automatically eliminated. Hence, attribute framing is actually results in evaluation, rather than making a choice. The second difference between risky choice framing and attribute framing is “what to frame”. While the outcome of a choice is framed in risky choice framing, a specific attribute or feature of the object or event is framed in attribute framing. The third and last difference is the existence of risk: Attribute framing does not stipulate any risky manipulation; it is related with the way of presenting the attribute.

2.3.3. Goal Framing

Goal framing occurs when the appeal of a behavior depends on whether positive outcomes of performing that behavior or negative outcomes of not performing that behavior is presented. The most well-known study of goal framing belongs to Meyerowitz and Chaiken (1987), which analyzes the attitude of female subjects towards breast self-examination (BSE). First group of subjects was informed about the positive consequences about having BSE, whereas the second group was informed about the negative consequences of not having BSE. The analysis concluded that the group which experienced the negative frame was more apt to having BSE than the first group. Figure 6 shows the basic illustration of goal framing.

Apanovitch, McCarthy and Salovey (2003) conducted a similar study to the one above. They used message framing in order to motivate women of low-income and ethnic minority about HIV testing and the result is the same: loss-framed message is more convincing on engaging in HIV testing. Mammography screening to detect a lump (Banks et al., 1995; Schneider et

al., 2001), skin self-examination to detect skin cancer (Block & Keller, 1995) and blood-test to detect a coronary heart disease (Maheswaran & Meyers-Levy, 1990) are also the studies in which the corresponding behavior is promoted by the loss-framed message. The common characteristic of these aforementioned studies is their illness-detecting behaviour and loss-framed messages are more effective in detection aspect (Banks et al., 1995; Rothman et al., 1993; Rothman et al., 1999). Since the detection activities may find out the disease, people perceive engaging in BSE, a mammogram, a blood-test or a skin self-examination as risky (e.g, the risk of finding a lump in one's breast or detecting high-level of cholesterol in one's blood). The outcome of not having the detection activity is also uncertain, but the detection activity has long-term benefits; hence, the claim about the detection activities being risky is open to discussion (Rothman and Salovey, 1997).

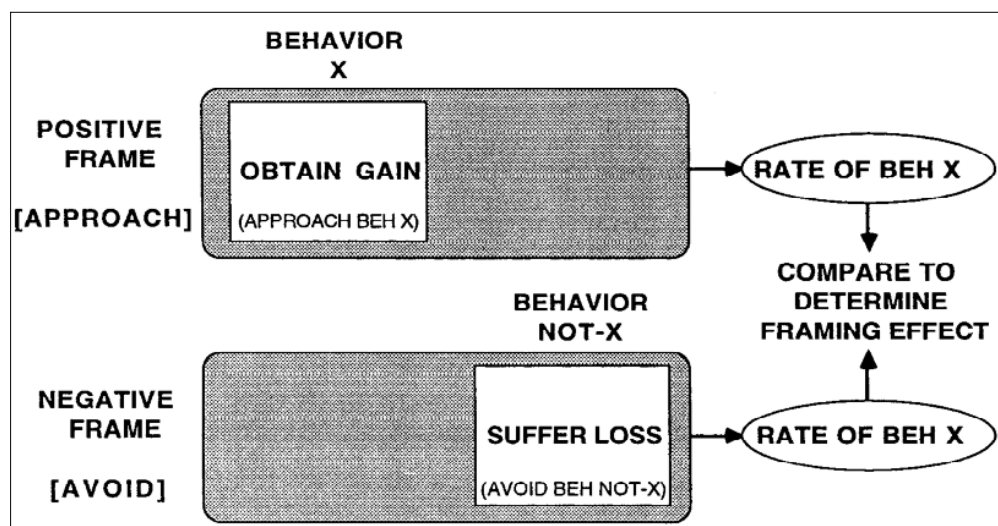


Figure 6 - The standard goal framing paradigm (1998) (Adapted from “A new look at framing effects: Distribution of effect sizes, individual differences, and independence of types of effects” by Levin, I. P., Gaeth, G. J., Schreiber, J., & Lauriola, M. (2002), *Organizational behavior and human decision processes*, 88(1), 411-429.)

On the other hand, gain-framed messages motivate people to adapt prevention behaviors (Rothman and Salovey, 1997; Detweiler et al., 1999). In the study of Rothman et al. (1993), subjects who are suggested to use sunscreen by mentioning its benefits are more inclined to use sunscreen in a given period of time with greater than or equal to 15 sun protection factor. Encouraging condom usage to decrease the risk of AIDS (Linville, Fischer & Fischhoff, 1993) and promoting mothers to use infant car-seats to decrease the risk of injury (Christopherson and Gyulay, 1981) are other prevention behavior examples which are more effective when presented with the gain-framed version.

2.4 Debiasing Framing Effect

In this section of the literature review, studies that aim to reduce or eliminate the framing effect for different groups of subjects are presented. Looking at the field of framing effect, it is observed that, to debias the framing effect, researchers in this area focus on one of the following: emotions, additional useful information (e.g. credible advice or warning), cognitive & analytical processing and individual differences (e.g. need for cognition (NC) and numeracy). These debiasing methods are implemented in medical decision making, marketing and finance but the areas may vary in real life. The age, gender and numeracy level are all the characteristics of subjects which are held as an experimental factor in these studies in accordance with the extent of the study. The debiasing methods are grouped under general titles. Following sections take a look at these methods and provide general information of the studies about them.

2.4.1. Regulating Emotions

Emotions affect human mind as a moderator to use heuristics (Lehrer, 2010) which can result in different cognitive biases. Hence, emotion regulation strategies were investigated by Miu and Crişan (2011) to debias the framing effect. They designed their experiment such that they would observe the choice trends of subjects on gambling tasks in the situations when the subjects use cognitive reappraisal (i.e., reinterpreting the situation so that the emotional impact is decreased) or expressing suppression (i.e., restraining behaviors related to emotions, such as gestures, facial impressions etc.). The experiment showed that cognitive reappraisal is helpful to reduce the framing effect.

In addition, the study which belongs to Cassatti et al. (2012) supports the idea that framing effect arises from the System-1 thinking which adopts the behavior of a heuristic way of thinking. The purpose of their study was to find out whether a specific emotion (positive or negative) affects the framing effect. They concluded that framing effect is debiased by positive emotional context. Their experiment showed that the subjects did not signal any bias on the financial decision making tasks after they looked at emotionally pleasant photographs.

2.4.2. Providing Additional Information and Increasing Involvement

It is worthwhile to point out the fact that in most of the framing effect studies, the subjects are isolated from any kind of social interaction, advice or warning. In his study, Druckman (2001) underlined this point and he claimed that credible advice can be used to overcome framing effect. The

advice concept here basically interacts with two factors: who gives the advice and which option the advisor suggests in the decision trial. Druckman designed two experiments: First one took the basis of the famous Asian Disease Problem; the only difference being that the choices are not presented as Program A or Program B; but they are presented as the programs suggested by a political party (Democrats or Republicans). He expected that participants would choose the program which will be suggested by the party that they are in favor of, independent of the gain or loss framing. The second experiment used the experiment design of McNeil et al (1982) in which participants were presented two types of treatments of a cancer in different frames, but the extension in this case is that the credible advice of specialists from two nationally outstanding medical research organizations were given, who recommended one of the therapies. Both experiments of Druckman concluded that credible advice is an effective method to overcome framing effect.

Warning is another type of information that is used to eliminate cognitive biases such as anchoring effect (George, Duffy and Ahuja, 2000), outcome effect (Clarkson, Emby and Watt, 2000) and hindsight bias (Hasher, Attig and Alba, 1981); on the other hand, very little research has been made on framing effect. Simple warning sentences that alert the decision maker about the wording of the choices presented may lead him to show decision invariance, which is suggested in the study of Cheng and Wu (2010). They investigated the effects of warning and involvement on framing effect together. Cheng and Wu presented an electronic Chinese-English translator to their subjects, mentioning the product's accuracy and failure rates of translation as the positive and negative frame, respectively. Given this information, they asked

the participants their intentions to buy the product. After that, they formed strong and weak warning sentences that notify the subjects about the way product information is presented and asked them to think carefully before buying the translator. The subjects completed a 10-item Revision of Revised Personal Involvement Inventory and gave some ratings about some features of the translator. Finally, they mentioned their intentions to purchase the good. This study concluded that subjects, given the warning sentences, showed less framing effect compared with the ones who received no warning.

Another finding of this study was that level of involvement moderates the framing effect. Highly-involved participants were less susceptible to the framing effect than less-involved participants. Involvement is defined as “a person’s perceived relevance of the object based on inherent needs, values and interests” (Zaichkowsky, 1985) and it can be measured through different types of scales in experiments. Kim’s study (2013) on issue-involvement for promoting abandoned animals adoption behaviours concluded that highly-involved participants showed adoption behaviours after being exposed to posters framed with negative messages. The same behaviour, however, is adopted by less-involved participants with the effect of posters framed with positive messages. This result suggests the idea that negatively framed messages are effective on adapting a behaviour. This result is also partially supported by Maheswaran and Meyers-Levy’s research (1990).

2.4.3. Encouraging Cognitive and Analytical Processing

While discussing the decision problems that are gain or loss framed, it is speculative whether the decision maker thinks really deeply about his choice.

Asking the decision maker to explain the reason of choice encourages him to think more about the choice he made. Miller and Fagley (1991) led their subjects to make an explanation regarding their choice and this sort of reflection decreased the magnitude of framing effect. Takemura (1993) and Sieck and Yates (1997) and Kim et al.(2005) used the same instruction and their findings were consistent with Miller and Fagley's.

In line with encouraging cognitive processing, Thomas and Millar (2011) conducted a research on older and younger adults and by encouraging analytical processing and the degree of framing effect was reduced among both groups. Thomas and Millar used basic computational or memory tasks in order to increase the cognitive processing. They asked gambling tasks in the context of risky-choice framing, and in each 4 questions they presented two computation problems, which were simply the multiplication of the given probability and the amount of money, in other words, the calculation of expected value. Additionally, they asked participants to either "think like a scientist" or to "think like a gambler" so that they directly motivated the older and younger participants to activate explicit cognitive processes. Results indicated that the framing effect was reduced with both methods.

2.4.4. Leading Personal Differences

Besides applying a specific debiasing method, the personal differences themselves have particular effects on framing effect. Need for cognition (NFC) is one of these personal characteristics in framing effect literature. Cacioppo and Petty (1982,p.116) defines NFC as "the difference among individuals in their tendency to engage in and enjoy thinking". People with high NFC are more inclined to make careful analysis on written messages

(Cacioppo et al, 1983) and they devote themselves to deeper information search (Verplanken et al, 1992). Considering these facts, the studies (Smith and Levin,1996; Chatterjee et al.,2000) showed that people with high NFC are less susceptible to framing effect than people with low NFC. In addition, Zhang and Buda (1999) proved the same relation between NFC and the framing of advertising messages. However, the study of LeBoeuf and Shafir (2003) failed to prove the interaction in the same way. Hence, NFC on message framing needs further discussion and observation.

Another personal difference as a moderator of framing effect is numeracy, which can be defined as “the ability to work with numbers”; in other words, “math competence”. Simon, Fagley and Halleran (2004) argued that risky choice framing includes choices with probabilities and people need quantitative skills in order to understand whether these choices are logically equivalent. This claim brings the question “Is a group with high numeracy less susceptible to framing effect than a group with low numeracy?” According to Peters et al. (2006), Peters and Levin (2008), the answer of this question is yes. On the other hand, some studies in the literature point out that groups with high numeracy (e.g. physicians or financial planners) still show framing effects (Roszkowski and Snelbecker, 1990). The degree of framing effects is obviously smaller among physicians but this is not a steady result (Christensen et al., 1995). Roszkowski and Snelbecker’s study (1990) indicated that the degree of framing effect is smaller among financial planners than undergraduates. Hence, different group samples in numeracy failed to explain comprehensively the decrease in framing effect.

Simon, Fagley and Halleran (2004) conducted a compact research that included both NFC, numeracy, and cognitive processing. Cognitive processing was managed during the experiment in a way that the participants were asked to 1) explain why they chose the option they did (reason explanation) or 2) paraphrase the decision problems and the choices as if they were explaining the problems to a friend (paraphrasing). These requests aimed to motivate subjects with low NFC to maximize the focus on their decision. The first part of this study which analyzed NFC, numeracy and “reason explanation” together proved that framing effect was not observed in subjects with both high NFC and numeracy. Here it was observed that reason explanation did not make a significant difference on this participant profile (high NFC and high numeracy)

In the second study, the decision problems were asked with high and low complexity in numeric terms and the second cognitive processing method was implemented (paraphrasing). In that case, the subjects who were high in NFC and who paraphrased the problems at the same time did not show any framing effect. Both studies suggested that NFC and depth of processing should be considered together to understand their debiasing effects on message framing.

2.4.5. Other Debiasing Methods

Other than the methods above, the following methods also can be listed under debiasing techniques of framing effect. The first two methods are conducted in the area of medical decision making and the third method is tested among university students. The first debiasing method is using visual aids, which was suggested by Garcia-Retamero and Galesic (2010) in the

medical field. Their study showed that the two groups of participants, which consisted of participants with low numeracy and participants with high numeracy, presented different risk perceptions for a specific surgical operation when its survival rate or its mortality rate is given. The low-numeracy group was more susceptible to the framing effect and as a debiasing method, using visual aids such as bar graphs and pie charts to explain these survival or mortality rates were helpful to reduce the framing effect. They also stated that not all visual aids were equally beneficial: icon array was the least effective among all. Second debiasing method in the health decision making area is to make a list of advantages and disadvantages of a health treatment. Almashat et al. (2008) claimed that framing effect is not observed in those subjects who made this list for the given cancer treatments (radiation therapy or surgery) after reading the vignettes with survival or mortality risks of lung cancer (the experiment design of McNeil et al., 1982) when compared to the subjects in the control group, which did not make any lists. The result of this experiment supports the idea of Takemura (1994) that the elaboration level is an important aspect on eliminating framing effect.

Differed from the study above, Keysar, Hayakawa, and An (2012) focused on the foreign-language effect in their study and they found that using a foreign language decreases decision-biases. A foreign language may increase one's cognitive load, but gain-versus-loss framing effects were not affected of this fact. According to this study, the foreign-language effect reduces the emotional reactions and hence, the framing effect is decreased.

CHAPTER 3

METHODOLOGY

This study aims to investigate the effects of two debiasing methods of framing effect: Encouraging analytical processing and giving explicit warning. In addition, the effects of different disciplines are analyzed on undergraduate students to see whether the type of education creates significant differences on the level of susceptibility to framing effect. Considering these research questions, this chapter explains the experimental methods used for this study.

3.1 Participants

A total of 231 participants filled the questionnaire, but only 209 of the questionnaires were evaluated in the statistical analysis. Answers of 22 participants were excluded because of two reasons: Firstly, most of them did not have the required participant profile for this study (for example, they were not undergraduates or they were from different universities.) Secondly, they did not answer all of the questions in the questionnaire.

Evaluated participants were all undergraduate level students of Middle East Technical University (METU) and they are from second, third or fourth grade of various departments. The reason participants were selected only from METU is that they have succeeded well in national university entrance exam and thus, it is predicted that their cognitive abilities are similar and the

participant pool is, therefore, assumed homogenous. In this study, the participants are classified into two main groups: Group 1 consists of students, who study at quantitative-based departments (e.g. engineering, mathematics, physics etc.) and Group 2 consists of students, who study at social science-based departments (e.g. business administration, sociology, international relations etc.). Group 1 and Group 2 consist of 102 and 107 participants, respectively. The purpose of this classification is to compare the decision making procedures of quantitative-based and social science-based students under framing effect. The expectation is that quantitative-based students are less susceptible to framing effect than social science-based ones. The departmental distribution of the students is shown in Table 2 and Table 3. The ages of the participants varied from 18 to 31 (M age = 21,96years).

Table 2 - Departmental Distribution of Group 1 Participants

Department Name	Nr of Participants	Department Name	Nr of Participants
Industrial Eng.	30	Civil Eng.	4
Electrical Eng.	16	Statistics	2
Chemical Eng.	10	Aerospace Eng.	2
Physics	7	Biology	2
Computer Eng.	6	Geological Eng.	2
Mechanical Eng.	6	Petrol. and Neut. Gas Eng.	2
Food Eng.	5	Mathematics	2
Mathematical Edu	5	Metallurgical Eng.	1
Total			102

Attending the questionnaire was voluntary and the participants did not receive any kind of reward or financial aid. The participant was presented

with a consent in the beginning of the questionnaire but a signature was not obligatory. The personal information of participants was kept confidential throughout this study.

Table 3 - Departmental Distribution of Group 2 Participants

Department Name	Nr of Participants
Business Administration	50
Political Science and Public Adm.	27
International Relations	14
Sociology	5
Foreign Language Education	4
Psychology	4
Philosophy	3
Total	107

3.2 Questionnaire

The current study aims to investigate the degree of susceptibility to framing effect of Group 1 and Group 2 participants under four conditions: 1) no debiasing method, 2) with analytical processing, 3) with explicit warning, and 4) both analytical processing and explicit warning. Content of questionnaire differs for each condition. The benchmark of this questionnaire is the work of Thomas and Millar (2011).

All of the four questionnaires included twenty-four monetary decision questions. In each decision prompt, the participant is presented an amount of money and then is forced to make a decision between two choices. The first choice is a certain gain or loss of a specific amount of money and the second

one is a risky bet: a higher amount of gain or loss than the certain amount in the first choice, or no change from the initial situation. The significant point is that both choices have the same expected value in each question. To illustrate, a question from the questionnaire is as follows:

You are given a sum of \$200. Which option would you choose?

- a. A sure gain of \$70
- b. A $\frac{2}{5}$ chances of gaining \$175, with a $\frac{3}{5}$ chance of gaining \$0

This question is prepared in accordance with gain-frame and both options have the same expected value: First option offers a certain gain of \$70 and the same amount of money is obtained in the second option when the products of the payoffs and their probabilities are summed. Alternatively, the loss-framed version of the question above is given below:

You are given a sum of \$360. Which option would you choose?

- a. A sure loss of \$90
- b. A $\frac{1}{3}$ chance of losing \$270, with a $\frac{2}{3}$ chance of losing \$0

The questionnaire includes twelve gain-framed and twelve loss-framed questions. These questions are designed such that each gain-framed question has its loss-framed match question in terms of the same award to the participant, no matter which option the participant selects. The two above sample questions from the questionnaire are in fact each other's match. The award of the gain-framed question is \$270 (\$200 plus the expected value \$70), which is the same amount with the loss-framed one (\$360 minus the expected value \$90). To sum up, there are twelve scenario pairs in each

questionnaire type. The sequence of the questions is randomly mixed in order to better monitor the difference between gain and loss framing.

The first type of questionnaire includes only these twenty-four questions. The second type of questionnaire includes simple multiplication questions in addition to these twenty-four questions, which was used in Thomas and Millar's (2011) work. In each four questions, two multiplication questions are presented to the participant, simply the multiplication of a number with a fraction (for example, $270 \times 1/3$). The two multiplication questions, in fact, include the numbers and fractions used in the second options of the two of four decision questions before them. However, they are not directly mentioned. In total, there are twelve multiplication questions in the second type of the questionnaire.

The third type of questionnaire consists of a warning sentence and the twenty-four decision questions. Cheng and Wu's (2011) work was the main benchmark for this method. They tested the difference between strong and weak warning sentence, but I included only one type of warning in the questionnaire. The warning is placed before the first question in order to gather the participant's attention before beginning to fill the questionnaire. This sentence was presented as follows:

"Before you begin, please be noted that,

The way the options are presented as losses/gains may influence people's decisions. Please be aware of this situation and try to avoid these biases before your final decision."

The fourth type of the questionnaire includes both the warning sentence and the twelve multiplication questions beside the twenty-four questions.

To summarize, all of the four questionnaires have the same 24 decision trials. The difference is that, Type 1 questionnaire does not include any debiasing method, Type 2 questionnaire has mathematical questions to encourage analytical processing, Type 3 questionnaire includes a warning sentence in the beginning and finally, Type 4 questionnaire includes both debiasing methods. The samples of each questionnaire can be found in Appendix A. The research framework is illustrated in Figure 7.

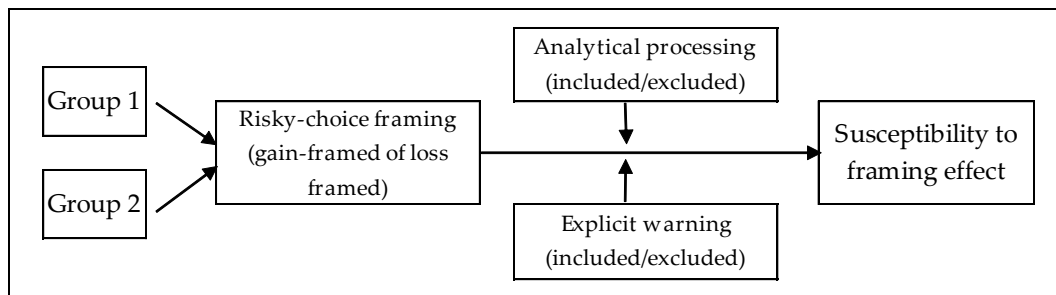


Figure 7 - Research framework

3.3 Setup and Procedure

In order to reach as many students as possible, the questionnaire was provided both on hard copy and soft copy. Hard copies were distributed to students at the end of lecture hours of different courses in METU and they were given approximately ten minutes to complete the questions. The soft copy was created by using Google Forms. The soft questionnaire was designed such that the participant could not quit before answering all of the questions. The web address of the questionnaire was shared in student groups on social media. It was obvious that hard copy participants were all

METU students. Differed from the hard copy, soft copy also asked the university the participant attended so that only METU students were identified and included to the participant pool.

At the beginning of the questionnaires, participants were required to fill the personal information: age, gender, department and grade. After that, they answered the questions. The four types of questionnaires were randomly distributed to participants in both hard and soft version.

CHAPTER 4

RESULTS

4.1 The Concept of FESR and Descriptives

The data was collected in both hard and soft format. 130 of the 209 answers were obtained from hard copies, and the rest came from soft copies. The age mean of the hard and soft copy participants is the same ($M_{age}=22$). To see whether there is a different pattern in answers to hard and soft questionnaires; Fisher Exact Test was used on randomly selected questions. For each of the 24 questions, 2x2 contingency tables were formed as below and Fisher's Exact Test was carried out for each table. Table 4 shows the sample contingency tables of randomly selected questions and the corresponding p-values. Fisher's Exact Test gave the p-values greater than $\alpha=0,05$ for 23 out of 24 questions and considering the hypothesis "The row variable and column variable are independent", the data are consistent with the hypothesis. Therefore, there was no evidence to indicate that the type of the questionnaire affected the decision on choices and the results of hard and soft questionnaires could be pooled. All of the contingency tables are presented in Appendix B.

In most of the previous studies, the level of susceptibility to framing effect is calculated by the proportion of risky choices selected in a given questionnaire (Kühberger and Tanner, 2010; Thomas and Millar, 2011). Parallel to this mentality in the literature, this study also measures the

susceptibility level by calculating “Framing Effect Susceptibility Ratio” (FESR).

Table 4 - Sample Contingency Tables

Question 1			Question 7		
Type	Count of Choice A	Count of Choice B	Type	Count of Choice A	Count of Choice B
Hard	63	67	Hard	62	68
Soft	33	46	Soft	35	44
p-value = 0,39			p-value = 0,67		

Question 13			Question 19		
Type	Count of Choice A	Count of Choice B	Type	Count of Choice A	Count of Choice B
Hard	73	57	Hard	75	55
Soft	42	37	Soft	49	30
p-value = 0,77			p-value = 0,56		

All of the statistical analyses of answers given to the decision questions were conducted on FESR, which was calculated for each participant separately. FESR is a measure for the degree of framing effect that the participant is susceptible to. There are 12 scenario pairs in one questionnaire and each pair has its gain-framed and loss-framed question, with the same award amount. If the participant is risk-averse for gain-framed question and risk-seeker for loss-framed question at the same time for one pair, then he receives the score “1”. For the rest of the conditions, the score is zero, “0”. This scoring was made for each 12 scenario pair and subsequently, FESR is calculated as follows:

$$\text{Framing Effect Susceptibility Ratio} = \frac{\text{Sum of the scores of each pair}}{12}$$

In this case, each participant may have a FESR between 0 and 1. If FESR is equal to 1 for a participant, it can be interpreted that the participants are extremely susceptible to framing effect. If FESR is equal to 0, then it may not be absolutely justified that the participant is resistant to framing effect, but it explains that the participant did not show the risk-aversion and risk-seeking behavior at the same time in one scenario pair. It can be declared that a FESR value greater than 0,5 signals a participant who is quite susceptible to framing effect.

As mentioned before, answers of 209 participants were taken into consideration during statistical analysis. The number of the participants for each type of questionnaire was not equal. Table 5 includes the basic descriptive statistics information, including the mean, sample size and standard deviation of FESR values for each questionnaire type.

Table 5 - Descriptive statistics values

Questionnaire Types	Mean, (Sample Size, Standard Deviation)	
	Quantitative-Based	Social-Science Based
Type 1	0.199,(26,0.202)	0.207,(27,0.25)
Type 2	0.308,(26,0.297)	0.265,(28,0.298)
Type 3	0.183,(25,0.188)	0.277,(25,0.289)
Type 4	0.213,(25, 0.191)	0.182,(27, 0.224)

4.2 Results of the Questionnaires

The statistical analyses were conducted on Minitab software and they consist of: 1) A General Linear Model analysis on a 2 x 2 x 2 (Analytical processing [included, excluded], warning [included, excluded], department [quantitative-based, social science-based]) between-subjects design, 2) A

General Linear Model analysis on 2×2 (Analytical processing [included, excluded], warning [included, excluded] between-subjects design for Group 1 and Group 2 separately, and 3) Tukey's test for pairwise comparisons when necessary. These analyses were carried out on the FESR data of all participants.

4.2.1 General Linear Model on all Factors

A General Linear Model analysis was conducted on a $2 \times 2 \times 2$ (Analytical processing [included, excluded], warning [included, excluded], department [quantitative-based, social science-based]) between-subjects design. None of the factors individually has a significant effect on framing effect. Analytical processing ($F(1, 201)=0,57, p=0,453$), explicit warning ($F(1, 201)=0,81, p=0,369$) and department ($F(1,201)=0,04, p=0,841$) have failed to show a main effect. In addition, their pairwise and total interactions were also evaluated and no significant effects were found for each of them. No significant relationship was found between analytical processing and explicit warning ($F(1, 201)=2,89, p=0,091$), between analytical processing and department ($F(1, 201)=1,66, p=0,2$), between explicit warning and department ($F(1, 201)=0,5, p=0,478$) and for the interaction of all three factors ($F(1, 201)=0,29, p=0,589$).

4.2.2 Comparison of Group 1 and Group 2 Students

After completing the General Linear Model analysis for $2 \times 2 \times 2$ design, Tukey's Test was conducted by pairing Group 1 (quantitative-based students) and Group 2 (social science-based students) for each type of questionnaire. The purpose of Tukey's Test here was to see 1) whether there is a significant difference on degree of framing effect between two groups

and 2) whether a debiasing method was more effective in any group. Figure 8 below visualizes the average FESR values of each questionnaire type on Group 1 and Group 2 students.

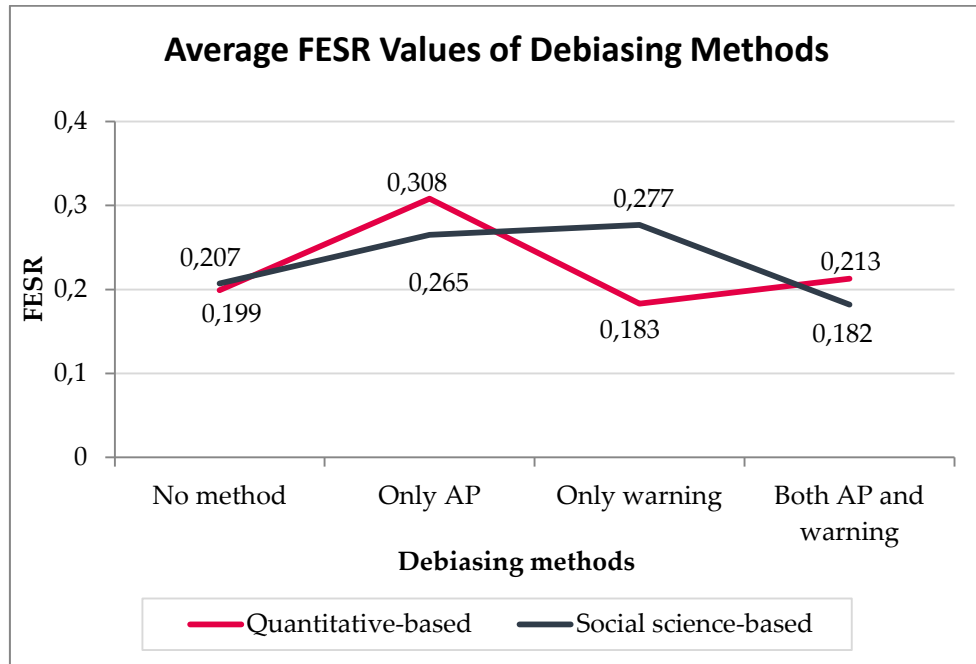


Figure 8 - Average FESR values of quantitative-based and social science-based groups on each questionnaire type

Tukey's Test on Type 1 questionnaire has shown that there is not any significant difference on the level of framing effect between Group 1 and Group 2 ($t(51)=0,12$, $p=1,000$). The same test was implemented on Type 2 questionnaire and it was found that using analytical processing did not cause a significant difference in both group ($t(52)=-0,64$, $p=0,998$). The result was the same for explicit warning, (Type 3 questionnaire, $t(48)=1,34$, $p=0,882$) and for Type 4 questionnaire, which included both methods ($t(50)=-0,46$, $p=1,000$).

4.2.3 Comparison of Methods on Group 1 Students

To understand the effect of debiasing methods on Group 1 participants, a General Linear Model analysis was conducted on a 2 x 2 (Analytical processing [included, excluded], warning [included, excluded]) design for quantitative-based students. Figure 9 illustrates the distribution of FESR values for each type of questionnaire. It can be observed that independently of type, the FESR values of Group 1 participants are piled between 0 and 0.2 most.

The General Linear Model indicated that the factors alone did not have a main effect ($F(1, 98)=2.49$, $p=0,118$) for analytical processing; ($F(1, 98)=1,55$, $p=0,216$) for explicit warning). Interaction effect of these two factors was also not observed ($F(1, 98)=0,8$, $p=0,372$).

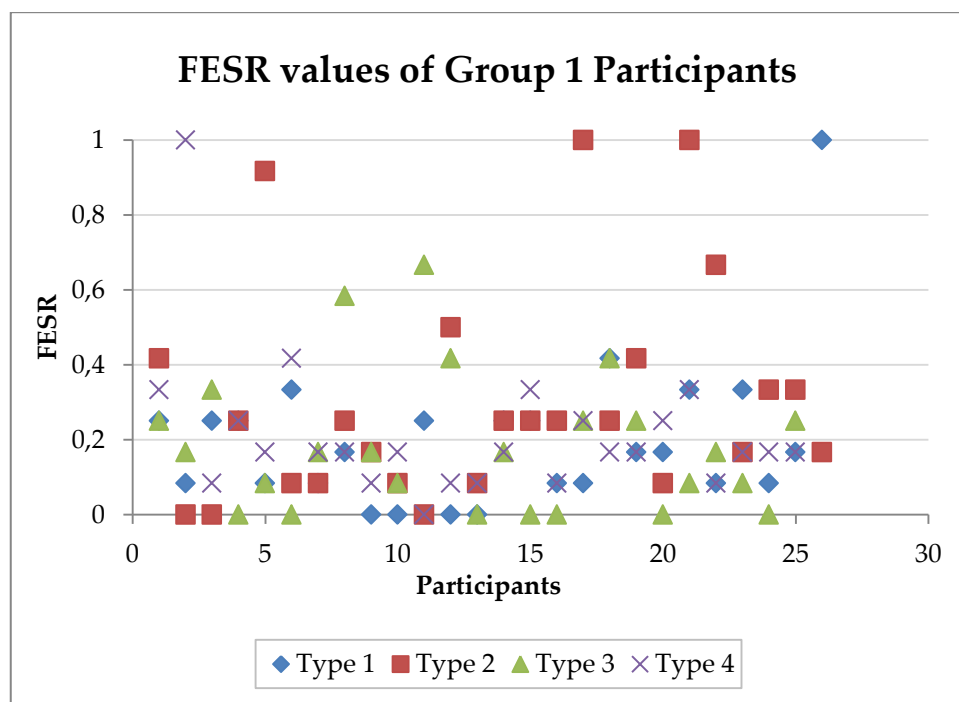


Figure 9 -The distribution of FESR values of Group 1 participants on each questionnaire type

After General Linear Model, Tukey's Test was also conducted to analyze the effects of debiasing methods on Group 1 students. First, in order to see whether the methods actually decreased the degree of framing effect, Tukey's Test was realized for Type 1-Type 2, Type 1-Type 3 and Type 1-Type 4 questionnaire pairs. Contrary to the expectations, analytical processing ($t(50)=1,77$, $p=0,295$), explicit warning ($t(49)=-0,25$, $p=0,995$) and both analytical processing and explicit warning at the same time ($t(49)=-0,23$, $p=0,995$) did not decrease the degree of framing effect on Group 1 students.

Secondly, this question comes to mind: "Which one is better on quantitative-based students: analytical processing or explicit warning?" To answer this question, Tukey's Test was conducted between Type 2 and Type 3 data, and no significant difference was observed ($t(49)=-2,00$, $p=0,196$).

Lastly, the combined effect of two debiasing methods should be analyzed by comparing Type 4 questionnaire with Type 2 and Type 3 questionnaire separately in Tukey's Test. The first comparison (Type 4 - Type 2) showed that including warning next to analytical processing did not make a significant difference when compared to analytical processing alone ($t(49)=-1,51$, $p=0,433$). Second comparison (Type 4 - Type 3) gave the similar result: combined methods did not have a more powerful debiasing trend on framing effect when compared to explicit warning alone ($t(48) = 0,48$, $p=0,964$).

4.2.4 Comparison of Methods on Group 2 Students

The same analyses made for Group 1 students were conducted also for Group 2 students. The General Linear Model analysis on a 2 x 2 (Analytical processing [included, excluded], warning [included, excluded]) model did not give a significant effect for analytical processing ($F(1, 103)=0,12$, $p=0,725$), for explicit warning ($F(1, 103)=0,02$, $p=0,901$) and for the interaction of methods ($F(1, 103)=2,18$, $p=0,142$). Figure 10 illustrates the FESR values of Group 2 participants for each type of questionnaire and most of the values are between 0 and 0.2.

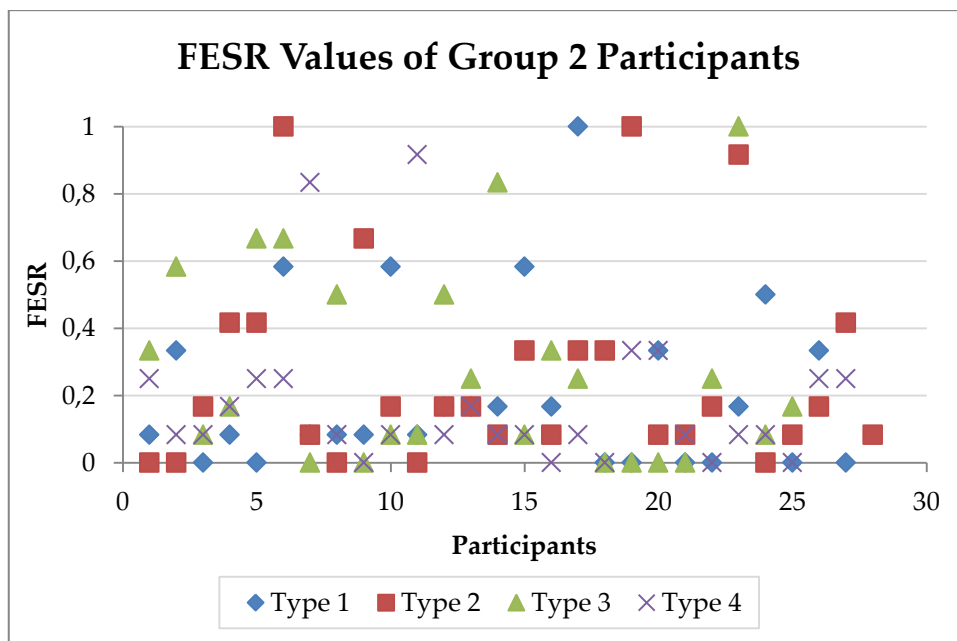


Figure 10 - The distribution of FESR values of Group 2 participants on each questionnaire type

The comparisons of the debiasing methods failed to show a main effect on Group 2 students. Tukey's Test on Type 1-Type 2, Type 1-Type 3 and Type 1-Type 4 questionnaire pairs indicated that analytical processing ($t(52)=0,81$, $p=0,851$), explicit warning ($t(50)=-0,94$, $p=0,782$) and both analytical

processing and explicit warning at the same time ($t(52)=-0,34$, $p=0,986$) did not decrease the degree of framing effect.

Similar to quantitative-based students, social science-based students were indifferent to analytical processing or explicit warning ($t(51)=-0,16$, $p=0,999$). In addition to this result, the combined method did not create any salient effect compared to the each debiasing method alone. ($t(53)=-1,15$, $p=0,66$ for analytical processing, ($t(50)=-1,28$, $p=0,58$ for explicit warning).

4.2.5 Comparison of Methods on Gain and Loss Framing

In this section of Results Chapter, the change of risk perception of participants is investigated on the two debiasing methods. The previous analyses were made on Framing Effect Susceptibility Ratio (FESR) of each participant, but this analysis was conducted on the values of proportion of risky choices selected in each questionnaire type. This analysis is made on gain and loss-framed questions separately. The purpose of this analysis is to see whether any of the debiasing methods has a significant effect on gain or loss-framed questions.

The number of risky choices (Choice b) selected are counted for gain and loss-framed questions separately and then the number is divided by 12 to find the proportion for both frames. Table 6 shows the descriptive values of each questionnaire type of each group on risky choice proportion values.

Table 6 - Descriptive statistics value of risky choice proportion value

Questionnaire Types	Mean, (Sample Size, Standard Deviation)			
	Social science-based		Quantitative-based	
	Loss frame	Gain frame	Loss frame	Gain frame
Type 1	0.53,(27,0.24)	0,65,(26,0.27)	0.49,(26,0.22)	0,61,(26,0.25)
Type 2	0.42,(28,0.27)	0.44,(26,0.29)	0.51,(26,0.273)	0.45,(26,0.29)
Type 3	0.52,(25,0.33)	0.62,(25,0.29)	0.44,(25,0.19)	0.62,(25,0.21)
Type 4	0.44,(27,0.28)	0.65,(25,0.26)	0.52,(25, 0.22)	0.61,(25, 0.24)

4.2.5.1 Analysis on Loss-Framed Questions

A General Linear Model analysis on a 2 x 2 x 2 (Analytical processing [included, excluded], warning [included, excluded], department [quantitative-based, social science-based]) between-subjects design was conducted on loss-framed questions and no main effect of any factor was observed. Interaction effect was also not found. Figure 11 shows the proportion of risky choices on loss-framed questions on each questionnaire type.

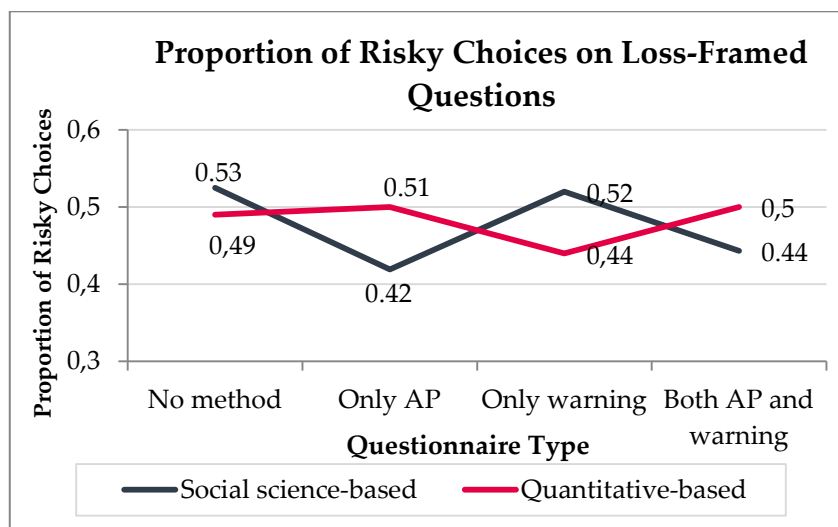


Figure 11 - Proportion of risky choices on loss-framed questions

Analytical processing ($F(1, 201) = 0,68, p = 0,411$), explicit warning ($F(1, 201) = 0,09, p = 0,763$) and department ($F(1, 201) = 0,04, p = 0,846$) have failed to show a main effect. In addition, their pairwise and total interactions were also evaluated and no significant effects were found for each of them. No significant relationship was found between analytical processing and explicit warning ($F(1, 201) = 0,27, p = 0,603$), between analytical processing and department ($F(1, 201) = 3,43, p = 0,066$), between explicit warning and department ($F(1, 201) = 0,21, p = 0,65$) and for the interaction of all three factors ($F(1, 201) = 0,06, p = 0,814$).

4.2.5.2 Analysis on Gain-Framed Questions

A General Linear Model analysis on a $2 \times 2 \times 2$ (Analytical processing [included, excluded], warning [included, excluded], department [quantitative-based, social science-based]) between-subjects design was conducted on gain-framed questions and single factor effect was significant for analytical processing ($F(1, 201) = 6,17, p = 0,014$) and explicit warning ($F(1, 201) = 6,17, p = 0,014$). The interaction effect of analytical processing and explicit warning was also significant ($F(1, 201) = 6,55, p = 0,011$). On the other hand, no significant relationship was found on department ($F(1, 201) = 0,17, p = 0,685$), between analytical processing and department ($F(1, 201) = 0,02, p = 0,901$), between explicit warning and department ($F(1, 201) = 0, p = 0,975$) and for the interaction of all three factors ($F(1, 201) = 0,32, p = 0,575$). Figure 12 shows the proportion of risky choices on gain-framed questions on each questionnaire type.

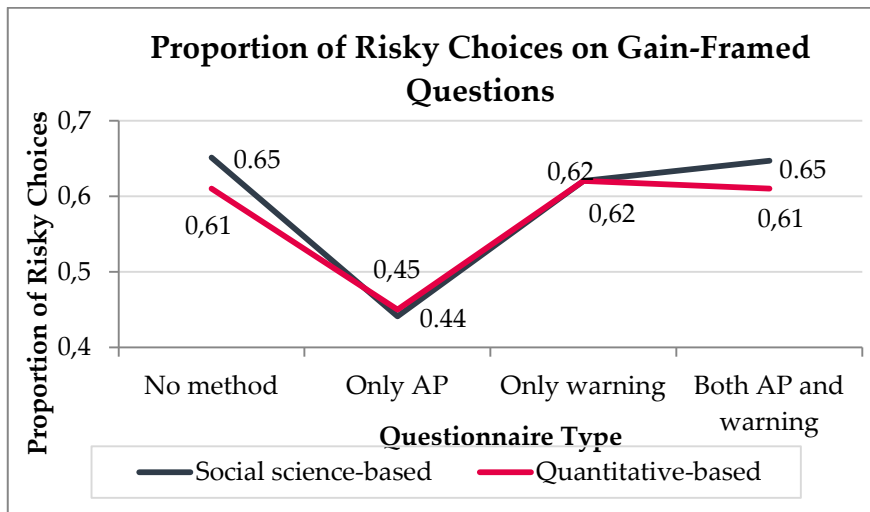


Figure 12 - Proportion of risky choices on gain-framed questions

In order to understand the pairwise relations, Tukey's test was conducted on gain-framed questions. Tukey's Test showed that there is a significant difference between Type 1 and Type 2 questionnaire ($t(105)=-3,61$, $p=0,002$), between Type 4 and Type 2 questionnaire ($t(104)=3,42$, $p=0,004$) and between Type 3 and Type 2 questionnaire ($t(102)=3,42$, $p=0,004$). All in all, Type 2 questionnaire, which includes the method of encouraging analytical processing, has a significant effect on subjects differed than other questionnaires.

CHAPTER 5

DISCUSSION AND FURTHER RESEARCH

Framing effect is a decision bias that is quite common in many areas such as health, marketing and finance. Although the choices presented are logically equivalent, human decisions are prone to this bias. Hence, over the last two decades there is a clear tendency in the literature to find and investigate effects of various debiasing methods on different subject groups. Two of the state-of-the-art debiasing methods on risky choice framing were used in this study, “Encouraging analytical processing” and “presenting explicit warning”. Furthermore, their separate effects were monitored on undergraduate students with different background education: The students were classified into two groups: students who study in quantitative-based departments (Group 1) and the ones who study in social science-based departments (Group 2). The results have pointed out that there is not any significant difference between the level of susceptibility to framing effect of Group 1 and Group 2, and each of the debiasing methods and their interactions have not caused any decrease in the susceptibility level in each group.

The first main finding of this study was that quantitative-based department students (Group 1) and social science-based department students (Group 2) did not differ in terms of magnitude of framing effect they were susceptible to. Group 1 participants are the students who mainly use mathematics in

their problem solving by the nature of their education and in that case these participants use System 2 thinking actively (Kahneman, 2011; Osman, 2004). This fact creates the instant expectation that Group 1 would be less susceptible to framing effect than Group 2. Contrary to the expectations, the susceptibility level has not significantly differed between two groups. This may be caused by the fact that Group 2 participants are also using System 2 actively. Group 2 participants mainly deal with words, interpretations and long & detailed readings, which lead them to be more alert about the meaning of what they read and the claim is that different wordings in the decision questions may activate their System 2. Thus, Group 2 students may more carefully evaluate the meaning of the choices presented in the gambling task, but in the end they do not show a different susceptibility level than Group 1 participants.

Second main finding of this study was that regardless of the quantitative or social science-based difference, there was no significant effect of the two debiasing methods investigated. First of all, encouraging analytical processing did not make any significant difference on the magnitude of framing effect of both groups, in contrast to Thomas and Millar's (2011) work, where analytical processing was used as a debiasing method of framing effect in younger and older adults. Analytical processing is encouraged in both groups by asking simple mathematical questions in order to increase the cognitive resources that the participants require. Cognitive resources may be a significant determinant on decision making between older and younger subjects (Thomas and Bulevic, 2006; Mata, Schooler and Rieskamp, 2007). Thus, Thomas and Millar (2011) could reach an affirmative result on this method but this study supports the idea that the

same determinant is not binding for the specified participant sample, consisting of undergraduate students with a mean age of 22. Different education disciplines may not necessarily create differences in the level of cognitive resources used. Thus, analytical processing fails to decrease the susceptibility of framing effect in both quantitative-based and social science-based participants.

Secondly, warning method also fails to elicit a distinct decrease in the degree of framing effect. The benchmark of this method is the research of Cheng and Wu (2010), in which they evaluated the buying intentions of subjects, who were given the characteristics of a translator including the strong and weak warning sentences in positive or negative frame. In their study, attribute framing was under investigation and strong type of warning were helpful for subjects to be decision invariant. Current study only includes the strong warning, yet the results are not the same with Cheng and Wu's. The implication is that warning is not a sufficient debiasing method in risky-choice framing. The participant is warned about the words "gain" and "loss", but risky choice framing also includes the risk factor, which, in this experiment, cannot be moderated only with a warning sentence, in contrast to attribute framing.

The third main finding of this study is that when the questions are analyzed separately on gain-framed and loss-framed questions, it is observed that the debiasing methods did not have a significant effect on loss-framed questions. On gain-framed questions, however; analytical processing has a significant effect. The number of risky choices selected on gain questions decreased significantly on subjects who were presented analytical processing. In other

words, encouraging analytical processing decreased the risk seeking behavior of participants on gain-framed questioned.

In addition to results above, another observation was that the presence of both methods also fails to debias the framing effect in each group. Even when the two methods combined their forces; it seems to be inadequate to create a significant decrease in the level of framing effect. Furthermore, when the data of each group was analyzed separately, none of the debiasing methods had a significant effect in each group. When the FESR values of each group are analyzed, it is observed that most of the FESR values are accumulated between 0 and 0.2, which are indeed low. This fact indicates that subjects of each group were not susceptible to framing effect and hence, the debiasing methods could not create a significant effect on the susceptibility level of framing effect on each group.

The current study took Thomas and Millar's (2011) work as benchmark in terms of the debiasing method selected (encouraging analytical processing) and the content of the questionnaire. They conducted their study on older and younger adults. Their younger adults had a mean of age 19.4 and a sample size of 120. When they filled the questionnaire with the probability tasks, the mean and standard deviation of the proportion of risky choices selected were as in Table 7. It is observed that the mean on gain-framed questions in the current study is close to Thomas and Millar's (2011) work. On the other hand, the mean values of loss-framed questions are different from their work. Quantitative-based students were more risk seeker and social science-based were more risk averse then the younger adults in their

study. The mean of age was 21.96 in the current study, which might cause this difference.

Table 7 – Proportion of risky choices of two studies

	Gains, M (SD)	Losses, M (SD)
Thomas and Millar (2011)		
Younger adults on probability tasks	0.45 (0.22)	0.47 (0.23)
Current study (Type 2 questionnaire)		
Quantitative-based students	0.45 (0.291)	0.52 (0.273)
Social science-based students	0.44 (0.292)	0.42 (0.272)

The current study has not been without limitations. First of all, answering the questionnaire on a hard copy or a soft copy might have created different focuses on participants. The hard copies were completed in approximately 10 minutes and participants answered the questions individually in a quiet class environment. However, since the medium of soft copies was the internet, the environment of soft copies of the questionnaires could not be controlled as much as hard copies. The soft copy participants might have filled the questionnaire in a longer or shorter time and they might have not concentrated enough as the participants in the class environment. Nonetheless, the separate analysis of hard copy participants is included in Appendix C and no main effect is observed.

Another limitation was the structure of the decision tasks. Each decision task assumes that the participant owns a certain amount of money as the reference point. The amount of the money changes between \$50 and \$800 and the participant is asked to behave as he owns this initial amount, which may create endowment effect. Thaler (1980) defines endowment effect as the

fact of people demanding more money while giving up of a good than they would be willing to pay to own it. In this study, the different level of reference points as well as the different frames (loss or gain) might cause this effect. If the reference point is relatively high (the initial amount of money is large), then people would look for a great amount in the choices to take a risk or not. In this case, observing framing effect would not be easy.

In addition, the participants were not presented any incentives in this study. Due to the fact that the questionnaires were also collected as soft copies, it was not possible to give incentives to soft copy participants. Hence, neither hard copy nor soft copy participants received incentives. If they had been presented incentives, they would have been more motivated to fill the questionnaires. It is known that using incentives is a useful method to maintain personal involvement of participants during data collection.

The fourth limitation was that the gender proportions were not equal in hard and soft questionnaires. The number of female/male participants was 60/70 in hard and 55/24 in soft copies. Gender effect was not in the scope of this study; however, the gender proportion equality could be better to make the participant pool more homogenous.

The last limitation was the department variety of the participants. One of the main purposes of this study was to compare quantitative-based students with social science-based students. Nevertheless, the departments categorized under these groups could have distinct behaviors against framing effect. To illustrate, mathematical education students and electronics engineering students may show different reactions to framing effect; yet they

were categorized under same group. Any specific interaction might have been missed out due to this categorization of different disciplines.

As further steps in the future, the data collection may be realized by only one medium; hard or soft copies. Accordingly, incentives may be presented to the participants so that they would be more motivated while answering the questions. In addition, the participant pool can be designed with the equality of gender proportion and with undergraduates from only two disciplines (one quantitative-based and one social science-based). Furthermore, the debiasing methods used in this study can also be examined on a goal framing design in the future. Short cases each including short information of a specific behavior (e.g. using sunscreen, having mammography etc) may be given to the participants with positive/negative outcomes of performing/not performing the behavior and the decision behavior of participants may be investigated. Different debiasing techniques mentioned in the literature can also be examined on the given participant profile as a further research. Applying these techniques can lead to different findings in future studies.

Summing up the results, it can be concluded that this research investigated the debiasing effects of analytical processing and explicit warning on risky-choice framing on undergraduate students from different departmental groups. No significant difference is observed between the susceptibility level of quantitative-based and social science-based students to framing effect. Encouraging analytical processing and explicit warning failed to decrease the susceptibility level in both participant groups; and the joint effect of the methods were not significant as well. When the two groups were compared

on debiasing methods, none of the methods created a more efficient decrease.

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APPENDICES

APPENDIX A. QUESTIONNAIRES

QUESTIONNAIRE – TYPE 1

MIDDLE EAST TECHNICAL UNIVERSITY

GRADUATE SCHOOL OF SOCIAL SCIENCES

DEPARTMENT OF BUSINESS ADMINISTRATION

-2015-

Dear Participant,

You are kindly invited to take part in a Master's Thesis study that is being conducted by an MBA student in Middle East Technical University. Decision making is the field of the study and this study will attempt to inquire decision making strategies.

There is no right or wrong answers. Please answer each question in a way that will best reflect your opinions and judgments. Participation in this questionnaire is completely voluntarily and anonymous.

Thank you for your valuable cooperation. Your answers will contribute to this academic research.

CONSENT

I have read and understand the information given above. I am participating in this research completely voluntarily.

AGE:

GENDER:

DEPARTMENT:

CLASS:

Contact e-mail: ezgi.akbulut@yahoo.com

1. You are given a sum of \$600. Which option would you choose?
 - a. A sure loss of \$300.
 - b. A $\frac{3}{5}$ chance of losing \$500, with a $\frac{2}{5}$ chance of losing \$0.
2. You are given a sum of \$350. Which option would you choose?
 - a. A sure gain of \$150.
 - b. A $\frac{2}{3}$ chance of gaining \$225, with a $\frac{1}{3}$ chance of gaining \$0.
3. You are given a sum of \$650. Which option would you choose?
 - a. A sure loss of \$400.
 - b. A $\frac{2}{3}$ chance of losing \$600 with a $\frac{1}{3}$ chance of losing \$0.
4. You are given a sum of \$190. Which option would you choose?
 - a. A sure gain of \$90.
 - b. A $\frac{3}{4}$ chance of gaining \$120 , with a $\frac{1}{4}$ chance of gaining \$0
5. You are given a sum of \$240. Which option would you choose?
 - a. A sure gain of \$60.
 - b. A $\frac{1}{3}$ chance of gaining \$180 , with a $\frac{2}{3}$ chance of gaining \$0.
6. You are given a sum of \$440. Which option would you choose?
 - a. A sure loss of \$110.
 - b. A $\frac{2}{5}$ chance of losing \$275 with a $\frac{3}{5}$ chance of losing \$0.
7. You are given a sum of \$210. Which option would you choose?
 - a. A sure gain of \$40.
 - b. A $\frac{1}{3}$ chance of gaining \$120, with a $\frac{2}{3}$ chance of gaining \$0.
8. You are given a sum of \$500. Which option would you choose?
 - a. A sure loss of \$270.
 - b. A $\frac{2}{3}$ chance of losing \$405 with a $\frac{1}{3}$ chance of losing \$0.
9. You are given a sum of \$175. Which option would you choose?
 - a. A sure loss of \$100.
 - b. A $\frac{2}{3}$ chance of losing \$150, with a $\frac{1}{3}$ chance of losing \$0.
10. You are given a sum of \$250. Which option would you choose?
 - a. A sure gain of \$80.
 - b. A $\frac{1}{4}$ chance of gaining \$320, with a $\frac{3}{4}$ chance of gaining \$0.

11. You are given a sum of \$180. Which option would you choose?
 - a. A sure loss of \$45.
 - b. A $\frac{3}{4}$ chance of losing \$60 with a $\frac{1}{4}$ chance of losing \$0.
12. You are given a sum of \$160. Which option would you choose?
 - a. A sure gain of \$70.
 - b. A $\frac{1}{3}$ chance of gaining \$210, with a $\frac{2}{3}$ chance of gaining \$0.
13. You are given a sum of \$50. Which option would you choose?
 - a. A sure gain of \$25.
 - b. A $\frac{1}{4}$ chance of gaining \$100, with a $\frac{3}{4}$ chance of gaining \$0.
14. You are given a sum of \$300. Which option would you choose?
 - a. A sure loss of \$80.
 - b. A $\frac{2}{3}$ chance of losing \$120 with a $\frac{1}{3}$ chance of losing \$0.
15. You are given a sum of \$100. Which option would you choose?
 - a. A sure gain of \$35.
 - b. A $\frac{1}{3}$ chance of gaining \$105, with a $\frac{2}{3}$ chance of gaining \$0.
16. You are given a sum of \$400. Which option would you choose?
 - a. A sure loss of \$120.
 - b. A $\frac{3}{4}$ chance of losing \$160 with a $\frac{1}{4}$ chance of losing \$0.
17. You are given a sum of \$360. Which option would you choose?
 - a. A sure loss of \$90.
 - b. A $\frac{1}{3}$ chance of losing \$270, with a $\frac{2}{3}$ chance of losing \$0.
18. You are given a sum of \$180. Which option would you choose?
 - a. A sure gain of \$40.
 - b. A $\frac{1}{5}$ chance of gaining \$200, with a $\frac{4}{5}$ chance of gaining \$0.
19. You are given a sum of \$250. Which option would you choose?
 - a. A sure loss of \$120.
 - b. A $\frac{3}{5}$ chance of losing \$200 with a $\frac{2}{5}$ chance of losing \$0.
20. You are given a sum of \$60. Which option would you choose?
 - a. A sure gain of \$30.
 - b. A $\frac{2}{5}$ chance of gaining \$75, with a $\frac{3}{5}$ chance of gaining \$0.

21. You are given a sum of \$200. Which option would you choose?
- a. A sure gain of \$70.
 - b. A $\frac{2}{5}$ chance of gaining \$175, with a $\frac{3}{5}$ chance of gaining \$0.
22. You are given a sum of \$800. Which option would you choose?
- a. A sure loss of \$300.
 - b. A $\frac{3}{4}$ chance of losing \$400 with a $\frac{1}{4}$ chance of losing \$0.
23. You are given a sum of \$85. Which option would you choose?
- a. A sure gain of \$45.
 - b. A $\frac{3}{5}$ chance of gaining \$75, with a $\frac{2}{5}$ chance of gaining \$0.
24. You are given a sum of \$120. Which option would you choose?
- a. A sure loss of \$30.
 - b. A $\frac{1}{3}$ chance of losing \$90 with a $\frac{2}{3}$ chance of losing \$0.

THANK YOU ☺

QUESTIONNAIRE – TYPE 2

1. You are given a sum of \$600. Which option would you choose?
 - a. A sure loss of \$300.
 - b. A $\frac{3}{5}$ chance of losing \$500 with a $\frac{2}{5}$ chance of gaining \$0.
2. You are given a sum of \$350. Which option would you choose?
 - a. A sure gain of \$150.
 - b. A $\frac{2}{3}$ chance of gaining \$225, with a $\frac{1}{3}$ chance of gaining \$0.
3. You are given a sum of \$650. Which option would you choose?
 - a. A sure loss of \$400.
 - b. A $\frac{2}{3}$ chance of losing \$600 with a $\frac{1}{3}$ chance of losing \$0.
4. You are given a sum of \$190. Which option would you choose?
 - a. A sure gain of \$90.
 - b. A $\frac{3}{4}$ chance of gaining \$120 , with a $\frac{1}{4}$ chance of gaining \$0
5. $225 * \frac{2}{3} =$
6. $500 * \frac{3}{5} =$
7. You are given a sum of \$240. Which option would you choose?
 - a. A sure gain of \$60.
 - b. A $\frac{1}{3}$ chance of gaining \$180, with a $\frac{2}{3}$ chance of gaining \$0.
8. You are given a sum of \$440. Which option would you choose?
 - a. A sure loss of \$110.
 - b. A $\frac{2}{5}$ chance of losing \$275 with a $\frac{3}{5}$ chance of losing \$0.
9. You are given a sum of \$210. Which option would you choose?
 - a. A sure gain of \$40.
 - b. A $\frac{1}{3}$ chance of gaining \$120, with a $\frac{2}{3}$ chance of gaining \$0.
10. You are given a sum of \$500. Which option would you choose?
 - a. A sure loss of \$270.
 - b. A $\frac{2}{3}$ chance of losing \$405 with a $\frac{1}{3}$ chance of losing \$0.
11. $180 * \frac{1}{3} =$
12. $405 * \frac{2}{3} =$

13. You are given a sum of \$175. Which option would you choose?
- c. A sure loss of \$100.
 - d. A $\frac{2}{3}$ chance of losing \$150, with a $\frac{1}{3}$ chance of losing \$0.
14. You are given a sum of \$250. Which option would you choose?
- a. A sure gain of \$80.
 - b. A $\frac{1}{4}$ chance of gaining \$320, with a $\frac{3}{4}$ chance of gaining \$0.
15. You are given a sum of \$180. Which option would you choose?
- a. A sure loss of \$45.
 - b. A $\frac{3}{4}$ chance of losing \$60 with a $\frac{1}{4}$ chance of losing \$0.
16. You are given a sum of \$160. Which option would you choose?
- a. A sure gain of \$70.
 - b. A $\frac{1}{3}$ chance of gaining \$210, with a $\frac{2}{3}$ chance of gaining \$0.
17. $320 * \frac{1}{4} =$
18. $150 * \frac{2}{3} =$
19. You are given a sum of \$50. Which option would you choose?
- a. A sure gain of \$25.
 - b. A $\frac{1}{4}$ chance of gaining \$100, with a $\frac{3}{4}$ chance of gaining \$0.
20. You are given a sum of \$300. Which option would you choose?
- a. A sure loss of \$80.
 - b. A $\frac{2}{3}$ chance of losing \$120 with a $\frac{1}{3}$ chance of losing \$0.
21. You are given a sum of \$100. Which option would you choose?
- a. A sure gain of \$35.
 - b. A $\frac{1}{3}$ chance of gaining \$105, with a $\frac{2}{3}$ chance of gaining \$0.
22. You are given a sum of \$400. Which option would you choose?
- a. A sure loss of \$120.
 - b. A $\frac{3}{4}$ chance of losing \$160 with a $\frac{1}{4}$ chance of losing \$0.
23. $100 * \frac{1}{4} =$
24. $160 * \frac{3}{4} =$

25. You are given a sum of \$360. Which option would you choose?
- a. A sure loss of \$90.
 - b. A $\frac{1}{3}$ chance of losing \$270, with a $\frac{2}{3}$ chance of losing \$0.
26. You are given a sum of \$180. Which option would you choose?
- a. A sure gain of \$40.
 - b. A $\frac{1}{5}$ chance of gaining \$200, with a $\frac{4}{5}$ chance of gaining \$0.
27. You are given a sum of \$250. Which option would you choose?
- a. A sure loss of \$120.
 - b. A $\frac{3}{5}$ chance of losing \$200 with a $\frac{2}{5}$ chance of losing \$0.
28. You are given a sum of \$60. Which option would you choose?
- a. A sure gain of \$30
 - b. A $\frac{2}{5}$ chance of gaining \$75, with a $\frac{3}{5}$ chance of gaining \$0.
29. $200 * \frac{3}{5} =$
30. $270 * \frac{1}{3} =$
31. You are given a sum of \$200. Which option would you choose?
- a. A sure gain of \$70.
 - b. A $\frac{2}{5}$ chance of gaining \$175, with a $\frac{3}{5}$ chance of gaining \$0.
32. You are given a sum of \$800. Which option would you choose?
- a. A sure loss of \$300.
 - b. A $\frac{3}{4}$ chance of losing \$400 with a $\frac{1}{4}$ chance of losing \$0.
33. You are given a sum of \$85. Which option would you choose?
- a. A sure gain of \$45.
 - b. A $\frac{3}{5}$ chance of gaining \$75, with a $\frac{2}{5}$ chance of gaining \$0.
34. You are given a sum of \$120. Which option would you choose?
- a. A sure loss of \$30.
 - b. A $\frac{1}{3}$ chance of losing \$90 with a $\frac{2}{3}$ chance of losing \$0.
35. $90 * \frac{1}{3} =$
36. $175 * \frac{2}{5} =$

THANK YOU ☺

QUESTIONNAIRE – TYPE 3

Before you begin, please be noted that,

The way the options are presented as losses/gains may influence people's decisions.

Please be aware of this situation and try to avoid these biases before your final decision.

1. You are given a sum of \$600. Which option would you choose?
 - a. A sure loss of \$300.
 - b. A $\frac{3}{5}$ chance of losing \$500, with a $\frac{2}{5}$ chance of losing \$0.
2. You are given a sum of \$350. Which option would you choose?
 - a. A sure gain of \$150.
 - b. A $\frac{2}{3}$ chance of gaining \$225, with a $\frac{1}{3}$ chance of gaining \$0.
3. You are given a sum of \$650. Which option would you choose?
 - a. A sure loss of \$400.
 - b. A $\frac{2}{3}$ chance of losing \$600 with a $\frac{1}{3}$ chance of losing \$0.
4. You are given a sum of \$190. Which option would you choose?
 - a. A sure gain of \$90.
 - b. A $\frac{3}{4}$ chance of gaining \$120 , with a $\frac{1}{4}$ chance of gaining \$0
5. You are given a sum of \$240. Which option would you choose?
 - a. A sure gain of \$60.
 - b. A $\frac{1}{3}$ chance of gaining \$180 , with a $\frac{2}{3}$ chance of gaining \$0.
6. You are given a sum of \$440. Which option would you choose?
 - a. A sure loss of \$110.
 - b. A $\frac{2}{5}$ chance of losing \$275 with a $\frac{3}{5}$ chance of losing \$0.
7. You are given a sum of \$210. Which option would you choose?
 - a. A sure gain of \$40.
 - b. A $\frac{1}{3}$ chance of gaining \$120, with a $\frac{2}{3}$ chance of gaining \$0.
8. You are given a sum of \$500. Which option would you choose?
 - a. A sure loss of \$270.
 - b. A $\frac{2}{3}$ chance of losing \$405 with a $\frac{1}{3}$ chance of losing \$0.

9. You are given a sum of \$175. Which option would you choose?
 - a. A sure loss of \$100.
 - b. A $\frac{2}{3}$ chance of losing \$150, with a $\frac{1}{3}$ chance of losing \$0.
10. You are given a sum of \$250. Which option would you choose?
 - a. A sure gain of \$80.
 - b. A $\frac{1}{4}$ chance of gaining \$320, with a $\frac{3}{4}$ chance of gaining \$0.
11. You are given a sum of \$180. Which option would you choose?
 - a. A sure loss of \$45.
 - b. A $\frac{3}{4}$ chance of losing \$60 with a $\frac{1}{4}$ chance of losing \$0.
12. You are given a sum of \$160. Which option would you choose?
 - a. A sure gain of \$70.
 - b. A $\frac{1}{3}$ chance of gaining \$210, with a $\frac{2}{3}$ chance of gaining \$0.
13. You are given a sum of \$50. Which option would you choose?
 - a. A sure gain of \$25.
 - b. A $\frac{1}{4}$ chance of gaining \$100, with a $\frac{3}{4}$ chance of gaining \$0.
14. You are given a sum of \$300. Which option would you choose?
 - a. A sure loss of \$80.
 - b. A $\frac{2}{3}$ chance of losing \$120 with a $\frac{1}{3}$ chance of losing \$0.
15. You are given a sum of \$100. Which option would you choose?
 - a. A sure gain of \$35.
 - b. A $\frac{1}{3}$ chance of gaining \$105, with a $\frac{2}{3}$ chance of gaining \$0.
16. You are given a sum of \$400. Which option would you choose?
 - a. A sure loss of \$120.
 - b. A $\frac{3}{4}$ chance of losing \$160 with a $\frac{1}{4}$ chance of losing \$0.
17. You are given a sum of \$360. Which option would you choose?
 - a. A sure loss of \$90.
 - b. A $\frac{1}{3}$ chance of losing \$270, with a $\frac{2}{3}$ chance of losing \$0.
18. You are given a sum of \$180. Which option would you choose?
 - a. A sure gain of \$40.
 - b. A $\frac{1}{5}$ chance of gaining \$200, with a $\frac{4}{5}$ chance of gaining \$0.

19. You are given a sum of \$250. Which option would you choose?
- a. A sure loss of \$120.
 - b. A $\frac{3}{5}$ chance of losing \$200 with a $\frac{2}{5}$ chance of losing \$0.
20. You are given a sum of \$60. Which option would you choose?
- a. A sure gain of \$30.
 - b. A $\frac{2}{5}$ chance of gaining \$75, with a $\frac{3}{5}$ chance of gaining \$0.
21. You are given a sum of \$200. Which option would you choose?
- a. A sure gain of \$70.
 - b. A $\frac{2}{5}$ chance of gaining \$175, with a $\frac{3}{5}$ chance of gaining \$0.
22. You are given a sum of \$800. Which option would you choose?
- a. A sure loss of \$300.
 - b. A $\frac{3}{4}$ chance of losing \$400 with a $\frac{1}{4}$ chance of losing \$0.
23. You are given a sum of \$85. Which option would you choose?
- a. A sure gain of \$45.
 - b. A $\frac{3}{5}$ chance of gaining \$75, with a $\frac{2}{5}$ chance of gaining \$0.
24. You are given a sum of \$120. Which option would you choose?
- a. A sure loss of \$30.
 - b. A $\frac{1}{3}$ chance of losing \$90 with a $\frac{2}{3}$ chance of losing \$0.

THANK YOU 😊

QUESTIONNAIRE – TYPE 4

Before you begin, please be noted that,

The way the options are presented as losses/gains may influence people's decisions.

Please be aware of this situation and try to avoid these biases before your final decision.

1. You are given a sum of \$600. Which option would you choose?
 - a. A sure loss of \$300.
 - b. A $\frac{3}{5}$ chance of losing \$500 with a $\frac{2}{5}$ chance of gaining \$0.
2. You are given a sum of \$350. Which option would you choose?
 - a. A sure gain of \$150.
 - b. A $\frac{2}{3}$ chance of gaining \$225, with a $\frac{1}{3}$ chance of gaining \$0.
3. You are given a sum of \$650. Which option would you choose?
 - a. A sure loss of \$400.
 - b. A $\frac{2}{3}$ chance of losing \$600 with a $\frac{1}{3}$ chance of losing \$0.
4. You are given a sum of \$190. Which option would you choose?
 - a. A sure gain of \$90.
 - b. A $\frac{3}{4}$ chance of gaining \$120 , with a $\frac{1}{4}$ chance of gaining \$0
5. $225 * \frac{2}{3} =$
6. $500 * \frac{3}{5} =$
7. You are given a sum of \$240. Which option would you choose?
 - a. A sure gain of \$60.
 - b. A $\frac{1}{3}$ chance of gaining \$180 , with a $\frac{2}{3}$ chance of gaining \$0.
8. You are given a sum of \$440. Which option would you choose?
 - a. A sure loss of \$110.
 - b. A $\frac{2}{5}$ chance of losing \$275 with a $\frac{3}{5}$ chance of losing \$0.
9. You are given a sum of \$210. Which option would you choose?
 - a. A sure gain of \$40.
 - b. A $\frac{1}{3}$ chance of gaining \$120, with a $\frac{2}{3}$ chance of gaining \$0.

10. You are given a sum of \$500. Which option would you choose?
- a. A sure loss of \$270.
 - b. A $\frac{2}{3}$ chance of losing \$405 with a $\frac{1}{3}$ chance of losing \$0.
11. $180 * \frac{1}{3} =$
12. $405 * \frac{2}{3} =$
13. You are given a sum of \$175. Which option would you choose?
- e. A sure loss of \$100.
 - f. A $\frac{2}{3}$ chance of losing \$150, with a $\frac{1}{3}$ chance of losing \$0.
14. You are given a sum of \$250. Which option would you choose?
- a. A sure gain of \$80.
 - b. A $\frac{1}{4}$ chance of gaining \$320, with a $\frac{3}{4}$ chance of gaining \$0.
15. You are given a sum of \$180. Which option would you choose?
- a. A sure loss of \$45.
 - b. A $\frac{3}{4}$ chance of losing \$60 with a $\frac{1}{4}$ chance of losing \$0.
16. You are given a sum of \$160. Which option would you choose?
- a. A sure gain of \$70.
 - b. A $\frac{1}{3}$ chance of gaining \$210, with a $\frac{2}{3}$ chance of gaining \$0.
17. $320 * \frac{1}{4} =$
18. $150 * \frac{2}{3} =$
19. You are given a sum of \$50. Which option would you choose?
- a. A sure gain of \$25.
 - b. A $\frac{1}{4}$ chance of gaining \$100, with a $\frac{3}{4}$ chance of gaining \$0.
20. You are given a sum of \$300. Which option would you choose?
- a. A sure loss of \$80.
 - b. A $\frac{2}{3}$ chance of losing \$120 with a $\frac{1}{3}$ chance of losing \$0.
21. You are given a sum of \$100. Which option would you choose?
- a. A sure gain of \$35.
 - b. A $\frac{1}{3}$ chance of gaining \$105, with a $\frac{2}{3}$ chance of gaining \$0.

22. You are given a sum of \$400. Which option would you choose?
- a. A sure loss of \$120.
 - b. A $\frac{3}{4}$ chance of losing \$160 with a $\frac{1}{4}$ chance of losing \$0.
23. $100 * \frac{1}{4} =$
24. $160 * \frac{3}{4} =$
25. You are given a sum of \$360. Which option would you choose?
- a. A sure loss of \$90.
 - b. A $\frac{1}{3}$ chance of losing \$270, with a $\frac{2}{3}$ chance of losing \$0.
26. You are given a sum of \$180. Which option would you choose?
- a. A sure gain of \$40.
 - b. A $\frac{1}{5}$ chance of gaining \$200, with a $\frac{4}{5}$ chance of gaining \$0
27. You are given a sum of \$250. Which option would you choose?
- a. A sure loss of \$120.
 - b. A $\frac{3}{5}$ chance of losing \$200 with a $\frac{2}{5}$ chance of losing \$0.
28. You are given a sum of \$60. Which option would you choose?
- a. A sure gain of \$30
 - b. A $\frac{2}{5}$ chance of gaining \$75, with a $\frac{3}{5}$ chance of gaining \$0.
29. $200 * \frac{3}{5} =$
30. $270 * \frac{1}{3} =$
31. You are given a sum of \$200. Which option would you choose?
- a. A sure gain of \$70.
 - b. A $\frac{2}{5}$ chance of gaining \$175, with a $\frac{3}{5}$ chance of gaining \$0.
32. You are given a sum of \$800. Which option would you choose?
- a. A sure loss of \$300.
 - b. A $\frac{3}{4}$ chance of losing \$400 with a $\frac{1}{4}$ chance of losing \$0.
33. You are given a sum of \$85. Which option would you choose?
- a. A sure gain of \$45.
 - b. A $\frac{3}{5}$ chance of gaining \$75, with a $\frac{2}{5}$ chance of gaining \$0.

34. You are given a sum of \$120. Which option would you choose?

- a. A sure loss of \$30.
- b. A $\frac{1}{3}$ chance of losing \$90 with a $\frac{2}{3}$ chance of losing \$0.

35. $90 * \frac{1}{3} =$

36. $175 * \frac{2}{5} =$

APPENDIX B. FISHER EXACT TEST RESULTS FOR ALL QUESTIONS

Question 1		
Type	Count of Choice A	Count of Choice B
Hard	63	67
Soft	33	46
p-value = 0,392		

Question 2		
Type	Count of Choice A	Count of Choice B
Hard	64	66
Soft	39	40
p-value = 1		

Question 3		
Type	Count of Choice A	Count of Choice B
Hard	65	65
Soft	31	48
p-value = 0,153		

Question 4		
Type	Count of Choice A	Count of Choice B
Hard	59	71
Soft	32	47
p-value = 0,565		

Question 5		
Type	Count of Choice A	Count of Choice B
Hard	84	46
Soft	54	25
p-value = 0,652		

Question 6		
Type	Count of Choice A	Count of Choice B
Hard	43	87
Soft	31	48
p-value = 0,375		

Question 7		
Type	Count of Choice A	Count of Choice B
Hard	63	67
Soft	33	46
p-value = 0,39		

Question 8		
Type	Count of Choice A	Count of Choice B
Hard	63	67
Soft	42	37
p-value = 0,569		

Question 9		
Type	Count of Choice A	Count of Choice B
Hard	57	73
Soft	35	44
p-value = 1		

Question 10		
Type	Count of Choice A	Count of Choice B
Hard	57	73
Soft	34	45
p-value = 1		

Question 11		
Type	Count of Choice A	Count of Choice B
Hard	65	65
Soft	46	33
p-value = 0,257		

Question 12		
Type	Count of Choice A	Count of Choice B
Hard	60	70
Soft	36	43
p-value = 1		

Question 13		
Type	Count of Choice A	Count of Choice B
Hard	63	67
Soft	33	46
p-value = 0,39		

Question 14		
Type	Count of Choice A	Count of Choice B
Hard	46	84
Soft	41	38
p-value = 0,021		

Question 15		
Type	Count of Choice A	Count of Choice B
Hard	71	59
Soft	34	45
p-value = 0,118		

Question 16		
Type	Count of Choice A	Count of Choice B
Hard	49	81
Soft	30	49
p-value = 1		

Question 17		
Type	Count of Choice A	Count of Choice B
Hard	65	65
Soft	41	38
p-value = 0,887		

Question 18		
Type	Count of Choice A	Count of Choice B
Hard	40	90
Soft	28	51
p-value = 0,543		

Question 19		
Type	Count of Choice A	Count of Choice B
Hard	63	67
Soft	33	46
p-value = 0,39		

Question 20		
Type	Count of Choice A	Count of Choice B
Hard	60	70
Soft	35	44
p-value = 0,886		

Question 21		
Type	Count of Choice A	Count of Choice B
Hard	56	74
Soft	34	45
p-value = 1		

Question 22		
Type	Count of Choice A	Count of Choice B
Hard	57	73
Soft	33	46
p-value = 0,776		

Question 23		
Type	Count of Choice A	Count of Choice B
Hard	87	43
Soft	53	26
p-value = 1		

Question 24		
Type	Count of Choice A	Count of Choice B
Hard	51	79
Soft	26	53
p-value = 0,379		

APPENDIX C. ANALYSIS OF HARD COPY PARTICIPANTS

Out of 209 participants, 130 of them completed the questionnaire in hard copy and the rest 79 participants completed them in soft copy. To see whether there is a main effect within one medium of questionnaire, hard copy answers were analyzed separately. A General Linear Model analysis on a $2 \times 2 \times 2$ (Analytical processing [included, excluded], warning [included, excluded], department [quantitative-based, social science-based]) between-subjects design was conducted and no main effect of any factor was observed. Interaction effect was also not found. The descriptive statistics values can be observed in Table 8.

Table 8 - Descriptive statistics value of hard copy participants

Questionnaire Types	Mean, (Sample Size, Standard Deviation)	
	Quantitative-Based	Social-Science Based
Type 1	0.17 (23, 0.124)	0.181 (12, 0.207)
Type 2	0.224 (16, 0.235)	0.265 (11, 0.329)
Type 3	0.2 (20, 0.199)	0.322 (15, 0.279)
Type 4	0.226 (21, 0.206)	0.257 (12, 0.3)

Analytical processing ($F(1, 122) = 0.35, p = 0.553$), explicit warning ($F(1, 122) = 0.99, p = 0.323$) and department ($F(1, 122) = 1.51, p = 0.222$) have failed to show a main effect. In addition, their pairwise and total interactions were also evaluated and no significant effects were found for each of them. No significant relationship was found between analytical processing and explicit warning $F(1, 122) = 1.13, p = 0.289$, between analytical processing and department $F(1, 122) = 0.13, p = 0.717$, between explicit warning and

department $F(1, 122)=0,37, p=0,543$) and for the interaction of all three factors $F(1, 122)=0,54, p=0,464$).

These results show that the debiasing methods failed to show a main effect on 130 hard copy participants. Hence, selecting only one medium of questionnaire did not make a significant effect for the sample size selected.

APPENDIX D: TURKISH SUMMARY

Karar verme eylemi yaşamın bir parçasıdır. Her gün bilinçli veya farkına varmaksızın verdiğimiz kararlar, ölümcül bir karaciğer kanseri tedavisine karar vermek kadar zor veya akşam yemeği için satın alacağımız yoğurdun marka seçimi kadar basit olabilir. Karar verme süreci ister basit ister karmaşık olsun, karar veren kişi mevcut seçenekleri değerlendirir ve Lovett'a göre (2006) rasyonel olabilmek adına, maksimum değeri veya faydayı sağlayan seçeneği seçer.

Öte yandan, insanlarda karar verme mekanizmasında rasyonelliğin belli sınırları vardır. Simon (1956), bilişsel kapasitenin sınırlı olması ve zaman baskısı nedeniyle, insan zihninin kararları hızlı alabilmek adına kolay yollar bulmak için adapte olduğunu savunmuştur. Simon, analizlerinde, kısmen rasyonel olarak insan aklını yeniden tanımlamış ve "sınırlı rasyonellik" kavramını literatüre kazandırmıştır. Risk ve belirsizlik olduğunda, karar verme süreci karmaşıklaşır ve insan aklı sezgisel yollarla karar vermeyi tercih eder. Sezgisel yollar ise, bilişsel önyargılara neden olur. Bilişsel önyargılar, sınırlı düşünsel kapasite, duygusal etmenler ve çevresel faktörler nedeniyle oluşan düşünce hatalarıdır (Wilke ve Mata, 2012). İnsanlar karar vermek için hatalı ipuçlarını kullandığında, sonuç irrasyonel bir karar olabilir. Uzmanlar, son yirmi yıldır bu önyargıları ve bunların şimdiki ve gelecekteki engelleme yöntemlerini araştırmaktadır. Mevcut çalışma, bu bilişsel önyargılardan biri olan çerçeveleme etkisinin üzerinde durmaktadır.

İnsanlar risk ve belirsizlik içeren bir karar problemi ile karşı karşıya kaldıklarında, sahip oldukları risk algısına göre seçenekleri değerlendirir ve

daha sonra bir çözüm bulurlar. Ancak, risk algısının yanı sıra, problemin kendisi de çözüme katkı sağlar. Örnek vermek gerekirse, yoğurt satın almak için markete gidildiğinde, "%80 yağsız" olarak etiketlenmiş paket ile "%20 yağlı" olarak etiketlenmiş paket içerik olarak aynı ürünü içerse bile, tercihimiz "%80 yağsız" olan paketten yana olacaktır. Benzer şekilde, ölümcül karaciğer kanseri bir hasta olduğunu düşünün. Doktorlar % 95 başarısızlık oranındaki kritik bir cerrahi operasyonu teklif etseydi, hasta bu teklifi değerlendirecek ve ölüm oranı çok yüksek olduğundan onu reddedecekti. Doktor "% 5 hayatta kalma oranı" olarak söz etseydi, bu karar değişmez miydi?

Yukarıdaki iki senaryoda da, verilen seçenekler mantıksal olarak eşittir. Seçenekleri farklı olarak gösteren, onların sunuluş biçimleridir. Verilen kararların, eşit seçeneklerin sunuluş biçimlerine göre değişmesi durumu Kahneman ve Tversky (1981) tarafından adlandırılan çerçeveleme etkisini oluşturur. Ünlü Asya Hastalığı problemi, literatürde çerçeveleme etkisini gözler önüne seren en ünlü örnektir. Kahneman ve Tversky bu deneylerinde, öldürücü bir hastalığın ortaya çıkacağı ve Amerika'da 600 kişiyi öldüreceğine dair bir senaryo oluşturur. Hükümet iki adet tedavi seçeneği belirler ve bu seçenekler deneklere sunulur:

Program A: Eğer Program A seçilirse, kesin olarak 200 kişi hastalıktan kurtulacaktır.

Program B: Eğer Program B seçilirse, 1/3 ihtimalle 600 kişi kurtulacak, 2/3 ihtimalle kimse kurtulamayacaktır.

Seenekler “kurtarılan hayat” ibaresiyle sorulduğunda, katılımcıların %72’si Program A’yı, yani kesin olarak hayat kurtarmayı tercih etmiştir. Aynı seenekler, bir de aşağıdaki gibi sorulmuştur:

Program C: Eğer Program C seilirse, kesin olarak 400 kişi ölecektir.

Program D: Eğer Program D seilirse, 1/3 ihtimalle kimse ölmeyecek, 2/3 ihtimalle 600 kişi ölecektir.

Seenekler “ölen insan sayısı” ibaresiyle sunulduğunda da, deneklerin %78’i Program D’yi semiş, yani risk almayı tercih etmişlerdir. Bu deneyin sonuçları şunu kanıtlar: Seenekler pozitif bir çerçevede (kazanç) sunulduğunda insanlar riskten kaçınan, negatif bir çerçevede sunulduğunda ise (kayıp) riske giren bir davranış sergiler.

Çereveleme etkisini bir karar verme teorisi olan beklenti teorisiyle açıklamak mümkündür. Kahneman ve Tversky’nin (1979) oluşturduğu S şeklindeki asimetrik değer fonksiyonu, kazanç bölgesinde içbükey, kayıp bölgesinde ise dışbükey şekildedir ve insanların risk yaklaşımına dair kanıt niteliği taşır. Ayrıca beklenti teorisi, seeneklerin gerekleşme olasılıkları için bir de ağırlık fonksiyonu sunmaktadır. Bu fonksiyon, küçük gerekleşme olasılıklarını semeye olan eğilimimizi ve kesinlik etkisini açıklar niteliktedir. (Hardman, 2009).

Literatürde üç tip çereveleme etkisinden bahsedilmektedir. Bunlardan ilki, Kahneman ve Tversky’nin Asya Hastalığı probleminde kullandığı risk seenekli çereveleme etkisidir. Risk seenekli çereveleme etkisine göre, biri kesin diğeri olasılık içeren seeneklerin kayıp veya kazanç çereveleri içinde sunulması, kişinin risk algısında deėişikliklere yol açmaktadır. İkinci etki,

nitelik çerçeveleme etkisidir. Nitelik çerçeveleme etkisine göre, bir ürünün herhangi spesifik bir niteliği pozitif ya da negatif şekilde sunulduğunda, kişinin o ürüne sahip olmaya yönelik isteği değişebilmektedir. Levin ve Gaeth'in (1988) örneğinde, deneklere sunulan “%80 yağsız” ve “%20 yağlı” etiketli dana kıyma paketlerinden, “%80 yağsız” olanlar daha fazla tercih edilmiştir. Ürünler birebir aynı olmasına rağmen, pozitif özelliği belirtilen ürün deneklerde daha cazibeli bir hale gelmiştir. Nitelik çerçevelemesinde sunulan seçenekler, birbirini tamamlayıcı niteliktedir. Üçüncü etki ise, amaç çerçeveleme etkisidir. Amaç çerçeveleme etkisine göre, bir davranışı edinme / uygulama isteği, o davranış edinilirse oluşacak pozitif sonuçlar ile o davranış edinilmezse oluşacak negatif sonuçlardan birinin sunulduğu duruma göre değişiklik göstermektedir. Amaç çerçeveleme etkisine en ünlü örnek olarak Meyerowitz ve Chaiken'in (1987) davranış olarak kendi kendine göğüs muayenesi üzerine yaptıkları deneyden bahsedilebilir. İlk denek gruplarına kendi kendilerine yapacakları muayenenin pozitif sonuçlarını, ikinci denek grubuna ise muayeneyi yapmadıkları takdirde oluşacak negatif sonuçlardan söz ettiklerinde, negatif sonuçları dinlemiş olan deneklerin muayeneyi yapmaya daha istekli oldukları gözlenmiştir. Burada, kendi kendine göğüs muayenesi aslında göğüs kanserini tespit etmeye yönelik bir davranıştır. Amaç çerçeveleme söz konusu olduğunda, tespit edici davranışların negatif çerçeveleme, önleyici davranışların ise pozitif çerçevelemeyle daha cazip hale geldiği gözlenmiştir. Meme kanseri için mamografi taraması (Banks et al., 1995; Schneider et al., 2001) ve kalp hastalığı teşhisi için kan tahlili (Maheswaran & Meyers-Levy, 1990) tespit edici davranışlara örnek olarak gösterilebilir. Önleyici davranışlara örnek olarak zararlı ışıklardan korunmak amaçlı güneş kremi kullanımı (Rothman

et al.,1993), AIDS'ten korunma amaçlı kondom kullanımı (Linville, Fischer & Fischhoff, 1993) ve arabalarda bebek koltuğu kullanımı (Christopherson ve Gyulay,1981) gösterilebilir.

Çerçeveleme etkisi pazarlama, sağlık ve finans gibi birçok alanda kullanılmakta ve fark etmeden insanların karar mekanizmalarına etki etmektedir. Bu nedenle uzmanlar son yirmi yıldır çerçeveleme etkisini azaltan veya ortadan kaldıran yöntemler üzerine çalışmaktadır. Bunun için çeşitli başlıklar altında farklı yöntemlerden söz edilebilir. Birinci yöntem olarak, duygu yönetiminin çerçeveleme etkisi üzerinde azaltıcı bir etkisi görülmüştür. Miu ve Crişan (2011) bu bağlamda bilişsel yeniden değerlendirme ve duyguları bastırma üzerinde çalışarak başarılı sonuçlar elde etmişlerdir.

İkinci yöntem ekstra bilgi sunma ve katılımı artırmadır. Druckman (2001), deneklerine siyasi partiler veya güvenilir medikal kuruluşlar üzerinden tedavi tavsiyeleri verdiğinde, çerçeveleme etkisinden bağımsız olarak tutulan parti veya değer verilen kuruluşun sunduğu/tavsiye ettiği seçeneğin tercih ettiği görülmüştür. Cheng ve Wu (2010) ise, deneklerine çerçeveleme etkisine dair dikkatli olmalarını söyleyen bir uyarı cümlesi sunduktan sonra, elektronik bir dil çeviriciyi satın alma davranışlarını incelemiş ve uyarı cümlelerinin çerçeveleme etkisini azalttığını gözlemlemişlerdir. Ayrıca bu deneyde, deneklerin konuya katılımı da ölçülmüş ve yüksek katılımı olan deneklerin çerçeveleme etkisine daha az maruz kaldığı görülmüştür.

Üçüncü yöntem analitik düşünmeyi teşvik ederek bilişsel süreci daha aktif bir hale getirmektir. Deneklerinden yaptıkları tercih için bir açıklama getirmelerini bekleyen Miller and Fagley (1991), Takemura (1993), Sieck ve

Yates (1997) ve Kim et al.(2005), onların tercihleri üzerinde daha çok düşünmelerini sağlamış ve böylece çerçeveleme etkisini azaltmışlardır. Thomas ve Millar (2011) ise, çeşitli hafıza ve matematik işlemleri kullanarak yaşlı ve genç bireylerde analitik düşünmeyi artırmış ve yine çerçeveleme etkisinin azaldığını gözlemlemiştir.

Dördüncü yöntem ise, insanların farklı kişilik özelliklerine odaklanarak çerçeveleme etkisini ortadan kaldırmaktır. Bunlardan ilk olarak biliş ihtiyacından söz edilebilir. Biliş ihtiyacı, Cacioppo ve Petty (1982,p.116) tarafından “bireyler arasındaki düşünmeye yönelik tutum farkları,düşünmeyi sevmek, düşünme yatkınlığı” şeklinde tanımlanmıştır. Biliş ihtiyacı yüksek olan insanların, yazılı metinler üzerine daha derin analizler yaptıkları (Cacioppo et al, 1983) ve dolayısıyla kendilerini daha derin bir bilgi arayışına adadıkları (Verplanken et al, 1992) görülmüştür. Bu gerçek göz önünde bulundurulduğunda, Smith ve Levin (1996) ile Chatterjee et al.’nin (2000) yaptığı çalışmalar, biliş ihtiyacı yüksek olan bireylerin çerçeveleme etkisine daha az maruz kaldığını göstermiştir.İkinci bir kişisel farklılık ise kişilerin matematik yetkinlikleridir. Matematiğe yatkın olan bireylerin çerçeveleme etkisine maruz kalmadığı gözlemlenmiştir (Peters et al.,2006;Peters ve Levin,2008).

Bu yöntemlerin haricinde, kişinin kendi anadili dışında bir başka dilde karar vermek durumunda bırakılması da çerçeveleme etkisini ortadan kaldıran bir yöntem olup, kendi ülkesi dışında bir ülkede yaşayıp başka bir dili konuşan bireylerin daha başarılı karar aldığı gözlemlenmiştir (Keysar, Hayakawa, ve An , 2012). Başka bir yöntem olarak, bireylerin riskli seçeneklerde olasılıkları daha iyi anlamaları adına, pasta ve bar grafiği gibi görsel yardım kullanarak

risk algısının çerçeveleme etkisinden etkilenmemesi hedeflenmiş ve olumlu sonuçlar elde edilmiştir (Garcia-Retamero ve Galesic, 2010). Ek olarak, Almashat et al. (2008), seçenekler arasında avantaj ve dezavantaj listeleri oluşturmanın da çerçeveleme etkisini azalttığını iddia etmiştir.

Bu tez, yukarıda bahsedilen yöntemlerden literatürde baskın olan iki tanesinin çerçeveleme etkisi üzerindeki etkilerini araştırmayı hedeflemiştir: Analitik düşünmeye teşvik etmek ve açık uyarı sunmak. Buna ek olarak, farklı disiplinlerin çerçeveleme etkisi üzerinde etkisi olup olmadığı da bu çalışmada incelenmiştir. Literatürde çeşitli mesleklerin çerçeveleme etkisine farklı duyarlılıklar gösterdiği gözlenmiştir (Christensen et al., 1995). Bu nedenle, farklı daldaki üniversite eğitimlerinin de çerçeveleme etkisi üzerinde bir rol oynayıp oynamayacağı araştırmak istenmiştir.

Anket, Orta Doğu Teknik Üniversitesi'nin farklı departmanlarının 2,3 ve 4. sınıflarında okuyan toplam 209 adet lisans öğrencisiyle gerçekleştirilmiştir. Katılımcılar iki ana gruba ayrılmıştır: Grup 1 sayısal tabanlı (nicel bazlı) bölümlerinde okuyan öğrencilerden (örneğin mühendislik, matematik, fizik vs.) ve Grup 2 sosyal bilimlerde okuyan öğrencilerden (örneğin işletme, sosyoloji, uluslararası ilişkiler vs.) oluşturulmuştur. Grup 1 ve Grup 2, sırasıyla 102 ve 107 katılımcı içermektedir. Bu sınıflandırmanın amacı, çerçeveleme etkisi altında sayısal bazlı ve sosyal bilimlerde bazlı eğitim alan öğrencilerin karar verme prosedürlerini karşılaştırmaktır. Katılımcıların yaş ortalamaları 21,96 olarak ölçülmüştür.

Mevcut çalışmanın amacı, yukarıda belirtilen iki grup arasında, iki yöntemin etkilerini araştırmaktır. Bunu sağlamak adına dört tip anket oluşturulmuştur: 1) Hiçbir yöntem içermeyen anket 2) Analitik düşünmeyi

artıran matematik soruları içeren anket, 3) Açık uyarı metni içeren anket, ve 4) İki yöntemi de içeren anket. Anketin ana yapısı Thomas ve Millar'ın (2011) çalışmasındaki anketten baz alınmıştır.

Dört anketin hepsinde, yirmi dört adet parasal karar sorusu bulunmaktadır. Her karar isteminde, katılımcıya başlangıçta bir miktar para sunulur ve daha sonra iki seçenek arasında bir karar vermesi istenir. İlk tercih kesin miktardaki bir kazanç ya da kaybı içerirken, ikinci tercih ise ilk tercihteki miktardan daha yüksek bir miktar için riskli bir bahisten oluşmaktadır. Dikkat edilmesi gereken önemli nokta, her iki seçeneğin de beklenen değerinin aynı olmasıdır.

Anket 12 adet kazanç durumuyla, 12 adet de kayıp durumuyla çerçevelenmiş sorudan oluşmaktadır. Özetle, 12 adet soru çifti de denebilir; çünkü her kazanç sorusunun son değer olarak eşit olduğu bir kayıp sorusu eşleniği bulunmaktadır. Sorular katılımcılara sırası karıştırılmış olarak sunulmuştur. Anket öğrencilere hem çıktı olarak, hem de elektronik ortamda dağıtılmıştır. İki şekilde dağıtılan anket sonuçlarının, anket tipinden etkilenmediğini kanıtlamak adına, her soru için kontenjan tabloları oluşturulmuş ve her tablo üzerinde Fisher test uygulanmıştır. Sonuçta 24 tablodan 23'ünde $p > 0.05$ değeri bulunmuş ve iki anket tipinden gelen sonuçların ortak olarak analiz edilebileceğine karar verilmiştir.

Sorulara verilen cevapların istatistiksel analizlerin tümü, Çerçeveleme Etkisi Duyarlılık Oranı (ÇEDO) üzerinden her bir katılımcı için ayrı ayrı hesaplanarak gerçekleştirilmiştir. Bir ankette 12 soru çifti bulunmaktadır ve her çift için ödül miktarı aynıdır. Katılımcı, kazanç kavramıyla çerçevelenen soruda riskten kaçınmış ve kayıp kavramıyla çerçevelenmiş soruda risk

arayışına girmişse, o soru çiftinden skoru "1" olur. Diğer koşullar için, skor sıfırdır. Bu hesaplama tüm soru çiftleri için yapılmış ve sonra, bir katılımcı için ÇEDO aşağıdaki formülle hesaplanmıştır:

$$\text{Çerçeveleme Etkisi Duyarlılık Oranı} = \frac{\text{Tüm soru çiftlerinin skor toplamı}}{12}$$

İstatistiksel analizler, tüm faktörlerin ana etkilerini anlamak amacıyla önce bir 2 x 2 x 2 (Analitik düşünme [var, yok], açık uyarı [var, yok], departman [sayısal, sosyal bilimler]) Genel Lineer Model üzerinden yapılmıştır. Ardından Grup 1 ve Grup 2 üzerinde ayrı ayrı 2 x 2 (Analitik düşünme [var, yok], açık uyarı [var, yok]) Genel Lineer Model'ler incelenmiştir. Ana etkinin görüldüğü yerde karşılaştırmalar yapmak amacıyla da Tukey testi kullanılmıştır. Ayrıca, kazanç ve kayıp kavramlarıyla çerçevelenmiş sorular üzerinde, çerçeveleme etkisini azaltan iki yöntemin etkileri de ayrı ayrı Genel Lineer Model ile incelenmiştir.

Bu çalışmanın ilk ana bulgusu olarak sayısal bölümü öğrencileri (Grup 1) ve sosyal bilimler öğrencileri (Grup 2) arasında çerçeveleme etkisine karşın duyarlılık seviyeleri arasında belirgin bir fark olmamasından bahsedilebilir. Grup 1 katılımcıları eğitimleri gereğince aktif olarak matematiği günlük hayatlarında kullanan ve bu nedenle de Sistem 2 düşünce yapısına sıkça başvuran bireylerdir (Osman, 2004; Kahneman, 2011). Bu durum, Grup 1 katılımcılarının Grup 2'ye nazaran çerçeveleme etkisine daha az maruz kalacağına dair anlık bir beklenti yaratsa da, istatistiksel sonuçlar temel bir farklılık olmadığını ortaya koymuştur, çünkü Grup 2 katılımcıları da aktif olarak Sistem 2 düşünce yapısını kullanmaktadır. Grup 2 katılımcıları disiplinleri gereği kelimelere, anlamlarına, uzun metinleri yorumlamaya

meylli bir yapıda olduklarından, anlatıma ve üsluba dikkat etmektedirler. Dolayısıyla sosyal bilimler öğrencileri de sıkça Sistem 2 düşünce yapısına başvurur ve mevcut çalışmadaki farklı kavramlarla çerçevelenen seçeneklere karşı bir çerçeveleme etkisi göstermemişlerdir.

Bu çalışmanın ikinci temel bulgusu olarak, departman tipi fark etmeksizin, çerçeveleme etkisini azaltmaya yönelik kullanılan iki yöntemin de anlamlı bir etki yaratmamasından bahsedilebilir. İlk olarak, matematik sorularıya analitik düşünmeye teşvik etmek, Thomas ve Millar'ın (2011) çalışmasında yaşlı ve genç bireyler üzerinde olumlu sonuçlar vermiştir. Analitik düşünceye teşvik, katılımcıların bilişsel kaynaklarını daha fazla kullanmalarını amaçlar ve bilişsel kaynaklar yaşlı ve genç bireylerde (Mata, Schooler ve Rieskamp, 2007; Thomas ve Bulevic, 2006) karar verme esnasında önemli bir belirleyici faktördür. Bu nedenle, Thomas ve Millar (2011), bu yöntem ile çerçeveleme etkisini yaşlı ve genç bireyler üzerinde azaltmada başarılı olmuştur. Öte yandan, mevcut çalışma yaş ortalaması 22 olan üniversite öğrencilerini kapsamaktadır ve farklı eğitim disiplinleri, bilişsel kapasite kullanımını bağlayıcı bir etmen değildir. Bu nedenle, analitik düşünmeye teşvik yöntemi, hem sayısal hem de sosyal bilime dayalı katılımcılarda çerçeveleme etkisine olan duyarlılığı azaltmada başarısız olmuştur.

İkinci olarak, açık uyarı yöntemi de çerçeveleme etkisini azaltmada başarısız olmuştur. Bu yöntem, Cheng ve Wu'nun (2010) çalışmasında nitelik çerçevelemesi üzerinde kullanılmış ve anlamlı sonuçlar elde edilmişti. Mevcut çalışmada ise aynı yöntem risk seçenekli çerçeveleme etkisi üzerinde kullanılmış ve farklı sonuçlar bulunmuştur. Açık uyarının, risk faktörü

içeren seçeneklerde, çerçeveleme etkisini azaltacak derecede etkili olmadığı gözlemlenmiştir. Uyarı cümlelerinde, katılımcıdan "kazanç" ve "kayıp" sözcüklerine ve bu sözcüklerin yaratacağı düşünce sapmalarına dikkat etmeleri istenmiş, ancak çerçeveleme etkisini azaltan bir durum gözlenmemiştir.

Üçüncü ana bulgu olarak, kazanç ve kayıp kavramlarıyla çerçevelenmiş soruları üzerinde çerçeveleme etkisini azaltıcı olarak kullanılan iki yöntemin etkilerinden bahsedilebilir. 12'şer adet olan kazanç ve kayıp soruları ayrı ayrı ele alınmış ve iki soru grubunda da her katılımcı için riskli seçeneğin seçilme oranı hesaplanmıştır. Daha sonra bu oranlar üzerinden yapılan istatistiksel analizlerde, kayıp kavramıyla çerçevelenmiş sorular üzerinde yöntemlerin anlamlı bir etkisi gözlenmemiştir. Öte yandan, kazanç çerçeveli sorularda ise, analitik düşünmeye teşvik etme yönteminin, katılımcıları riskli seçenekten uzaklaştırdığı ve daha riskten kaçınan bir davranışa yönelttiği görülmüştür.

Yukarıdaki sonuçlara ek olarak başka bir gözlem de, her iki yöntemin varlığının da çerçeveleme etkisini azaltmada başarısız olmasıdır. İki yöntem güçlerini birleştirmiş olsa bile, anlamlı bir azaltıcı etki yaratmak için yetersiz kalmıştır. Ayrıca, bu yöntemler Grup 1 ve Grup 2 üzerinde ayrı ayrı analiz edildiğinde de, belirgin bir azalma gözlemlenmemiştir. İki gruptaki bireylerin herhangi bir yöntem içermeyen birinci tip anket üzerindeki ÇEDO değerleri incelendiğinde, büyük çoğunluğun 0 - 0,2 aralığında olduğu saptanmıştır. Bu durumda çerçeveleme etkisine yalın durumda bile az oranda maruz kalan deneklerin üzerinde, iki yöntemin de çalışmamış olması şaşırtıcı değildir.

Mevcut çalışmada Thomas ve Millar'ın (2011) kullandığı yöntem ve anket tipi temel ölçü olarak alınmıştır. Onlar çalışmalarını yaşlı ve genç erişkinler üzerinde yürütmüşlerdir. 120 genç erişkinlerin yaş ortalaması 19,4'tür ve Thomas ve Millar, risk içerikli seçeneğin seçilme oranı üzerinden istatistiksel analizlerini gerçekleştirmiştir. Önceki bölümlerde de bahsedildiği gibi, bu çalışmada da kazanç ile kayıp soruları üzerinde analizler yapılırken, aynı oran hesaplanmıştır. Mevcut çalışmadaki oranlar ile Thomas ve Millar'ın genç katılımcıların anket sonuçlarından aldığı oranlar karşılaştırıldığında, kazanç kavramı ile çerçevelenmiş sorulardaki ortalama değerler birbirine oldukça yakınken (Thomas ve Millar: 0,45; mevcut çalışma [sayısal, sosyal bilimler]: [0,45, 0,441]), kayıp kavramı ile çerçevelenmiş sorularda ortalama değerlerde farklılıklar gözlemlenmiştir. (Thomas ve Millar: 0,47; mevcut çalışma [sayısal, sosyal bilimler]: [0,5, 0,419]). Kazanç çerçeveli sorularda bulgular Thomas ve Millar'ın çalışmalarıyla paralel iken, kayıp çerçeveli sorularda sayısal bölümlerden gelen öğrenciler risk içerikli seçeneği daha çok tercih etmişken, sosyal bilim bölümlerinden gelen öğrenciler daha az tercih etmiştir. Bu duruma iki çalışmadaki yaş ortalaması farkları sebep olmuş olabilir. Mevcut çalışmadaki yaş ortalaması 209 katılımcı için 21,96'dır. Ayrıca, sonraki bölümde bahsedilecek çeşitli kısıtlamalar da bu farka yol açmış olabilir.

Mevcut çalışmanın bazı yönlerden kısıtlamaları olduğundan da söz etmek gerekir. Her şeyden önce, anketin hem basılı kopya hem de elektronik kopya olarak dağıtılması, katılımcılarda farklı odaklar oluşturmuş olabilir. Çıktı olarak dağıtılan kopyalar yaklaşık 10 dakika içinde sessiz bir sınıf ortamında tamamlanmıştır; ancak, elektronik kopyaların doldurulduğu ortam, katılımcı motivasyonu ve süre açısından yeterince kontrol edilememiş olabilir.

Bununla birlikte, çıktı anket dolduran katılımcıların ayrı analizi Ek C'de yer almaktadır ve hiçbir ana etki gözlenmemiştir.

Başka bir kısıt, anketlerdeki soruların yapısının donanım etkisi yaratmış olma ihtimalidir. Anketteki her soruda, katılımcıya referans noktası olarak belirli bir miktar paraya sahip olduğu bilgisi verilir. 24 soru içerisinde para miktarı 50\$ ile 800\$ arasında değişmektedir ve katılımcıdan, bu paraya sahipmiş gibi davranması beklenmektedir. Thaler (1980) donanım etkisini açıklarken, sahip olunan objeleri geri vermek istediğimiz zaman talep ettiğimiz bedellerin, onları ilk kez satın aldığımız bedellerden daha yüksek olduğunu savunmaktadır. Bu çalışmada, farklı seviyelerdeki referans noktaları (farklı miktarlardaki başlangıç paraları) ve farklı çerçevelmeler (kayıp veya kazanç) bu etkiye neden olabilir. Referans noktası (başlangıç parası) nispeten yüksek ise, o zaman insanlar risk almak için seçenek olarak büyük bir miktar için arayışa girebilirler. Bu durumda, çerçeveleme etkisinin gözlemlenmesi kolay olmayacaktır.

Diğer bir kısıt, katılımcılara teşvik edici bir unsurun sunulmamasıydı. Elektronik ortamda anket dolduracak katılımcılara ulaşmak mümkün olmayacağından, teşvik unsuru ortadan kaldırılmıştır. Ancak parasal yardım gibi teşviklerin motivasyonu artırdığı gerçeği düşünüldüğünde, bu çalışmada teşvik sunmanın olumlu etkilerinden faydalanılmamıştır.

Dördüncü kısıt, katılımcı kadın/erkek oranının iki farklı anket tipinde eşit olmamasıydı. Kadın/erkek katılımcı sayısı çıktı olarak ve elektronik ortamda sunulan anketlerde sırasıyla 60/70 ve 55/24 idi. Cinsiyet etkisi bu çalışmanın kapsamı içinde değildi; ancak, cinsiyet oranı eşitliği oranı katılımcı havuzunu daha homojen hale getirmek için faydalı olabilir.

Son kısıt olarak katılımcıların departman çeşitliliğinden bahsedilebilir. Bu çalışmanın temel amaçlarından biri, sayısal tabanlı öğrenciler ile sosyal bilimler tabanlı öğrencileri karşılaştırmaktır. Bununla birlikte, bu gruplar altında kategorize edilen bölümler çerçeveleme etkisine karşı farklı davranışlara sahip olabilir. Matematik bölümü öğrencileri ve elektronik mühendisliği öğrencileri çerçeveleme etkisine karşı farklı tepkiler gösterebilir, fakat bu iki bölüm aynı grup altında kategorize edildiği için, bu tarz farklı etkileşimler göz ardı edilmiş olabilir.

İleriki çalışmalarda, veri toplama işlemi sadece kağıt anket üzerinden gerçekleştirilebilir; böylece anket doldurulan ortamın kontrolü tüm katılımcılar için maksimum düzeyde sağlanabilir. Katılımcılara anket öncesinde parasal yardım ya da hediye çeki gibi teşvik edici unsurlar sunulduğunda, anket sorularını cevaplarken daha fazla motive olmaları sağlanabilir. Buna ek olarak, katılımcıların cinsiyet oranı eşitliği sağlanarak ve sadece iki disiplinden lisans öğrencilerinin katılımı ile daha homojen bir katılımcı havuzu dizayn edilebilir. Bundan başka, bu çalışmada kullanılan çerçeveleme etkisi azaltma yöntemleri, aynı zamanda gelecekte bir amaç çerçeveleme tasarımı üzerinde incelenebilir. Belirli davranışlar üzerinde kısa vakalar oluşturularak katılımcıların verdikleri kararlar, davranışın gerçekleştirilip gerçekleştirilmeme duruna göre doğacak sonuçlar üzerinden incelenebilir. Literatürde belirtilen farklı çerçeveleme etkisi azaltma teknikleri de farklı katılımcı profilinde incelenebilir. Bu teknikler uygulanarak gelecekteki çalışmalarda farklı bulgular elde edilebilir.

APPENDIX E. TEZ FOTOKOPİSİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü	☐
Sosyal Bilimler Enstitüsü	☒
Uygulamalı Matematik Enstitüsü	☐
Enformatik Enstitüsü	☐
Deniz Bilimleri Enstitüsü	☐

YAZARIN

Soyadı : AKBULUT

Adı : Ezgi

Bölümü : İşletme

TEZİN ADI (İngilizce):Debiasing Framing Effect: Analytical Processing and Explicit Warning

TEZİN TÜRÜ: Yüksek Lisans ☒ Doktora ☐

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir. ☒
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir. ☐
3. Tezimden bir bir (1) yıl süreyle fotokopi alınamaz. ☐

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: