



HACETTEPE UNIVERSITY
Graduate School of Social Sciences
Department of Economics

**THE GOOD, THE BAD AND THE UGLY: TRILATERAL DIMENSIONS OF
CHOICE OVERLOAD IN DECISION MAKING PROCESS**

Yalçın YALÇIN

Master's Thesis

Ankara, 2016

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Yalçiner YALÇIN tarafından hazırlanan "İyi, Kötü ve Çirkin: Seçenek Fazlalığının Karar Verme Sürecindeki Üç Yönlü Boyutu" başlıklı bu çalışma, 29.01.2016 tarihinde yapılan savunma sınavı sonucunda başarılı bulunarak jürimiz tarafından yüksek lisans tezi olarak kabul edilmiştir.



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TEŞEKKÜR

Çalışmama sundukları değerli katkılarından ötürü danışmanım Yrd. Doç. Dr. Selcen ÖZTÜRK’e ve Yrd. Doç. Dr. Mustafa Aykut ATTAR’a teşekkür ederim.

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Ayrıca anket çalışmasında yer alan tüm katılımcılara yaptıkları katkılardan ötürü teşekkürlerimi sunarım.

Çalışmanın ilgili herkese faydalı olması dileklerimle...

ÖZET

YALÇIN, Yalçmer. “İyi, Kötü ve Çirkin: Seçenek Fazlalığının Karar Verme Sürecindeki Üç Yönlü Boyutu”, Yüksek Lisans Tezi, Ankara, 2016.

Bireylerin karar alma süreçlerinde temel olarak iki farklı görüş bulunmaktadır. Bunlardan ilkinin rasyonel bakış açısı, ikincisini ise davranışsal yaklaşım oluşturmaktadır. Rasyonel yaklaşım rasyonellik varsayımına dayanmaktadır. Bu varsayım iktisat literatüründe kendisine yer etmiş ve birçok iktisadi modelin oluşumuna katkı sağlamıştır. Ancak günümüz iktisat teorileri diğer bilim dallarındaki gelişmelere kayıtsız kalamamıştır. Özellikle finans ve hizmet piyasalarındaki insan davranışlarının incelenmesi ile birlikte, varsayım temeline dayanan rasyonellik olgusu da sorgulanabilir bir hale gelmiştir. Sosyoloji, psikoloji, pazarlama, finans gibi alanlarda yapılan çalışmalarla birlikte yeni bir alanın, davranışsal iktisat olarak bilinen yaklaşımın temelleri atılmıştır. Buna göre, insanlar çevresel ve psikolojik faktörlerden bağımsız olarak karar alamamakta, bu faktörlerdeki değişimler insanların sistematik ve öngörülebilir bir şekilde hata yapmalarına yol açmaktadır. Bu doğrultuda, çalışmanın temel amacını insanların karar alma süreçlerinin iktisadi modeller çerçevesinde daha tutarlı ve güvenilir bir şekilde incelenmesine katkı sağlamak oluşturmaktadır. Konunun literatürdeki yeri ve kapsamı oldukça geniş olmakla birlikte, mevcut çalışmada “seçenek fazlalığı” olarak bilinen ve karar alma süreçlerini etkileyen olgu üzerinde durulacaktır. Böylece rasyonel varsayım temeline dayanan birtakım kabullerin, gerçek hayat ile olan ilişkileri incelenecek ve gerçek hayatta karşılaşılan problemler karşısında karar vericilerin nasıl bir tutum sergiledikleri aydınlatılmaya çalışılacaktır. Bu çaba, daha doğru ve gerçekçi bir teorinin oluşmasına, piyasaların daha iyi anlaşılmasına olanak tanıyacaktır.

Anahtar Sözcükler: Davranışsal İktisat, Davranışsal Eğilimler, Davranışsal Karar Alma Süreçleri, Seçenek Fazlalığı, Optimal Seçim.

ABSTRACT

YALÇIN, Yalçın. “The Good, The Bad and The Ugly: Trilateral Dimensions of Choice Overload in Decision Making Process”, Master’s Thesis, Ankara, 2016.

There are two different views on human decision making processes. One suggests that all economic agents make optimal decisions, and the other argues that these agents have behavioral biases and they are destined to plunge into sub-optimal decisions. In literature, former is known as classic or rational economic theory on decision making, and the latter is known as behavioral approach. Rational theory is based on the assumption of rationality. This assumption has contributed to the development of many economic theories and used in different analysis of economic approach. However, this view of classical thinking has gradually become questionable. Especially after the development of new studies on finance, psychology, sociology, and marketing, a new approach on decision making has emerged namely known as “behavioral thinking”. According to this view, individuals can’t make decisions without considering circumstantial, psychological and environmental factors, and it eventually leads them making systematic and predictable mistakes. In this vein, the purpose of the study consists of representing a more viable and consistent theory of decision making. Although the scope of this issue has a wide-range of implementations, we will concentrate our efforts on the concept known as “choice overload”. In this way, it will be possible for us to see the differences between theoretical and actual decision-making processes. It is believed that this endeavor will help us forming a more realistic theory of decision-making, and markets will be understood better which will also help development of new economic studies.

Keywords: Behavioral Economics, Behavioral Biases, Behavioral Decision Making, Choice Overload, Choice Optimality

TABLE OF CONTENTS

KABUL VE ONAY	İ
BİLDİRİM.....	İİ
TEŞEKKÜR.....	İİİ
ÖZET.....	İV
ABSTRACT	V
TABLE OF CONTENTS	VI
INTRODUCTION.....	1

CHAPTER I

DECISION MAKING STRATEGIES AND THEORETICAL FRAMEWORK	3
1.1. RATIONAL DECISION MAKING THEORY.....	3
1.1.1. Historical Background.....	3
1.1.2. Rational Choice Theory.....	5
1.2. BOUNDED RATIONALITY AND BEHAVIORAL DECISION MAKING	9
1.2.1. Biases and Heuristics in Decision Making Process.....	9
1.2.1.1. Bounded Rationality	11
1.2.1.1.1. Judgment Errors.....	11
1.2.1.1.2. Choice Errors.....	15
1.2.1.2. Bounded Willpower	21
1.2.1.3. Bounded Self-Interest	22
1.3. GENERAL FACTORS THAT AFFECT DECISION MAKING PROCESS.....	24
1.4. INVALIDITY OF THE AXIOMS OF RATIONAL CHOICE.....	25
1.5. CONSUMER DECISION MAKING STRATEGIES	28
1.5.1. Compensatory Strategies	32
1.5.2. Non-Compensatory Strategies	32

CHAPTER II

THE CONCEPT OF CHOICE OVERLOAD AND THE ACCURACY OF DECISIONS	35
2.1. CHOICE OVERLOAD	35
2.2. OPTIMAL ABILITY TO CHOOSE AND THE PAST STUDIES	39
2.3. A STUDY ON CHOICE OVERLOAD CONCEPT AND THE ACCURACY OF DECISIONS	47

2.3.1. The Method.....	47
2.3.2. Data and the Test Design.....	50
2.3.3. The Results	52
2.3.4. Discussion.....	63

CHAPTER III

POLICY IMPLICATIONS ON COMPETITION THEORY: A PERSPECTIVE ON CHOICE OVERLOAD EFFECT	64
3.1. SUPPLY & DEMAND FACTORS IN A COMPETITIVE MARKET	64
3.2. CHOICE OVERLOAD AND ITS EFFECT ON WELFARE THEORY	66
3.2.1. Positive Aspects of Choice Overload (The Good Side)	69
3.2.2. Negative Aspects of Choice Overload (The Bad Side)	71
3.2.3. Competitive Outcomes at the Overloaded Markets (The Ugly Side).....	73
3.3. A NEED FOR PATERNALISM?.....	82
CONCLUSION	84
REFERENCES.....	86
APPENDICES.....	95
APPENDIX 1 – COFFEE MUG EXPERIMENTS.....	95
APPENDIX 2 – STATUS-QUO EFFECT SURVEY STUDY	96
APPENDIX 3 – HOMOGENEITY OF GROUPS - TEST QUESTIONS (QUESTIONNAIRE 1).....	97
APPENDIX 4 – PREFERENCE AND PRIORITY OF PARTICIPANTS - TEST QUESTIONS (QUESTIONNAIRE 2).....	100
APPENDIX 5 – CHOICE TEST (QUESTIONNAIRE 3 – TWO OPTIONS VERSION)	103
APPENDIX 6 – TEST RESULTS OF GROUP A (WEIGHTED BY INDIVIDUAL PREFERENCES AND ALTERNATIVE SPECIFICATION).....	106
APPENDIX 7 – TEST RESULTS OF GROUP B (WEIGHTED BY INDIVIDUAL PREFERENCES AND ALTERNATIVE SPECIFICATION).....	110
APPENDIX 8 – TEST RESULTS OF GROUP C (WEIGHTED BY INDIVIDUAL PREFERENCES AND ALTERNATIVE SPECIFICATION).....	118
APPENDIX 9 – POST STUDY STATEMENT RESULTS – ALL GROUPS.....	130
APPENDIX 10 – EC MICROSOFT INTERNET EXPLORER CASE - REMEDY.....	131
APPENDIX 11 – DECISION OF THE ETHICS BOARDS AND COMMISSIONS.....	132
APPENDIX 12 – AUTHENTICITY REPORT	133

TABLES

<i>Table 1: Two Cognitive Systems</i>	10
<i>Table 2: Gamble Study Results</i>	27
<i>Table 3: Summary of Empirical Violations</i>	28
<i>Table 4: Summary of Empirical Violations</i>	34
<i>Table 5: Distribution of Participants (University)</i>	51
<i>Table 6: Distribution of Participants (Department)</i>	51
<i>Table 7: Distribution of Participants (Gender)</i>	52
<i>Table 8: Maximization Scale (ANOVA Test Results)</i>	53
<i>Table 9: Pre-selection Statistics</i>	54
<i>Table 10: Test Group Descriptions</i>	55
<i>Table 11: Data Set Example (First Six Rows)</i>	56
<i>Table 12: Probabilities of Selection (Two Alternatives Setting)</i>	57
<i>Table 13: Probabilities of Selection (Six Alternatives Setting)</i>	58
<i>Table 14: Probabilities of Selection (Twelve Alternatives Setting)</i>	59
<i>Table 15: Post-Selection Statistics</i>	61
 <i>Table A 1: Results of Two Experiments</i>	 95
<i>Table A 2: A Small Part of the Questionnaire</i>	96

FIGURES

<i>Figure 1: Hypothetical Value Function</i>	17
<i>Figure 2: The Competitive Cycle</i>	65
<i>Figure 3: Equilibrium of Supply and Demand Curves</i>	67
<i>Figure 4: Spatial Competition Between Two-Firms</i>	74
<i>Figure 5: A Hypothetical Segmented Market</i>	76

INTRODUCTION

We live in a world with full of possibilities. As these possibilities “were” and “will be” a part of our life, we can shape our future as well as others by deciding each step of it. This occurrence is known as “butterfly effect”¹. Apart from countless consequences of this phenomenon, understanding the process may enlighten our path towards a better evaluation of human decision making.

The process of individual decision making has been a focal interest for over 100 years. On the one hand, rational decision theories has discussed the process and created a well-known type of agent namely “*homo-economicus*”. This typical human being has evolved in time and some assumptions of it has been relaxed. Nevertheless, rational decision theory reached to the 20th century and shaped many economic theories in our time. On the other hand, alternative explanations of human behavior gave rise to a new theory which is known as “the behavioral decision theory”. Apart from rational decision theories, mistakes, biases and other types of distorted decisions included in the theory and a more realistic human behavior were tried to be portrayed by the proponents.

So how should decision process be understood? What are the dynamics that influence our decision process? Is it possible for an individual to affect another one’s future? Are there any systematic relationship between separate events? We can easily proliferate questions regarding to this matter. However, what we would like to demonstrate here is the importance of vast probabilities that shapes our future. Which conditions affect probabilities of decisions?

There are lots of decision problems that we encounter each day and those problems consist of hundreds of alternatives. One and maybe the most salient example is related to the supermarkets. To be able to create a convenient trade environment, supermarkets

¹ In chaos theory, the butterfly effect is the sensitive dependence on initial conditions in which a small change in one state of a deterministic nonlinear system can result in large differences in a later state.

earned great importance, and they display almost any kind of product one would imagine. Even though buying a bar of chocolate may not seem a daunting task, supermarkets provide us a vast diversity of it and complicate the task significantly. For example, a dark chocolate is produced by adding fat and sugar to the cacao mixture, while a white chocolate, although similar in texture to that of milk and dark chocolate, does not contain any cocoa solids. Semisweet chocolate is a dark chocolate with low sugar content. Bittersweet chocolate is chocolate liquor to which some sugar, more cocoa butter, vanilla, and sometimes lecithin have been added. It has less sugar and more liquor than semisweet chocolate, but the two are interchangeable for baking. Unsweetened chocolate is pure chocolate liquor, also known as bitter or baking chocolate. On the other hand, raw chocolate often referred to as raw cacao, is always dark and a minimum of 75% cacao. Because the act of processing results in the loss of certain vitamins and minerals (such as magnesium), some consider raw cacao to be a more nutritious form of chocolate (Russo, 2009). These specifications are only the basic differences between products in a long list of chocolate bar alternatives.

A common assumption in economics is that options benefit consumers as these options provide for a potentially better match between consumers' own preferences and the product's offerings. However, this may not be the case in all circumstances as we will try to explain in this study. Finding the appropriate answers to the following questions constitute an important part of this study: Do options affect human decision making process? If so, which effects will occur? What are the economic consequences of these effects? What implications and policy tools should be suggested? In this vein, firstly, a theoretical framework of rational and behavioral decision making processes will be portrayed and several examples of such situations will be presented. After that, consumer decision strategies will be analyzed in terms of compensatory and non-compensatory decision strategies. In the second part, effects that are caused by the overburden of choices will be explained and the term "choice overload" will be defined. In this chapter, both statistical and analytical results of several experiments will be analyzed, and in the last part of the study, findings of these experiments will be transformed and embedded in the policy tools and competition theory. This will enable us to sustain a consistent and robust economic theory on decision making process.

CHAPTER I

DECISION MAKING STRATEGIES and THEORETICAL FRAMEWORK

1.1. RATIONAL DECISION MAKING THEORY

How do people cope with decisions they must make, some of which involve difficult trade-offs and uncertainties? However difficult the problem seems to us, this is not the case for a maximizer in a rational decision making study. This maximizer has well-defined and consistent preferences, and always acts in a way that maximize his/her own “utility”. It is also assumed that this maximizer has enough information enabling him properly assess the costs and benefits of each options, so that the right choices can be made. If there is not enough information to choose the best alternative, maximizer will seek additional information with an associated cost of acquiring it. When the costs and benefits of all these alternatives have been weighed up, the chosen outcome would maximize individual well-being according to rational decision making theory (Becker 1976, p.3-14; Rubin 2005, p.1092).

A real maximizer will figure out the costs of gathering and assessing information. A prolonged and exhaustive search of alternatives is not the way a maximizer should follow as these search processes have enormous costs associated with them. At this juncture, it is expected from a maximizer to project all search processes and figure out when information seeking will reach to the point of diminishing returns. This is the point where a maximizer should stop searching for additional information and/or alternatives and choose the best alternative.

1.1.1. Historical Background

In classical and neo-classical thinking, rational acts or rational behaviors have prominent roles especially when we deal with individual decision mechanisms. As this thinking is a core element of many assumptions in economic theory, it is also a starting point for a more grounded and comprehensive analysis of the economy itself.

It is indeed possible to take rational behavior thinking to the studies of John Stuart Mill in 1840 (Mill 1943; Mill 1948). Even though a complete definition of rational behavior was not defined at those days, steady progress of rational behavior thinking created an artificial rational human being which is also known as “*homo economicus*”. Schneider (2010, p.4-7) summarizes it as follows:²

- It is an egoist who puts himself first.
- It applies economic principles into action.³
- It maximizes utility⁴ and is immune to falsification.
- It reacts systematically to the changes in constraints and/or its preferences.
- It knows what it wants and has stable preferences.
- It is fully informed at all times, abstracting itself from the existence of uncertainty and information costs.

Homo economicus is an artificial being which is not possible to come across in daily life. Because of its unrealistic attributes, and exclusion of complexities in daily life, many criticisms brought by many authors. Nevertheless, it helped many economic theories to be developed with its applicable and simple characteristic.

Following years evolved *homo economicus* into a being that has more relaxed assumptions of rationality. As Posner (1998, p.4) mentioned, rational maximization shouldn't be confused with a computer's comprehensive calculations and an action might be deemed as rational if it falls under the rational choice model. To be able to present a better understanding of today's rational behavior, this study will debate on two

² For more information see (Becker, 1976).

³ Actions are rational if they satisfy the economic principle of achieving set targets with the minimum allocation of resources or aiming for the maximum possible degree of target achievement with given resources.

⁴ Utility is the ability of an option to satisfy our needs and desires. We define a “value” term for each of the available options.

important issues (namely “*expected utility theory*” and “*subjective optimal decisions*”) that shape rational choice theory.

1.1.2. Rational Choice Theory

Behaviors of individuals were examined by many economic models. One of the most common assumptions of those models includes that individuals are motivated by monetary rewards. These assumptions attracted many other social scientists and made them concentrate on the fact that actions of individuals might be somewhat rational in itself. This approach contributed to the development of a theory which is known as “*rational choice theory*” (Scott 2000, p.126).

According to this theory, human beings have pre-established ends as a result of their beliefs. They are deemed rational if they choose the optimal mean to realize those pre-establish ends (Rubin 2005, p.1092). At this point, it is very important to note that optimal mean is determined at the exact moment of decision process. Because of this fact, it is very possible to see that a mean might not be the optimal one for another decision-maker or the same decision-maker in a different period of time. So, if a decision-maker chooses the optimal mean with his/her available knowledge, he/she is deemed as a rational decision maker.⁵

Expected-Utility Theory

The core of the theory is constructed by the “expected utility rule”. In other words, a decision maker’s choice will be influenced by utilities of each possible alternatives. In the past, it was used prescriptively in management science, predictively in finance and economics, and descriptively by psychologists. Consequently, the model has become the focus of many theoretical and empirical researches.

⁵ For more information see (Becker, 1976, p.13-14).

The use of normative analyses and creating a rational decision model to predict and explain actual behaviors have several justifications (Tversky and Kahneman 1986, p.251). First, it is reasonable to assume and describe choice as a maximization process because individuals generally thought to be effective in pursuing their goals. Second, competition favors rational individuals as optimal decisions increase the chances of survival in a competitive environment. Third, the intuitive appeal of the axioms of rational choice makes it plausible that the theory derived from these axioms should provide an acceptable account of choice behavior.

According to the rational choice theory, an individual evaluates and ranks all feasible alternatives, and he/she simply ranks them according to his/her preferences and chooses the alternative that has the highest utility. For example, in a commodity consumption problem, the choice process can be expressed in a compact form as follows:

$$\max_{Q_1, \dots, Q_n} U(Q_1, \dots, Q_n)$$

is subjected to

$$\sum_1^n p_i Q_i = Y$$

where $U(.)$ is the utility level, p_i is price of the commodity and Q_i is consumption of i^{th} commodity, and Y is income. Each of these alternatives have a different utility level, and these levels are comparable to each other. In this decision problem, decision maker will choose the best alternative by evaluating each alternative's utility levels. Consequently, highest utility level will be chosen over others.

Expected-utility theory (von Neuman & Morgenstern 1944; 1947) has long been the standard model for decision under risk although the descriptive validity of it has long been questioned (Payne et al 1992, p.107). The goal has been to model risky decisions in a way that will allow trade-offs between probabilities and values. Axiomatic analysis of the foundations of it reveals four substantive assumptions: cancellation, transitivity, dominance and invariance.

Cancellation: In this property, if A is preferred to B , then the prospect of winning A if it rains tomorrow should be preferred to the prospect of winning B if it rains tomorrow because the two prospects yield the same outcome if there is even no rain tomorrow.

Transitivity: This assumption is necessary and essentially sufficient for the representation of preference by an ordinal utility scale u such that A is preferred to B whenever $u(A) > u(B)$. Thus transitivity is satisfied if it is possible to assign to each option a value that does not depend on other available options. According to transitivity, following relations must be satisfied:

whenever $A > B$ and $B > C$, then also $A > C$

whenever $A \geq B$ and $B \geq C$, then also $A \geq C$

whenever $A = B$ and $B = C$, then also $A = C$.

Dominance: If one option is better than another in one state and at least as good in all other states, the dominant option should be chosen.

Invariance: Different representations of the same choice problem should yield the same outcome. That is, the preference between two options should be independent of their description.

In light of these properties, expected utility models deal with choices among risky prospects whose outcomes may be single or multi-dimensional (Schoemaker 1982, p.530). We can demonstrate a choice problem in a risky environment by denoting various outcome vectors (x_i) with probabilities for each outcome (p_i) like:

$$\sum_1^n F_{p_i} U_{x_i}$$

and denoting probabilities as:

$$\sum_1^n p_i = 1$$

In an expected-utility model, decision maker evaluates each outcome with respect to its probabilities and maximizes the utility function by using relevant alternatives.

Subjective Optimal Decisions

Another important aspect of rational choice theory is the subjectivity of decisions. In other words, theory accepts decisions which are subjective as long as they are optimal according to an individual's knowledge and state at decision time. As Keller and Staelin (1987, p.201) mentioned in their article, a nutritious brand might not be a universal solution in a choice problem. Many nutritionists (and consumers) believe what is best for one person may not be best for another person.

It is possible to give other examples for the subjectivity of decisions. For example Rubin (2005, p.1096) mentions in his article about two hypothetical and separate firms that are named as "*Trusty*" and "*Crusty*". In this setting, it is demanded from investors that they have to choose one equity out of ten possible alternatives. According to the scenario, Trusty's stocks have performed well, and on the contrary, Crusty's stocks haven't been able to perform as well as Trusty by the end of the year. Rational choice theory does not interpret this situation by suggesting the investors of Trusty are more rational than the investors of Crusty. What the theory suggests here is the subjectivity of the decisions might cause this outcome and investors of Crusty might have had deficient information at the decision time. Therefore, investors that have more and higher quality information would select Trusty's stocks and invest their money to this firm. Rubin (2005, p.1096) at this point states that it is possible for Crusty investors to change their decision in the following years. As these investors experience the bad outcomes of their decisions, they will learn from their experience and change their previous investment decisions. Otherwise, those persist on bad investment decisions will be out of the game, and, one way or another, market will come to an equilibrium.

1.2. BOUNDED RATIONALITY AND BEHAVIORAL DECISION MAKING

In the previous section, basic tenets of rational decision making theory have been presented. This decision process has constructed many economic theories and provided an ease while building up each stage of it. However, it is argued by many authors that these assumptions and presentations of human activity cannot represent actual behaviors in a real life setting. Basically from this thinking, Herbert Simon defined human decision process with the help of “*satisficing*” criteria in 1957.⁶ Especially from this date on, many authors such as Tversky and Kahneman (1974), Kahneman and Tversky (1979, 1984), Fischhoff (1975), Weinstein (1980), Samuelson and Zeckhauser (1988), Thaler (1980; 1985; 1988), Thaler and Sunstein (2003; 2008), Camerer and Thaler (1995), Korobkin and Ulen (2000) and Sunstein (2004) approached to the issue with comprehensive and more satisfying explanations. All these works in the literature created a new approach to individual behavior and decision process which is known as “Behavioral Decision Making”, “Behavioral Economics”, “Bounded Rationality” and such. In this section, a compact definition of behavioral aspects on the theory will be presented and differences from rational decision theory will be introduced in light of different experimental and field studies.

1.2.1. Biases and Heuristics in Decision Making Process

According to classical thinking, it is known that a man chooses among fixed and known alternatives, to each of which is attached to known consequences. However, when perception and cognition intervene between decision maker and his/her objective environment, the model no longer proves adequate (Simon 1959, p.272).

Scientists define two different types of systems; “automatic” and “reflective”.⁷ While automatic system operates fast and intuitive, reflective system operates deliberately

⁶ For more information see. Simon (1957, p.270-271)

⁷ An alternative labeling of these systems are System I and System II.

(Thaler and Sunstein 2008, p.19). When we wake up in the morning, we wash our hands, brush our teeth, or, when we arrive at the office we say hello to our colleagues without thinking much. In situations like this, we intuitively use our automatic system. On the other hand, when we decide to buy a new house, or a car or plan a holiday, we cannot reach to a conclusion swiftly. In those situations, we think over the possible alternatives, and make a deliberate decision since our reflective systems are in use.⁸ General attributes of these systems are summarized in the following table:

Table 1: Two Cognitive Systems

Automatic System	Reflective System
Uncontrolled	Controlled
Effortless	Effortful
Associative	Deductive
Fast	Slow
Unconscious	Self-aware
Skilled	Rule-following

Source: (Thaler and Sunstein 2008, p.20)

At this point, we should ask whether agents (both sellers and consumers) operating in a market act according to their automatic system or reflective system. Or more precisely: Are they using these systems substantially and/or effectively? An answer to these questions has been searched for over 60 years. In 1950s, Herbert Simon started this endeavor by defining “*satisficing*” criteria and tried to define “*bounded rational*” behavior.⁹ According to him, individuals are bounded rational and they cannot maximize their own utility, but they can only “*satisfice*” their needs.¹⁰

In real-life situations, people generally have more information than they can process.

⁸ It is necessary to note that we can improve our autonomous system as we practice repetitively. However, it requires too much effort and time.

⁹ For more information see. (Simon 1957, p.270-271).

¹⁰ “*Satisficing criteria*” is the point where we stop our search as soon as we reach to a satisfying solution. This search process normally uses long term memory in dealing with complicated problems, but the process generally operates as if it deals with simple problems (Simon 1979, p.507).

Because of this fact, a decision-maker's information on his/her environment is much less than an approximation to the real environment. In this definition, approximation implies that the subjective world of decision maker resembles external environment closely, but lacks some fineness of detail. Differences between those two worlds involve both omissions and distortions, and arise in both perception and inference (Simon 1959, p.272). These situations can be grouped under *heuristics* and *biases* of decision making process. Because they affect decision process non-consciously, they can provide unexpected outcomes with each occurrence in different settings. To be more specific, individuals require "*mental shortcuts*" as they have limited working memory and computational capabilities. This fact resolves assumptions of rational decision making and prevents the occurrence of expected outcomes of the theory. Hence, the link between judgment and choice becomes separate, and the normative theory deviates from actual outcomes in a systematic manner (Tor 2008, p.243). Consequently, *heuristic* and *biases* cause three types of errors that are called in literature as "*bounded rationality*", "*bounded willpower*" and "*bounded self-interest*" and they form behavioral decision theory.

1.2.1.1. Bounded Rationality

There are two possible stages that bounded rationality might occur. On the one hand, as decisions start with judgments of individuals, these judgments might be disrupted by external factors or uncertainty of the events. On the other hand, choices are outcomes of our judgments. We decide to choose a brand of toothpaste on the basis of our judgments towards generally to toothpastes and specifically to that chosen brand and its alternatives. It is also possible for us to choose sub-optimal brands even under the assumptions of full information and rational judgment. Hence, several factors affect our decision processes and make us act in a way different from rational expectations.

1.2.1.1.1. Judgment Errors

In a decision process, individuals shape their judgments with the availability of relevant information and relationship between information and judgment. For example, let's

define Jane as a shy, introvert, humble and friendly person. Most likely, a question about Jane's occupation will be associated with her personality traits. The reason behind our judgment that Jane is a librarian rather than a sales-person is that she is most likely suit to a librarian stereotype. This link between personal trait and occupation is called ***“representativeness”*** and might be disrupted in a way that generates judgment errors (Tversky and Kahneman 1974, p.1124). Some of those examples include following situations:

One common factor is *“insensitivity to prior probability of outcomes”*. In decision theory, probability of previous outcomes should be included in the process, since these probabilities should be an inseparable part of our judgments. If an individual evaluate the probability by representativeness, prior probabilities will be neglected. In one study, subjects used prior probabilities correctly when they had no other information. However, right after giving them a personality sketch (an additional information) which is not a relevant factor to judge an unknown's occupation, they ignored prior probabilities (Tversky and Kahneman 1974, p.1125).

The second factor is *“insensitivity to sample size”*. As we all know, sample size should move proportionally with the expected outcome of that sample statistics. If probabilities are assessed by representativeness, then the judged probability of a sample statistic will be independent of the sample size. For example, the probability of a coin toss is .50-heads - .50-tails. However, this does not mean that it will be obtained five heads in ten repetitive coin tosses. It is highly possible that deviation will be higher first, but as we continue tossing the coin (and consequently toss it infinite number of times), the probabilities will be expected to be .50-.50.

“Misconception of a chance” factor is another judgment error type under representativeness heuristic. According to this heuristic, people tend to evaluate chance factor locally. In the coin toss example, let's assume that we threw the coin six times and the outcome was H-H-H-H-H-H (all heads). People evaluate this situation as if the probability of a tails in the seventh attempt is higher than another heads. As it is mentioned earlier, sample statistics does not guarantee a .50 chance of a heads in ten

attempts. It tends to give those probabilities in an infinite number of attempts. That is why local probabilities might deviate from the sample statistics.

“Availability” of an object causes judgment errors in many situations (Tversky and Kahneman 1974, p.1127). This heuristic makes us ignore the probability of an outcome, and evaluate those situations according to their appearances, and/or memorability. For example, an individual might judge travelling by airplane is more dangerous than other types of transportation. The reason behind this judgment is directly related to the catastrophic results of an airplane accident.

In most of the situations, people build their expectations from a starting point (Tversky and Kahneman 1974, p.1128). This heuristic is called **“anchoring and adjustment”**. We encounter this heuristic in many situations. For example, we go to a restaurant, and from the moment we get inside we start our evaluations and adjust our beliefs about that restaurant. Even our satisfaction level is determined partially by the moment we see that restaurant. First, we anchor our beliefs to a specific starting point, and then, we adjust it according to the experience we obtain. That is the reason behind our first impression on a person we meet is an important factor for our future relationship with him/her. As a result, selection of a starting point affects our judgments and impairs our decision processes.¹¹

One of the most well-known and important heuristics in behavioral decision theory is called **“over-optimism”**. We experience this heuristic especially when we deal with probabilistic events that may occur in the future. According to the idea, individuals overestimate their positive sides and/or favorable outcomes, while they underestimate their negative sides and/or unfavorable outcomes. This heuristic makes people vulnerable against probabilistic events (Tor 2008, p.254-255). In one study, Weinstein (1980, p.806-820) examined 18 positive and 24 negative hypothetical events with participation of 258 university students and found that people judge that they would

¹¹ For more information see. (Slovic and Lichtenstein 1971, p.649)

encounter positive events more probably than negative ones.

Over-optimism is a common heuristic that we experience in many mundane events. This heuristic impairs our judgments on risk factor, and makes us shoulder risky decisions. For example, many people (especially in developing and under-developed countries) choose not to use the safety belt in their cars, even though the cost of using a safety belt is very small (just a little discomfort). People in those situations underestimate the negative outcomes of a possible car crash (injury or even death). However, statistics prove otherwise.¹²

We like to use the following quotation: “I know this would happen”. We use this saying because of “*hindsight bias*” operates in the background. According to this bias, a situation cannot be judged (whose outcome is known) without thinking about the outcome of it (Fischhoff 1975, p.288-299). The decision maker’s awareness of the bias does not necessarily cancel it,¹³ and so, knowing the outcome of a relevant event always affects our judgments in those situations.

The last bias that causes judgment errors is called “*self-serving bias*”. We evaluate our judgments under the influence of our desires, plans, and/or objectives. We can give an example to this situation from the plaintiff-defendant relationship. Rational theory assumes that these parties will come to an agreement prior to a possible litigation if the disagreement between them is not so conspicuous. Otherwise, a lawsuit which might be prolonged will cause both parties a greater cost. Self-serving bias in those situations makes people believe that they are right without any question or at least advantageous over each other. This outcome proves wrong the idea of a possible agreement between them (Korobkin and Ulen 2000, p.1093-1095).

¹² “Car insurance industry estimates, you will file a claim for a collision about once every 17.9 years. That’s if you’re an average driver, which, whether you’re willing to admit it or not, you likely are.” Source: <http://www.forbes.com/sites/moneybuilder/2011/07/27/how-many-times-will-you-crash-your-car/>, last access 19.04.2015.

¹³ For the relevant experiments see. (Fischhoff 1975, p.289-297), (Kamin and Rachlinski 1995, p.94-99).

1.2.1.1.2. Choice Errors

Choice errors consist of various types of errors that might appear after the judgment stage. The important thing is that our judgment does not lead us make these errors; hence we can still judge our options rationally. These errors appear because human nature as well as certain externalities cause selecting suboptimal alternatives. To be more specific, following factors will be presented in the context of choice errors.

The first factor is known as “*framing and reference point effect*” in the literature. *Framing effect* means that presentation of an alternative will affect our decisions even though this presentation does not necessarily affect our utility function. Tversky and Kahneman (1981, p.453) introduced this effect with the following example:

Example (Framing Effect): In this study, participants were required to answer some questions about a hypothetical event (Asian disease). They were told that U.S. was preparing for the outbreak of an unusual Asian disease, which was expected to kill 600 people. Two alternative programs to combat the disease had been proposed. In the first study Program A and B, in the second study Program C and D were presented to the participants and asked them which option they would choose.

In the first study, 152 people were required to choose among framed options. Results were obtained as following:

- If Program A is adopted, 200 people will be saved. (%72)
- If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved. (%28)

In the second study, 155 people were required to choose among framed options. Results were obtained as following:

- Program C is adopted, 400 people will die. (%22)
- Program D is adopted, there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die. (%78)

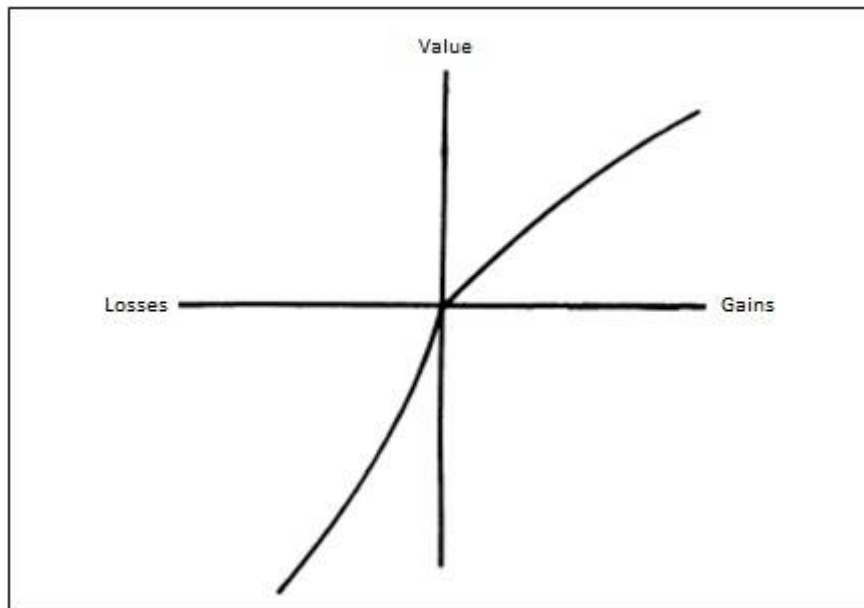
In the first study, even though outcomes of two alternatives were the same (200 people will be saved), the prospect of certainty of saving 200 lives was more attractive than a risky prospect of one-in-three chance of saving 600 lives. The majority of choice in this

problem was *risk averse*. In the second study, presentations of alternatives were changed from the context of “saving” to “death”. Results changed dramatically. Certain death of 400 people was less acceptable in this frame, while two-in-three chance of 600 deaths was more preferable. So the majority in second study were *risk taking*.

These studies illustrate a common pattern: choices involving gains are often risk averse, and choices involving losses are often risk taking (Kahneman and Tversky 1984, p.341-343). Hence, participants in the first study preferred Program A (which consists a certain result), while the participants of second study preferred Program D (which consists an uncertain result).

According to rational choice theory, alternatives are evaluated in terms of their contribution to our total wealth. For example, a 100 TL bet has a consequence of either $\text{Wealth} + 100 \text{ TL}$ or $\text{Wealth} - 100 \text{ TL}$. However, when Kahneman and Tversky (1979, p.263-291) developed “*Prospect Theory*”, a new term which is called “***reference point effect***” casts suspicion on rationality assumption. One of the outcomes of this new theory was that contribution of 100 TL to our wealth might vary according to a reference point we already have. For example, difference in value between 200 TL and 100 TL is precisely 100 TL. In the same vein, the difference between 1100 TL and 1200 TL is the same. They assert that 100 TL in these two different situation are not the same and the value of adding 100 TL to 200 TL income is greater than adding the same amount to 1100 TL. They further support that losses are evaluated at the opposite direction that is the value of losing 100 TL, while the income is 200 TL, has a greater contribution than losing the same amount while the income is 1100 TL. Kahneman and Tversky (1979, p.279) presents this example graphically as follows:

Figure 1: Hypothetical Value Function



Source: (Kahneman and Tversky 1979, p.279)

In the light of reference point effect, the hypothetical value function is concave on the side of gains, and convex on the side of losses. Additionally, when we compare gains and losses, we can see the effect of “*loss aversion*”¹⁴, and this leads curve to have a steeper slope in terms of losses.

Kahneman and Tversky (1984, p.347) studied reference point effect in the following experiment:

¹⁴ According to loss aversion, impact of a change on the side of losses ($-v(x)$) is greater than a change on the side of gains ($v(x)$) which gives us, $|v(x)| < |-v(x)|$.

Example (Reference Point Effect):

Scenario 1: Imagine that you will buy a calculator which costs 15\$. When you go to the shop, you find out that the same calculator costs 10\$ in another shop which takes 20 minutes of walking. Would you make a trip to the other store?

Scenario 2: Imagine that you will buy a jacket which costs 125\$. When you go to the shop, you find out that the same jacket costs 120\$ in another shop which takes 20 minutes of walking. Would you make a trip to the other store?

In the first scenario, calculator is the target product whereas in the second one it is a jacket. The difference between those products is the cost which constitutes a reference point for this experiment. Same amount of saving (5\$) is offered in both scenarios. Rational theory suggests that the result (making a trip to the other shop) will not change as long as the offered saving is the same amount. However, as prospect theory suggested reference point might change the outcome of those two scenarios. The results show that, in the first scenario, 68% of participants will go to the other shop (N=88) whereas 29% of them will go in the second scenario (N=93). The outcome is previously explained by the shape of hypothetical value curve.

Rational Choice Theory suggests that decision-makers evaluate opportunity costs¹⁵ equivalent to out-of-pocket costs¹⁶. In the same manner, it is expected from a rational decision maker that he/she will demand the same amount of entity to purchase a good, as he/she will foregone the privilege of that good (Korobkin 2003, p.1231). At this point, ***endowment effect*** proves otherwise.

When we compare our gains and losses, as prospect theory suggests, we are *loss averse* that we can deduce it from the slope of the hypothetical value curve. Thaler (1980, p.44) suggests that people construe forgone goods as losses, and purchased goods as gains. Hence, people appraise goods that they own above a level that normative theory suggests. Kahneman et al. (1990, p.1325-1346) examined this effect in a series of

¹⁵ Opportunity cost of a choice is the value of best alternative forgone, in a situation in which a choice needs to be made between several mutually exclusive alternatives given limited resources.

¹⁶ Out-of-pocket costs are direct outlays of cash which may be later reimbursed.

experiments:

In the first experiment, with a participation of 44 people, money and commodity were used as medium of exchange. In the first part of the study, a control group was formed and no-endowment effect was tested by using a standard token. Firstly, participants were expected to appraise the purchase of the token. Similarly, they appraised the token which they would forgo the privilege of it. In light of these experimental designs, market price and trade volumes were calculated. Results showed that price level and volume conformed to the expectations (no endowment effect). In the second part of the study, coffee cup and pen were used as the medium of exchange. In this design, results fell apart from expectations. The trade volume of coffee cup was 2.25, and that of the pen was 4.5 (expected value was 11). Further, owners of coffee cup demanded 5.25\$ in average while willing purchasers offered 2.25\$-2.75\$ (Appendix 1). These results showed that endowment effect is an important part of a basic transaction and should not be ignored in terms of economic understanding.

In the second experiment, instead of using money as the medium of exchange, two separate commodities were used in the experimental design. Two separate groups were formed, and accordingly, the first group (N=76) owned coffee cups whereas the second group (N=87) owned a bar of chocolate. Both groups were told that they could trade their commodities with each other. At this point, a third group (N=55) was formed and the participants of this group were told that they would choose between a coffee cup and a bar of chocolate. Results showed that approximately 89% of the first group kept their coffee cup, and only 11% of them trade it with the second group. To see the endowment effect, the results of the third group were presented because they were required to choose a product without holding any privilege on a specific commodity. Since 56% of this group had chosen coffee cup (comparatively a balanced volume), endowment effect was evident in this experiment.

There is another bias that leads us choose suboptimal alternatives. This bias is known as *“the status quo bias”*. Briefly, it means “doing nothing” or “preserving a situation, a position”. According to this bias, alternatives might be excluded by a decision maker

even though those alternatives provide a higher level of utility. Samuelson and Zeckhauser (1988, p.12-19) tried to present this bias with a survey study (N=486). Two types of survey format were used in this study. First one was the unbiased format that participants were required to choose among new alternatives. Second one was the biased type to see whether participants would switch their previously made decision (Appendix 2). Results confirmed that participants were prone to status-quo bias.

It is possible to link this bias with loss aversion. Loss averse people will try to preserve their position because they evaluate their privileges above a level that the normative theory suggests. This attitude towards previous selections will contribute to excluding other alternatives.

Another explanation of this bias might be related to anchoring our judgments to a specific starting point. According to this heuristic, it is not possible to reach to a final decision that is independent of an already determined level. In other words, decision-maker will start his/her evaluation from a previously selected alternative (or position, situation), after analyzing his/her current state, and as a result of it he/she will adjust it to an another level. At this point, the status-quo bias suggests that he/she won't be able to adjust this level radically, and consequently, current state will most likely be preserved.

Last factor that will be mentioned on the issue is ***“mental accounting”***. Classical thinkers suggest that budget or equities are mediums of taking advantage of a higher level of utility. But people use “mental accounting” in many situations, and this fact abolishes the idea of classical thinking. Thaler (1985, p.199-214) explains it with a simple real-life example. A couple goes to a fishing trip and catches lots of fish. As they cannot carry the fish with them, at the end of the day, they decide to cargo those fish. However, their cargo gets lost on its way and our couple have a right to get \$300 compensation. As they get this money, they go to a premium restaurant and spend most of their compensation. This couple has not spent this amount of money to a restaurant in their entire lives. They do mental accounting in this situation. They earned \$300-compensation money from an unexpected event and this money has not actually entered

into their budget as an income item. If they got the \$300 as an increase in salary, they would not spend it carelessly.

1.2.1.2. Bounded Willpower

According to the behavioral decision theory, individuals are impatient beings in general. This specification points out situations in which individuals desire to get positive results (rewards) as quickly as possible. On the other hand, they postpone negative activities (penalties or pay-offs) as far as possible. Thaler (1980, p.56) divides these activities into two sub-section. According to him, it is possible to define positive events in which a prize would be obtained in the near future as “investment goods”, and the negative ones as “negative investment goods”. We can give examples to negative ones such as smoking or drinking activities. These products provide pleasure in near future whereas they provide various health problems in long-term. Studying or exercising are types of investment goods. Positive outcomes (success) are obtained in distant future, while the negative ones (time, effort) should be suffered in short-term.

Before taking an action, it is expected from a rational individual to assess short and long term consequences of a decision process. We can denote this discount parameter as:

$$d(t) = \delta^t, \text{ where } 1 > \delta > 0$$

and δ is known as the discount factor that is $1/(1+r)$. However, individuals might choose alternatives that do not contribute to their interests in long-term (Jolls et al. 1998, p.1479). The situation is known as “*hyperbolic discounting*” which means that short term gains or costs will be evaluated above rational level of a discount factor. If today is denoted as t , a (long-term) period between $(t+1)$ and $(t+2)$ might have a lower, while a (short-term) period between (t) and $(t+1)$ might have a relatively higher discount rate in the eyes of a decision-maker¹⁷ (Laibson 1997, p.445). Hence,

¹⁷ In a decision problem having alternatives of “getting 100TL today”, or “getting 110TL one year later” and with an annual 0.10 discount rate, individuals will prefer getting 100TL today as they estimate a

individuals desire gains in the short run, while they decide to bear costs in the long run.

Hyperbolic discounting causes two types of personalities namely “*a planner*” and a “*doer*”. As Thaler (1980, p.55) suggests, there is a myopic relationship between these two personalities and they contravene in many situations. Assume that you invite your friends to a supper. You put a bowl of snacks on the table since you assume your friends might be very hungry. In this situation, eating some snacks might be rational while waiting for dinner to be ready. However, eating above-optimal level of snack will damage their utilities that they would get from a delicious food. At this point, your friends will encounter a decision problem with three alternatives: (a) eat some snacks, (b) eat all the snacks, (c) eat nothing before the supper. Planner will choose alternative (a) at the start of the process ($t-1$), as he/she assesses short and long run benefits rationally. Thus, according to the planner, it is optimal to stop eating more snacks when he/she reaches to (t) because benefits he/she will get at the supper ($t+1$) will decrease substantially. However, as they reach (t), decision maker will not be *the planner*, but *doer*. That is the reason, *doer* will choose (b) which is the worst alternative of all, and eat all the snacks¹⁸.

1.2.1.3. Bounded Self-Interest

Self-interest can be described in light of the rational choice theory as acting in accordance with individual desires, and maximizing the outcome of a utility function. However, behavioral decision theory raises some questions on this rational way of thinking. People can be described beyond a level that the rational choice theory depicts them. They can be “*nicer*” or “*spiteful*” (Jolls et al. 1998, p.1479). We can see the effects of these attributes in studies known as “*the ultimatum game*”¹⁹.

higher discount rate (above 0.10) in the short-term. On the other hand, if we move the period from today to one year later (that is “get 100TL one year later” or “get 110 TL two years later”), decision maker will probably choose getting 110TL in two years later, as he/she will estimate a lower discount rate (below 0.10) in the long run.

¹⁸ For the original version of this hypothetical example see. (Thaler and Sunstein 2008, p.40-41)

¹⁹ For more information and different versions of the game see. (Thaler 1988, p.195-206), (Camerer and

Example (Ultimatum Game): There are two sides of this game: “*a proposer*” and “*a responder*”. Rules are very simple. A sum of money is entrusted to a proposer and he/she will divide it among himself/herself and responder. There is only one condition. In order for them to earn this money, responder must accept the sum that proposer has already offered to him/her. Otherwise, they will both get nothing. To eliminate distortionary effects, the game is played once and subjects are chosen among people that have no connection or relation with each other. Rational theory suggests that, proposer must offer the least amount of money and responder must accept it as getting something is better than nothing. Results present that proposers offer in average %30-40 of the money, and responders generally rejects the offer if it is under the %20 threshold (Camerer and Thaler 1995, p.210).

There is a dilemma in ultimatum games that proposer might think that his/her offer will be rejected if it is a low amount. Even though this dilemma is more appropriate to repetitive ultimatum games (Camerer and Thaler 1995, p.215), there still might be a tendency for the proposer. In order to eliminate this possibility, it is useful to examine “*dictator game*”²⁰.

Example (Dictator Game): This game is played by “*allocators*” and “*recipients*”. Comparing with ultimatum games, there is an exception in this game as recipients don’t have a choice of rejection. To eliminate distortionary effects, subjects are chosen among people that have no connection or relation with each other and allocators’ identities are kept hidden. In this game, allocators are entrusted 20\$ and they are asked for allocating this money between themselves and recipients. There are only two choices that allocators can choose among (“allocate equally 10\$-10\$” or “allocate 18\$-2\$”). With participation of 161 subjects, %76 of them distribute 20\$ equally between himself/herself and recipients (Kahneman et al. 1986, p.291).

The abovementioned studies presents that there can be irrational behaviors in decision making processes that stems from bounded self-interest nature of individuals²¹.

Thaler 1995, p.209-219).

²⁰ For more information on the game see. (Kahneman 1986, p.290-292).

²¹ It is possible to examine this type of irrationalities under some titles such as social norms, fairness and

1.3. GENERAL FACTORS THAT AFFECT DECISION MAKING PROCESS

The rational choice decision theory suggests a descriptive and normative decision making process. However, we can understand from the discussions presented in this chapter, it is a non-systematic process with full of possibilities. As we try to understand the nature of decision makers, it can be summarized in three-stages dependency (Bettman et. al., p.50-79).

First dependency is about characteristics of a person. We have already discussed many of the heuristics and biases which are parts of every individual. In addition to these characteristic dependencies, both ability and knowledge differences can have major impacts (Bettman et. al., p.63). For example, some decision makers who find arithmetic calculations relatively difficult might more prone to the occurrence of such heuristics and biases. So, instead of using quantitative measures, they use qualitative measures which may change according to personality or experience of a decision maker. This fact also raises some questions whether prior knowledge might be an effect on decision making strategies.

The second one is about the problem itself. When people face a simple problem, they tend to be more analytical and rational as it will be discussed comprehensively in the next chapter. This problem or task dependency affects directly which strategy a decision maker will adopt and which level of rationality he/she will exhibit. As people have deficient memory and computational capacities, they will use heuristics and biases when they face a complex problem.

Complexity could be generated by the design of problem itself, as well as it might be a proxy of individual experiences or perceptions. For example, a consumer goes to a supermarket in order to buy a tube of toothpaste. As there are various brands that

represent the product, including product line extensions, it is highly possible for him/her to be overwhelmed by the number of varieties. According to the normative theory, this consumer will first examine values for several brands on a particular attribute, then select another attribute and compare several brands on it, and so on. This process will repeat itself until he/she will reach a final decision. Hence, as alternatives proliferated, he/she will be restricted in terms of cost (search, get information and process it) and time. Even if we relax the cost and time constraints, it is highly possible for a decision maker to deviate from rational decision making and use heuristics and biases that will distort the process. Consequently, it is probable that a sub-optimal decision will be the outcome of this process.

The third and the last type of dependency is related to the society or social context. Bettman et. al. (1991, p.63) argues that social factors can influence decision making. According to this view, a decision maker might feel accountable to others, such as friends or family members. Such feelings of accountability can lead them to choose alternatives that can be justified more easily to others. Clearly, there is a great difference between deciding for ourselves (only satisfying our desires) and deciding with a friend or a family member that will add another parameter to the decision making problem.

Another social context is about comparing ourselves with other people (Schwartz 2004, p.187-189). The comparison provides information that helps people evaluate experiences. On the other hand, it puts a stress factor on the decider and makes him/her undertake relatively easy tasks or even refrain from doing some tasks. What if I fail? What will others think? What if I cannot meet the expectations? These questions explain social thinking behind those irrational behaviors, and the fact that some social factors discourage people from making rational decisions.

1.4. INVALIDITY OF THE AXIOMS OF RATIONAL CHOICE

Behavioral decision theory introduces heuristics and biases that we presumably all have. Thus, rational theory of decision making might not be “rational” itself. In that regard, it will be discussed whether axioms suggested by rational choice theory are essentially

true in all situations.

Failure of invariance: According to this property, different representations of a problem do not matter and the outcome stays the same. However as it is mentioned earlier, people act in accordance with hypothetical value function. They tend to choose risky alternatives in situations comprising loss problems, on the other hand, they do not want to risk a certain gain in many cases. As it is evident from the Asian disease experiment, even though the outcome of two alternatives were the same (200 people will be saved), the prospect of certainty of saving 200 lives was more attractive than a risky prospect of one-in-three chance of saving 600 lives. The majority choice in this problem was *risk averse*. When presentations of alternatives were changed from the context of “saving” to “death”, results also changed dramatically. Certain death of 400 people was less acceptable in this frame while two-in-three chance of 600 deaths was more preferable. So majority in the second study were *risk taking*.

Failure of cancellation: According to this property, if alternative A is preferred to alternative B, all other conditions that do not affect decision process will not matter and the outcome will be the same. However, as we see from the framing of problems, decision makers might be affected by the certainty level of alternatives. For example, Tversky and Kahneman (1986, p.265) studied responses to the following problem:

Example (Certainty Effect):

Problem 1 (N=77):

Which of the following options do you prefer?

A: A sure gain of \$30 (%78)

B: %80 chance to win \$45 and %20 chance to win nothing (%22)

Which of the following options do you prefer?

C: %25 chance to win \$30 and %75 chance to win nothing (%42)

D: %20 chance to win \$45 and %80 chance to win nothing (%58)

In expected utility theory, a preference for A over B in problem 1 implies a preference

for C over D in problem 2. Contrary to this prediction, the majority preference switched from the lower prize (\$30) to the higher one (\$45) when the probabilities of winning were substantially reduced.

Failure of dominance: According to this property, if one option is better than another in one state and at least as good as in others then this option will be preferred to others. We can easily observe the violation of this property in previous examples. For example, when we examine problem 1, alternative A (which yields a \$30 gain) is preferred to B (which yields a \$36 gain) even though this alternative is worse than B. Hence, sub-addition of decision weights might not matter for some cases.

Failure of transitivity: In summary, transitivity means that A is preferred to B, and B is preferred to C, then $u(A) > u(B) > u(C)$. However, for some cases we can see the violation of this axiom. The gambles used by Tversky (1969) are listed in the following table:

Table 2: Gamble Study Results

Gamble	Probability (p)	Prize (x)	Expected Value
A	.29	5.00	1.46
B	.33	4.75	1.58
C	.38	4.50	1.69
D	.42	4.25	1.77
E	.46	4.00	1.83

Source: Tversky (1969)

There are five different gambles which differ with respect to their probabilities (p), and prizes (x). According to this theory if people use a lexicographic semi-order²², their

²² Semi-order means that small differences are responded to as if there were no difference (Luce 1956).

A lexicographic order is illustrated by the task of alphabetizing a list of words.

preferences will be intransitive. Lexicographic semi-order interpretation of Tversky's (1969) results is examined as follows. People first compare probabilities of winning in two gambles. When this difference was large enough (greater than a threshold), they chose the gamble with the higher probability to win. However, when this difference is small, they compare prizes and chose the gamble with larger prize. Suppose that difference in probability must be greater than 0.1 to be decisive. In that case, people would prefer A to C (since $.38 - .29 = .09$, they compare prizes ($5.00 > 4.50$)) and C to E (since $.46 - .38 = .08$, they compare prizes ($4.50 > 4.00$)), but prefer E to A (since $.46 - .29 = .17$, they compare probabilities ($.46 > .29$)).

We can summarize violations of rational theory's axioms in the following table:

Table 3: Summary of Empirical Violations

Axiom	Empirical Violation
Cancellation	Certainty Effect
Transitivity	Lexicographic Semi-order
Dominance	Contrasting Risk Attitudes
	Sub-additive Decision Weights
Invariance	Framing Effects

Source: (Tversky and Kahneman 1986, p.271)

1.5. CONSUMER DECISION MAKING STRATEGIES

Decision is a process which consists of a series of stages. First, we must examine elements that compose a choice: alternatives, attributes of value, and probabilities. Then, we look at how that information is available in the environment, both in terms of content and structure. Finally, we look at other factors that may influence how a consumer responds to a choice task (Bettman et. al. 1991, p.51). However, making a good decision always involves much elaborate thinking and action. We can divide this process into two main stages: pre-choice period and post-choice period (MacCrimmon 1968, p.2-4). Pre-choice process involves three sub-stages. First, we start with figuring

out and defining our objectives. Second, we should evaluate the importance of each objective and search for information related to the decision problem. And then, we should compare the alternatives whether they satisfy our objectives and choose the best one in order to maximize our benefits. At this point, we make a decision and choose one of the available alternatives. In the second stage, we implement our choice and then monitor it for further information which might affect our decisions in the future.

Apart from thinking the boundaries of normative theory, real-life involves uncertainties and constraints upon information-processing capacities. Most of the time, it is very unclear which outcome might be obtained. Hence, evaluation of alternatives upon prior knowledge might mislead decision-makers as they not only have restricted-information, but also have a limited-capacity of processing power. For example, choice difficulty generally will increase (Bettman et. al. 1991, p.51-53);

- If the number of alternatives and attributes increase,
- If some specific attribute values are difficult to process,
- If there is a great deal of uncertainty about the values of attributes,
- If the number of similar attributes becomes smaller.

This difficulty of the decision process might also be influenced by how information is provided in the environment. Information might be conveyed directly through advertisement, package, store-displays, or indirectly through price or position of the product itself. Further, it can be obtained from friends, family, or salespeople. Consequently, a partial or complete set of information could be obtained, and consumer face a decision problem. Given the objectives and information is present in memory, consumer must choose an alternative. He/she might utilize an existing strategy, perhaps one that has been used previously, or constructs a new strategy.

Principle function of cognitive structure is to differentiate various products and services in ways that are useful for decision making (Alba and Hutchinson 1987, p.414). That is why categorization approach is potentially a useful way of examining how consumers

perceive and react to a stimuli (Sujan 1985, p.44-45). According to this approach, consumers have well-defined product categories in memory and expectations about these categories are already coded in the system. Hence, these categories reduce the uncertainty factor and help consumers in evaluation and decision processes.

The development of category structure has been investigated in terms of (Alba and Hutchinson 1987, p.415):

- (a) Level of generality of the category,
- (b) Graded structure that exists within the category,
- (c) Extent to which the category is related to specific and/or non-taxonomic goals.

In *basic level categories*, objects tend to be spontaneously named, and discrimination at this level tends to be easier. For instance, we can start with categorizing cars rather than a definition of sedan or hatchback. But an increase in ability to categorize might suggest finer discriminations can be made with great reliability. Thus, consumers who are familiar with automobiles can distinguish between cars that differ in manufacturer, model, or even year. However, we should note that, the failure of consumers to appreciate a more abstract level of categorization is likely to limit the number of products that are considered to be substitutive potentially resulting in sub-optimal choices.

In *graded structure*, membership of a category becomes a matter of degree. For instance, Coca-Cola might be a better example of carbonated beverage. This graded structure is often referred as prototypicality. Novice consumers will know about prototypical brands, but not atypical ones. Expert consumers on the other hand will be familiar with both types (Alba and Hutchinson 1987, p.416).

Goal derived categories are directly related to the goal itself. For instance, we categorize some types of foods that we cannot eat in a diet program, or, when we travel to a place outside the town, we categorize some types of transportation methods.

Above-mentioned categories help consumers adopting a relatively easier decision strategy. However, it might still depend on the type of consumer which can be divided into two groups: “*maximizers*” and “*satisficers*”. Maximizers need to be assured that every purchase or decision is the best that could be made. In order to do that, he/she must check all the alternatives regardless of which category that alternative belongs to. A maximizer cannot be certain that he/she found the best alternative unless he/she has looked at all the sweaters, or he/she cannot know that he/she is getting the best price unless he/she has checked all the prices (Schwartz 2004, p.77-79). On the other hand, a satisficer doesn’t check all the alternatives. He/she has criteria or standards that should be satisfied. He/she keeps searching until he/she finds an item that meets those standards, and, at that point, he/she stops. It is not important if there is a better alternative out there.

In reality of course, no one is an actual maximizer that searches all the stores, all the alternatives and evaluates each attribute of those alternatives have. Otherwise, it would take a lifetime to buy a pair of shoes. The important thing here is that a maximizer aspires to achieve that goal (Schwartz 2004, p.78). Further, search efforts might also change from an individual to another as we have described in the subjectivity of decisions.

To formulate a more positive, theoretical approach to strategy selection, one must begin by considering consumer’s goals and characteristics when selecting a strategy. At this point, strategy will change in accordance with other factors such as complexity, context, objectives (minimize cost or maximize benefit), and so on. The decision-maker must make a trade-off between positive outcomes and negative ones. How much effort should I make? How much time should I spend? What is the best outcome in this situation? Which strategy should I follow? We can proliferate these questions in a given problem structure. However, the important point here is that it will be expected from a decision maker to evaluate all those factors, and reach to a final decision (which is expected to be a rational one) after eliminating sub-optimal alternatives.

A decision strategy can be seen as a sequence of events, such as reading the values of

two alternatives on an attribute, evaluating and comparing them, and so forth. In this vein, consumer choice strategies fall into two basic sub-sections: *compensatory* and *non-compensatory strategies*. In the next section, these strategies are represented in accordance with the categorization used by Bettman et al (1991, p.58-60), Bettman et al (1998, p.189-192) and Payne et al (1988, p.536-537).

1.5.1. Compensatory Strategies

Compensatory strategies consists of a complete evaluation of all alternatives. According to this approach, a decision maker is expected to evaluate all relevant information and make a trade-off between good and bad aspects of each alternatives.

The Weighted Additive (WADD) Rule: WADD approach considers value of all relevant attributes of each alternative, and considers all the relative importance of the attributes. This approach requires substantial computational processing of the information. The decision-maker weights all attributes, multiplies with its assigned value and sums over all attributes to arrive at an overall evaluation of an alternative. In the final stage, he/she compares each alternative with respect to their overall evaluations. This strategy maximizes the expected value of a choice.

The Equal Weight (EQW) Rule: EQW approach is very similar to WADD. It considers all of the alternatives and related attributes. However, EQW rule simplifies decision making by ignoring information on relative importance of each attribute.

1.5.2. Non-Compensatory Strategies

Non-compensatory strategies are relaxed form of compensatory evaluations. This time a decision-maker reduces information processing effort and ignores some of them in accordance with the strategy he/she has adopted. This strategies trade-off decision accuracy with costs such as effort and time.

The Satisficing (SAT) Heuristic: Satisficing is one of the oldest heuristics in the

literature (Simon 1957, p.270-271). According to this approach, all alternatives are considered one at a time, in the order they occur in the set. Decision maker specifies a threshold for the decision problem, and value of each alternative is considered to see whether it meets the predetermined threshold. First alternative that has a value which meets this requirement will be selected. If no alternative passes the threshold, level of this threshold might be relaxed and the process will be repeated in the same manner.

The Lexicographic (LEX) Heuristic: The decision maker determines the most important attribute, and then examines all the alternatives in a choice set with respect to this attribute. The alternative with the best value on the most important attribute will be selected. If two alternatives tied, second most important alternative will be considered, and so on, until an attribute prevails.

The Lexicographic Semi-Order (LEXSEMI) Heuristic: According to this strategy, just noticeable difference criteria will be selected for the most important attribute, and if the importance of another alternative for the same attribute remains under this threshold, those alternatives will be eliminated. Otherwise, they will be compared in terms of second most important attribute (Tversky, 1969).

The Elimination-by-Aspect (EBA) Heuristic: It is first described by Tversky (1972). First, the decision maker selects the most important attribute and determines a certain threshold for that attribute. Second, he/she evaluates each alternative according to this specification, and eliminates all alternatives which cannot satisfy the requirement. Process continues with the second most important attribute, and finally, last remaining alternative will be selected.

The Majority of Confirming Dimensions (MCD) Heuristic: It is first described by Russo and Doshier (1983). It involves processing pairs of alternatives. The values for each pair will be compared on all attributes, and the alternative with a majority of winning attribute values will be retained. Retained alternative is then compared with the next alternative in the set, and process of pair wise comparison will repeat until a final winning alternative is identified.

The Frequency of Good and Bad Features (FRQ) Heuristic: Alba and Marmorstein (1987) suggest that decision-makers evaluate or choose alternatives based upon counts of the good and bad features of the alternatives possesses. In other words, decision-maker will determine a threshold for each attribute and then count the number of good and bad features. Depending upon whether a decision-maker focusses on good, bad or both features, different results might be obtained.

The Random Choice (RAN) Rule: According to this strategy, a decision-maker ignores all the relevant information, and chooses an alternative at random. It provides a minimum baseline for measuring both accuracy and effort.

Combined (COMB) Heuristics: Decision-makers might adopt more than one strategy and use a combination of them. Such combined strategies have an initial stage where poor alternatives are eliminated, and then a second phase examining the remaining alternatives in more detail (Bettman et. al. 1991, p.59; Payne 1976).

Table 4: Summary of Empirical Violations

Heuristics	Compensatory(C) versus Non- Compensatory(N)	Consistent(C)) versus Selective(S)	Attribute-based(AT) versus Alternative- based(AL)	Quantitative (QN) versus Qualitative(QL)	Evaluation Formed? (Yes or No)	Amount of Information Processed
WADD	C	C	AL	QN	Y	Extensive
EQW	C	C	AL	QN	Y	Extensive
SAT	N	S	AL	QL	N	Variable
LEX	N	S	AT	QL	N	Limited
EBA	N	S	AT	QL	N	Variable
MCD	C	C	AT	QN	Y	Extensive
FRQ	C	C	AL	QN	Y	Variable
RAN	N	S	AL	QL	N	None

Source: (Bettman et. al. 1991, p.61 and Bettman et al 1998, p.191)

CHAPTER II

THE CONCEPT OF CHOICE OVERLOAD and THE ACCURACY OF DECISIONS

In the last twenty years, products have been proliferated at an increasing rate that no previous experience managed to record it. Most firms have been pursuing product expansion strategies, and it eventually led to a segmented marketplace. Although proponents of these strategies assert that consumers desire more options, and these options enhance their welfare; these strategies might fail to satisfy such assumptions. As it is mentioned in the first chapter, individuals have limited processing and computational capacity, and this factor may lead them to make sub-optimal decisions. Further, they might be affected by various external factors such that we see from the framing of decision problems, social or cultural effects and other distortionary externalities. In this chapter, it will be seen how choice overload paradigm exacerbates these effects that distort human decision making process.

2.1. CHOICE OVERLOAD

A common type of processing capacity complexity occurs when decision environment involves numerous alternatives. In this environment, a decision maker must choose one among others although he/she has limited information, time and rationality. Let's assume that you must choose an apple. You go to a small grocery store and there you see only one kind of apple. Since you have no other alternatives, your decision problem seems pretty easy. You either buy it, or return to your home empty-handed. This decision problem gets more complicated when you go to a supermarket. You can see almost all kinds of apples in such vendors as it increases the set of alternatives in the decision process. This time, possible outcomes will not be restricted to a bi-lateral context, but to a multi-lateral context that consists of much more complexity in it. This hypothetical example gives a brief overview about what should be understood from the choice overload effect.

In a market economy, variety persists if one or more of the following is true (Lancaster

1990, p.190):

- Each individual has different consumption regimes and they seek different types of goods.
- Because there is no homogeneity among consumers, tastes might vary accordingly.
- Firms might benefit from the variety of products and they might increase their profits by differentiating their products from those of their competitors.

However these properties provide a necessary base for variety, they are not sufficient to assume that a market has proliferated options. It might exactly vary from one market to another. On the other hand, we can easily state that there is an inclination for both sectors to proliferate options, independent of the necessities they already have. So, what is the rationale behind those occurrences? Why are there hundreds of alternatives for a specific product? Who does get the benefit of it? These are only a few questions which might conflict with the economic theory. That is why we should examine deeply and try to put a reasonable answer to this endeavor.

Understanding an Individual Consumer

Traditional models assume that each consumer has different indifference curves that are strictly convex to the origin and have negative slopes. According to this idea, budget level is the determinant of these consumer's buying behavior. In other words, they are assumed that they will get or at least try to get the highest benefit within the boundaries of these curves.

Strictly convexity implies an inherent preference for variety, since it asserts that there is a combination of n goods that is preferred to any combination of fewer goods which costs no more. When we apply this thinking to a choice situation where there is a group of similar but differentiated goods, it predicts that the individual would consume every product in the group and every brand or variant of those products for some range of relative prices (Lancaster 1990, p.190).

In the meantime, firms position themselves according to the assumption of variety seeking by consumers. They must consider each factor such as the cost of production, distribution and other cost related factors as well as market prices, revenues and willingness to pay for their products. At the end of the day, they must decide on which strategy is feasible and what might be the outcome of those strategies.

Both sides of the marketplace creates a market equilibrium. Once again, classical thinkers assume that this equilibrium has a supply-side oriented mechanism since consumers seek variety in almost all situations. Thus, the degree of product variety has been perceived as limited only on the supply side (Lancaster 1990, p.192). This assumption of consumer behavior and market environment lacks certain considerations like complexity and uncertainty. Due to the fact that these properties directly affect decision making processes, assumptions on variety seeking behavior might also lack some proper corner stone.

Task Complexity and Its Effects on Choice Strategies

The conventional theory assumes that a choice problem is a function of product preference, and this relation is not affected by non-optimal alternatives in a choice set. However, as several studies such as Luce's axioms (Luce 1959), Clark's rule (Clarke 1957) and its extensions (Morgan 1974) suggested, the probability of any product being chosen is a function not only of product preference, but also of the utilities of the non-optimal products (Shugan 1980, p.99). Unfortunately, the influence of those alternatives is still arbitrary and there is not an explanation if a systematic relation exists.

When an individual encounters with a choice problem, he/she tends to evaluate all available information. However, determination has costs which might affect decision processes and strategies. Generally, the net utility of finding the best product from one set of products may be different from the net utility of finding it as best from another set of products. In other words, there might be a cost factor that is associated with the act of making a decision. That is called "the cost of thinking" (Shugan 1980, p.100).

Assume that you are going to buy a tube of toothpaste and there are two alternatives in the store. This means that you must compare possible alternatives only one time ($C(2, 2)$). Now assume that you have three alternatives. This time you must make three comparisons ($C(3, 2)$). These scenarios can be iterated by adding more options to the choice set ($C(n, 2)$) and each item that we consider creates a certain burden of evaluation.²³

The burden of evaluation affects individual decision processes at a substantial level. First of all, it will shape the strategy which will be implemented by decision-makers. In order to reduce cognitive demands of choice tasks, they will adopt simpler decision strategies (Payne 1976). There are various studies (Wright 1975, Payne 1976, Bettman et al 1998, Shugan 1980) related to this problem and they analyze relationship between task complexity and strategy selection. For example, Payne (1976) found that individuals employ search strategies consistent with a compensatory decision process when they face with a two alternative situation. In contrast, they tend to eliminate some alternatives as quickly as possible and process limited information when they face multivariate decision tasks. The result is that information processing leading to a choice will vary as a function of task complexity. It is possible to find similar results in other studies. According to Bettman et al (1998, p.199), an increase in the number of alternatives faced with a consumer lead to greater use of non-compensatory strategies that eliminate alternatives. Jacoby et al. (1974a) also report that number of subjects whose choices are predictable by a compensatory model decreases as number of alternatives increases.

As it can be seen from these studies, task complexity directly affects individual decision processes. More specifically, individuals more frequently prefer the use of non-compensatory strategies in a multivariate complex decision problem, where they prefer compensatory strategies in simpler situations. This strategy change might benefit

²³ In this example, it is assumed that consumers evaluate alternatives pairwise. In certain cases however, there might be a necessity of comparing some sub-groups with more than two alternatives in it.

decision-makers as it eliminates some alternatives and requires less information processing capability. However, this convenience comes with a certain drawback which we know and try to explain in this study as irrational or sub-optimal decisions.

2.2. OPTIMAL ABILITY TO CHOOSE AND THE PAST STUDIES

In the past, there are many studies that try to identify a consistent framework on decision strategies and their outcomes, yet there is not a unified point of view in those arguments. In some studies, they support rationality in a very strict form, while in others they relax some properties of the theory and add a certain level of relativity to the decisions. The design of those studies also varies. In some studies, context becomes the dependent variable, whereas in others attributes of options and/or available information on them becomes the one.

Earlier experiments in this area started in 1960s. Anderson et al. (1966) conducted two laboratory experiments to see the effects of number of choices on decision effectiveness. In 1970s, Jacoby and his associates (Jacoby et al 1974a; Jacoby et al 1974b) presented the results of their experiments to ascertain the influence of the amount of information available to a consumer on his/her ability to make a correct choice among food products. In this work, the concept of information overload was presented, but questioned immediately by a number of academics (Russo 1974; Staelin and Payne 1976; Wilkie 1974). In 1977, Scammon (1977) published the results of a study that fixed the number of alternatives at two. In the study, she changed the number of attributes and asked to identify the brand that was nutritionally superior instead of choosing their best alternative. More studies have been published in the following years.

Studies in 1960s

In 1966, Anderson et al. (1966) published the results of two laboratory experiments. In these experiments, they tested two hypotheses:

- 1- *“In a multiple alternative situation where one alternative is presented as correct more*

frequently than the others, predicting the occurrence of the more frequently occurring alternative is independent of the number alternatives available.”

- 2- *“The effect of a stimulus change in one of the less frequently occurring alternatives upon the choice of the other alternatives is independent of the number of alternatives available.”*

They formed six test groups which were divided into four experimental groups and two control groups. Half of the experimental groups had two brands; and the other half had five brands of cake mix. They tested two and five cents of price drops with a trial format. The first hypothesis that $P(A)$ is independent of the number of choices was evaluated by analysis of variance and the findings indicated to reject this hypothesis. Similar findings, based on the five cent drop group, led them to the rejection of hypothesis 2.

The rejection of first hypothesis demonstrated that the number of alternatives in a decision environment actually affects choices. Also, the tendency towards not considering all alternatives was specifically demonstrated by the rejection of hypothesis 2. Here in multi-alternative situation, price drop of a brand affected subjects' choices less than it is in the two brand condition. Assuming that price drops are for the benefit of consumers, they seemed to be less sensitive to the changes in multi-alternative situation.

Studies in 1970s

In 1974, Jacoby et al (1974a) conducted an experiment in order to see the effects of information load on decision effectiveness. The subjects were 153 university students. They formed nine different cells that comprise 17 subjects in each cell. They received either 2, 4 or 6 items of information for either 4, 8 or 12 bogus brands of laundry detergent. The results showed that accuracy of decisions was inversely related to number of brands and positively related to number of items of information per brand.

In the same year, Jacoby et al (1974b) conducted another study and tested that

consumers could effectively use finite limits of existing information. The subjects were 192 paid housewife volunteers. There were either 4, 8, 12, or 16 brands and either 4, 8, 12, or 16 bits of information per brand. Performance accuracy was estimated by considering “most preferred brand accuracy” and “rank order accuracy” measurements. Former measurement indicated that accuracy generally decreased for both products as the number of brands increased. On the other hand, as the number of bits of information per brand increased, accuracy increased for rice; and it first decreased and then increased for prepared dinners. The latter on the other hand indicated that accuracy was stable through 12 brands scheme, increasing for prepared dinner and decreasing for rice at the highest level of number of brands. This measurement also showed that accuracy was constantly increasing across both products as the number of bits of information per brand increased.

In 1975, Wright (1975) tested two hypotheses;

- *“as candidate options increase, the relative difficulty of some strategies changes,”*
- *as candidates increase, the uni-dimensional or cutoff-based strategies may seem relatively easier to use.”*

In this study, subjects were 300 males and females students. He asked participants several questions and each response was made on a seven-point bipolar scale. ANOVA's ran for each response. It is found that non-compensatory strategies were rated significantly simpler than compensatory ones on the relevant scale. In addition, confidence in having made the correct choice decreased as the number of alternatives increased.

In 1976, Payne (1976) conducted an experiment with six subjects of college age. Stimuli in this experiment was “information boards” representing different one-bedroom furnished apartments. The subjects were told that each alternative represented a furnished one bedroom apartment and that they should choose the apartment they would prefer for themselves with the help of available information. A complete

transcript of the verbal reports given by the participants and protocols were broken up into short phrases. Results indicated that the percentage of information searched declined both as the number of available alternatives increased and as the number of dimensions per alternative increased. These findings suggest that subjects tend to eliminate alternatives when they faced with a multivariate choice situation. In this study, another finding was related to the decision strategy selection. When faced with two alternatives situation, subjects employed compensatory decision processes. In contrast, they employed elimination strategies in multivariate decision situations.

In 1977, Scammon (1977) found that simplified information enables more accurate identification of the best brand and leaves subjects dissatisfied with their choice. Four experimental groups were formed in this study and two hypothesis were tested; *(1) Choice quality will be higher for consumers receiving a greater number of dimensions of information, (2) Choice quality will be higher for consumers receiving simplified information.* After exposure to the test commercials, subjects were asked to identify which of the brands were more nutritious. She decided on an objective criterion before testing the hypotheses. After pair-wise group comparisons, she found that “some information” is better than “no information”. The same procedure is repeated for the subjective criterion and she tested two more hypotheses. However, she could not find a significant difference between groups receiving different amounts of information.

In 1979, Lussier and Olshavsky (1979) conducted a study with the participation of twenty-seven MBA students. Portable manual typewriters were selected in this study. They compared test results between groups consisting different numbers of brands and attributes, and found that brand choice strategy is contingent upon task complexity. According to the results, subjects preferred compensatory strategies when they face limited number of alternatives and/or attributes. On the other hand, they preferred non-compensatory strategies when they face complex problems or they first eliminated some alternatives before they use compensatory strategies.

Studies in 1980s

In 1982, Malhotra (1982) published the results of a study consisting of different test groups that vary between 5 and 25 (number of alternatives and number of attributes) alternative test designs. The choice set consisted of hypothetical profiles of houses. Each profile described on a separate index card and personal interviews with 300 male and female heads of houses were conducted. According to the test results, the probability of correct choice decreased significantly as the number of attributes on which information is provided increased. However, it is found that the probability of correct choice did not decrease significantly as the number of attributes increased from five to ten.

In the same year, Huber et al (1982) tested the effects of adding an asymmetric alternative²⁴ to the choice set and found that adding such an alternative increased the share of the item that dominated it. Thus, it violated the regularity assumption. This result indicated that increasing the complexity of the decision task would increase the error in the choices.

In 1983, Huber and Puto (1983) tested attraction and substitution effects in a choice problem. They used the manipulation of the choice set with regard to the number of product classes, dimensions and order of alternatives. They also used a decoy to see the effect of it. There were several findings. Variations were important because results showed that the stronger the decoy relative to the target, the greater the substitution effect. On the other hand, it is found that location (quality) of the decoy did not matter and competitor received one-third share regardless of the quality of decoy. However, it was evident that order of the items was the reason behind attraction effect.

In 1989, Klein and Yadav (1989) tested two hypothesis: *(1) Choices made in contexts with a higher number of dominated alternatives will be more accurate and take less*

²⁴ An alternative is asymmetric if it is dominated by at least one alternative in the set but is not dominated by at least one other.

effort, (2) Choices made in contexts with a higher number of dominated alternatives will be perceived as more accurate. They found that increasing the number of dominated alternatives significantly improved choice accuracy and choice effort. In addition, decision makers simplified choice sets less when there were more dominated alternatives.

Studies in 1990s

In 1990, Kekre and Srinivasan (1990) investigated the benefits and cost disadvantages of broad product lines on a sample over 1400 business units. According to their findings, a firm that has a narrower product line was likely to have, on average, 7-13 share points lower than its competitors. They hypothesized that firms with broader product lines than their competition charge relatively higher prices. It was also supported in the study. Interestingly on the other hand, they couldn't find a strong negative effect of broadening product lines on direct and manufacturing costs.

In 1997, Garbarino and Edell (1997) examined cognitive effort and its influence on choice outcomes through process-induced negative affect. Their proposal was that an alternative preferred less if it required more effort to process. In their study, they manipulated cognitive effort by varying resources required within a choice and number of attributes on which information was presented. Overall, they found that cognitive effort was an important construct in understanding preference and choice. When respondents put forth relatively more cognitive effort, they were less likely to choose the effortful item, unless it was clearly superior.

Studies in 2000s

In 2000, Iyengar and Lepper (2000) conducted experiments in both field and laboratory settings. In the first field experiment, they formed a tasting booth that displayed either a limited (six alternatives) and extensive (twenty-four alternatives) selection of different flavors of jam. The tasting booth was placed in a grocery store and included 754 observed shoppers. First finding was relevant to the attraction effect. Of the 242

customers who passed the extensive selection display of jams, 60% (N=145) actually stopped at the booth. On the other hand, of the 260 customers who passed the limited-selection display of jams, 40% (N=104) stopped. The second finding was relevant to the purchase behavior. In the limited-alternative setting 30% (N=31) of the consumers actually purchased a jar of jam; in contrast, only 3% (N=4) of the consumers purchased it in the extensive alternative setting. Thus, too much choice was found to have detrimental effects on purchasing decisions.

The second study was a laboratory experiment. Students in an introductory social psychology class were given an opportunity to write a two-pages essay on either 6 or 30 potential essay topics. Of the 70 student assigned to the limited-choice condition, 74% turned in the assignment. On the other hand, of the 123 students assigned to the extensive-choice condition, only 60% chose to bring this assignment. It was also found that students assigned to the limited-choice setting performed slightly but significantly better than their counterparts.

The third study was another laboratory experiment which contains three alternatives choice groups: limited choice (six alternatives), extensive choice (thirty alternatives) and a no-choice control (both) condition. There were 33 participants in the limited choice condition, 34 participants in the extensive choice condition, and 67 participants in the no-choice condition. According to the results, participants spent significantly more time deciding which chocolate to sample when there were thirty alternatives. They also reported feeling that they had been given too many alternatives. Extensive-choice condition was found significantly less satisfactory than limited-choice group. And finally, purchasing behavior was coherent with the previous studies.

In 2003, Iyengar et al. (2003) conducted a research using data from nearly 800,000 employees, and tested the hypothesis that employee 401(k) plans was higher in plans offering a handful of funds, as compared to plans offering ten or more options. To test its presence they examined employees' decisions on how much to participate in the retirement plan offered to them by their employers. It is shown in the study that if a plan offered more funds, this depressed the probability of employee 401(k) participation.

Other things being equal, they found that there was a 1.5 to 2 percent drop in participation rates related to every ten funds added to the system. On the other hand, it was evident that participation rates peaked at 75 percent if there were only two funds offered.

In 2008, Frank and Lamiraud (2008) found using both survey data and observations that switching rates to be significantly higher in areas with fewer health plans. According to their study, it was controversial that these findings were observed in the Swiss market for health insurance as one would expect high levels of price competition and active movement among health plans by the participants. However, results from various model specifications pointed to a consistent finding that more choice served to inhibit switching of health plans.

In 2010, Iyengar and Kamenica (2010) analyzed how the size of a choice set influenced which alternative was selected. In this experiment, subjects were shown a set of gambles from which they have chosen one as compensation. There were eleven alternative gambles in the extensive-choice setting, whereas there were three alternatives in the limited-choice setting. According to the results of the first experiment, only %16 of the 69 subjects in the limited-condition have chosen the \$5 for sure, but %63 of the 68 subjects in the extensive-condition did so.

In 2011, Reutskaja et al (2011) used eye-tracking method to see the effects of the number of alternatives on decision process. They addressed three main questions: *(i) What were the computational processes deployed by consumers during the search and decision processes, and to what extent were they compatible with standard economic search models? (ii) How did the processes and their performance change with the number of alternatives? (iii) Were there any systematic biases that could be manipulated?* They found that subjects were good at optimizing within the set of items but, since the initial search process was approximately random with respect to value, it was not the case that items with higher values were more likely to be seen. It was also found that subjects terminated search process using a stochastic stopping rule which contained both optimal search and satisficing elements. Concerning to the second item

(ii), they found that subjects responded to the additional pressure by shortening the duration of their fixation by about 60 ms and by searching for about 250 ms longer. The shift was found to be modest compared to the increase in the number of alternatives, and they found a small impact on the quality of choices. Finally, they found a certain bias that they looked at the center of the display and items that were placed in the region was almost 60 percent more likely to be selected.

2.3. A STUDY ON CHOICE OVERLOAD CONCEPT AND THE ACCURACY OF DECISIONS

In this section, a study on decision making process will be conducted, and stated preferences of each individual will be considered as a relevant measure on this theory. Because there are different methods and results relating to the concept of choice overload, it is believed that the study will contribute to create a more concrete theory on this issue.

2.3.1. The Method

According to the general theory, decision makers can rank possible alternatives in order of preference, and they always choose the most desirable one given his/her tastes and the relevant constraints. We can formalize the theory as follows:

Let each participant i ($i = 1, 2, \dots, m$) in a certain sample or population have a choice set C_j ($j = 1, 2, \dots, k$) which contains j number of different alternatives. Also, let each C_j be associated with a number of attributes depending on the characteristics of different items. We can denote a row vector of x_j as elements of the i^{th} participant's choice function. According to decision theory, we must admit that there is a subjectivity in each decision taken by an individual. To be more specific, we must include another factor which represents judgements of each decision maker. Let y_j represents this factor. Finally, we must define a utility function U_{ij} which will help each decision maker to choose correctly the most desirable alternative. That is;

$$U_{ij} = U(x_{ij}, y_{ij}); \quad i: 1, 2, \dots, m$$

$$j: 1, 2, \dots, k$$

However, it is not possible for us to measure U_{ij} directly, because it must be estimated from cross-sectional data rather than from repeated observations on individual i (Punj and Staelin 1978, p.589). Thus, it is essential to consider two additive elements that represents U_{ij} , a deterministic component V_{ij} and a stochastic error term ε_{ij} , independent of V_{ij} , which is expected to capture all-misspecifications associated with a given subject and alternative. Mathematically this implies

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad \text{where,} \quad V_{ij} = V(x_{ij}, y_{ij})$$

The goal is to estimate the factors that determine V_{ij} both in the rational theory setting that will be calculated according to the weighting of attributes and actual preferences. With respect to the results, the probability of each alternative will be estimated by using logit formula which originally derived by Luce (1959) from assumptions about the characteristics of choice probabilities and denoted as the independence from irrelevant alternatives (IIA) property. It was completed by McFadden (1974) showing that the logit formula for the choice probabilities necessarily implies that unobserved utility is distributed extreme value.

According to McFadden (1974), the logit model is obtained by assuming that each ε_{ij} is independently, and identically distributed (iid)²⁵ extreme value. This distribution is also called Gumbel Law or Type I extreme value²⁶. The density for each unobserved

²⁵ In probability theory and statistics, a sequence or other collection of random variables is independent and identically distributed if each random variable has the same probability distribution as the others and all are mutually independent.

²⁶ In probability theory and statistics, the Gumbel distribution is used to model the distribution of the maximum (or the minimum) of a number of samples of various distributions. Such a distribution might be used to represent the distribution of the maximum level of a river in a particular year if there was a list of maximum values for the past ten years. It is useful in predicting the chance that an extreme earthquake,

component of utility is

$$f(\epsilon_{ij}) = e^{-\epsilon_{ij}} e^{-e^{-\epsilon_{ij}}}$$

and the cumulative distribution is

$$F(\epsilon_{ij}) = e^{-e^{-\epsilon_{ij}}}$$

The mean of the extreme value distribution is not zero. But, only differences in utility matter, and the difference between two extreme value variables is distributed logistic. That is, if ϵ_{i1} and ϵ_{i2} are iid extreme value, then $\epsilon_{i12}^* = \epsilon_{i1} - \epsilon_{i2}$ follows the logistic distribution

$$F(\epsilon_{i12}^*) = \frac{e^{\epsilon_{i12}^*}}{1 + e^{\epsilon_{i12}^*}}$$

Using the extreme value distribution for the errors, we are nearly assuming that the errors are independently normal. This independence means that the unobserved portion of utility for one alternative is unrelated to the unobserved portion of utility for another alternative (Train 2003, p.39).

Following McFadden (1974), we can derive the logit choice probabilities of a decision maker i^* chooses alternative j^* as follows;

flood or other natural disaster will occur.

In the latent variable formulation of the multinomial logit model — common in discrete choice theory — the errors of the latent variables follow a Gumbel distribution. This is useful because the difference of two Gumbel-distributed random variables has a logistic distribution.

$$P_{ij}^* = \text{Prob} (U_{ij}^* > U_{ij} \mid V_{ij} = k_j, j \in \{C_{jj}\}), \forall j^* \neq j$$

$$P_{ij}^* = \text{Prob} (V_{ij}^* + \varepsilon_{ij}^* > V_{ij} + \varepsilon_{ij} \mid V_{ij} = k_j, j \in \{C_{jj}\}), \forall j^* \neq j$$

$$P_{ij}^* = \text{Prob} (\varepsilon_{ij} - \varepsilon_{ij}^* < V_{ij}^* - V_{ij} \mid V_{ij} = k_j, j \in \{C_{jj}\}), \forall j^* \neq j$$

This equation is a statement about probability that the stochastic elements (ε_{ij} 's) take on a specific relationship with respect to observed variables (V_{ij} 's). Because this equation is in the form of a probability statement, it lends itself to maximum likelihood estimation once the joint distribution for ε_{ij} 's is determined and the V_{ij} 's are specifically modeled in terms of parameters (Punj and Staelin 1978, p.589-590).

In this equations, ε_{ij} 's are not given in the model, so we must compute the integral of $P_{ij} \mid \varepsilon_{ij}$ for all values of ε_{ij} weighted by its density (Train 2003, p.40):

$$P_{ij} = \int \left(\prod_{j^* \neq j} e^{-e^{-(\varepsilon_{ij} + V_{ij} - V_{ij}^*)}} \right) e^{-\varepsilon_{ij}} e^{-e^{-\varepsilon_{ij}}} d\varepsilon_{ij}$$

Implementing some algebraic manipulation of this integral results in a succinct, closed-form expression:

$$P_{ij} = \frac{e^{V_{ij}}}{\sum_j e^{V_{ij}}}$$

which is the logit choice probability.

2.3.2. Data and the Test Design

The data in this study contains 150 participants who are currently a member of fourth grade or at least graduated from a major program in university in Turkey. The aim is to form a sample which represents a diversity in terms of experience and they are expected to behave at least on a certain level of rationality.

It is possible to see the distribution of participants among universities in the following table:

Table 5: Distribution of Participants (University)

METU	Ankara University	Hacettepe University	Gazi University	Bilkent University	Istanbul University
33,82%	16,91%	15,44%	11,03%	5,88%	3,68%
Marmara University	Bogazici University	Dokuz Eylül University	Yildiz Tech. University	İstanbul Tech. University	Baskent University
2,94%	1,47%	1,47%	1,47%	0,74%	0,74%
TOBB	Atilim University	Erciyes University	Abant İzzet Baysal University	Cumhuriyet University	Yeditepe University
0,74%	0,74%	0,74%	0,74%	0,74%	0,74%

Source: Survey Results

According to the table, there are 18 different universities and 33,82% of the participants are a member of METU, 19,91% Ankara University and 15,44% Hacettepe University.

Subjects belong to eleven different departments of educational background. Distribution of them as follows:

Table 6: Distribution of Participants (Department)

Economics	Construction Engineering	Business Administration	Physical Therapy and Rehabilitation	Law	Public Administration
23,02%	20,14%	15,11%	11,51%	11,51%	9,35%
International Relations	Political Science	Management Engineering	Finance	Econometrics	Computer Engineering
3,60%	2,16%	1,44%	0,72%	0,72%	0,72%

Source: Survey Results

Gender distribution is provided in the following table:

Table 7: Distribution of Participants (Gender)

Female	Male
48,59%	51,41%

Source: Survey Results

It can be seen from the table that we have a balanced sample in terms of gender distribution.

In this experiment, three different test groups were formed relating to the number of alternatives in a choice situation and to be able to sustain coherence, each group was formed with the help of a random selection method. There are 48 participants in the first group (Group A) which contains a choice design of two alternatives, 50 participants in the second group (Group B) with six alternatives and 52 participants in the last group (Group C) with twelve alternatives. In the first stage, the homogeneity of the groups were tested (Appendix 3). Then, preferences and priorities of each participant were measured by asking a series of questions (Appendix 4). In the last part, the decision making setting was formed, and each participant were required to select the best option according to their interests (Appendix 5). It is believed that results of this hypothetical choice design would show us the difference between theories of rationality and behavioral thinking.

2.3.3. The Results

In this experiment, stated preferences of each participant were measured with the help of a three stages of decision making design.

Stage 1: Pre-Study Design

The primary objective in this design was to sustain homogeneity in terms of

characteristic features. For the purpose, participants were asked 13 questions that will help us measure stated rationality level of each group. At this stage, we implemented the method of Schwartz (2004, p.77-85) which is generally used to distinguish maximizers from satisficers. It is asked to those taking the survey whether they agree on each item. The more they agree, the more they were maximizers. They wrote a number from 1 (completely disagree) to 7 (completely agree) next to each question. The total of each score might range from a low of 13 to a high of 91. If the total of a participant was 65 or higher, he/she would be deemed as a maximizer. On the other hand, if the score was below 40, they were on the side of satisficing. Between the thresholds of 40 and 65, we would consider that they had mixed preferences.

As it is mentioned earlier, we had three test groups: Group A ($N=48$), Group B ($N=50$) and Group C ($N=52$). So, we had a total number of 150 observations. According to the ANOVA test results, we had the following figures:

Table 8: Maximization Scale (ANOVA Test Results)

	Group A	Group B	Group C
Minimum	40.00	29.00	31.00
Maximum	77.00	83.00	79.00
Median	54.50	56.50	59.50
Mean	55.33	57.92	56.96
ANOVA Test Results	F-Stat = 0.758 p. = 0.47		

Source: Survey Results

As it can be seen from the table, we had close mean values between groups. For Group A we had a mean value of 55.33, and with respectively 57.92 for Group B, 56.96 for Group C. To be able to detect if there is a significant difference in between groups relating to the maximization scale, we analyzed ANOVA test results under the null hypothesis that all groups have the same statistical mean values. The reason behind this analysis is to check whether personality characteristics are equally distributed to the

decision making setting. At this point, a low F-statistical value of 0.758 which is not enough to reject the null hypothesis was calculated.

Stage 2: The Study

In the next stage, a hypothetical choice problem was created and participants were asked to buy a hypothetical power drill (Appendix 5). Certain descriptions on how and where to use a power drill were provided, and ten specific features of it were defined as the facilitators to decision making problem. Before starting the decision questionnaire, participants were asked to answer three questions on whether the provided information was clear, whether they have previous experience and whether they have a power drill in their house. The results are reported in the following table:

Table 9: Pre-selection Statistics

	Group A	Group B	Group C
The provided information on power drills was clear.	5.77 (7.00)*	6.04 (7.00)*	6.03 (7.00)*
I have previous experience on power drills.	21 (48)** 43.75%	21 (50)** 42.00%	30 (52)** 57.69%
I have a power drill in my house.	25 (48)** 52.08%	18 (50)** 36.00%	24 (52)** 46.15%

* Out of a possible maximum of 7 points.

** Number of participants in each group is indicated in paranthesis.

Source: Survey Results

Three test groups were asked the same questions. Out of a possible 7 points, participants in each group noted an average 5.77 (Group A), 6.04 (Group B) and 6.03 (Group C) points and the results indicated that they found the information provided to them was fairly clear. When the previous experiences of them were questioned, approximately

half of them answered positively. Similarly, almost half of them answered that they had a power drill in their houses. These results were a little bit surprising since a power drill was not expected to be used much in daily life. On the other hand, it is understood that a majority of participants did not have any experience on a power drill. Thus, it was believed that previous experiences were considerably excluded from the model.

Our method consists of three test groups with a total of 150 participants.

Table 10: Test Group Descriptions

	Group A	Group B	Group C
Alternatives	C and E	G, I, H, C, E, J	B, A, D, G, I, H, C, E, J, F, I, K ²⁷
Participants	<i>N</i> = 48	<i>N</i> = 50	<i>N</i> = 52

Source: Survey Design

In the first group, we had 48 participants who were expected to make a decision between two alternative products. In the second one, we had 50 participants who were offered six alternatives. Finally in the last one, we had 52 participants who were expected to select a product among twelve alternatives. The order of alternatives were preserved to exclude the framing effects and a dominating alternative E was selected before the experiment to measure the relative influence of product proliferation strategy.²⁸

²⁷ In Group C, two identical alternatives (Alternative I) were included to increase confusion and to see the effects of pseudo proliferation in a product line extension.

²⁸ However a dominating alternative was selected, we had injected the subjectivity factor to the model by using the stated preferences of each participants. Thus, the dominating alternative was expected to change according to the differences in preferences. Since we were seeking to examine relative differences between rational and actual results, this factor would not be affected by the subjective nature of rational decisions.

As it is inclusively mentioned in the previous section, we are seeking to find a probability of selection of an alternative that is presented to the members of each groups. We have the following equation:

$$P_{ij}^* = Prob (U_{ij}^* > U_{ij} | V_{ij} = k_j, j \in \{C_j\}, \forall j^* \neq j)$$

To be able to provide a consistent explanation on decision making behavior, we used ten varying specifications on different products. Thus, we can denote a row vector of x_j as elements of the i^{th} participant's choice function. We have

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad \text{where,} \quad V_{ij} = V(x_{ij} | y_{ij})$$

and to be able to calculate $V(x_{ij} | y_{ij})$ we have

$$V_{ij} = \beta x_{ij}(y_{ij}) + \varepsilon_{ij} \text{ where } (i = 1, 2, 3, \dots, 150) \text{ and } (j = 1, 2, 3, \dots, 12)$$

For example, calculating Group A we have the following data set of first three participants;

Table 11: Data Set Example (First Six Rows)

Individual Alternative		Choice..Actual.	Choice..Rational.	Reliability	Battery.Pack.Durability	Torque	Price	Comfort	Power.Source	Guarantee	
1	11	C	0	0	1.5000	1.5000	0.3333	0.8333	0.5000	0	1.1667
2	11	E	1	1	1.5000	1.5000	0.6667	0.8333	0.5000	0	1.7500
3	12	C	0	0	1.7213	1.7213	0.5738	0.1639	0.5738	0	1.1475
4	12	E	1	1	1.7213	1.7213	1.1475	0.1639	0.5738	0	1.7213
5	13	C	0	0	1.6667	1.6667	0.4630	0.7407	0.3704	0	0.9259
6	13	E	1	1	1.6667	1.6667	0.9259	0.7407	0.3704	0	1.3889
Durability.of.the.Drill		Drilling.Capacity	Power	Max.Scale							
1		1.1667	1.5000	1.5000	61						
2		1.7500	1.5000	1.5000	61						
3		1.1475	1.7213	1.7213	56						
4		1.7213	1.7213	1.7213	56						
5		1.2963	1.6667	1.3889	66						
6		1.9444	1.6667	1.3889	66						

Source: Survey Results

The logit model is useful when one tries to explain discrete choices, i.e. choices of one among several mutually exclusive alternatives. Once fitted, a logit model is useful for predictions (i) enter new values for the explanatory variables, (ii) get at an individual level the probabilities of choice, at an aggregate level the market shares (Croissant, p.2). The formula will be used to get the relevant results for each group of participants and the following null hypothesis will be tested:

H₀ = As alternatives in a choice set increases, the probability of selecting a dominated alternative will not be affected.

To be able to test the null hypothesis, first it is essential to find the coefficients of the logit model that are estimated by full information maximum likelihood. Newton-Ralphson method²⁹ will be used where at each iteration, an estimation of the hessian is calculated using the second derivatives of the function (Croissant, p.18). After that, a fitted model will be created and a predicted probability of selecting an alternative will be presented. These results will be complemented by an actual selection probability figure that is stated by the participants and a rational selection probability figure which will be calculated by using a WADD rule that is believed to represent the best results under the compensatory strategies.

Firstly, results for the Group A (two alternatives setting) will be presented (Appendix6):

Table 12: Probabilities of Selection (Two Alternatives Setting)

Decision Type	Probabilities of Selection	
	Alternative C	Alternative E*
Actual (Frequency)	0.020833	0.979167
Rational (WADD rule)	0	1
Logit Model (Pure Multi-nominal Logit)	Actual: 3.986666e-21 Rational: 4.319114e-09	Actual: 1.000000e+00 Rational: 1.000000e+00

* Alternative E was designed to dominate other alternatives.

Source: Survey Results

Prior to the examination of results, it was believed that dominating alternative E will be

²⁹ Newton-Ralphson method is a method for finding successively better approximations to the roots (or zeroes) of a real-valued function.

$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

The process is repeated until a sufficiently accurate value is reached.

selected by most of the participants as it was also believed by the rational decision theory. After comparing two different alternatives, ~ 0.97 of the participants selected Alternative E as their best option, where ~ 0.02 of them picked Alternative C. With respect to the rational theory, WADD results were calculated for each of the participants including the subjectivity of each decision maker. Results showed that Alternative E was the best option for all of the participants. Finally, we predicted the choice probabilities of two alternative situations, and the results confirmed that Alternative E will be selected by almost all decision makers in this setting.

Second, results for Group B (six alternatives setting) will be presented (Appendix 7):

Table 13: Probabilities of Selection (Six Alternatives Setting)

Decision Type	Probabilities of Selection					
	C	E*	G	H	I	J
Actual (Frequency)	0.080000	0.460000	0.040000	0.100000	0.260000	0.060000
Rational (WADD rule)	0.000000	0.924528	0.000000	0.018868	0.056604	0.000000
Logit Model (Pure Multi-nominal Logit)	<u>Actual:</u>	<u>Actual:</u>	<u>Actual:</u>	<u>Actual:</u>	<u>Actual:</u>	<u>Actual:</u>
	6.395043e-06	8.400689e-01	2.568273e-27	1.370576e-05	1.599110e-01	4.627776e-25
	<u>Rational:</u>	<u>Rational:</u>	<u>Rational:</u>	<u>Rational:</u>	<u>Rational:</u>	<u>Rational:</u>
	3.097465e-08	9.889154e-01	2.594429e-03	2.594693e-03	3.301447e-03	2.594045e-03

* Alternative E was designed to dominate other alternatives.

Source: Survey Results

In the second group, additional four alternatives were included in the decision setting. According to the rational theory, these alternatives should have no or significant effect on decision maker, and the probability of selecting Alternative E shouldn't differ comparing to Group A. However at this point, we should be careful if the subjectivity of rational decisions differs between different decision environments. If the rationality of

choosing Alternative E decreases, actual decisions should be expected to decrease with a relevant proportion. Examining the results of Group B, dominating alternative E is still the best option for ~ 0.92 (~ 0.98 in the model) of the participants. This figure constitutes a 0.08 (~ 0.02 in the model) decrease in rationality of selecting this item comparing the Group A results. However, we can see from the table that actual frequencies of selecting this item dropped from ~0.97 to ~0.46 (1 to ~0.84 in the model). What is more interesting is that Alternative C which no one in Group A selected ($3.99\text{e-}21$ in the model) has a 0.08 ($6.39\text{e-}06$ in the model) share in the second experimental setting. This means that adding new alternatives to the decision environment might increase the chance of selection of another dominated alternative.

Finally, responses of the participants were examined by implementing similar processes in the Group C (twelve alternatives) decision setting. The results will be presented in the next table (Appendix 8):

Table 14: Probabilities of Selection (Twelve Alternatives Setting)

Decision Type	Probabilities of Selection					
	A	B	C	D	E*	F
Actual (Frequency)	0.096154	0.038462	0.038462	0.000000	0.307692	0.019231
Rational (WADD rule)	0.000000	0.000000	0.000000	0.000000	0.892857	0.000000
Logit Model (Mixed Logit)	<u>Actual:</u> 6.070653e-02	<u>Actual:</u> 1.066857e-02	<u>Actual:</u> 4.385938e-02	<u>Actual:</u> 3.915626e-12	<u>Actual:</u> 3.876267e-01	<u>Actual:</u> 1.249110e-02
	<u>Rational:</u> 1.093687e-05	<u>Rational:</u> 2.549018e-05	<u>Rational:</u> 2.549018e-05	<u>Rational:</u> 2.549018e-05	<u>Rational:</u> 9.997057e-01	<u>Rational:</u> 2.549018e-05
	G	H	I **	J	K	
Actual (Frequency)	0.019231	0.057692	0.346154	0.019231	0.057692	

Rational (WADD rule)	0.000000	0.017857	0.089286	0.000000	0.000000	
Logit Model (Mixed Logit)	<u>Actual:</u>	<u>Actual:</u>	<u>Actual:</u>	<u>Actual:</u>	<u>Actual:</u>	
	3.443713e-03	2.982117e-02	4.259442e-01	2.109146e-118	2.543869e-02	
	<u>Rational:</u>	<u>Rational:</u>	<u>Rational:</u>	<u>Rational:</u>	<u>Rational:</u>	
	2.549018e-05	3.149509e-05	7.340452e-05	2.549018e-05	2.549018e-05	

* Alternative E was designed to dominate other alternatives.

** Alternative I was included in the choice problem under two different names.

Source: Survey Results

In the final group, six additional alternatives (two of them identical – pseudo proliferation) were added to the choice problem. According to the results of the first two groups, it is expected that the share of dominated alternative E will be dropped further. Results confirmed the expectation. Actual selection frequencies of this alternative decreased further and reached to a minimum level of 0.30 (~0.38 in the model) where the rationality level is 0.89 (~0.99 in the model). This result means a further~0.16 (~0.46 in the model) drop in share, where the rationality dropped~ 0.03 (almost same in the model).

Another interesting point was the selection of an item turns in favor of Alternative I which had a rationality level of only~0.08 (~7.34e-05 in the model). 0.34 (~0.42 in the model) of the participants have chosen the second-best alternative which was ~0.04 (~0.04 in the model) more than their first best alternative. This result seems interesting since it reveals the distortionary effects of choice overload. Additional findings that are presented in the previous groups seems also evident in Group C experiment.

Stage 3: Post-Study Statements

In the last stage, we tried to understand the feelings of participants while they were

conducting their decision strategies. There are seven different dimensions of the post analysis which consist of “decision time”, “difficulty of the problem”, “frustration in the selection process”, “confidence in decision making”, “satisfaction with relating to the decision”, “well informed”, and “requiring more alternatives”. In the next table, findings relating to the post-study statements are represented (Appendix 9):

Table 15: Post-Selection Statistics

		Group A	Group B	Group C
Time	Mean	1.479 min	2.12 min	3.269 min
	ANOVA Test Results	F-Stat: 11.76 p. = 1.833e-05 ***		
Difficulty	Mean	2.042 (7.00)	3.52 (7.00)	3.827 (7.00)
	ANOVA Test Results	F-Stat: 17.34 p. = 1.726e-07 ***		
Frustration	Mean	2.167 (7.00)	3.4 (7.00)	3.25 (7.00)
	ANOVA Test Results	F-Stat: 7.774 p. = 6.174e-04 ***		
Confidence	Mean	5.438 (7.00)	4.98 (7.00)	4.981 (7.00)
	ANOVA Test Results	F-Stat: 1.9 p. = 0.15		
Satisfaction	Mean	5.729 (7.00)	5.32 (7.00)	5.25 (7.00)
	ANOVA Test Results	F-Stat: 2.493 p. = 0.08614 *		
Well Informed	Mean	5.125 (7.00)	5.04 (7.00)	5.115 (7.00)
	ANOVA Test Results	F-Stat: 0.06998 p. = 0.9324		

More Alternatives	Mean	5.729 (7.00)	3.54 (7.00)	3.058 (7.00)
	ANOVA Test Results	F-Stat: 30.88 p. = 6.352e-12 ***		

*** p. < 0.001

** p. < 0.01

* p. < 0.1

Source: Survey Results

Prior to implementing third test, we were expecting to see choice overload would make people less confident, but more-informed decisions. However, after the examination of each dimensions, confidence in decision making and well-informed decision criteria had non-significant test results. Nonetheless, other results were in accordance with the prior belief that choice overload distorts decision making process.

First property is related to a negative property that we call “decision time”. It is fairly reasonable that we may spend more time where there is a complex problem structure. The means of time in three test groups are 1.479 (Group A), 2.12 (Group B), and 3.269 (Group C) minutes. Test results confirm that the more alternatives we have the more time we spend while making our decisions.

Second property is related to the complexity of the problem. We define this property as “difficulty of the problem”. According to the test results we have a mean value of 2.042 (Group A), 3.52 (Group B), and 3.827 (Group C) out of a possible seven-level likert-scale. Test results confirm the fact that more choice increases the difficulty of a problem.

Another (partially) significant property is about “frustration in the selection process”. More alternatives increases the frustration level of decision-makers. The means of frustration property scores in the test groups are 2.167 (Group A), 3.4 (Group B), and 3.25 (Group C). Comparing Group A and B results, test results confirm that more alternatives cause more frustration. However, Group C’s frustration level is less than Group B. This result seems controversial with our assumption on choice overload.

Satisfaction property was interrelated to the confidence level. Although we have non-significant test results on confidence level, it was evident that more alternatives decreases satisfaction scores of decision-makers. As it can be seen on the table, we have a mean score value of 5.729 for Group A, 5.32 for Group B, and 5.25 for Group C.

Last property which will be discussed is about the expectations of decision-makers. As rational theory suggests, decision-makers seek more alternatives to increase their expected utility levels. They want to find the best alternative that fit to their interests. Test results prove the exact opposite as we have a mean value of 5.729 for Group A, 3.54 for Group B, and 3.058 for Group C. Results are highly significant and suggest that decision-makers less-inclined to seek more choices when they face more complex problem designs.

2.3.4. Discussion

According to the literature on decision making behavior, choice overload is supposed to be a concept that brings certain costs rather than benefits. This argument contradicts the basic tenets of rational theory on decision making. In this section, it was the main object to enlighten this conflict of thoughts by implementing a decision making survey. We analyzed decision-makers' responses for several questions and divided this analysis into three main stages. In the first stage, we tested the rationality level of each group to see if there is an unbalanced participant profile in each test groups. After confirming the homogeneity of three test groups, we used both statistical and econometric methods to determine whether choice proliferation has a distortionary effect on decision making behavior. It was evident that more choice brings sub-optimal decisions and has a higher than expected distortionary effect on decision making behavior. In the last stage, we questioned participants' feelings on each decision making settings. It was expected that more alternatives brings complexity and unfavorable feelings about their decisions, where less-alternatives generates positive ones. Except for two properties ("confidence" and "well-informed decisions"), we have significant test results for five other dimensions ("decision time", "difficulty of the problem", "frustration in the selection process", "satisfaction with relating to the decision", and "requiring more alternatives") which conform to the previous belief on choice overload effect.

CHAPTER III

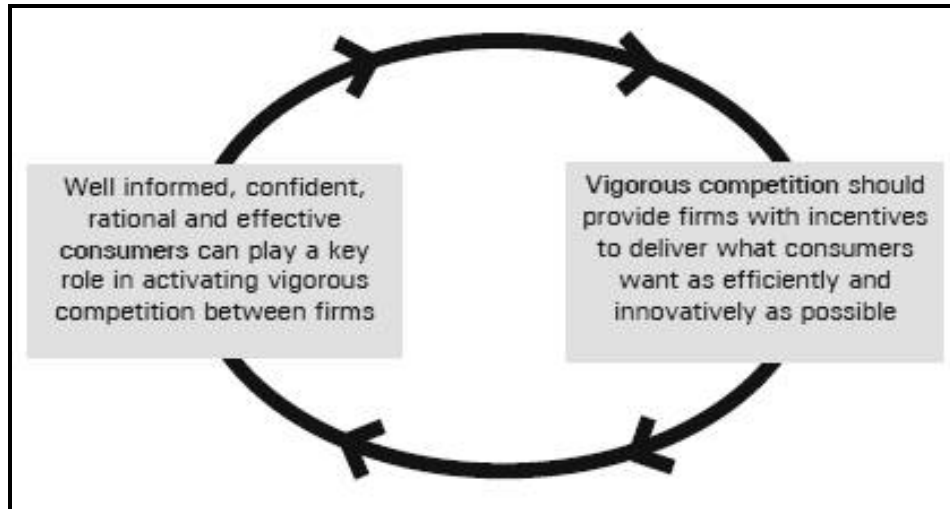
POLICY IMPLICATIONS ON COMPETITION THEORY: A PERSPECTIVE ON CHOICE OVERLOAD EFFECT

Today in most of the countries, there are several competition and/or regulatory regimes in action to prevent the anti-competitive effects that are created by companies or the characteristics of the market itself. What is important here is the sustainability of an efficient and working mechanism that governments don't need to intervene. At this point, how should we interpret the policy implications which are expected to be achieved with a possible minimum effort. In this section, we will look at the issue in terms of choice overload effect since it is believed that the distortionary outcomes of this phenomenon is related to both supply and demand side of the market. On this manner, first, general characteristics of a competitive market will be defined. Then, possible outcomes of overload effect will be determined by analyzing the proliferation of products and it will be conceived that there are both positive and negative impacts on the system. And finally, conceivable suggestions relating to a paternalistic approach will be presented to sustain a workable competitive design.

3.1. SUPPLY & DEMAND FACTORS IN A COMPETITIVE MARKET

In a commentary, FTC's commissioner J. Thomas Rosch told that preferences of consumers are very important for us to be able to analyze all aspects of competition and these preferences make it possible to evaluate non-measurable items such as innovation and quality (Rosch 2010, p.7). When we look into the process of market mechanism, we capture an interrelated relationship between supply and demand sides of it. On the one hand, suppliers will compete to evolve or preserve their position by producing necessary, efficient, and/or innovative products (or services) which we consider as the supply side of competition. On the other hand, preferences of each consumer will affect the competition between rivals by compensating or awarding their efforts. Thus, it is very important for each consumer to analyze and decide the best alternative that satisfies their interests. We can depict the relationship between both sides of the market by using the next graph which is called "the competitive cycle":

Figure 2: The Competitive Cycle



Source: (OFT 2010, p.9)

As it can be seen from the graph, the relationship between supply and demand factors has a continuum that a defect at any level of it will break the chain and affect both sides of the market. We can explain the situation by an example which is presented by Arlen (1998, p.1774). Let's assume a consumer underestimates the risk factor that he/she will become permanently disabled. According to this assumption, he/she will naturally underestimate the implicit price (that is market price + preventive means for possible damages) of a risky product like an automobile. This means that he/she will be ready to pay less than expected since a behavioral bias is on operation. So we have a signal from demand side of the market. Suppliers in this situation will receive and transform this signal into a less-safer product. As a consequence, occurrence of a distortion in the side of demand will ultimately affect the competition between suppliers and a safer automobile will not be awarded.

To be able to sustain an efficient operability in the cycle, consumers have to operate three stages rationally (OFT 2010, p.10-14).

First, they have to obtain relevant information by assessing positive and negative aspects of getting it. In other words, they have to consider "search costs" of getting that information. However, rational theory suggests a process that proceeds until the cost of

getting that information exceeds the benefit, behavioral theory suggests the other way. In the example on “reference point effect”, it was discussed that cost of a product will affect search processes. According to this effect, consumers might ignore the same benefit (for example 5\$) when they face a higher priced product and stop searching further.

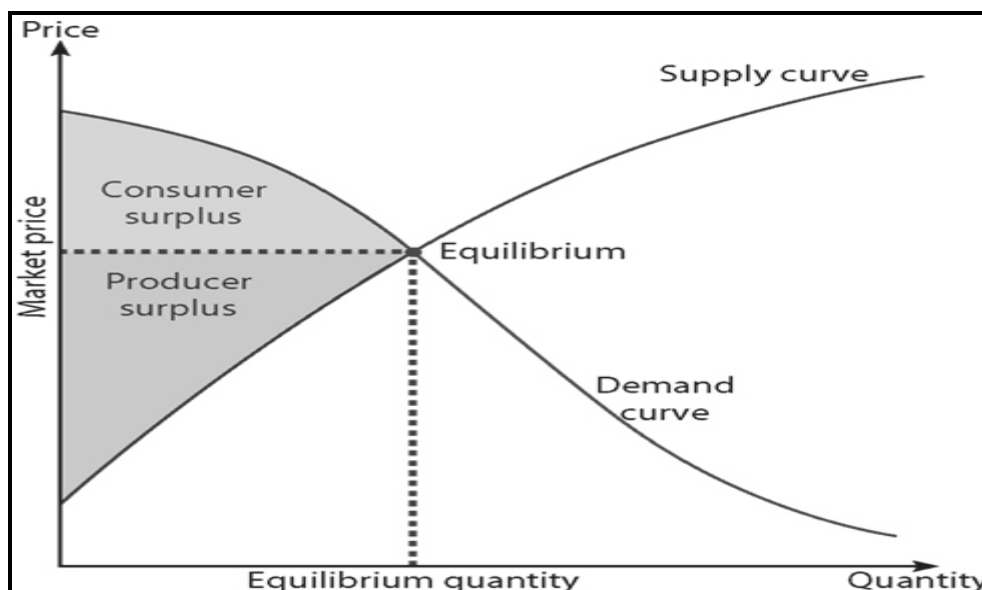
Second, they accurately have to process the obtained information. In this phase, they will form a utility function to be able to assess the best product that satisfies their needs. However, as behavioral approach suggests their decision-making processes will be affected by several biases and make them choose sub-optimal alternatives.

Third stage is the action. Even if consumers get through first two stages without any interruption, they might be vulnerable as they deviate from rational assumptions. “Status-quo” is an example to this kinds of behavior. For example, a small switching cost might create an inertia for consumers to change their current positions. Wilson and Price (2010, p.647-668) analyzed electricity sector in England and found that only 8-20% of the users enjoyed optimal-alternatives by switching to a better producer.

3.2. CHOICE OVERLOAD AND ITS EFFECT ON WELFARE THEORY

In a market economy, there are basically two parties who desire to get the best outcome for their activities. On the one hand, producers want to get the highest profit and sustain their positions in a market. On the other hand, consumers seek to get the best alternative with a possibly lowest cost. Thus, we have two conflicting propensities that we see in the same market. We can examine this relationship with the help of supply-demand curves:

Figure 3: Equilibrium of Supply and Demand Curves



Source: <http://journal.frontiersin.org>

As it can be seen from the graph, there is a free-market equilibrium level that divides consumer and producer surpluses in a basic transaction. Above this level constitutes the consumer surplus, while lower levels indicate a producer surplus. In a perfectly competitive market, everything is in accordance with this equilibrium. However, it is very difficult to see such a market in real-life setting and probably some flaws might occur in this relationship. Thus, market price changes according to the asymmetry between parties of transactions. As a result, we get some un-equality in favor of one of the parties and/or some deadweight loss in those markets.

Relating to the transaction in a market, producers want to capture all the possible surplus to increase their profits. In economics, we analyze it under the name of “price discrimination” behavior. At this type of behavior, producers try to get relevant information on consumers and charge different price levels according to each consumer’s demand curves (first order price discrimination). However it is very difficult to know the individual demand curves since there are at least thousands of consumers in a real market setting. So, they emphasize their efforts on second or third order discrimination strategies which target different consumer segments or buying behaviors.

After summarizing the existing literature on consumer-producer relationship, we will divert our attention into a fairly new concept of strategic behavior which is called proliferation strategies. Although we accept the term relatively new, it is actually and implicitly hidden under the differentiation strategies of producers. In this vein, some companies choose to compete as full-line marketers (such we see in the automobile industry), while others choose to compete in niche markets. The fact that different producers in the same industry choose to compete with different product lines suggests that product selection has both strategic and technological determinants (Gilbert and Matutes 1990, p.152). We will discuss this issue in the following parts but first let's have a look at how and why there is proliferated products in markets.

Producers differentiate their products from their counterparts in four main ways: space, form, service and image (Connor 1981, p.19). They might choose to target specific parts of a geographic region and divert their efforts to satisfy the needs of that region. They can also choose to differentiate form of their products and they might physically create differences in shape, flavor, color, ingredient, or packaging. Sometimes they create a difference in service conditions or they choose to change the image of a certain product and create subjective impressions of consumers on it.

In a rational approach, producers should strive to balance the revenue and cost impacts of variety decisions to maximize their long-term profits (Lancaster 1990; Ramdas 2003, p.80). In order to realize this long-term objective, they have to consider both their internal factors as well as rival's positions in a market they compete with each other. At this points, a producer have to determine the level of proliferation in terms of variety, architecture properties, and timing which can provide a considerable advantage over the rivals. As we can see, proliferation strategies have different dimensions of decision milestones that might create or enhance the strength of a firm in the market.

The proliferation strategy itself might not create a problem in the market. Moreover, it is possible to defend this strategy since it creates a large portfolio of selection in the service of customers. However, as it is extensively argued in the previous section, it might also create an "overload effect" and ultimately distorts decision-making processes

of individuals. Thus, we might have a problem when it is believed that producers use it in a strategic manner. In the following sub-sections, we will argue both positive and negative aspects of proliferation strategies, and question it in light with the strategic behaviors of rival firms.

3.2.1. Positive Aspects of Choice Overload (The Good Side)

Microeconomic theory assumes that provision of choice is necessarily advantageous because it lets consumers to maximize their utilities. Because of this necessity, it seems natural for producers to develop new products in order to satisfy the average needs of a consumer. Moreover, developing new products also benefits suppliers in terms of gaining new market share over their rivals. Thus, product proliferation;

- Enables better preference matching between suppliers and demanders (allows firm to meet heterogeneous consumer demand),
- Fosters utility maximization with the help of diversification,
- Fosters competition among competitors,
- Creates a motivation and impulse for new-product development.

However, as Lancaster (1990, p.190) suggests, proliferation might only be viable in markets where (i) individual consumers seek variety for their own consumption, (ii) tastes of consumers varies, (iii) individual firms can increase their profits, and (iv) profitability is in relation with differentiation. He also adds that none of the (nor any combination of) above-mentioned conditions are sufficient to guarantee variety in the market. From this perspective, proliferation strategies that a firm adopts have actually certain benefits to consumers and society by providing them better offerings. In the same vein, firms wishing to provide superior value to consumers should act accordingly and produce better alternatives that are well-suited to specific market segments (Hunt and Arnett 2004, p.10).

Classical research in psychology demonstrates that people prefer making their own

choices rather than having them externally dictated (Botti and Iyengar 2006, p.25). According to this view, more choices give decision-makers a play-ground where they can freely run and ultimately decide on which action they will choose. It is generally believed that this type of decisions have been associated with desirable consequences, such as greater satisfaction with the task and the decision outcome (DeCharms 1968; Deci 1975; Deci and Ryan 1985). Additionally, choice allows people to feel in control of their fates, thus improves their psychological condition (Botti and Iyengar 2006, p.25). According to a study conducted by Langer and Rodin (1976), even trivial choices might have powerful effects on choosers' happiness levels relative to non-choosers.

Aside from the psychological factors, variety of production brings cost advantage which is called "economies of scope". This concept of economic thinking is first introduced by Panzar and Willig (1975; 1981) and it is seen as a complement to the old concept of "economies of scale" (Bailey and Friedlaender 1982, p.1025). According to this idea, providing a large number of diversified products enables a firm to utilize inputs that will be in the service of more than one production line. Economies of scope is possible if (Bailey and Friedlaender 1982, p.1031):

$$C(Y_1, Y_2) < C(Y_1, 0) + C(0, Y_2)$$

where C is the cost of production, Y_1 and Y_2 are the output level of product 1 and 2.

There are empirical studies which presents certain positive outcomes of proliferation. Brynjolfsson et al (2003, p.1580-1596) compared two different platforms that are used to sell books, CDs, DVDs, digital cameras etc. Where one of the platforms (internet base) have millions of products that varies in different specifications, the other platform (brick-and-mortar stores) have limited number of varieties comparing to the former. In addition, enhanced search features and personalized recommendation tools offered by internet platform allow consumers to select their optimal products. Authors examined these two electronic sellers and presented that increased variety at online store enhanced consumer welfare by \$731 million to \$1.03 billion which is between 7 and 10 times as large as the consumer welfare gain from increased competition and lower prices in the

market.

In another study, (Schreier 2006, p.317-327) tried to measure the value that is delivered to the consumers by using mass-customization tools. They expected that consumers will be willing to pay price premiums as long as it is commensurate to the perceived added value. They used a customization toolkit that allows customers to design their cell phone covers, t-shirts, and scarves. After examining the participants' behavior in this setting, they found that self-designed cell phone cover produces a value increment of %207 (an extra € 7.7 per product), where %113 for self-designed t-shirts (an extra € 6.8 per product), and %106 for self-designed scarf (an extra € 5.2 per product). Thus, it is found that mass-customization creates substantial value increments in general.

3.2.2. Negative Aspects of Choice Overload (The Bad Side)

Choice enables us to control our lives since it also gives us the opportunity and freedom to select the best option that meets our desires. It has both psychological and economic benefits which might increase consumer surpluses in a specified market. However, as we have thoroughly examined in the second chapter, more choice is not always good for decision-makers. As the number of available alternatives keeps growing, negative aspects of having more choices begin to appear. Consequently, it escalates until decision-makers become overloaded. At this point, choice no longer liberates but deliberates, and it might even be said to tyrannize (Schwartz 2004, p.2-3).

More choice also creates the illusion of control over alternatives (Fear 2008, p.2). It is evident from previous studies as well as new ones, when faced with a complex problem (no clear preference for one option over another), people often opt to make no choice or make a choice that they will regret and dissatisfied (Dhar 1997, p. 119-130; Botti and Iyengar 2006, p. p.24-38). It ultimately creates a consumer surplus loss where we expect to see a gain in favor of them.

Iyengar et. al (2003)'s analysis of retirement plans shows that when people are confronted with more alternatives, their participation probabilities to a plan declines 2%

for every 10-option increase. To better understand the effect of not participating the retirement plan, it is possible to give an example for a 25 years old median salary earner who chooses to postpone participation on his/her retirement plan for one year (Botti and Iyengar 2006, p.31). In this example, by the age of 60 (assuming a 9% annual total return), this person will have 18.540\$ less than an equal peer who participated and saved 5% of his/her income.

There is also some pitfalls for the firms who chooses to proliferate their products (Quelch and Kenny 1994, p.153-160; Kekre and Srinivasan 1990, p.1216-1231).

Product proliferation might increase production costs since it requires purchases of a greater range of parts and components. Fragmentation of the market increases the complexity of production techniques and this leads to shorter production runs and more frequent line changeovers. Different brand groups might also increase the administrative and/or advertising costs such stems from planning, promotion, and adding more staff to the purpose.

Proliferation also affects brand loyalty for a producers' good. When a company extends its lines, it risks disrupting consumer's buying patterns and habits. It also obscure the logic behind product lines because adding more items in a line might confuse decision-maker's reasoning behind his previous selections.

Another drawback might come from dealing with a retailer. Since a retailer has limited shelf-space, producers might find it relatively hard to get the necessary shelf-space for their line of products. This might give a bargaining power to the retailer, and more aggressive advertising and selling tactics might be necessary for the producers.

As we can see, there are both benefits and costs that comes with the proliferation of products. A reasonable company should be expected to evaluate those pros and cons, and it should be ultimately decided on whether to proliferate the products or not. However, it is not sufficient to decide proliferation alone. The company should also decide which part of the market and how much to proliferate. At this point, after

analyzing all the relevant factors, it is expected from both supply and demand sides of the market to act as rational decision-makers. Ultimately, it will give us the best-result for a market equilibrium.

However, as it can be observed from almost all areas of production, there is a strong inclination for proliferating alternatives. This is surprising since it is not an optimal strategy for companies as well as consumers unless certain conditions are realized for both market settings and individual and/or company characteristics. Next, we will concentrate on this issue, argue the competitive outcomes of proliferating alternatives and try to represent a reasonable explanation.

3.2.3. Competitive Outcomes at the Overloaded Markets (The Ugly Side)

Today, almost all areas of life we have abundance of alternatives that we occasionally and persistently fall victim of negative overload effects of them. This effects are very important for producers since small deviations from rationality can have first-order consequences in microeconomic analyses (Akerlof and Yellen 1985, p.708-720). In this vein, each producer must be aware of those consequences that are expected to persist in the market setting. According to the idea, they will position themselves in order to gain maximum benefits such as profitability and sustainability of their businesses.

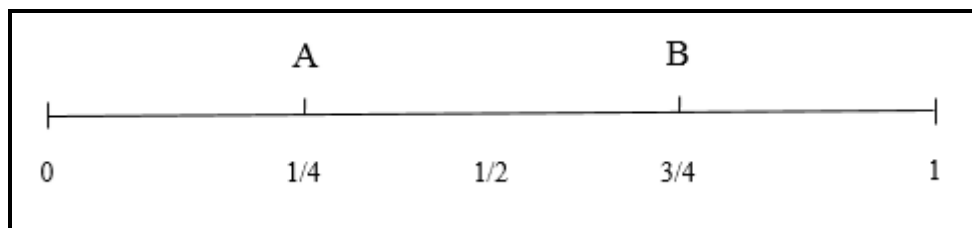
A firm in a market is likely to face the following dynamics. Its share depends on the demand curve of its products and the length of product lines, as well as actions of its competitors and market specifications. A broader product line makes it more likely that a consumer's desire will match one of the firm's products. Additionally, it might also increase the chance of selection arbitrarily by generating a complex decision-making setting as we examined it in our study where twelve alternatives are included in the test environment. Consequently, it becomes natural for firms to proliferate and extend their lines of products.

On the negative side of proliferation, a proliferating firm have to face certain costs and risks its efficiency of the business. That is why it have to contemplate whether benefits

predominate the negative ones. Otherwise, proliferating firm will lose business in the market. Connor (1981) reviewed critics on the U.S. food manufacturing system and revealed several reasons why this strategy failed. First, product proliferation is regarded as deceptive because most new products were actually imitations or minor variants of existing products. Second, proliferation is said to exacerbate inflation since this strategy consists of advertising and selling premium-products. Third, it is found that proliferation comes with high failure rates and sub-optimal production levels. And finally, it may undermine rational decisions and render evaluation difficult. So why firms persist in conducting proliferation strategies?

One explanation might be found in the Hotelling's spatial competition (Hotelling 1929, p.41-57) approach on market settings. This idea is mainly concentrates on differences among products and these differences create a fragmented market structure. The Hotelling approach treats any product characteristics as equivalent to different geographical locations. For instance, consider the following illustration that a homogenous distribution of buyers is present and two firms representatively denoted A and B are competing with each other (Hotelling 1929, p.45). We have;

Figure 4: Spatial Competition Between Two-Firms



Source: (Hotelling 1929, p.45)

For the sake of simplicity, distances are divided into quarters and these distances are representing the differences between products (for example sweetness of lemonade). No customer has any preferences other than these distances (sweetness level) and price of the products. If the prices were the same, market share would be divided into two equal parts. At this point, producers should choose where to operate and how much they charge to their customers. There are some basic assumptions to this competition. First,

market share of a producer can be increased via price cuts and/or repositioning of business. For example, B wants to increase its market share and decides on cutting its prices (price competition). As a consequence, it will get an extra share from A's market between distances $\frac{1}{4}$ and $\frac{1}{2}$. If B further cuts its prices, it is possible to get even larger market share. But this strategy comes with an increasing cost (decreasing level of efficiency) since it is harder to entice consumers located near A. Moreover, A might react to this strategy and cut its prices to compete with B's product. As a consequence, both companies will compete to a level where their prices equals to their marginal costs. In this manner, first strategy has high risks of failure. So, a producer might want to preserve its current market share and price levels. Second strategy however seems more reasonable since it does not require cutting prices. According to this idea, producers compete with each other by differentiating their products. In other words, they move from their current position to get extra market share. In the example, B gets between $\frac{3}{4}$ and 1 plus a certain part of between $\frac{1}{4}$ and $\frac{3}{4}$ with respect to the price levels. The game theoretical calculations suggests that both firms will choose the midpoint $\frac{1}{2}$ to maximize their market share (Rasmusen and Wiley Jr 1989, p.1020). For example B moves slightly to the left (lets say x) from its current position. By doing this move, its market share will increase to a level of $(1 - \frac{3}{4}) + x + ((\frac{3}{4} - \frac{1}{4} - x)/2)$. Since A will lose some of its market share, it will react and move slightly right (lets say x) to the right. This move will balance the market share among those competitors. After continuous iterations, the optimal location for both firms will be $\frac{1}{2}$.

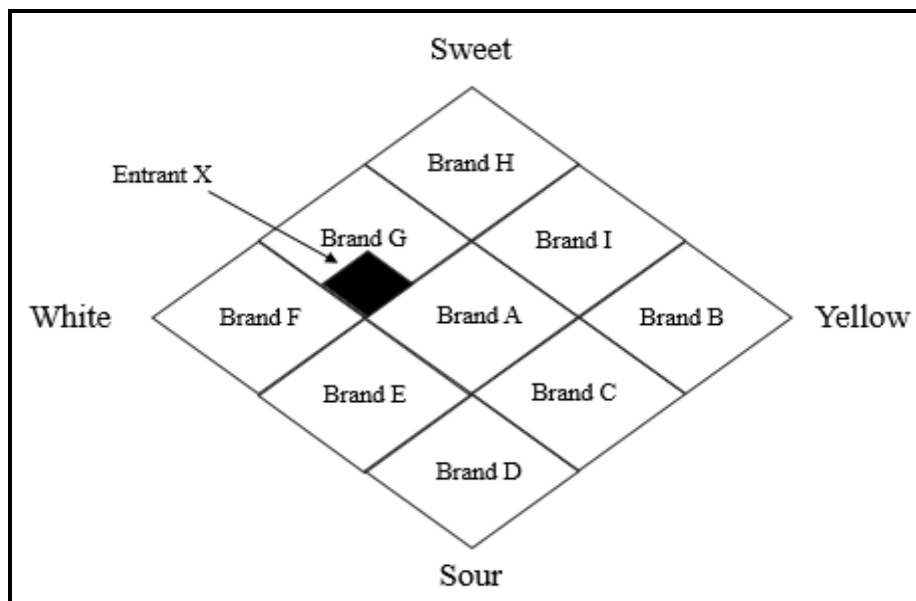
According to the abovementioned example, if both producers choose to compete for the same location, they will each get the half of the market. However, if they choose to operate in different locations of a market, they won't have competition and will eventually be able to increase their prices to get supra-normal profits. This fact creates "localization of competition".

Localization of competition originally comes from the need of different customer tastes and requirements. In this manner, it is a practical and efficient tool for producers to meet those different tastes of consumers as soon as the outcome is acknowledged profitable and sustainable. It eventually leads producers to differentiate their products

and proliferate options in a market environment.

For market segmentation strategy, firms try to identify different segments of demand, target those specific segments and develop specific marketing tools/mixes for each targeted market segments (Hunt and Arnett 2004, p.7). Thus, competition among firms becomes asymmetric. To be able to identify this issue, consider the following example where nine producers compete through differentiation in a fragmented market. Assume further that, they have two-dimensions of differentiation techniques (sweetness and color) for a hypothetical product lemonade. We have the following segmented market:

Figure 5: A Hypothetical Segmented Market



In this hypothetical example, there are nine segments of the market where in each segment a producer operates with its specific brand.³⁰ All brands have varying levels of sweetness and color levels that categorize demand into two-dimensional setting. Since competition among producers are localized, they can't easily penetrate each other's segments simply changing their prices. As a consequence of it, all segments of the

³⁰ In real market structures, one company generally produces several brands.

market has higher than competitive price levels.³¹

The lack of rationality in the demand market exacerbates the possible anti-competitive outcomes by creating an opportunity for producers to act freely without considering much on others behalf. For example, in a localized market a new and promising product will not be appreciated as it should be expected as under an allegedly rational market setting or a producer will deceive its consumers by promoting another brand which will increase the producer surplus. Since the market becomes crowded by various brands, consumers will make sub-optimal decisions (sometimes no-decision at all) which will lead to higher market price levels, lower quality of products and this sum will benefit the supply side as a whole. A natural outcome of this market structure will be similar to anti-competitive acts like predation, entry deterrence, tacit collusion or other pricing schemes.

Proliferation Strategies Enables Cost-Efficient Predatory Pricing Schemes

Potential competition is a strong factor in competitive analysis. Thus, we assume that an Entrant X wants to produce lemonades, and penetrate to the lemonade market (see. Figure 5). At this point, it starts to produce a little sweeter and relatively white colored lemonade and becomes a rival to the Brand G. However, potential outcomes of this rivalry stay within the boundaries of that specific market segment. Because consumers in other segments ignores the new entrant's product, price levels of those segments doesn't affected alike. It also facilitates the possible practice of a predatory pricing, since a multi-product firm implementing this strategy will lose money in a limited market setting (Campbell 1987, p.1652).

³¹ In a paper published in 2007, Thomadsen (2007, p.792-804) examined possible business strategies of two fast-food giants Burger King and McDonalds. According to the analysis of optimal product positioning, he suggests that Burger King, as the weaker competitor, should try to locate far away from McDonald's to create its own unique niche of customers. McDonald's on the other hand is suggested to avoid anticipated competition with Burger King, and differentiate itself if the market is large enough. As a consequence, it becomes possible for both firms to monopolize in those areas.

Proliferation Strategies Enables Collusion Among Rivals

Economic models of collusion are central to antitrust policies. One of the most-known outcomes of collusion is the higher prices in a market. Since collusion among firms creates a mutual understanding on business strategies, they are expected to act as monopolists and implement monopoly pricing in the market. Although it is believed that collusion is less likely in industries characterized by product differentiation, the effects of product differentiation may differ when firms compete more directly with some rivals than others (Levy and Reitzes 1993, p.349-368). In other words, in markets where competition is localized, it is more likely that firms will choose to collude and exploit their segments on a localized base.³²

Levy and Reitzes (1993, p.352) states that collusive schemes may range from a cartel, in which collusion is explicit to conscious parallelism, in which collusion is implicit or tacit. Although there is a materialistic difference between these two-types of anti-competitive acts, they have both the same effects on demand side of the market. Since there are no-profit to be gained from invasion, it is a better opportunity for them to collectively practice proliferation strategies and pricing schemes on consumers. In most of the time, this strategy will not require them to convene and agree on terms like it is in classical cartels. This characteristic of proliferation strategies makes it more practicable and risk-free in case of a competition investigation.

Proliferation Strategies Create Natural Entry-Barriers and Deter New Entries

In the Hotelling's spatial competition setting, each gap of the market is filled by one or several brands which makes it hard to penetrate in those segments.³³ As Schmalensee

³² According to Campbell (1987, p.1648-1652), an implication of heterogeneous product model is that it enhances the effectiveness of cartels, whether tacit or explicit. When localized competition exists, it is easier to discipline a new entrant since the loss from this strategy will be limited to the relevant segment.

³³ To see the theoretical explanation of deterring an entry through product positioning see also (Hay 1976, p.240-257).

(1982) stated that “*A low market share does not necessarily establish that market power is negligible, for competition may be ‘localized’*”. It is particularly true if decision-makers in a localized market fail to notice that a better alternative is trying to penetrate to a particular segment of that market.

The presence of location specific assets may have several entry-deterrence effects (Levy and Reitzes 1993, p.365): (i) *Location-specific assets serve a credible commitment that the incumbent firm will remain in a particular segment of the market. The entrant should face competition in those committed segments.* (ii) *Location-specific investments generally involve fixed costs that a potential entrant must sell enough to cover those costs.* (iii) *The entry decision is particularly risky since a location-specific entry might be found unprofitable and fail.* Thus, to be able create a successful business in a segment of a market, entrant should face the risk of investment as well as the risk of demand side which is required to react and appreciate entrant’s better products.

One real-life example of entry-deterrence through proliferation might be found in the ready-to-eat breakfast cereal industry in U.S. FTC pursued the case for approximately ten years, but dropped it in 1982 by accepting the recommendation of an FTC administrative law judge that the agency's staff had failed to prove the original charges. Schmalensee (1978, p.305-327) examined the high profits that producers in the market get and try to identify the relevant factors that cause this phenomenon. It was surprising that given the industries growth and profitability, there was a lack of noticeable entry by new firms over a long period through 1950 and 1972. It was also surprising that there was six leading producers with over 80 different brands at the same period. The findings of the study is promising since scale economies of this magnitude wouldn’t seem sufficient to explain the prolonged persistence of high profits in the market (Schmalensee 1978, p.307). Implementing the general framework he devised, there are strong relations with Hotelling’s spatial competition that will help identify the competitive problem in the market:

First, there was no-use of pricing strategies as an instrument of rivalry. List price cuts and trade deals were rare and the leading firms did very little private label production.

The observed pattern of competition in the market was similar to localized rivalry since price competition was surpassed and rivalry was channeled into advertising and new product introduction.³⁴ The basic principle here was that each firm selfishly positions its brands in the space so that new launches by insiders cannot erode its profits.

The second point he emphasized was the lack of new entry to this profitable-market. In general economic theory, it is assumed that if an opportunity of profit is seen by potential competitors in a competitive market, it is highly possible and rational that new brand introductions by outsiders will be created. However, in the cereal market example, even though a high chance of getting profit was available, there wasn't enough competition that might surpass the profit ratios to a competitive level.

And the last point is relevant to the demand factor in the market. As it was mentioned earlier, a possible immobility in the localized market might undermine new efficient entry attempts. Additionally, it might also be a negative-signal for possible entrants not to enter since consumers make irrational decisions. In the cereal market example, we can take forward this issue since there is a certain shift in demand in favor to the natural cereals. Although there was a substantial new market segment was up for capturing, and several new brands were introduced to the segment, only one of the entrant firms had a sustainable cereal brand on a national level as of late 1977 (Schmalensee 1978, p.318). Consequently, it could be found optimistic to assume that new entrants erode the high levels of profits by penetrating to a segment.

Effects of Proliferation Strategies on Overall Market Price Levels

There are several reasons behind an increase in market price level. One of the most known reason stems from economic reasoning. Basically, when the supply and demand

³⁴ According to a questionnaire completed by 296 managers from 42 different product groups, it is found that firms most often use strategies like filling all product niches, masking the results for highly profitable divisions, and advertising, while capacity preemption and limit pricing are used least (Bunch and Smiley 1992, p.509-521).

curves of a product intersects, market price level takes shape under the assumption of free competition. However, in real-life setting, it is not valid under many circumstances. First of all, not all markets are perfectly competitive, or at least quasi-competitive. Additionally, there might be governmental interventions, or anti-competitive practices among firms.

In a market, profit of the producers are determined by the cost of production in the long-run. One of the most known cost-effective production technique is realized by producing in large quantities that we know as economies of scale. Basic idea is that when a company produces in mass-quantities, it gets an additional advantage by increasing the efficiency of its operations and decreasing cost per unit of output. According to the idea, this company specializes in producing certain products, and ignores consumer preferences and customization of its products. On the other hand, it is also possible for them to obtain cost advantages through customizing products. It is the exact opposite of scale economies since cost-advantages comes from the variety of products. Thus, a company might reduce cost per output by sharing its production lines for different products.

In-real life setting however, there is another factor which might determine the level of profits. Since markets do not operate such we expect from perfectly competitive ones, it is possible to get premiums from consumption and extra surplus from demand side. One of a common technique is price discrimination which allows a firm to utilize individual demand curves of consumers. However, this task is not easy since there are millions of demand curves a firm might encounter. Thus, producers generally choose to discriminate among large-groups of consumers.

In this study, we are suggesting another explanation of getting high levels of profit such we see in the cereal market example in U.S. According to the idea, it is highly possible to detect that proliferation of alternatives creates sub-optimal decisions in a market and this fact leads to a decrease in consumer surplus (most of it is a transfer to the producers). It also explains one of the rationale behind high variety of alternatives that a producer choose to supply. Furthermore, it creates a segmented market environment

which also makes it easy to practice anti-competitive acts among rivals. One might argue that variety increases the decision effectiveness by facilitating consumers to get high levels of utility. We partly agree with this argument. However, our study as well as the extant literature on choice overload proves these suggestions wrong since further increases in the number of alternatives create a substantial number of sub-optimal decisions.

3.3. A NEED FOR PATERNALISM?

Observing the relationship between supply and demand sides of a market, it is possible to state that there are millions of completed-transactions relating to those markets in every single day. These characteristics of markets make it difficult to analyze possible effects of a bad transaction. In this manner, we have analyzed possible consequences of an overloaded market, and reached to a conclusion that there are numerous number of poor decisions when alternatives increased in numbers.

Both theoretical and experimental studies suggest a multidimensional analysis dealing with complex market failures. Especially after the recognition of hybrid models in economics, policy makers dealing with antitrust and regulatory regimes have noticed the need of an autonomous supervising system that will help them create a healthy market environment. It is an important tool since it is not possible for a policy maker to deal with each transaction separately. For this purpose, it is believed that “*libertarian paternalism*” which is introduced by Thaler ve Sunstein (2008) might be a panacea.

The first part of the term includes “*libertarian*” which can be defined as freedom of decision, while the second part includes “*paternalism*” where a supreme authority has the patronage over those decisions. At first appearance, it might be hard to comprehend how two contrasting view could be handled together. However, the origin of the approach tries to reduce the unwanted consequences of behavioral biases. That is, while it enables decision makers to choose considering their desires, at the same time it also directs them to choose best available alternative.

There are several previous experiences on the issue. In 2009, European Commission investigated *Microsoft*³⁵ for tying its internet explorer tool to the operating system. It is stated in the decision that this practice might disturb competitive environment in browser market. European Commission implemented a remedy where users of the product should make an active decision among different brands of browsers. Thus, users had the freedom of choice as well as they had been protected against the unwelcomed practices of the leading producer (Appendix 10).

In another example, it can be seen how policy tools affected the selection of retirement plans in U.S. Madrian and Shea (2001, p.1149-1187) examined investments on 401(k) retirement plan. In the study, they compared two different periods of investments that are separated by the implementation of automatic registration system. It is stated that automatic registration affected the selection of 401(k) retirement plan positively which provided a better outcome for investors.

According to Thaler and Sunstein (2008, p.72-80), agents might require libertarian paternalism more in some situations. For example, in some instances we cannot clearly detect the possible effects of a decision, or in others we cannot get the feedbacks that we will use in future decision problems. According to their articulation, a little “*nudge*” might be useful.

Paternalism seems as a workable tool since it prevents *false positives* created by legal authorities. It just nudges the system until an efficient outcome is realized. It also creates a self-correction system which will dynamically react to failures in it. However, it shouldn't over-regulate or over-intervene with the transaction among parties. It also shouldn't restrict the freedom of decisions. For example, in an overloaded market the policy shouldn't be the restriction of the number of alternatives unless there is an anti-competitive practice, rather it should enable decision makers to analyze those options comfortably. Thus, it should concentrate its efforts on creating a better decision environment.

³⁵ Microsoft (Tying), Case COMP/39.530, [2009].

CONCLUSION

Since the beginning of our lives, we encounter numerous paths that we are required to walk through by selecting one of them. Sometimes others choose those paths for us, but most of the time we must decide on our behalves. Since we are human, we have feelings that shape our decisions. Some of those includes intrinsic motives, while others include social or contextual dependencies. Thus, in some situations, these choices might not be the right ones for us, but right for others or in some situations the reverse is true. Although there are conflicting desires or preferences, at the end of the day, we make decisions.

In the classical thinking, the nature of our preferences is ignored by assuming that we always choose what is best for us, or at least try to realize it under certain circumstances. However, this way of thinking was demonstrated wrong in many studies as well as in this study. There are lots of factors that distort our decision-making processes, and they ultimately lead us making sub-optimal decisions. Although it seemed as a beneficial factor, proliferation strategies constitute one of an example to those distortionary effects. Moreover, this strategy might be used as a tool which firms gain advantage over demand side of the market.

In the study, putting a reasonable explanation to this problem was the main aim. In the first chapter, tenets of rational economic thinking and behavior of individuals has been presented. According to the view, individuals act in a way that rational theory suggests, in which all agents in a system must process all relevant information and all alternatives in a choice problem. On the other hand, various criticisms tried to explain why this theory assumes some unrealistic individual behaviors. It is known today as behavioral aspects of human decision making process, and proponents of this view suggests that we should understand true nature of human behavior. At this point, how will we understand the nature of our behaviors? This question is yet to be answered in a complete systematic way, but studies on human nature, human decision making and related topics show promising features and results. Evaluating these factors that distort human decision making process, in the second chapter, a specific decision making

problem was examined, arising from proliferation of alternatives, which is known in the literature as “*choice overload effect*”. At this juncture, it was observed that creating a simple complexity in a decision problem might cause greater distortionary effects on both revealed and stated preferences of individuals, and on market as a whole. Although there were mixed-assumptions on the issue, according to our analysis, it was evident that more alternatives distort rational decision-making and cause an increase in sub-optimal decisions. However, interpreting these results, it was essential to question how agents in a free-market would react and whether they would utilize the flaw in decision processes. This is important since rational theory assumes that a malfunction in a system tends to correct itself without any intervention from outside. Thus, in the last chapter, it was the main objective to clarify this issue on the basis of both supply and demand factors in the system and suggest possible effects of proliferating products. In this vein, it was pointed that there were both positive and negative sides of the strategy. On the one hand, it was providing an environment where consumers freely choose their optimal and desirable alternatives without incurring the lack of availability of an option. On the other hand, people were facing overloading effect of those alternatives which gave rise to a distorted decision-making process. Ultimately, they fall victim to the proliferation strategies of firms. It was denoted in the study as “the ugly side” of proliferation strategies.

At this point, there are certain responsibilities that must be taken by legal authorities. Since these units operate to create and sustain an efficient, competitive market structure, they must prevent negativities in it. By doing so, markets will construct an equilibrium which will benefit both consumers and firms. However, legal precautions shouldn't be restrictive and/or coercive. They should be supplied in accordance with the free-market idea. They should give the freedom to economic actors, but facilitate them to make optimal decisions. Ultimately, creating a self-restoring, efficient market structure should be the main purpose. In the study, “*libertarian paternalism*”, which was introduced by Thaler ve Sunstein (2008), was suggested as a reasonable policy that should be implemented. It might probably create a safe-harbor for both economic units and regulatory authorities. Since this strategy is not believed to restrict freedom of choice, it might have little or no distortionary effects on an efficient competitive environment.

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APPENDICES

Appendix 1 – Coffee Mug Experiments

Table A 1: Results of Two Experiments

TABLE 2 RESULTS OF EXPERIMENT 1 INDUCED-VALUE MARKETS				
Trial	Actual Trades	Expected Trades	Price	Expected Price
1	12	11	3.75	3.75
2	11	11	4.75	4.75
3	10	11	4.25	4.25
CONSUMPTION GOODS MARKETS				
Trial	Trades	Price	Median Buyer Reservation Price	Median Seller Reservation Price
Mugs (Expected Trades = 11)				
4	4	4.25	2.75	5.25
5	1	4.75	2.25	5.25
6	2	4.50	2.25	5.25
7	2	4.25	2.25	5.25
Pens (Expected Trades = 11)				
8	4	1.25	.75	2.50
9	5	1.25	.75	1.75
10	4	1.25	.75	2.25
11	5	1.25	.75	1.75

TABLE 3 RESULTS OF EXPERIMENT 2 INDUCED-VALUE MARKETS				
Trial	Actual Trades	Expected Trades	Price	Expected Price
1	10	10	3.75	4.25
2	9	10	4.75	4.25
3	7	8	4.25	4.75
CONSUMPTION GOODS MARKETS				
Trial	Trades	Price	Median Buyer Reservation Price	Median Seller Reservation Price
Mugs (Expected Trades = 9.5)				
4	3	3.75	1.75	4.75
5	3	3.25	2.25	4.75
6	2	3.25	2.25	4.75
7	2	3.25	2.25	4.25
Binoculars (Expected Trades = 9.5)				
8	4	1.25	.75	1.25
9	4	.75	.75	1.25
10	3	.75	.75	1.75
11	3	.75	.75	1.75

Source: (Kahneman et al 1990, p.1332, 1334)

Appendix 2 – Status-quo Effect Survey Study

Table A 2: A Small Part of the Questionnaire

Decision Questionnaire

This handout is part of a research project on decision making under uncertainty conducted by Professor William Samuelson (Boston University) and Professor Richard Zeckhauser (Harvard University). Please indicate your choice for each of a series of decision questions. Your choices will be kept confidential; the cross-section of subject decisions is the focus of the research. (Different students in the class have been given different questions to answer.) The exercise is in three short parts. After the third part has been completed, the results will be briefly discussed.

...

2. You are a serious reader of the financial pages but until recently have had few funds to invest. That is when you inherited a large sum of money from your great uncle. You are considering different portfolios. Your choices are:

- | | |
|--|---|
| <p>_____ a) Invest in moderate-risk Co A. Over a year's time, the stock has .5 chance of increasing 30% in value, a .2 chance of being unchanged, and a .3 chance of declining 20% in value.</p> <p>_____ c) Invest in treasury bills. Over a year's time, these will yield a nearly certain return of 9%.</p> | <p>_____ b) Invest in high-risk Co. B. Over a year's time, the stock has a .4 chance of doubling in value, a .3 chance of being unchanged, and a .3 chance of declining 40% in value.</p> <p>_____ d) Invest in municipal bonds. Over a year's time, they will yield a tax-free return of 6%.</p> |
|--|---|

2'. You are a serious reader of the financial pages but until recently have had few funds to invest. That is when you inherited a portfolio of cash and securities from your great uncle. A significant portion of this portfolio is invested in moderate-risk Company A. You are deliberating whether to leave the portfolio intact or to change it by investing in other securities. (The tax and broker commission consequences of any change are insignificant.) Your choices are (check one):

- _____ a) Retain the investment in moderate-risk Company A. Over a year's time, the stock has a .5 chance of increasing 30% in value, a .2 chance of being unchanged, and a .3 chance of declining 20% in value.
- _____ b) Invest in high-risk Company B. Over a year's time, the stock has a .4 chance of doubling in value, a .3 chance of being unchanged, and a .3 chance of declining 40% in value.
- _____ c) Invest in treasury bills. Over a year's time, they will yield a nearly certain return of 9%.
- _____ d) Invest in municipal bonds. Over a year's time, these will yield a *tax-free* rate of return of 6%.

(*Alternative wording:* The bank, which will be distributing the shares to you, can buy and sell at negligible cost. Hence, you need have no concern about commissions. The tax consequences of any change are insignificant.)

Source: (Samuelson and Zeckhauser (1988, p.52-53))

Appendix 3 – Homogeneity of Groups - Test Questions (Questionnaire 1)

ID Number (School or Institution) _____;
 University _____;
 Department _____;
 Gender _____;

QUESTIONNAIRE 1:

Please indicate your ranking of the importance of the following questions by assigning ranks from "1"(completely disagree) to "7"(completely agree).

1. Whenever I'm faced with a choice, I try to imagine what all the other possibilities are, even ones that aren't present at the moment.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

2. No matter how satisfied I am with my job, it's only right for me to be on the lookout for better opportunities.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

3. When I am in the car listening to the radio, I often check other stations to see if something better is playing, even if I am relatively satisfied with what I'm listening to.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

4. When I watch TV, I channel surf, often scanning through the available options even while attempting to watch one program.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

5. I treat relationships like clothing: I expect to try a lot on before finding the perfect fit.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

6. I often find it difficult to shop for a gift for a friend.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

7. Renting videos is really difficult. I'm always struggling to pick the best one.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

8. When shopping, I have a hard time finding clothing that I really love.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

9. I'm a big fan of lists that attempt to rank things (the best movies, the best singers, the best athletes, the best novels, etc.).

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

10. I find that writing is very difficult, even if it's just writing a letter to a friend, because it's so hard to word things just right. I often do several drafts of even simple things.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

11. No matter what I do, I have the highest standards for myself.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

12. I never settle for second best.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

13. I often fantasize about living in ways that are quite different from my actual life.

Completely Disagree			Not Sure			Completely Agree
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Appendix 4 – Preference and Priority of Participants - Test Questions (Questionnaire 2)

ID Number (School or Institution) _____
University _____
Department _____
Gender _____

QUESTIONNAIRE 2:

Please read the following instructions about the usage and specifications of a “power drill”.

POWER DRILL:

- ✓ A drill is a tool fitted with a cutting tool attachment or driving tool attachment, usually a drill bit or driver bit, used for boring holes in various materials or fastening various materials together with the use of fasteners.
- ✓ The attachment is gripped by a chuck at one end of the drill and rotated while pressed against the target material.
- ✓ The tip, and sometimes edges, of the cutting tool does the work of cutting into the target material. This may be slicing off thin shavings (twist drills or auger bits), grinding off small particles (oil drilling), crushing and removing pieces of the work-piece (SDS masonry drill), countersinking, counter-boring, or other operations.
- ✓ Drills are commonly used in woodworking, metalworking, construction and do-it-yourself projects.
- ✓ Specially designed drills are also used in medicine, space missions and other applications. Drills are available with a wide variety of performance characteristics.
 - Reliability
 - Battery Pack Type (NiCad, NiMH, Alkaline, or Lithium Ion)
 - Price
 - Torque
 - Comfort
 - Power Source (electric cord or battery)
 - Guarantee
 - Durability
 - Drilling Capacity
 - Power (Voltage)



SPECIFICATION SCALE:

In this section, participants are expected to fill the following specification scale according to the instructions.

1. Did you read carefully abovementioned information on power drills?

Yes	No

2. Is it clear from the passage that in which purposes a power drill might be used?

Not Clear			Not Sure			Absolutely Clear
(1)	(2)	(3)	(4)	(5)	(6)	(7)

3. Do you have any previous experience on using a power drill?

Yes	No

4. Do you have a power drill in your house?

Yes	No

5. Please imagine what you would expect from a power drill and **indicate your ranking of the importance** by assigning ranks from **"1"(not important) to "7"(absolutely important)**.

- Reliability

Not Important			Moderate			Absolutely Important
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- Battery Pack Durability (It changes according to types such as NiCad, ~~NiMh~~, Alkaline, Lithium Ion etc.)

Not Important			Moderate			Absolutely Important
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- Torque (from 25 to 90 Nm)

Not Important			Moderate			Absolutely Important
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- Price (from 100 to 150 TL)

Not Important			Moderate			Absolutely Important
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- Comfort

Not Important			Moderate			Absolutely Important
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- Power Source (electric cord or battery – please select one and rate)

Electric Cord	Battery	Indifferent

Not Important			Moderate			Absolutely Important
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- Guarantee (from 1 to 3 years)

Not Important			Moderate			Absolutely Important
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- Durability of the Drill (from 1 to 5 years)

Not Important			Moderate			Absolutely Important
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- Drilling Capacity (a maximum of 22mm to 51mm)

Not Important			Moderate			Absolutely Important
(1)	(2)	(3)	(4)	(5)	(6)	(7)

- Power (from 18 to 36 volt)

Not Important			Moderate			Absolutely Important
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Appendix 5 – Choice Test (Questionnaire 3 – Two Options Version)

ID Number (School or Institution) _____
 University _____
 Department _____
 Gender _____

QUESTIONNAIRE 3:

Please read the following instructions about the usage and specifications of a "power drill".

POWER DRILL:

- ✓ A drill is a tool fitted with a cutting tool attachment or driving tool attachment, usually a drill bit or driver bit, used for boring holes in various materials or fastening various materials together with the use of fasteners.
- ✓ The attachment is gripped by a chuck at one end of the drill and rotated while pressed against the target material.
- ✓ The tip, and sometimes edges, of the cutting tool does the work of cutting into the target material. This may be slicing off thin shavings (twist drills or auger bits), grinding off small particles (oil drilling), crushing and removing pieces of the work-piece (SDS masonry drill), countersinking, counter-boring, or other operations.
- ✓ Drills are commonly used in woodworking, metalworking, construction and do-it-yourself projects.



CASE:

In our hypothetical case, you have recently bought a new house. Since you are planning to make some changes (might be woodworking, and/or metalworking) in it, it is essential for you to purchase "a new power drill". You are visiting a warehouse for this specific purpose. At this point, you encounter the following decision problem with a set of possible alternatives.

Please consider carefully each alternative and make a selection that best fits to your expectations. There is no time limitations for your selection. However, please write down "starting time" to the following box if you are ready.

Starting Time

1. You have the following alternatives and each attribute have three possible levels (High, Medium, Low). You can only buy one power drill. Which product would you choose?

Product A	Product B

Product A	
Specifications	
Reliability	High
Battery Pack Durability	High
Price	125 TL
Maximum Torque	22 Nm
Comfort	Low
Power Source	Electric Cord
Guarantee	2 years
Drill Durability	Medium
Drilling Capacity	51 mm
Power	36 Volt

Product B	
Specifications	
Reliability	High
Battery Pack Durability	High
Price	125 TL
Maximum Torque	28 Nm
Comfort	Low
Power Source	Electric Cord
Guarantee	3 years
Drill Durability	High
Drilling Capacity	51 mm
Power	36 Volt

2. If you have chosen an alternative in the previous question, please write down the "ending time" to the following box.

Ending Time
:

3. Please note briefly which steps did you follow in your decision making strategy?

Step 1: ...

Step 2: ...

Step 3: ...

Step 4: ...

Step 5: ...

Step 6: ...

4. Do you feel that you made a well-informed decision on the power drill you picked?

Absolutely Not			Not Sure			Absolutely Yes
(1)	(2)	(3)	(4)	(5)	(6)	(7)

5. Did you find it difficult to make your decision of which power drill to pick?

Absolutely Not			Not Sure			Absolutely Yes
(1)	(2)	(3)	(4)	(5)	(6)	(7)

6. Did you feel satisfied while and after making the choice?

Absolutely Not			Not Sure			Absolutely Yes
(1)	(2)	(3)	(4)	(5)	(6)	(7)

7. Can you confidently say that this power drill among the best you would ever have?

Absolutely Not			Not Sure			Absolutely Yes
(1)	(2)	(3)	(4)	(5)	(6)	(7)

8. Did you feel any frustration while making the choice?

Absolutely Not			Not Sure			Absolutely Yes
(1)	(2)	(3)	(4)	(5)	(6)	(7)

9. Do you think there should have been included more alternatives of power drills?

Absolutely Not			Not Sure			Absolutely Yes
(1)	(2)	(3)	(4)	(5)	(6)	(7)

Appendix 6 – Test Results of Group A (Weighted by Individual Preferences and Alternative Specification)

```
> summary(mlogitAactualresult)

Call:
mlogit(formula = Choice..Actual. ~ 0 | Reliability + Battery.Pack.Durability +
  Torque + Price + Comfort + Power.Source + Guarantee + Durability.of.the.Drill +
  Drilling.Capacity + Power + Max.Scale - 1, data = mlogitAactualdata,
  method = "nr", print.level = 0)

Frequencies of alternatives:
      C      E
0.020833 0.979167

nr method
20 iterations, 0h:0m:0s
g' (-H)^-1g = 4.03E-07
gradient close to zero

Coefficients :
              Estimate  Std. Error t-value Pr(>|t|)
Reliability:E      -16.45381  17906.44447  -0.0009  0.9993
Battery.Pack.Durability:E  51.24206  31395.38317   0.0016  0.9987
Torque:E           2.32543  34646.13261   0.0001  0.9999
Price:E            58.51900  17458.18694   0.0034  0.9973
Comfort:E        -109.75177  62972.82762  -0.0017  0.9986
Power.Source:E     -16.97507  10549.65213  -0.0016  0.9987
Guarantee:E       -11.12344  31107.23561  -0.0004  0.9997
Durability.of.the.Drill:E  10.19094  32250.13810   0.0003  0.9997
Drilling.Capacity:E  -61.40741  17196.14713  -0.0036  0.9972
Power:E           59.41877  14432.71028   0.0041  0.9967
Max.Scale:E        0.25997   496.99425   0.0005  0.9996

Log-Likelihood: -1.4834e-07

> predictAactualresult <- predict(mlogitAactualresult, outcome = FALSE, type="response")
> print (predictAactualresult)
      C      E
3.986666e-21 1.000000e+00
> |

> summary(mlogitArationalresult)

Call:
mlogit(formula = Choice..Rational. ~ 0 | Reliability + Battery.Pack.Durability +
  Torque + Price + Comfort + Power.Source + Guarantee + Durability.of.the.Drill +
  Drilling.Capacity + Power + Max.Scale - 1, data = mlogitArationaldata,
  method = "nr", print.level = 0)

Frequencies of alternatives:
 C E
0 1

nr method
18 iterations, 0h:0m:0s
g' (-H)^-1g = 6.03E-07
gradient close to zero
```

Coefficients :

	Estimate	Std. Error	t-value	Pr(> t)
Reliability:E	1.3904e+00	8.6168e+03	2e-04	0.9999
Battery.Pack.Durability:E	1.4497e+00	7.9502e+03	2e-04	0.9999
Torque:E	2.3733e+00	1.3117e+04	2e-04	0.9999
Price:E	2.0065e+00	9.7912e+03	2e-04	0.9998
Comfort:E	4.3362e+00	2.1112e+04	2e-04	0.9998
Power.Source:E	-2.4934e-01	3.5970e+03	-1e-04	0.9999
Guarantee:E	1.3003e+00	7.8515e+03	2e-04	0.9999
Durability.of.the.Drill:E	1.1644e+00	9.4881e+03	1e-04	0.9999
Drilling.Capacity:E	1.7150e+00	9.0206e+03	2e-04	0.9998
Power:E	1.2933e+00	9.5060e+03	1e-04	0.9999
Max.Scale:E	2.5070e-03	2.6277e+02	0e+00	1.0000

Log-Likelihood: -2.2185e-07

```
> predictArationalresult <- predict(mlogitArationalresult, outcome = FALSE, type="response")
> print (predictArationalresult)
              C              E
4.319114e-09 1.000000e+00
> |
```

Individual	Alternative	Choice (Actual)	Choice (Rational)	Reliability	Battery Pack Durability	Torque	Price	Comfort	Power Source	Guarantee	Durability of the Drill	Drilling Capacity	Power	Max.Scale
11	C	0	0	1.3000	1.3000	0.3333	0.8333	0.3000	0.0000	1.1667	1.1667	1.3000	1.3000	61
11	E	1	1	1.3000	1.3000	0.6667	0.8333	0.3000	0.0000	1.7500	1.7500	1.3000	1.3000	61
12	C	0	0	1.7213	1.7213	0.5738	0.1639	0.5738	0.0000	1.1475	1.1475	1.7213	1.7213	36
12	E	1	1	1.7213	1.7213	1.1475	0.1639	0.5738	0.0000	1.7213	1.7213	1.7213	1.7213	36
13	C	0	0	1.6667	1.6667	0.4630	0.7407	0.3704	0.0000	0.9239	1.2963	1.6667	1.3889	66
13	E	1	1	1.6667	1.6667	0.9239	0.7407	0.3704	0.0000	1.3889	1.9444	1.6667	1.3889	66
14	C	0	0	1.1111	1.9444	0.3704	0.7407	0.6481	0.0000	0.7407	1.1111	1.9444	1.1111	31
14	E	1	1	1.1111	1.9444	0.7407	0.7407	0.6481	0.0000	1.1111	1.6667	1.9444	1.1111	31
15	C	1	0	1.8421	1.3138	0.4386	0.7018	0.3263	1.0526	1.2281	1.2281	1.8421	1.3138	38
15	E	0	1	1.8421	1.3138	0.8772	0.7018	0.3263	1.0526	1.8421	1.8421	1.8421	1.3138	38
16	C	0	0	1.9091	1.3636	0.4343	1.0909	0.3433	0.0000	0.9091	0.9091	1.3636	1.3636	71
16	E	1	1	1.9091	1.3636	0.9091	1.0909	0.3433	0.0000	1.3636	1.3636	1.3636	1.3636	71
17	C	0	0	1.8421	1.3138	0.5263	1.0526	0.3509	0.0000	1.2281	1.0526	1.3789	1.3789	67
17	E	1	1	1.8421	1.3138	1.0526	1.0526	0.3509	0.0000	1.8421	1.3789	1.3789	1.3789	67
18	C	0	0	1.9091	1.3636	0.4343	1.0909	0.3433	0.0000	0.9091	0.9091	1.3636	1.3636	46
18	E	1	1	1.9091	1.3636	0.9091	1.0909	0.3433	0.0000	1.3636	1.3636	1.3636	1.3636	46
19	C	0	0	1.9811	1.9811	0.3774	0.7547	0.3660	1.1321	0.7547	1.1321	1.9811	1.9811	33
19	E	1	1	1.9811	1.9811	0.7547	0.7547	0.3660	1.1321	1.1321	1.6881	1.1321	1.9811	33
110	C	0	0	1.8000	1.8000	0.4000	0.8000	0.6000	0.0000	0.6000	1.4000	2.1000	1.3000	49
110	E	1	1	1.8000	1.8000	0.8000	0.8000	0.6000	0.0000	0.9000	2.1000	2.1000	1.3000	49
111	C	0	0	2.0192	2.0192	0.3846	0.7692	0.3846	1.1538	0.7692	1.3462	2.0192	1.1538	43
111	E	1	1	2.0192	2.0192	0.7692	0.7692	0.3846	1.1538	1.1538	2.0192	2.0192	1.1538	43
112	C	0	0	1.6406	1.6406	0.3469	0.6230	0.3906	1.6406	0.9375	1.0938	1.6406	1.6406	36
112	E	1	1	1.6406	1.6406	1.0938	0.6230	0.3906	1.6406	1.4063	1.6406	1.6406	1.6406	36
113	C	0	0	2.2826	1.3043	0.4348	0.4348	0.6522	0.0000	1.0870	1.0870	1.3043	1.6304	73
113	E	1	1	2.2826	1.3043	0.8696	0.4348	0.6522	0.0000	1.6304	1.6304	1.3043	1.6304	73
114	C	0	0	2.0388	1.1763	0.3922	0.9804	0.4902	1.1763	1.3723	1.3723	1.1763	1.1763	44
114	E	1	1	2.0388	1.1763	0.7843	0.9804	0.4902	1.1763	2.0388	2.0388	1.1763	1.1763	44
115	C	0	0	2.0192	2.0192	0.6731	0.1923	0.6731	0.0000	0.1923	0.1923	2.0192	2.0192	32
115	E	1	1	2.0192	2.0192	1.3462	0.1923	0.6731	0.0000	0.2885	0.2885	2.0192	2.0192	32
116	C	0	0	1.3138	1.3789	0.4386	1.0526	0.3263	1.0526	1.0526	1.2281	1.3789	1.3789	62
116	E	1	1	1.3138	1.3789	0.8772	1.0526	0.3263	1.0526	1.3789	1.8421	1.3789	1.3789	62
117	C	0	0	1.7308	1.1538	0.4808	0.9613	0.3846	0.0000	0.9613	1.1538	1.7308	1.4423	46
117	E	1	1	1.7308	1.1538	0.9613	0.9613	0.3846	0.0000	1.4423	1.7308	1.7308	1.4423	46
118	C	0	0	1.8103	1.3517	0.5172	1.0343	0.4310	1.0343	0.8621	1.0343	1.8103	1.3517	48
118	E	1	1	1.8103	1.3517	1.0343	1.0343	0.4310	1.0343	1.2931	1.3517	1.8103	1.3517	48
119	C	0	0	1.4286	1.6667	0.3968	0.7937	0.4762	0.0000	1.1111	1.1111	1.6667	1.6667	38
119	E	1	1	1.4286	1.6667	0.7937	0.7937	0.4762	0.0000	1.6667	1.6667	1.6667	1.6667	38
120	C	0	0	1.1538	1.4423	0.4808	0.7692	0.4808	0.0000	1.1538	1.1538	1.7308	1.7308	61
120	E	1	1	1.1538	1.4423	0.9613	0.7692	0.4808	0.0000	1.7308	1.7308	1.7308	1.7308	61
121	C	0	0	1.3789	1.3789	0.5263	1.2281	0.5263	0.0000	1.0526	1.0526	1.3789	0.5263	31
121	E	1	1	1.3789	1.3789	1.0526	1.2281	0.5263	0.0000	1.3789	1.3789	1.3789	0.5263	31
122	C	0	0	1.3000	1.3000	0.5000	1.0000	0.5000	1.3000	1.0000	1.0000	1.3000	1.3000	73
122	E	1	1	1.3000	1.3000	1.0000	1.0000	0.5000	1.3000	1.3000	1.3000	1.3000	1.3000	73
123	C	0	0	1.8750	1.6071	0.4464	0.8929	0.3337	1.0714	1.2500	1.2500	1.0714	1.3393	32
123	E	1	1	1.8750	1.6071	0.8929	0.8929	0.3337	1.0714	1.8750	1.8750	1.0714	1.3393	32
124	C	0	0	1.7647	1.4706	0.3922	0.7843	0.4902	1.1763	1.1763	1.7647	1.4706	1.4706	77
124	E	1	1	1.7647	1.4706	0.7843	0.7843	0.4902	1.1763	1.7647	1.7647	1.7647	1.4706	77
125	C	0	0	1.9811	1.6981	0.6604	0.9434	0.3774	1.1321	0.9434	0.9434	1.4131	1.4131	38
125	E	1	1	1.9811	1.6981	1.3208	0.9434	0.3774	1.1321	1.4131	1.4131	1.4131	1.4131	38
126	C	0	0	1.6071	1.8750	0.3371	0.3337	0.6230	1.0714	1.2500	1.2500	1.3393	1.6071	39
126	E	1	1	1.6071	1.8750	0.7143	0.3337	0.6230	1.0714	1.8750	1.8750	1.3393	1.6071	39
127	C	0	0	1.6667	1.6667	0.4762	0.9324	0.3968	1.1903	1.1111	1.1111	1.6667	1.4286	64
127	E	1	1	1.6667	1.6667	0.9324	0.9324	0.3968	1.1903	1.6667	1.6667	1.6667	1.4286	64
128	C	0	0	1.6667	1.6667	0.3336	0.9239	0.4630	1.1111	0.9239	1.1111	1.6667	1.3889	60
128	E	1	1	1.6667	1.6667	1.1111	0.9239	0.4630	1.1111	1.3889	1.6667	1.6667	1.3889	60
129	C	0	0	1.3000	1.3000	0.5000	1.1667	0.5000	1.0000	1.0000	1.0000	1.7500	1.3000	33
129	E	1	1	1.3000	1.3000	1.0000	1.1667	0.5000	1.0000	1.3000	1.3000	1.7500	1.3000	33
130	C	0	0	1.8000	1.2000	0.5000	0.6000	0.5000	1.3000	1.0000	1.2000	1.3000	1.8000	48
130	E	1	1	1.8000	1.2000	1.0000	0.6000	0.5000	1.3000	1.3000	1.8000	1.3000	1.8000	48
131	C	0	0	1.9811	1.6981	0.6604	0.7547	0.2830	0.8491	0.9434	1.3208	1.4131	1.6981	39
131	E	1	1	1.9811	1.6981	1.3208	0.7547	0.2830	0.8491	1.4131	1.9811	1.4131	1.6981	39

132	C	0	0	1,7308	0,8654	0,3769	0,9615	0,1923	1,1338	1,1338	1,3462	2,0192	1,7308	39
132	E	1	1	1,7308	0,8654	1,1338	0,9615	0,1923	1,1338	1,7308	2,0192	2,0192	1,7308	39
133	C	0	0	1,6667	1,4286	0,3336	0,7937	0,3175	0,0000	1,1111	1,1111	1,6667	1,6667	46
133	E	1	1	1,6667	1,4286	1,1111	0,7937	0,3175	0,0000	1,6667	1,6667	1,6667	1,6667	46
134	C	0	0	1,8103	1,5317	0,4310	0,6897	0,5172	0,0000	1,0345	1,0345	1,5317	1,5317	43
134	E	1	1	1,8103	1,5317	0,6897	0,6897	0,5172	0,0000	1,5317	1,5317	1,5317	1,5317	43
135	C	0	0	1,6406	1,6406	0,4688	0,9375	0,5469	0,0000	0,9375	1,0938	1,4063	1,4063	67
135	E	1	1	1,6406	1,6406	0,9375	0,9375	0,5469	0,0000	1,4063	1,6406	1,4063	1,4063	67
136	C	0	0	1,9091	1,0909	0,3636	0,7273	0,3636	1,0909	1,2727	1,2727	1,9091	1,9091	30
136	E	1	1	1,9091	1,0909	0,7273	0,7273	0,3636	1,0909	1,9091	1,9091	1,9091	1,9091	30
137	C	0	0	1,9811	1,6981	0,3774	0,7547	0,1887	0,0000	1,3208	1,3208	1,4151	1,4151	43
137	E	1	1	1,9811	1,6981	0,7547	0,7547	0,1887	0,0000	1,6981	1,9811	1,4151	1,4151	43
138	C	0	0	2,0000	1,6667	0,4444	0,8889	0,3333	0,0000	1,3333	1,3333	1,3333	1,0000	47
138	E	1	1	2,0000	1,6667	0,8889	0,8889	0,3333	0,0000	1,3333	2,0000	1,3333	1,0000	47
139	C	0	0	1,8103	1,8103	0,3448	0,6897	0,6034	0,0000	0,6897	1,2069	1,5317	1,8103	36
139	E	1	1	1,8103	1,8103	0,6897	0,6897	0,6034	0,0000	1,0345	1,8103	1,5317	1,8103	36
140	C	0	0	1,8421	1,8421	0,4386	1,2281	0,4386	0,0000	0,7018	0,7018	1,8421	1,0526	46
140	E	1	1	1,8421	1,8421	0,8772	1,2281	0,4386	0,0000	1,0526	1,0526	1,8421	1,0526	46
141	C	0	0	2,1000	1,8000	0,6000	0,6000	0,5000	1,5000	0,6000	1,0000	1,5000	1,5000	46
141	E	1	1	2,1000	1,8000	1,2000	0,6000	0,5000	1,5000	0,9000	1,5000	1,5000	1,5000	46
142	C	0	0	1,9444	1,1111	0,6481	1,2963	0,4630	0,0000	0,3704	1,1111	1,3889	1,3889	46
142	E	1	1	1,9444	1,1111	1,2963	1,2963	0,4630	0,0000	0,5556	1,6667	1,3889	1,3889	46
143	C	0	0	1,7213	1,7213	0,4918	0,9836	0,4918	0,7377	1,1475	1,1475	1,4754	1,4754	48
143	E	1	1	1,7213	1,7213	0,9836	0,9836	0,4918	0,7377	1,7213	1,7213	1,4754	1,4754	48
144	C	0	0	1,8103	1,2931	0,5172	0,6897	0,5172	0,0000	1,0345	1,0345	1,5317	1,5317	34
144	E	1	1	1,8103	1,2931	1,0345	0,6897	0,5172	0,0000	1,5317	1,5317	1,5317	1,5317	34
145	C	0	0	1,6071	1,6071	0,3337	0,3371	0,3337	0,0000	1,0714	1,0714	1,6071	1,6071	48
145	E	1	1	1,6071	1,6071	1,0714	0,3371	0,3337	0,0000	1,6071	1,6071	1,6071	1,6071	48
146	C	0	0	1,6406	1,6406	0,3125	1,0938	0,5469	0,9375	1,0938	1,0938	1,6406	1,6406	62
146	E	1	1	1,6406	1,6406	0,6250	1,0938	0,5469	0,9375	1,6406	1,6406	1,6406	1,6406	62
147	C	0	0	2,1000	1,8000	0,3000	1,2000	0,4000	0,0000	0,8000	1,0000	1,2000	1,5000	40
147	E	1	1	2,1000	1,8000	1,0000	1,2000	0,4000	0,0000	1,2000	1,5000	1,2000	1,5000	40
148	C	0	0	2,1000	1,2000	0,4000	1,2000	0,6000	1,2000	0,8000	1,0000	1,5000	1,5000	72
148	E	1	1	2,1000	1,2000	0,8000	1,2000	0,6000	1,2000	1,5000	1,5000	1,5000	1,5000	72

Appendix 7 – Test Results of Group B (Weighted by Individual Preferences and Alternative Specification)

```
> mlogitBactualresult
```

Call:
mlogit(formula = Choice..Actual. ~ 0 | Reliability + Battery.Pack.Durability + Torque + Price + Comfort + Power.Source + Guarantee + Durability.of.th\$

Coefficients:

	Reliability:E	Reliability:G	Reliability:H	Reliability:I	Reliability:J
Battery.Pack.Durability:E	-29.54440	2.11602	-16.70214	-27.86422	86.37177
Battery.Pack.Durability:G	-27.09899	17.22392	-2.98382	-31.44291	7.71894
Torque:E	41.31098	-337.20444	-25.11822	45.73884	-149.14511
Price:E	-5.17058	-30.25426	0.83848	-1.01641	-41.27888
Comfort:E	73.97029	148.84288	24.41755	73.77644	-65.92928
Power.Source:E	1.19229	19.16378	-2.02804	0.40785	18.66496
Guarantee:E	5.36669	-156.06600	30.54165	2.90416	-168.19860
Durability.of.the.Drill:E	24.64449	47.72763	-22.86322	20.20669	87.36344
Drilling.Capacity:E	-12.79739	155.53592	-24.91301	-7.82423	-41.93515
Power:G	17.16682	35.85791	37.11076	62.38831	-68.61780
Max.Scale:E	-0.42115	0.18791	0.02277	-0.48799	0.85803

```
> predictBactualresult <- predict(mlogitBactualresult, outcome = FALSE, type="response")
> print (predictBactualresult)
```

	C	E	G	H	I	J
	6.395043e-06	8.400689e-01	2.568273e-27	1.370576e-05	1.599110e-01	4.627776e-25

```
> summary(mlogitBrationalresult)
```

Call:
mlogit(formula = Choice..Rational. ~ 0 | Reliability + Battery.Pack.Durability + Torque + Price + Comfort + Power.Source + Guarantee + Durability.of.the.Drill + Drilling.Capacity + Power + Max.Scale - 1, data = mlogitBrationaldata, method = "nr", print.level = 0)

Frequencies of alternatives:

	C	E	G	H	I	J
	0.000000	0.924528	0.000000	0.018868	0.056604	0.000000

```
nr method
6 iterations, 0h:0m:0s
g' (-H)^-1g = 1.94E+05
last step couldn't find higher value
```

Coefficients :

	Estimate	Std. Error	t-value	Pr(> t)
Reliability:E	4.841385	39.901848	0.1213	0.9034
Reliability:G	7.864408	62.613646	0.1256	0.9000
Reliability:H	6.839929	41.154626	0.1662	0.8680
Reliability:I	6.106964	40.616502	0.1504	0.8805
Reliability:J	5.240334	41.734020	0.1256	0.9001
Battery.Pack.Durability:E	21.124911	147.767433	0.1430	0.8863
Battery.Pack.Durability:G	20.756373	148.268207	0.1400	0.8887
Battery.Pack.Durability:H	21.290651	148.216640	0.1436	0.8858
Battery.Pack.Durability:I	22.768384	148.024256	0.1538	0.8778
Battery.Pack.Durability:J	31.136714	222.419252	0.1400	0.8887
Torque:E	0.856749	56.746425	0.0151	0.9880
Torque:G	-0.603664	118.406186	-0.0051	0.9959
Torque:H	-1.550620	58.927742	-0.0263	0.9790
Torque:I	-2.588915	58.213866	-0.0445	0.9645
Torque:J	-0.607419	118.399180	-0.0051	0.9959
Price:E	4.058600	45.491568	0.0892	0.9289
Price:G	1.813943	31.459247	0.0577	0.9540
Price:H	1.226147	46.688824	0.0263	0.9790
Price:I	1.654109	46.441950	0.0356	0.9716
Price:J	2.716306	47.162155	0.0576	0.9541
Comfort:E	56.820555	335.334332	0.1694	0.8654
Comfort:G	53.530489	337.391245	0.1587	0.8739
Comfort:H	50.004283	337.362785	0.1482	0.8822
Comfort:I	57.090235	336.597832	0.1696	0.8653
Comfort:J	53.538396	337.442866	0.1587	0.8739
Power.Source:E	-0.049994	2.045048	-0.0244	0.9805
Power.Source:G	0.774333	6.716270	0.1153	0.9082
Power.Source:H	2.585037	6.581355	0.3928	0.6945
Power.Source:I	2.484010	4.369365	0.5685	0.5697
Power.Source:J	0.774045	6.719908	0.1152	0.9083
Guarantee:E	-36.153930	214.321000	-0.1687	0.8660
Guarantee:G	-54.758460	321.983437	-0.1701	0.8650
Guarantee:H	-54.840139	321.905766	-0.1704	0.8647
Guarantee:I	-121.831487	643.842108	-0.1892	0.8499
Guarantee:J	-109.523546	644.015790	-0.1701	0.8650
Durability.of.the.Drill:E	11.394569	102.886680	0.1107	0.9118
Durability.of.the.Drill:G	10.910049	103.676150	0.1052	0.9162
Durability.of.the.Drill:H	31.458882	310.839035	0.1012	0.9194
Durability.of.the.Drill:I	11.767723	103.240948	0.1140	0.9093
Durability.of.the.Drill:J	32.731587	311.033451	0.1052	0.9162
Drilling.Capacity:E	17.002121	74.011647	0.2297	0.8183
Drilling.Capacity:G	49.236009	224.674942	0.2191	0.8265
Drilling.Capacity:H	23.634306	112.240949	0.2106	0.8332
Drilling.Capacity:I	17.804207	74.784585	0.2381	0.8118
Drilling.Capacity:J	16.412829	74.896168	0.2191	0.8265

Drilling.Capacity:E	17.002121	74.011647	0.2297	0.8183
Drilling.Capacity:G	49.236009	224.674942	0.2191	0.8265
Drilling.Capacity:H	23.634306	112.240949	0.2106	0.8332
Drilling.Capacity:I	17.804207	74.784585	0.2381	0.8118
Drilling.Capacity:J	16.412829	74.896168	0.2191	0.8265
Power:E	-38.372162	252.469982	-0.1520	0.8792
Power:G	-57.289900	379.308630	-0.1510	0.8799
Power:H	-36.600863	252.867903	-0.1447	0.8849
Power:I	-116.011969	757.936688	-0.1531	0.8783
Power:J	-114.577964	758.601401	-0.1510	0.8799
Max.Scale:E	0.225841	1.391154	0.1623	0.8710
Max.Scale:G	0.207368	1.424039	0.1456	0.8842
Max.Scale:H	0.175878	1.417578	0.1241	0.9013
Max.Scale:I	0.191140	1.405022	0.1360	0.8918
Max.Scale:J	0.207453	1.424106	0.1457	0.8842

Log-Likelihood: -3.1519

> |

```
> predictBrationalresult <- predict(mlogitBrationalresult, outcome = FALSE, type="response")
> print (predictBrationalresult)
```

	C	E	G	H	I	J
	3.097465e-08	9.889154e-01	2.594429e-03	2.594693e-03	3.301447e-03	2.594045e-03

> |

Individual	Alternative	Choice (Actual)	Choice (Rational)	Reliability	Battery Pack Durability	Torque	Price	Comfort	Power Source	Guarantee	Durability of the Drill	Drilling Capacity	Power	Max Scale
21	G	0	0	1,0606	1,5909	0,5303	1,3636	0,4545	1,3636	1,0606	1,5909	0,4545	1,0606	69
21	I	0	0	1,5909	1,5909	1,0606	0,9091	0,4545	1,3636	0,5303	1,5909	1,3636	0,5303	69
21	H	1	0	1,5909	1,5909	1,0606	0,9091	0,4545	1,3636	1,0606	0,5303	0,9091	1,5909	69
21	C	0	0	1,5909	1,5909	0,5303	0,9091	0,4545	0,0000	1,0606	1,0606	1,3636	1,5909	69
21	E	0	1	1,5909	1,5909	1,0606	0,9091	0,4545	0,0000	1,5909	1,5909	1,3636	1,5909	69
21	J	0	0	1,5909	1,0606	0,5303	0,9091	0,4545	1,3636	0,5303	0,5303	1,3636	0,5303	69
22	G	0	0	1,2963	1,1111	0,5556	1,3889	0,5556	1,1111	1,1111	1,9444	0,5556	0,5556	60
22	I	0	0	1,9444	1,1111	1,1111	0,9239	0,5556	1,1111	0,5556	1,9444	1,6667	0,2778	60
22	H	0	0	1,9444	1,1111	1,1111	0,9239	0,5556	1,1111	1,1111	0,6481	1,1111	0,8333	60
22	C	0	0	1,9444	1,1111	0,5556	0,9239	0,5556	1,1111	1,1111	1,2963	1,6667	0,8333	60
22	E	1	1	1,9444	1,1111	1,1111	0,9239	0,5556	1,1111	1,6667	1,9444	1,6667	0,8333	60
22	J	0	0	1,9444	0,7407	0,5556	0,9239	0,5556	1,1111	0,5556	0,6481	1,6667	0,2778	60
23	G	0	0	1,0769	1,3846	0,4615	1,1538	0,5385	1,3846	1,0769	1,6154	0,5385	1,0769	54
23	I	1	0	1,6154	1,3846	0,9231	0,7692	0,5385	1,3846	0,5385	1,6154	1,6154	0,5385	54
23	H	0	0	1,6154	1,3846	0,9231	0,7692	0,5385	1,3846	1,0769	0,5385	1,0769	1,6154	54
23	C	0	0	1,6154	1,3846	0,4615	0,7692	0,5385	0,0000	1,0769	1,0769	1,6154	1,6154	54
23	E	0	1	1,6154	1,3846	0,9231	0,7692	0,5385	0,0000	1,6154	1,6154	1,6154	1,6154	54
23	J	0	0	1,6154	0,9231	0,4615	0,7692	0,5385	1,3846	0,5385	0,5385	1,6154	0,5385	54
24	G	1	0	1,3462	1,1538	0,3846	1,4423	0,4808	1,4423	0,9615	1,7308	0,7692	0,9615	68
24	I	0	0	2,0192	1,1538	0,7692	0,9615	0,4808	1,4423	0,4808	1,7308	1,7308	0,4808	68
24	H	0	0	2,0192	1,1538	0,7692	0,9615	0,4808	1,4423	0,9615	0,7692	1,1538	1,4423	68
24	C	0	0	2,0192	1,1538	0,3846	0,9615	0,4808	0,0000	0,9615	1,1538	1,7308	1,4423	68
24	E	0	1	2,0192	1,1538	0,7692	0,9615	0,4808	0,0000	1,4423	1,7308	1,7308	1,4423	68
24	J	0	0	2,0192	0,7692	0,3846	0,9615	0,4808	1,4423	0,4808	0,7692	1,7308	0,4808	68
25	G	0	0	1,1111	1,6667	0,3704	1,1111	0,5556	1,6667	1,2963	1,9444	0,3704	0,7407	65
25	I	0	0	1,6667	1,6667	0,7407	0,7407	0,5556	1,6667	0,6481	1,9444	1,1111	0,3704	65
25	H	0	0	1,6667	1,6667	0,7407	0,7407	0,5556	1,6667	1,2963	0,6481	0,7407	1,1111	65
25	C	0	0	1,6667	1,6667	0,3704	0,7407	0,5556	0,0000	1,2963	1,2963	1,1111	1,1111	65
25	E	1	1	1,6667	1,6667	0,7407	0,7407	0,5556	0,0000	1,9444	1,9444	1,1111	1,1111	65
25	J	0	0	1,6667	1,1111	0,3704	0,7407	0,5556	1,6667	0,6481	0,6481	1,1111	0,3704	65
26	G	0	0	1,2069	1,8103	0,6034	1,0345	0,4310	1,0345	1,0345	1,8103	0,6034	0,6897	53
26	I	0	0	1,8103	1,8103	1,2069	0,6897	0,4310	1,0345	0,5172	1,8103	1,8103	0,3448	53
26	H	0	0	1,8103	1,8103	1,2069	0,6897	0,4310	1,0345	1,0345	0,6034	1,2069	1,0345	53
26	C	0	0	1,8103	1,8103	0,6034	0,6897	0,4310	1,0345	1,0345	1,2069	1,8103	1,0345	53
26	E	1	1	1,8103	1,8103	1,2069	0,6897	0,4310	1,0345	1,5517	1,8103	1,8103	1,0345	53
26	J	0	0	1,8103	1,2069	0,6034	0,6897	0,4310	1,0345	0,5172	0,6034	1,8103	0,3448	53
27	G	0	0	1,0000	1,5000	0,5000	1,5000	0,5000	1,5000	1,0000	1,5000	0,5000	0,5000	66
27	I	1	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	0,5000	1,5000	1,5000	0,5000	66
27	H	0	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	1,0000	0,5000	1,0000	1,5000	66
27	C	0	0	1,5000	1,5000	0,5000	1,0000	0,5000	0,0000	1,0000	1,0000	1,5000	1,5000	66
27	E	0	1	1,5000	1,5000	1,0000	1,0000	0,5000	0,0000	1,5000	1,5000	1,5000	1,5000	66
27	J	0	0	1,5000	1,0000	0,5000	1,0000	0,5000	1,5000	0,5000	0,5000	1,5000	0,5000	66
28	G	0	0	1,4286	1,0714	0,3571	1,7857	0,4762	1,4286	0,9524	2,1429	0,4762	0,7143	52
28	I	0	0	2,1429	1,0714	0,7143	1,1905	0,4762	1,4286	0,4762	2,1429	1,4286	0,3571	52
28	H	0	0	2,1429	1,0714	0,7143	1,1905	0,4762	1,4286	0,9524	0,7143	0,9524	1,0714	52
28	C	0	0	2,1429	1,0714	0,3571	1,1905	0,4762	1,4286	0,9524	1,4286	1,4286	1,0714	52
28	E	0	1	2,1429	1,0714	0,7143	1,1905	0,4762	1,4286	1,4286	2,1429	1,4286	1,0714	52
28	J	1	0	2,1429	0,7143	0,3571	1,1905	0,4762	1,4286	0,4762	0,7143	1,4286	0,3571	52
29	G	0	0	1,4894	0,9574	0,3191	1,5957	0,6383	1,2766	1,2766	1,5957	0,4255	0,8511	51
29	I	0	0	2,2340	0,9574	0,6383	1,0638	0,6383	1,2766	0,6383	1,5957	1,2766	0,4255	51
29	H	1	0	2,2340	0,9574	0,6383	1,0638	0,6383	1,2766	1,2766	0,5319	0,8511	1,2766	51
29	C	0	0	2,2340	0,9574	0,3191	1,0638	0,6383	0,0000	1,2766	1,0638	1,2766	1,2766	51
29	E	0	1	2,2340	0,9574	0,6383	1,0638	0,6383	0,0000	1,9149	1,5957	1,2766	1,2766	51
29	J	0	0	2,2340	0,6383	0,3191	1,0638	0,6383	1,2766	0,6383	0,5319	1,2766	0,4255	51
210	G	0	0	1,3725	1,4706	0,4902	1,1765	0,3922	0,0000	0,7843	1,4706	0,5882	1,1765	76
210	I	0	0	2,0588	1,4706	0,9804	0,7843	0,3922	0,0000	0,7843	1,4706	1,7647	0,5882	76
210	H	0	0	2,0588	1,4706	0,9804	0,7843	0,3922	0,0000	0,7843	0,4902	1,1765	1,7647	76
210	C	1	0	2,0588	1,4706	0,4902	0,7843	0,3922	1,4706	0,7843	0,9804	1,7647	1,7647	76
210	E	0	1	2,0588	1,4706	0,9804	0,7843	0,3922	1,4706	1,1765	1,4706	1,7647	1,7647	76
210	J	0	0	2,0588	0,9804	0,4902	0,7843	0,3922	0,0000	0,3922	0,4902	1,7647	0,5882	76

211	G	0	0	1,3043	1,3043	0,5435	1,6304	0,4348	0,3261	1,3043	1,9565	0,5435	0,8696	31
211	I	1	0	1,9565	1,3043	1,0870	1,0870	0,4348	0,3261	0,6522	1,9565	1,6304	0,4348	31
211	H	0	0	1,9565	1,3043	1,0870	1,0870	0,4348	0,3261	1,3043	0,6522	1,0870	1,3043	31
211	C	0	0	1,9565	1,3043	0,5435	1,0870	0,4348	0,3261	1,3043	1,3043	1,6304	1,3043	31
211	E	0	1	1,9565	1,3043	1,0870	1,0870	0,4348	0,3261	1,9565	1,9565	1,6304	1,3043	31
211	J	0	0	1,9565	0,8696	0,5435	1,0870	0,4348	0,3261	0,6522	0,6522	1,6304	0,4348	31
212	G	0	0	1,3333	2,0000	0,4444	1,3333	0,5556	0,6667	1,1111	1,6667	0,4444	0,8889	34
212	I	0	0	2,0000	2,0000	0,8889	0,8889	0,5556	0,6667	0,5556	1,6667	1,3333	0,4444	34
212	H	1	0	2,0000	2,0000	0,8889	0,8889	0,5556	0,6667	1,1111	0,5556	0,8889	1,3333	34
212	C	0	0	2,0000	2,0000	0,4444	0,8889	0,5556	0,6667	1,1111	1,1111	1,3333	1,3333	34
212	E	0	1	2,0000	2,0000	0,8889	0,8889	0,5556	0,6667	1,6667	1,6667	1,3333	1,3333	34
212	J	0	0	2,0000	1,3333	0,4444	0,8889	0,5556	0,6667	0,5556	0,5556	1,3333	0,4444	34
213	G	0	0	0,8696	1,3043	0,4348	1,6304	0,4348	1,3043	1,0870	2,2826	0,4348	1,0870	75
213	I	0	0	1,3043	1,3043	0,8696	1,0870	0,4348	1,3043	0,5435	2,2826	1,3043	0,5435	75
213	H	0	0	1,3043	1,3043	0,8696	1,0870	0,4348	1,3043	1,0870	0,7609	0,8696	1,6304	75
213	C	0	0	1,3043	1,3043	0,4348	1,0870	0,4348	0,0000	1,0870	1,5217	1,3043	1,6304	75
213	E	1	1	1,3043	1,3043	0,8696	1,0870	0,4348	0,0000	1,6304	2,2826	1,3043	1,6304	75
213	J	0	0	1,3043	0,8696	0,4348	1,0870	0,4348	1,3043	0,5435	0,7609	1,3043	0,5435	75
214	G	0	0	1,4894	1,2766	0,4255	2,2340	0,5319	1,2766	0,8511	1,2766	0,4255	0,8511	42
214	I	0	0	2,2340	1,2766	0,8511	1,4894	0,5319	1,2766	0,4255	1,2766	1,2766	0,4255	42
214	H	0	0	2,2340	1,2766	0,8511	1,4894	0,5319	1,2766	0,8511	0,4255	0,8511	1,2766	42
214	C	1	0	2,2340	1,2766	0,4255	1,4894	0,5319	1,2766	0,8511	0,8511	1,2766	1,2766	42
214	E	0	1	2,2340	1,2766	0,8511	1,4894	0,5319	1,2766	1,2766	1,2766	1,2766	1,2766	42
214	J	0	0	2,2340	0,8511	0,4255	1,4894	0,5319	1,2766	0,4255	0,4255	1,2766	0,4255	42
215	G	0	0	1,2300	1,6071	0,5357	0,6250	0,0000	1,0714	1,6071	0,5357	1,2300	1,2300	46
215	I	0	0	1,6750	1,6071	1,0714	0,1786	0,6250	0,0000	0,5357	1,6071	1,6071	0,6250	46
215	H	0	0	1,6750	1,6071	1,0714	0,1786	0,6250	0,0000	1,0714	0,5357	1,0714	1,6750	46
215	C	0	0	1,6750	1,6071	0,5357	0,1786	0,6250	1,0714	1,0714	1,0714	1,6071	1,6750	46
215	E	1	1	1,6750	1,6071	1,0714	0,1786	0,6250	1,0714	1,6071	1,6071	1,6071	1,6750	46
215	J	0	0	1,6750	1,0714	0,5357	0,1786	0,6250	0,0000	0,5357	0,5357	1,6071	0,6250	46
216	G	0	0	1,0345	1,0345	0,4310	1,8103	0,5172	1,5517	1,2069	1,5517	0,5172	0,8621	36
216	I	1	0	1,5517	1,0345	0,8621	1,2069	0,5172	1,5517	0,6034	1,5517	1,5517	0,4310	36
216	H	0	0	1,5517	1,0345	0,8621	1,2069	0,5172	1,5517	1,2069	0,5172	1,0345	1,2931	36
216	C	0	0	1,5517	1,0345	0,4310	1,2069	0,5172	0,0000	1,2069	1,0345	1,5517	1,2931	36
216	E	0	1	1,5517	1,0345	0,8621	1,2069	0,5172	0,0000	1,8103	1,5517	1,5517	1,2931	36
216	J	0	0	1,5517	0,8697	0,4310	1,2069	0,5172	1,5517	0,6034	0,5172	1,5517	0,4310	36
217	G	0	0	1,0145	1,5217	0,5072	1,3043	0,5072	1,5217	1,0145	1,5217	0,5072	1,0145	64
217	I	0	0	1,5217	1,5217	1,0145	0,8696	0,5072	1,5217	0,5072	1,5217	1,5217	0,5072	64
217	H	0	0	1,5217	1,5217	1,0145	0,8696	0,5072	1,5217	1,0145	0,5072	1,0145	1,5217	64
217	C	0	0	1,5217	1,5217	0,5072	0,8696	0,5072	1,5217	1,0145	1,0145	1,5217	1,5217	64
217	E	1	1	1,5217	1,5217	1,0145	0,8696	0,5072	1,5217	1,5217	1,5217	1,5217	1,5217	64
217	J	0	0	1,5217	1,0145	0,5072	0,8696	0,5072	1,5217	0,5072	0,5072	1,5217	0,5072	64
218	G	0	0	1,3043	2,2826	0,7609	0,3261	0,4348	0,0000	0,8696	1,9565	0,1087	1,0870	38
218	I	0	0	1,9565	2,2826	1,5217	0,2174	0,4348	0,0000	0,4348	1,9565	0,3261	0,5435	38
218	H	0	0	1,9565	2,2826	1,5217	0,2174	0,4348	0,0000	0,8696	0,6522	0,2174	1,6304	38
218	C	0	0	1,9565	2,2826	0,7609	0,2174	0,4348	1,6304	0,8696	1,3043	0,3261	1,6304	38
218	E	1	1	1,9565	2,2826	1,5217	0,2174	0,4348	1,6304	1,3043	1,9565	0,3261	1,6304	38
218	J	0	0	1,9565	1,5217	0,7609	0,2174	0,4348	0,0000	0,4348	0,6522	0,3261	0,5435	38
219	G	0	0	1,2000	1,2000	0,4000	1,0000	0,6000	1,2000	1,2000	1,8000	0,4000	1,0000	39
219	I	0	0	1,8000	1,2000	0,8000	1,0000	0,6000	1,2000	0,6000	1,8000	1,2000	0,5000	39
219	H	0	0	1,8000	1,2000	0,8000	1,0000	0,6000	1,2000	1,2000	0,6000	0,8000	1,5000	39
219	C	0	0	1,8000	1,2000	0,4000	1,0000	0,6000	0,0000	1,2000	1,2000	1,2000	1,5000	39
219	E	1	1	1,8000	1,2000	0,8000	1,0000	0,6000	0,0000	1,8000	1,8000	1,2000	1,5000	39
219	J	0	0	1,8000	0,8000	0,4000	1,0000	0,6000	1,2000	0,6000	0,6000	1,2000	0,5000	39
220	G	0	0	1,4000	1,8000	0,4000	1,2000	0,5000	1,2000	1,2000	1,8000	0,4000	0,8000	65
220	I	0	0	2,1000	1,8000	0,8000	0,8000	0,5000	1,2000	0,6000	1,8000	1,2000	0,4000	65
220	H	0	0	2,1000	1,8000	0,8000	0,8000	0,5000	1,2000	1,2000	0,6000	0,8000	1,2000	65
220	C	0	0	2,1000	1,8000	0,4000	0,8000	0,5000	1,2000	1,2000	1,2000	1,2000	1,2000	65
220	E	0	1	2,1000	1,8000	0,8000	0,8000	0,5000	1,2000	1,8000	1,8000	1,2000	1,2000	65
220	J	1	0	2,1000	1,2000	0,4000	0,8000	0,5000	1,2000	0,6000	0,6000	1,2000	0,4000	65

221	G	0	0	1,1864	1,7797	0,5932	1,0169	0,4237	0,2542	1,1864	1,7797	0,5932	1,1864	66
221	I	0	0	1,7797	1,7797	1,1864	0,6780	0,4237	0,2542	0,5932	1,7797	1,7797	0,5932	66
221	H	0	0	1,7797	1,7797	1,1864	0,6780	0,4237	0,2542	1,1864	0,5932	1,1864	1,7797	66
221	C	0	0	1,7797	1,7797	0,5932	0,6780	0,4237	0,2542	1,1864	1,1864	1,7797	1,7797	66
221	E	1	1	1,7797	1,7797	1,1864	0,6780	0,4237	0,2542	1,7797	1,7797	1,7797	1,7797	66
221	J	0	0	1,7797	1,1864	0,5932	0,6780	0,4237	0,2542	0,5932	1,7797	1,7797	0,5932	66
222	G	0	0	1,3208	1,6981	0,5660	1,4151	0,4717	1,1321	0,9434	1,4151	0,4717	0,9434	51
222	I	0	0	1,9811	1,6981	1,1321	0,9434	0,4717	1,1321	0,4717	1,4151	1,4151	0,4717	51
222	H	0	0	1,9811	1,6981	1,1321	0,9434	0,4717	1,1321	0,9434	0,4717	0,9434	1,4151	51
222	C	0	0	1,9811	1,6981	0,5660	0,9434	0,4717	1,1321	0,9434	0,9434	1,4151	1,4151	51
222	E	1	1	1,9811	1,6981	1,1321	0,9434	0,4717	1,1321	1,4151	1,4151	1,4151	1,4151	51
222	J	0	0	1,9811	1,1321	0,5660	0,9434	0,4717	1,1321	0,4717	0,4717	1,4151	0,4717	51
223	G	0	0	1,0606	0,9091	0,5303	1,5909	0,5303	1,5909	1,0606	1,5909	0,5303	0,9091	83
223	I	1	0	1,5909	0,9091	1,0606	1,0606	0,5303	1,5909	0,5303	1,5909	1,5909	0,4543	83
223	H	0	0	1,5909	0,9091	1,0606	1,0606	0,5303	1,5909	1,0606	0,5303	1,0606	1,3636	83
223	C	0	0	1,5909	0,9091	0,5303	1,0606	0,5303	0,0000	1,0606	1,0606	1,5909	1,3636	83
223	E	0	1	1,5909	0,9091	1,0606	1,0606	0,5303	0,0000	1,5909	1,5909	1,5909	1,3636	83
223	J	0	0	1,5909	0,6061	0,5303	1,0606	0,5303	1,5909	0,5303	0,5303	1,5909	0,4543	83
224	G	0	0	1,3462	1,1538	0,3846	2,0192	0,3846	1,1538	1,3462	2,0192	0,3846	0,7692	60
224	I	0	0	2,0192	1,1538	0,7692	1,3462	0,3846	1,1538	0,6731	2,0192	1,1538	0,3846	60
224	H	0	0	2,0192	1,1538	0,7692	1,3462	0,3846	1,1538	1,3462	0,6731	0,7692	1,1538	60
224	C	0	0	2,0192	1,1538	0,3846	1,3462	0,3846	1,1538	1,3462	1,3462	1,1538	1,1538	60
224	E	1	1	2,0192	1,1538	0,7692	1,3462	0,3846	1,1538	2,0192	2,0192	1,1538	1,1538	60
224	J	0	0	2,0192	0,7692	0,3846	1,3462	0,3846	1,1538	0,6731	0,6731	1,1538	0,3846	60
225	G	0	0	1,0714	1,3393	0,4464	1,6071	0,4464	1,3393	1,2500	1,6071	0,3357	0,8929	73
225	I	0	0	1,6071	1,3393	0,8929	1,0714	0,4464	1,3393	0,6250	1,6071	1,6071	0,4464	73
225	H	1	0	1,6071	1,3393	0,8929	1,0714	0,4464	1,3393	1,2500	0,3357	1,0714	1,3393	73
225	C	0	0	1,6071	1,3393	0,4464	1,0714	0,4464	0,0000	1,2500	1,0714	1,6071	1,3393	73
225	E	0	1	1,6071	1,3393	0,8929	1,0714	0,4464	0,0000	1,8750	1,6071	1,6071	1,3393	73
225	J	0	0	1,6071	0,8929	0,4464	1,0714	0,4464	1,3393	0,6250	0,3357	1,6071	0,4464	73
226	G	0	0	1,3462	1,1538	0,6731	1,1538	0,3846	1,1538	1,3462	2,0192	0,3846	0,7692	70
226	I	0	0	2,0192	1,1538	1,3462	0,7692	0,3846	1,1538	0,6731	2,0192	1,1538	0,3846	70
226	H	0	0	2,0192	1,1538	1,3462	0,7692	0,3846	1,1538	1,3462	0,6731	0,7692	1,1538	70
226	C	0	0	2,0192	1,1538	0,6731	0,7692	0,3846	0,0000	1,3462	1,3462	1,1538	1,1538	70
226	E	1	1	2,0192	1,1538	1,3462	0,7692	0,3846	0,0000	2,0192	2,0192	1,1538	1,1538	70
226	J	0	0	2,0192	0,7692	0,6731	0,7692	0,3846	1,1538	0,6731	0,6731	1,1538	0,3846	70
227	G	0	0	1,1321	1,4151	0,5660	1,1321	0,5660	1,6981	0,7547	1,4151	0,5660	0,9434	53
227	I	1	1	1,6981	1,4151	1,1321	0,7547	0,5660	1,6981	0,3774	1,4151	1,6981	0,4717	53
227	H	0	0	1,6981	1,4151	1,1321	0,7547	0,5660	1,6981	0,7547	0,4717	1,1321	1,4151	53
227	C	0	0	1,6981	1,4151	0,5660	0,7547	0,5660	0,0000	0,7547	0,9434	1,6981	1,4151	53
227	E	0	1	1,6981	1,4151	1,1321	0,7547	0,5660	0,0000	1,1321	1,4151	1,6981	1,4151	53
227	J	0	0	1,6981	0,9434	0,5660	0,7547	0,5660	1,6981	0,3774	0,4717	1,6981	0,4717	53
228	G	0	0	1,0000	1,5000	0,5000	1,5000	0,5000	1,5000	1,0000	1,5000	0,5000	1,0000	58
228	I	1	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	0,5000	1,5000	1,5000	0,5000	58
228	H	0	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	1,0000	0,5000	1,0000	1,5000	58
228	C	0	0	1,5000	1,5000	0,5000	1,0000	0,5000	0,0000	1,0000	1,0000	1,5000	1,5000	58
228	E	0	1	1,5000	1,5000	1,0000	1,0000	0,5000	0,0000	1,5000	1,5000	1,5000	1,5000	58
228	J	0	0	1,5000	1,0000	0,5000	1,0000	0,5000	1,5000	0,5000	0,5000	1,5000	0,5000	58
229	G	0	0	1,2500	1,6071	0,4464	0,5357	0,5357	1,0714	1,2500	1,8750	0,5357	1,0714	61
229	I	0	0	1,8750	1,6071	0,8929	0,5357	0,5357	1,0714	0,6250	1,8750	1,6071	0,5357	61
229	H	0	0	1,8750	1,6071	0,8929	0,5357	0,5357	1,0714	1,2500	0,6250	1,0714	1,6071	61
229	C	0	0	1,8750	1,6071	0,4464	0,5357	0,5357	0,0000	1,2500	1,2500	1,6071	1,6071	61
229	E	1	1	1,8750	1,6071	0,8929	0,5357	0,5357	0,0000	1,8750	1,8750	1,6071	1,6071	61
229	J	0	0	1,8750	1,0714	0,4464	0,5357	0,5357	1,0714	0,6250	0,6250	1,6071	0,5357	61
230	G	0	0	1,2281	1,5789	0,5263	1,3158	0,4386	1,3158	1,0526	1,3158	0,5263	1,0526	53
230	I	1	0	1,8421	1,5789	1,0526	0,8772	0,4386	1,3158	0,5263	1,3158	1,5789	0,5263	53
230	H	0	0	1,8421	1,5789	1,0526	0,8772	0,4386	1,3158	1,0526	0,4386	1,0526	1,5789	53
230	C	0	0	1,8421	1,5789	0,5263	0,8772	0,4386	1,3158	1,0526	0,8772	1,5789	1,5789	53
230	E	0	1	1,8421	1,5789	1,0526	0,8772	0,4386	1,3158	1,5789	1,3158	1,5789	1,5789	53
230	J	0	0	1,8421	1,0526	0,5263	0,8772	0,4386	1,3158	0,5263	0,4386	1,5789	0,5263	53
231	G	0	0	1,2281	1,0526	0,3509	1,5789	0,5263	0,0000	1,2281	1,8421	0,4386	0,8772	51
231	I	0	0	1,8421	1,0526	0,7018	1,0526	0,5263	0,0000	0,6140	1,8421	1,3158	0,4386	51
231	H	0	0	1,8421	1,0526	0,7018	1,0526	0,5263	0,0000	1,2281	0,6140	0,8772	1,3158	51
231	C	0	0	1,8421	1,0526	0,3509	1,0526	0,5263	1,5789	1,2281	1,2281	1,3158	1,3158	51
231	E	1	1	1,8421	1,0526	0,7018	1,0526	0,5263	1,5789	1,8421	1,8421	1,3158	1,3158	51
231	J	0	0	1,8421	0,7018	0,3509	1,0526	0,5263	0,0000	0,6140	0,6140	1,3158	0,4386	51

232	G	0	0	1,1321	1,6981	0,4717	1,1321	0,4717	1,9811	0,9434	1,4131	0,4717	0,9434	32
232	I	0	1	1,6981	1,6981	0,9434	0,7347	0,4717	1,9811	0,4717	1,4131	1,4131	0,4717	32
232	H	0	1	1,6981	1,6981	0,9434	0,7347	0,4717	1,9811	0,9434	0,4717	0,9434	1,4131	32
232	C	1	0	1,6981	1,6981	0,4717	0,7347	0,4717	0,0000	0,9434	0,9434	1,4131	1,4131	32
232	E	0	0	1,6981	1,6981	0,9434	0,7347	0,4717	0,0000	1,4131	1,4131	1,4131	1,4131	32
232	J	0	0	1,6981	1,1321	0,4717	0,7347	0,4717	1,9811	0,4717	0,4717	1,4131	0,4717	32
233	G	1	0	1,1765	1,7647	0,3922	1,1765	0,4902	1,7647	0,9804	1,7647	0,4902	0,7843	36
233	I	0	1	1,7647	1,7647	0,7843	0,7843	0,4902	1,7647	0,4902	1,7647	1,4706	0,3922	36
233	H	0	0	1,7647	1,7647	0,7843	0,7843	0,4902	1,7647	0,9804	0,3922	0,9804	1,1765	36
233	C	0	0	1,7647	1,7647	0,3922	0,7843	0,4902	0,0000	0,9804	1,1765	1,4706	1,1765	36
233	E	0	1	1,7647	1,7647	0,7843	0,7843	0,4902	0,0000	1,4706	1,7647	1,4706	1,1765	36
233	J	0	0	1,7647	1,1765	0,3922	0,7843	0,4902	1,7647	0,4902	0,3922	1,4706	0,3922	36
234	G	0	0	1,3909	1,7045	0,4345	1,3636	0,4345	0,3409	1,3909	2,3864	0,4345	0,2273	29
234	I	0	0	2,3864	1,7045	0,9091	0,9091	0,4345	0,3409	0,7955	2,3864	1,3636	0,1136	29
234	H	0	0	2,3864	1,7045	0,9091	0,9091	0,4345	0,3409	1,3909	0,7955	0,9091	0,3409	29
234	C	1	0	2,3864	1,7045	0,4345	0,9091	0,4345	0,3409	1,3909	1,3909	1,3636	0,3409	29
234	E	0	1	2,3864	1,7045	0,9091	0,9091	0,4345	0,3409	2,3864	2,3864	1,3636	0,3409	29
234	J	0	0	2,3864	1,1364	0,4345	0,9091	0,4345	0,3409	0,7955	0,7955	1,3636	0,1136	29
235	G	0	0	1,0606	1,1364	0,4345	1,3636	0,3303	1,3636	1,0606	1,3636	0,3303	1,0606	68
235	I	0	0	1,3909	1,1364	0,9091	1,0606	0,3303	1,3636	0,3303	1,3909	1,3909	0,3303	68
235	H	0	0	1,3909	1,1364	0,9091	1,0606	0,3303	1,3636	1,0606	0,3303	1,0606	1,3909	68
235	C	0	0	1,3909	1,1364	0,4345	1,0606	0,3303	0,0000	1,0606	1,0606	1,3909	1,3909	68
235	E	1	1	1,3909	1,1364	0,9091	1,0606	0,3303	0,0000	1,3909	1,3909	1,3909	1,3909	68
235	J	0	0	1,3909	0,7376	0,4345	1,0606	0,3303	1,3636	0,3303	0,3303	1,3909	0,3303	68
236	G	0	0	1,4286	1,8367	0,4082	1,2245	0,7143	0,0000	1,0204	1,3306	0,4082	0,8163	42
236	I	0	0	2,1429	1,8367	0,8163	0,8163	0,7143	0,0000	0,5102	1,3306	1,2245	0,4082	42
236	H	0	0	2,1429	1,8367	0,8163	0,8163	0,7143	0,0000	1,0204	0,5102	0,8163	1,2245	42
236	C	0	0	2,1429	1,8367	0,4082	0,8163	0,7143	0,9184	1,0204	1,2245	1,2245	1,2245	42
236	E	1	1	2,1429	1,8367	0,8163	0,8163	0,7143	0,9184	1,3306	1,3306	1,2245	1,2245	42
236	J	0	0	2,1429	1,2245	0,4082	0,8163	0,7143	0,0000	0,5102	0,5102	1,2245	0,4082	42
237	G	0	0	1,3208	1,4131	0,3774	1,4131	0,4717	1,1321	1,1321	1,6981	0,5660	0,9434	43
237	I	0	0	1,9811	1,4131	0,7347	0,9434	0,4717	1,1321	0,5660	1,6981	1,6981	0,4717	43
237	H	1	0	1,9811	1,4131	0,7347	0,9434	0,4717	1,1321	1,1321	0,5660	1,1321	1,4131	43
237	C	0	0	1,9811	1,4131	0,3774	0,9434	0,4717	0,0000	1,1321	1,1321	1,6981	1,4131	43
237	E	0	1	1,9811	1,4131	0,7347	0,9434	0,4717	0,0000	1,6981	1,6981	1,6981	1,4131	43
237	J	0	0	1,9811	0,9434	0,3774	0,9434	0,4717	1,1321	0,5660	1,6981	1,6981	0,4717	43
238	G	0	0	0,9239	1,1111	0,6481	1,3889	0,6481	1,6667	1,1111	1,1111	0,4630	0,9239	61
238	I	0	0	1,3889	1,1111	1,2963	0,9239	0,6481	1,6667	0,5556	1,1111	1,3889	0,4630	61
238	H	0	0	1,3889	1,1111	1,2963	0,9239	0,6481	1,6667	1,1111	0,3704	0,9239	1,3889	61
238	C	0	0	1,3889	1,1111	0,6481	0,9239	0,6481	0,0000	1,1111	0,7407	1,3889	1,3889	61
238	E	1	1	1,3889	1,1111	1,2963	0,9239	0,6481	0,0000	1,6667	1,1111	1,3889	1,3889	61
238	J	0	0	1,3889	0,7407	0,6481	0,9239	0,6481	1,6667	0,5556	0,3704	1,3889	0,4630	61
239	G	0	0	0,9091	1,3909	0,4345	1,3909	0,3788	1,3909	1,0606	1,3909	0,3303	1,0606	48
239	I	0	0	1,3636	1,3909	0,9091	1,0606	0,3788	1,3909	0,3303	1,3909	1,3909	0,3303	48
239	H	0	0	1,3636	1,3909	0,9091	1,0606	0,3788	1,3909	1,0606	0,3303	1,0606	1,3909	48
239	C	0	0	1,3636	1,3909	0,4345	1,0606	0,3788	0,0000	1,0606	1,0606	1,3909	1,3909	48
239	E	1	1	1,3636	1,3909	0,9091	1,0606	0,3788	0,0000	1,3909	1,3909	1,3909	1,3909	48
239	J	0	0	1,3636	1,0606	0,4345	1,0606	0,3788	1,3909	0,3303	0,3303	1,3909	0,3303	48
240	G	0	0	1,0204	1,3306	0,5102	1,3306	0,4082	1,3306	1,0204	1,3306	0,5102	1,0204	35
240	I	1	0	1,3306	1,3306	1,0204	1,0204	0,4082	1,3306	0,5102	1,3306	1,3306	0,5102	35
240	H	0	0	1,3306	1,3306	1,0204	1,0204	0,4082	1,3306	1,0204	0,5102	1,0204	1,3306	35
240	C	0	0	1,3306	1,3306	0,5102	1,0204	0,4082	0,0000	1,0204	1,0204	1,3306	1,3306	35
240	E	0	1	1,3306	1,3306	1,0204	1,0204	0,4082	0,0000	1,3306	1,3306	1,3306	1,3306	35
240	J	0	0	1,3306	1,0204	0,5102	1,0204	0,4082	1,3306	0,5102	0,5102	1,3306	0,5102	35
241	G	0	0	1,2300	1,8730	0,6230	1,2300	0,2083	0,0000	0,6230	2,1875	0,5208	1,2300	37
241	I	0	0	1,8730	1,8730	1,2300	0,8333	0,2083	0,0000	0,3125	2,1875	1,5625	0,6230	37
241	H	0	0	1,8730	1,8730	1,2300	0,8333	0,2083	0,0000	0,6230	0,7292	1,0417	1,8730	37
241	C	0	0	1,8730	1,8730	0,6230	0,8333	0,2083	0,9375	0,6230	1,4383	1,5625	1,8730	37
241	E	1	1	1,8730	1,8730	1,2300	0,8333	0,2083	0,9375	0,9375	2,1875	1,5625	1,8730	37
241	J	0	0	1,8730	1,2300	0,6230	0,8333	0,2083	0,0000	0,3125	0,7292	1,5625	0,6230	37
242	G	0	0	1,4000	1,3000	0,3000	2,1000	0,4000	1,2000	0,8000	1,8000	0,4000	0,8000	68
242	I	0	0	2,1000	1,3000	1,0000	1,4000	0,4000	1,2000	0,4000	1,8000	1,2000	0,4000	68
242	H	0	0	2,1000	1,3000	1,0000	1,4000	0,4000	1,2000	0,8000	0,6000	0,8000	1,2000	68
242	C	0	0	2,1000	1,3000	0,3000	1,4000	0,4000	0,0000	0,8000	1,2000	1,2000	1,2000	68
242	E	0	1	2,1000	1,3000	1,0000	1,4000	0,4000	0,0000	1,2000	1,8000	1,2000	1,2000	68
242	J	1	0	2,1000	1,0000	0,3000	1,4000	0,4000	1,2000	0,4000	0,6000	1,2000	0,4000	68

243	G	0	0	1,0769	1,6134	0,5385	0,9231	0,4615	0,0000	1,0769	1,6134	0,5385	1,0769	47
243	I	0	0	1,6134	1,6134	1,0769	0,6134	0,4615	0,0000	0,5385	1,6134	1,6134	0,5385	47
243	H	0	0	1,6134	1,6134	1,0769	0,6134	0,4615	0,0000	1,0769	0,5385	1,0769	1,6134	47
243	C	0	0	1,6134	1,6134	0,5385	0,6134	0,4615	1,3846	1,0769	1,0769	1,6134	1,6134	47
243	E	1	1	1,6134	1,6134	1,0769	0,6134	0,4615	1,3846	1,6134	1,6134	1,6134	1,6134	47
243	J	0	0	1,6134	1,0769	0,5385	0,6134	0,4615	0,0000	0,5385	0,5385	1,6134	0,5385	47
244	G	0	0	1,1864	1,5234	0,4237	1,5234	0,4237	1,2712	1,1864	1,7797	0,5085	0,8475	45
244	I	0	0	1,7797	1,5234	0,8475	1,0169	0,4237	1,2712	0,5932	1,7797	1,5234	0,4237	45
244	H	0	0	1,7797	1,5234	0,8475	1,0169	0,4237	1,2712	1,1864	0,5932	1,0169	1,2712	45
244	C	0	0	1,7797	1,5234	0,4237	1,0169	0,4237	0,0000	1,1864	1,1864	1,5234	1,2712	45
244	E	1	1	1,7797	1,5234	0,8475	1,0169	0,4237	0,0000	1,7797	1,7797	1,5234	1,2712	45
244	J	0	0	1,7797	1,0169	0,4237	1,0169	0,4237	1,2712	0,5932	0,5932	1,5234	0,4237	45
245	G	0	0	0,7018	1,3138	0,6140	0,5263	0,6140	1,5789	1,0526	1,8421	0,6140	1,0526	50
245	I	1	0	1,0526	1,3138	1,2281	0,3509	0,6140	1,5789	0,5263	1,8421	1,8421	0,5263	50
245	H	0	0	1,0526	1,3138	1,2281	0,3509	0,6140	1,5789	1,0526	0,6140	1,2281	1,5789	50
245	C	0	0	1,0526	1,3138	0,6140	0,3509	0,6140	0,0000	1,0526	1,2281	1,8421	1,5789	50
245	E	0	1	1,0526	1,3138	1,2281	0,3509	0,6140	0,0000	1,5789	1,8421	1,8421	1,5789	50
245	J	0	0	1,0526	0,8772	0,6140	0,3509	0,6140	1,5789	0,5263	0,6140	1,8421	0,5263	50
246	G	0	0	1,1429	0,8571	0,2857	1,4286	0,5714	0,0000	0,8571	1,7143	0,4286	1,1429	53
246	I	1	0	1,7143	0,8571	0,5714	1,4286	0,5714	0,0000	0,4286	1,7143	1,2857	0,5714	53
246	H	0	0	1,7143	0,8571	0,5714	1,4286	0,5714	0,0000	0,8571	0,5714	0,8571	1,7143	53
246	C	0	0	1,7143	0,8571	0,2857	1,4286	0,5714	1,7143	0,8571	1,1429	1,2857	1,7143	53
246	E	0	1	1,7143	0,8571	0,5714	1,4286	0,5714	1,7143	1,2857	1,7143	1,2857	1,7143	53
246	J	0	0	1,7143	0,5714	0,2857	1,4286	0,5714	0,0000	0,4286	0,5714	1,2857	0,5714	53
247	G	0	0	1,2000	1,8000	0,6000	1,2000	0,5000	1,8000	0,8000	1,2000	0,4000	1,0000	65
247	I	1	0	1,8000	1,8000	1,2000	0,8000	0,5000	1,8000	0,4000	1,2000	1,2000	0,5000	65
247	H	0	0	1,8000	1,8000	1,2000	0,8000	0,5000	1,8000	0,8000	0,4000	0,8000	1,5000	65
247	C	0	0	1,8000	1,8000	0,6000	0,8000	0,5000	1,8000	0,8000	0,8000	1,2000	1,5000	65
247	E	0	1	1,8000	1,8000	1,2000	0,8000	0,5000	1,8000	1,2000	1,2000	1,2000	1,5000	65
247	J	0	0	1,8000	1,2000	0,6000	0,8000	0,5000	1,8000	0,4000	0,4000	1,2000	0,5000	65
248	G	0	0	1,0769	1,3846	0,4615	1,1538	0,5385	1,6134	1,0769	1,6134	0,5385	0,9231	83
248	I	0	0	1,6134	1,3846	0,9231	0,7692	0,5385	1,6134	0,5385	1,6134	1,6134	0,4615	83
248	H	0	0	1,6134	1,3846	0,9231	0,7692	0,5385	1,6134	1,0769	0,5385	1,0769	1,3846	83
248	C	0	0	1,6134	1,3846	0,4615	0,7692	0,5385	0,0000	1,0769	1,0769	1,6134	1,3846	83
248	E	1	1	1,6134	1,3846	0,9231	0,7692	0,5385	0,0000	1,6134	1,6134	1,6134	1,3846	83
248	J	0	0	1,6134	0,9231	0,4615	0,7692	0,5385	1,6134	0,5385	0,5385	1,6134	0,4615	83
249	G	0	0	0,9804	1,4706	0,4902	0,3922	0,5882	1,7647	1,1765	1,7647	0,5882	0,7843	39
249	I	0	0	1,4706	1,4706	0,9804	0,3922	0,5882	1,7647	0,5882	1,7647	1,7647	0,3922	39
249	H	0	0	1,4706	1,4706	0,9804	0,3922	0,5882	1,7647	1,1765	0,5882	1,1765	1,1765	39
249	C	0	0	1,4706	1,4706	0,4902	0,3922	0,5882	0,0000	1,1765	1,1765	1,7647	1,1765	39
249	E	1	1	1,4706	1,4706	0,9804	0,3922	0,5882	0,0000	1,7647	1,7647	1,7647	1,1765	39
249	J	0	0	1,4706	0,9804	0,4902	0,3922	0,5882	1,7647	0,5882	0,5882	1,7647	0,3922	39
250	G	0	0	1,0000	1,8000	0,7000	1,8000	0,3000	1,5000	0,8000	1,2000	0,4000	1,2000	70
250	I	1	0	1,5000	1,8000	1,4000	1,2000	0,3000	1,5000	0,4000	1,2000	1,2000	0,6000	70
250	H	0	0	1,5000	1,8000	1,4000	1,2000	0,3000	1,5000	0,8000	0,4000	0,8000	1,8000	70
250	C	0	0	1,5000	1,8000	0,7000	1,2000	0,3000	1,5000	0,8000	0,8000	1,2000	1,8000	70
250	E	0	1	1,5000	1,8000	1,4000	1,2000	0,3000	1,5000	1,2000	1,2000	1,2000	1,8000	70
250	J	0	0	1,5000	1,2000	0,7000	1,2000	0,3000	1,5000	0,4000	0,4000	1,2000	0,8000	70

Appendix 8 – Test Results of Group C (Weighted by Individual Preferences and Alternative Specification)

```
> summary(mlogitCactualresult)
```

```
Call:
```

```
mlogit(formula = Choice..Actual. ~ Reliability + Battery.Pack.Durability +  
Torque + Price + Comfort + Power.Source + Guarantee + Durability.of.the.Drill +  
Drilling.Capacity + Power | Max.Scale, data = mlogitCactualdata,  
method = "nr", print.level = 0)
```

```
Frequencies of alternatives:
```

	A	B	C	D	E	F	G	H	I	J	K
	0.096154	0.038462	0.038462	0.000000	0.307692	0.019231	0.019231	0.057692	0.346154	0.019231	0.057692

```
nr method
```

```
21 iterations, 0h:0m:0s
```

```
g'(-H)^-lg = 4.47E-07
```

```
gradient close to zero
```

```
Coefficients :
```

	Estimate	Std. Error	t-value	Pr(> t)
B: (intercept)	2.0727e+01	1.0046e+01	2.0633	0.03909 *
C: (intercept)	4.1634e-01	1.2009e+01	0.0347	0.97234
D: (intercept)	-1.4921e+01	1.7132e+05	-0.0001	0.99993
E: (intercept)	-7.2008e+00	1.0380e+01	-0.6937	0.48785
F: (intercept)	-3.5456e+00	1.2496e+01	-0.2837	0.77661
G: (intercept)	-1.0815e+01	1.4353e+01	-0.7535	0.45117
H: (intercept)	6.3302e+00	1.1460e+01	0.5524	0.58070
I: (intercept)	-3.6083e+00	9.9265e+00	-0.3635	0.71623
J: (intercept)	3.6671e+02	5.5982e+04	0.0066	0.99477
K: (intercept)	-1.4993e+01	1.0938e+01	-1.3708	0.17045
Reliability	5.0107e+00	5.6684e+00	0.8840	0.37671
Battery.Pack.Durability	-9.4353e+00	7.3141e+00	-1.2900	0.19705
Torque	6.8975e+00	4.1039e+00	1.6807	0.09281 .
Price	-2.6922e+00	3.2670e+00	-0.8241	0.40991
Comfort	-2.0436e+00	2.2985e+00	-0.8891	0.37396
Power.Source	1.0158e+00	3.3309e-01	3.0498	0.00229 **
Guarantee	3.3091e-01	2.1644e+00	0.1529	0.87849
Durability.of.the.Drill	1.1860e+01	5.1500e+00	2.3030	0.02128 *
Drilling.Capacity	3.3863e+00	2.9927e+00	1.1315	0.25784
Power	2.5369e+00	1.9883e+00	1.2759	0.20199
B:Max.Scale	-3.6995e-02	1.0012e-01	-0.3695	0.71174
C:Max.Scale	9.3654e-02	9.7324e-02	0.9623	0.33590
D:Max.Scale	1.0331e-02	2.9571e+03	0.0000	1.00000
E:Max.Scale	8.9753e-02	7.0644e-02	1.2705	0.20391
F:Max.Scale	1.9169e-01	1.4163e-01	1.3534	0.17592
G:Max.Scale	2.7569e-01	1.8333e-01	1.5038	0.13264
H:Max.Scale	5.8264e-02	8.5434e-02	0.6820	0.49526
I:Max.Scale	6.7911e-02	6.6945e-02	1.0144	0.31038
J:Max.Scale	-1.0992e+01	1.7021e+03	-0.0065	0.99485
K:Max.Scale	2.7178e-01	1.1753e-01	2.3124	0.02076 *

```

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Log-Likelihood: -66.711
McFadden R^2:  NaN
Likelihood ratio test : chisq = NaN (p.value = NA)
> |

> predictCactualresult <- predict(mlogitCactualresult, outcome = FALSE, type="response")
> print (predictCactualresult)
      A      B      C      D      E      F      G      H      I      J      K
6.070653e-02 1.066857e-02 4.385938e-02 3.915626e-12 3.876267e-01 1.249110e-02 3.443713e-03 2.982117e-02 4.259442e-01 2.109146e-118 2.543869e-02
> |

> summary(mlogitCrationalresult)

Call:
mlogit(formula = Choice..Rational. ~ Reliability + Battery.Pack.Durability +
  Torque + Price + Comfort + Power.Source + Guarantee + Durability.of.the.Drill +
  Drilling.Capacity + Power | Max.Scale, data = mlogitCrationaldata,
  method = "nr", print.level = 0)

Frequencies of alternatives:
      A      B      C      D      E      F      G      H      I      J      K
0.000000 0.000000 0.000000 0.000000 0.892857 0.000000 0.000000 0.017857 0.089286 0.000000 0.000000

nr method
2 iterations, 0h:0m:0s
g'(-H)^-lg = 1.6E+03
last step couldn't find higher value

Coefficients :
              Estimate Std. Error t-value Pr(>|t|)
B: (intercept)  4.1990e+01  2.4524e+01  1.7122 0.086864 .
C: (intercept) -2.9910e+00  6.0744e+01 -0.0492 0.960728
D: (intercept)  1.0726e+02  3.8990e+01  2.7510 0.005942 **
E: (intercept) -3.1794e+01  2.5538e+01 -1.2450 0.213149
F: (intercept)  6.1029e+01  3.6899e+01  1.6540 0.098134 .
G: (intercept)  2.8621e+01  3.2052e+01  0.8930 0.371883
H: (intercept)  6.6761e+00  2.9366e+01  0.2273 0.820155
I: (intercept) -6.5923e+00  2.1758e+01 -0.3030 0.761900
J: (intercept)  5.9119e+01  3.6406e+01  1.6239 0.104396
K: (intercept) -3.0574e+01  3.2250e+01 -0.9480 0.343120
Reliability     5.0636e+01  1.7315e+01  2.9245 0.003450 **
Battery.Pack.Durability 2.4340e+01  1.0164e+01  2.3947 0.016635 *
Torque          2.8425e+01  1.3248e+01  2.1455 0.031909 *
Price           1.7630e+01  1.0299e+01  1.7119 0.086922 .
Comfort         1.5790e+01  1.3736e+01  1.1496 0.250318
Power.Source    3.2912e-01  1.0580e+00  0.3111 0.755745
Guarantee       2.3205e+01  1.0623e+01  2.1844 0.028934 *

```

```

Durability.of.the.Drill  3.1973e+01  1.3940e+01  2.2937 0.021809 *
Drilling.Capacity       1.4539e+01  5.6988e+00  2.5513 0.010733 *
Power                   1.6655e+01  9.0569e+00  1.8389 0.065932 .
B:Max.Scale             -4.2704e-04  2.1241e-01 -0.0020 0.998396
C:Max.Scale             -4.1628e-02  1.0015e+00 -0.0416 0.966845
D:Max.Scale             -2.3145e-01  2.0349e-01 -1.1374 0.255369
E:Max.Scale             -9.5330e-02  1.9686e-01 -0.4842 0.628213
F:Max.Scale             -1.3025e-01  3.6910e-01 -0.3529 0.724166
G:Max.Scale             -1.0479e-01  3.8633e-01 -0.2712 0.786212
H:Max.Scale             -1.8528e-02  2.1904e-01 -0.0846 0.932590
I:Max.Scale             -3.1014e-02  2.2400e-01 -0.1385 0.889877
J:Max.Scale              4.6520e-03  2.4965e-01  0.0186 0.985133
K:Max.Scale             -1.9595e-02  4.8718e-01 -0.0402 0.967917
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

Log-Likelihood: -52.701
McFadden R^2:  NaN
Likelihood ratio test : chisq = NaN (p.value = NA)

```

```
> |
```

```
> predictCrationalresult <- predict(mlogitCrationalresult, outcome = FALSE, type="response")
```

```
> print (predictCrationalresult)
```

```

      A      B      C      D      E      F      G      H      I      J      K
1.093687e-05 2.549018e-05 2.549018e-05 2.549018e-05 9.997057e-01 2.549018e-05 2.549018e-05 3.149509e-05 7.340452e-05 2.549018e-05 2.549018e-05

```

```
> |
```

Individual	Alternative	Choice (Actual)	Choice (Rational)	Reliability	Battery Pack Durability	Torque	Price	Comfort	Power Source	Guarantee	Durability of the Drill	Drilling Capacity	Power	Max Scale
31	B	0	0	0.9756	2.1951	0.1220	0.2439	1.8293	1.0976	1.4634	0.7317	0.6098	1.4634	42
31	A	0	0	0.9756	1.4634	0.3659	0.3659	1.8293	1.0976	1.4634	2.1951	0.6098	0.4878	42
31	D	0	0	0.4878	0.7317	0.3659	0.2439	1.2195	1.0976	1.4634	0.7317	0.6098	0.4878	42
31	G	0	0	0.9756	2.1951	0.1220	0.3659	0.6098	1.0976	1.4634	2.1951	0.6098	0.9756	42
31	H	0	0	1.4634	2.1951	0.2439	0.2439	0.6098	1.0976	1.4634	0.7317	1.2195	1.4634	42
31	C	0	0	1.4634	2.1951	0.1220	0.2439	0.6098	1.0976	1.4634	1.4634	1.8293	1.4634	42
31	E	0	1	1.4634	2.1951	0.2439	0.2439	0.6098	1.0976	2.1951	2.1951	1.8293	1.4634	42
31	J	0	0	1.4634	1.4634	0.1220	0.1220	0.6098	1.0976	0.7317	0.7317	1.8293	0.4878	42
31	F	0	0	0.9756	2.1951	0.2439	0.1220	0.6098	1.0976	0.7317	1.4634	1.2195	0.4878	42
31	I	1	0	1.4634	2.1951	0.2439	0.2439	0.6098	1.0976	0.7317	2.1951	1.8293	0.4878	42
31	K	0	0	1.4634	2.1951	0.2439	0.3659	0.6098	1.0976	2.1951	2.1951	1.2195	0.4878	42
32	B	0	0	1.1864	1.7797	0.3390	0.8475	1.5234	1.5234	1.0169	0.5083	0.5083	1.2712	63
32	A	0	0	1.1864	1.1864	1.0169	1.2712	1.5234	0.0000	1.0169	1.5234	0.5083	0.4237	63
32	D	0	0	0.5083	0.5083	1.0169	0.8475	1.0169	0.0000	1.0169	0.5083	0.5083	0.4237	63
32	G	0	0	1.1864	1.7797	0.3390	1.2712	0.5083	1.5234	1.0169	1.5234	0.5083	0.8475	63
32	H	0	0	1.7797	1.7797	0.6780	0.8475	0.5083	1.5234	1.0169	0.5083	1.1864	1.2712	63
32	C	0	0	1.7797	1.7797	0.3390	0.8475	0.5083	0.0000	1.0169	1.7797	1.2712	1.2712	63
32	E	0	1	1.7797	1.7797	0.6780	0.8475	0.5083	0.0000	1.5234	1.5234	1.7797	1.2712	63
32	J	0	0	1.7797	1.1864	0.3390	0.4237	0.5083	1.5234	0.5083	0.5083	1.7797	0.4237	63
32	F	1	0	1.1864	1.7797	0.6780	0.4237	0.5083	0.0000	0.5083	1.0169	1.1864	0.4237	63
32	I	0	0	1.7797	1.7797	0.6780	0.8475	0.5083	1.5234	0.5083	1.5234	1.7797	0.4237	63
32	K	0	0	1.7797	1.7797	0.6780	1.2712	0.5083	0.0000	1.5234	1.5234	1.1864	0.4237	63
33	B	0	0	1.0606	1.5909	0.4543	0.6061	1.5909	1.5909	1.0606	0.5303	0.5303	1.5909	67
33	A	0	0	1.0606	1.0606	1.3636	0.9091	1.5909	0.0000	1.0606	1.5909	0.5303	0.5303	67
33	D	0	0	0.5303	0.5303	1.3636	0.6061	1.0606	0.0000	1.0606	0.5303	0.5303	0.5303	67
33	G	0	0	1.0606	1.5909	0.4543	0.9091	0.5303	1.5909	1.0606	1.5909	0.5303	1.0606	67
33	H	0	0	1.5909	1.5909	0.9091	0.6061	0.5303	1.5909	1.0606	0.5303	1.0606	1.5909	67
33	C	0	0	1.5909	1.5909	0.4543	0.6061	0.5303	0.0000	1.0606	1.0606	1.5909	1.5909	67
33	E	0	1	1.5909	1.5909	0.9091	0.6061	0.5303	0.0000	1.5909	1.5909	1.5909	1.5909	67
33	J	0	0	1.5909	1.0606	0.4543	0.3030	0.5303	1.5909	0.5303	0.5303	1.5909	0.5303	67
33	F	0	0	1.0606	1.5909	0.9091	0.3030	0.5303	0.0000	0.5303	1.0606	1.0606	0.5303	67
33	I	1	0	1.5909	1.5909	0.9091	0.6061	0.5303	1.5909	0.5303	1.5909	1.5909	0.5303	67
33	K	0	0	1.5909	1.5909	0.9091	0.9091	0.5303	0.0000	1.5909	1.5909	1.0606	0.5303	67
34	B	0	0	0.9804	1.4706	0.3922	1.1765	1.1765	1.4706	0.9804	0.5882	0.5882	1.4706	67
34	A	0	0	0.9804	0.9804	1.1765	1.7647	1.1765	0.0000	0.9804	1.7647	0.5882	0.4902	67
34	D	0	0	0.4902	0.4902	1.1765	1.1765	0.7843	0.0000	0.9804	0.5882	0.5882	0.4902	67
34	G	0	0	0.9804	1.4706	0.3922	1.7647	0.3922	1.4706	0.9804	1.7647	0.5882	0.9804	67
34	H	0	0	1.4706	1.4706	0.7843	1.1765	0.3922	1.4706	0.9804	0.5882	1.1765	1.4706	67
34	C	0	0	1.4706	1.4706	0.3922	1.1765	0.3922	0.0000	0.9804	1.1765	1.7647	1.4706	67
34	E	0	1	1.4706	1.4706	0.7843	1.1765	0.3922	0.0000	1.4706	1.7647	1.7647	1.4706	67
34	J	0	0	1.4706	0.9804	0.3922	0.5882	0.3922	1.4706	0.4902	0.5882	1.7647	0.4902	67
34	F	0	0	0.9804	1.4706	0.7843	0.5882	0.3922	0.0000	0.4902	1.1765	1.1765	0.4902	67
34	I	1	0	1.4706	1.4706	0.7843	1.1765	0.3922	1.4706	0.4902	1.7647	1.7647	0.4902	67
34	K	0	0	1.4706	1.4706	0.7843	1.7647	0.3922	0.0000	1.4706	1.7647	1.1765	0.4902	67
35	B	0	0	1.2963	1.1111	0.5556	0.9259	0.8333	1.1111	1.1111	0.6481	0.5556	1.6667	64
35	A	0	0	1.2963	0.7407	1.6667	1.3889	0.8333	1.1111	1.1111	1.9444	0.5556	0.5556	64
35	D	0	0	0.6481	0.3704	1.6667	0.9259	0.5556	1.1111	1.1111	0.6481	0.5556	0.5556	64
35	G	0	0	1.2963	1.1111	0.5556	1.3889	0.2778	1.1111	1.1111	1.9444	0.5556	1.1111	64
35	H	0	0	1.9444	1.1111	1.1111	0.9259	0.2778	1.1111	1.1111	0.6481	1.1111	1.6667	64
35	C	0	0	1.9444	1.1111	0.5556	0.9259	0.2778	1.1111	1.1111	1.2963	1.6667	1.6667	64
35	E	1	1	1.9444	1.1111	1.1111	0.9259	0.2778	1.1111	1.6667	1.9444	1.6667	1.6667	64
35	J	0	0	1.9444	0.7407	0.5556	0.4630	0.2778	1.1111	0.5556	0.6481	1.6667	0.5556	64
35	F	0	0	1.2963	1.1111	1.1111	0.4630	0.2778	1.1111	0.5556	1.2963	1.1111	0.5556	64
35	I	0	0	1.9444	1.1111	1.1111	0.9259	0.2778	1.1111	0.5556	1.9444	1.6667	0.5556	64
35	K	0	0	1.9444	1.1111	1.1111	1.3889	0.2778	1.1111	1.6667	1.9444	1.1111	0.5556	64

36	B	0	0	1,2727	1,9091	0,3636	1,0909	1,6364	0,0000	0,9091	0,6364	0,3636	1,0909	36
36	A	0	0	1,2727	1,2727	1,0909	1,6364	1,6364	1,3636	0,9091	1,9091	0,3636	0,3636	36
36	D	0	0	0,6364	0,6364	1,0909	1,0909	1,0909	1,3636	0,9091	0,6364	0,3636	0,3636	36
36	G	0	0	1,2727	1,9091	0,3636	1,6364	0,3435	0,0000	0,9091	1,9091	0,3636	0,7273	36
36	H	0	0	1,9091	1,9091	0,7273	1,0909	0,3435	0,0000	0,9091	0,6364	0,7273	1,0909	36
36	C	0	0	1,9091	1,9091	0,3636	1,0909	0,3435	1,3636	0,9091	1,2727	1,0909	1,0909	36
36	E	1	1	1,9091	1,9091	0,7273	1,0909	0,3435	1,3636	1,3636	1,9091	1,0909	1,0909	36
36	J	0	0	1,9091	1,2727	0,3636	0,3435	0,3435	0,0000	0,4343	0,6364	1,0909	0,3636	36
36	F	0	0	1,2727	1,9091	0,7273	0,3435	0,3435	1,3636	0,4343	1,2727	0,7273	0,3636	36
36	I	0	0	1,9091	1,9091	0,7273	1,0909	0,3435	0,0000	0,4343	1,9091	1,0909	0,3636	36
36	K	0	0	1,9091	1,9091	0,7273	1,6364	0,3435	1,3636	1,3636	1,9091	0,7273	0,3636	36
37	B	0	0	1,2500	1,8750	0,5357	0,8929	1,6071	1,6071	0,7143	0,4464	0,4464	1,3393	61
37	A	0	0	1,2500	1,2500	1,6071	1,3393	1,6071	1,6071	0,7143	1,3393	0,4464	0,4464	61
37	D	0	0	0,6250	0,6250	1,6071	0,8929	1,0714	1,6071	0,7143	0,4464	0,4464	0,4464	61
37	G	0	0	1,2500	1,8750	0,5357	1,3393	0,5357	1,6071	0,7143	1,3393	0,4464	0,8929	61
37	H	0	0	1,8750	1,8750	1,0714	0,8929	0,5357	1,6071	0,7143	0,4464	0,8929	1,3393	61
37	C	0	0	1,8750	1,8750	0,5357	0,8929	0,5357	1,6071	0,7143	0,8929	1,3393	1,3393	61
37	E	0	1	1,8750	1,8750	1,0714	0,8929	0,5357	1,6071	1,0714	1,3393	1,3393	1,3393	61
37	J	0	0	1,8750	1,2500	0,5357	0,4464	0,5357	1,6071	0,3371	0,4464	1,3393	0,4464	61
37	F	0	0	1,2500	1,8750	1,0714	0,4464	0,5357	1,6071	0,3371	0,8929	0,8929	0,4464	61
37	I	0	0	1,8750	1,8750	1,0714	0,8929	0,5357	1,6071	0,3371	1,3393	1,3393	0,4464	61
37	K	1	0	1,8750	1,8750	1,0714	1,3393	0,5357	1,6071	1,0714	1,3393	0,8929	0,4464	61
38	B	0	0	1,4000	1,8000	0,5000	0,8000	1,8000	1,5000	0,8000	0,5000	0,4000	1,2000	40
38	A	0	0	1,4000	1,2000	1,5000	1,2000	1,8000	0,0000	0,8000	1,5000	0,4000	0,4000	40
38	D	0	0	0,7000	0,6000	1,5000	0,8000	1,2000	0,0000	0,8000	0,5000	0,4000	0,4000	40
38	G	0	0	1,4000	1,8000	0,5000	1,2000	0,6000	1,5000	0,8000	1,5000	0,4000	0,8000	40
38	H	0	0	2,1000	1,8000	1,0000	0,8000	0,6000	1,5000	0,8000	0,5000	0,8000	1,2000	40
38	C	0	0	2,1000	1,8000	0,5000	0,8000	0,6000	0,0000	0,8000	1,0000	1,2000	1,2000	40
38	E	0	1	2,1000	1,8000	1,0000	0,8000	0,6000	0,0000	1,2000	1,5000	1,2000	1,2000	40
38	J	0	0	2,1000	1,2000	0,5000	0,4000	0,6000	1,5000	0,4000	0,5000	1,2000	0,4000	40
38	F	0	0	1,4000	1,8000	1,0000	0,4000	0,6000	0,0000	0,4000	1,0000	0,8000	0,4000	40
38	I	1	0	2,1000	1,8000	1,0000	0,8000	0,6000	1,5000	0,4000	1,5000	1,2000	0,4000	40
38	K	0	0	2,1000	1,8000	1,0000	1,2000	0,6000	0,0000	1,2000	1,5000	0,8000	0,4000	40
39	B	0	0	0,8333	1,8750	0,7292	0,8333	0,9375	1,2500	0,6250	0,5208	0,5208	2,1875	62
39	A	1	0	0,8333	1,2500	2,1875	1,2500	0,9375	1,2500	0,6250	1,5625	0,5208	0,7292	62
39	D	0	0	0,4167	0,6250	2,1875	0,8333	0,6250	1,2500	0,6250	0,5208	0,5208	0,7292	62
39	G	0	0	0,8333	1,8750	0,7292	1,2500	0,3125	1,2500	0,6250	1,5625	0,5208	1,4383	62
39	H	0	0	1,2500	1,8750	1,4383	0,8333	0,3125	1,2500	0,6250	0,5208	1,0417	2,1875	62
39	C	0	0	1,2500	1,8750	0,7292	0,8333	0,3125	1,2500	0,6250	1,0417	1,5625	2,1875	62
39	E	0	1	1,2500	1,8750	1,4383	0,8333	0,3125	1,2500	0,9375	1,5625	1,5625	2,1875	62
39	J	0	0	1,2500	1,2500	0,7292	0,4167	0,3125	1,2500	0,3125	0,5208	1,5625	0,7292	62
39	F	0	0	0,8333	1,8750	1,4383	0,4167	0,3125	1,2500	0,3125	1,0417	1,0417	0,7292	62
39	I	0	0	1,2500	1,8750	1,4383	0,8333	0,3125	1,2500	0,3125	1,5625	1,5625	0,7292	62
39	K	0	0	1,2500	1,8750	1,4383	1,2500	0,3125	1,2500	0,9375	1,5625	1,0417	0,7292	62
310	B	0	0	1,1111	1,6667	0,3704	1,1111	0,8333	0,0000	1,1111	0,5556	0,5556	1,3889	57
310	A	0	0	1,1111	1,1111	1,1111	1,6667	0,8333	1,6667	1,1111	1,6667	0,5556	0,4630	57
310	D	0	0	0,5556	0,5556	1,1111	1,1111	0,5556	1,6667	1,1111	0,5556	0,5556	0,4630	57
310	G	0	0	1,1111	1,6667	0,3704	1,6667	0,2778	0,0000	1,1111	1,6667	0,5556	0,9259	57
310	H	0	0	1,6667	1,6667	0,7407	1,1111	0,2778	0,0000	1,1111	0,5556	1,1111	1,3889	57
310	C	0	0	1,6667	1,6667	0,3704	1,1111	0,2778	1,6667	1,1111	1,1111	1,6667	1,3889	57
310	E	1	1	1,6667	1,6667	0,7407	1,1111	0,2778	1,6667	1,6667	1,6667	1,6667	1,3889	57
310	J	0	0	1,6667	1,1111	0,3704	0,5556	0,2778	0,0000	0,5556	0,5556	1,6667	0,4630	57
310	F	0	0	1,1111	1,6667	0,7407	0,5556	0,2778	1,6667	0,5556	1,1111	1,1111	0,4630	57
310	I	0	0	1,6667	1,6667	0,7407	1,1111	0,2778	0,0000	0,5556	1,6667	1,6667	0,4630	57
310	K	0	0	1,6667	1,6667	0,7407	1,6667	0,2778	1,6667	1,6667	1,6667	1,1111	0,4630	57
311	B	0	0	1,2727	1,0909	0,3435	0,3636	1,9091	1,0909	1,0909	0,6364	0,3435	1,6364	52
311	A	0	0	1,2727	0,7273	1,6364	0,3435	1,9091	1,0909	1,0909	1,9091	0,3435	0,3435	52
311	D	0	0	0,6364	0,3636	1,6364	0,3636	1,2727	1,0909	1,0909	0,6364	0,3435	0,3435	52
311	G	0	0	1,2727	1,0909	0,3435	0,3435	0,6364	1,0909	1,0909	1,9091	0,3435	1,0909	52
311	H	0	0	1,9091	1,0909	1,0909	0,3636	0,6364	1,0909	1,0909	0,6364	1,0909	1,6364	52
311	C	0	0	1,9091	1,0909	0,3435	0,3636	0,6364	1,0909	1,0909	1,2727	1,6364	1,6364	52
311	E	1	1	1,9091	1,0909	1,0909	0,3636	0,6364	1,0909	1,6364	1,9091	1,6364	1,6364	52
311	J	0	0	1,9091	0,7273	0,3435	0,1818	0,6364	1,0909	0,3435	0,6364	1,6364	0,3435	52
311	F	0	0	1,2727	1,0909	1,0909	0,1818	0,6364	1,0909	0,3435	1,2727	1,0909	0,3435	52
311	I	0	0	1,9091	1,0909	1,0909	0,3636	0,6364	1,0909	0,3435	1,9091	1,6364	0,3435	52
311	K	0	0	1,9091	1,0909	1,0909	0,3435	0,6364	1,0909	1,6364	1,9091	1,0909	0,3435	52

312	B	0	0	1,0938	1,6406	0,4688	0,6230	1,6406	1,6406	1,0938	0,5469	0,4688	1,4063	33
312	A	0	0	1,0938	1,0938	1,4063	0,9375	1,6406	0,0000	1,0938	1,6406	0,4688	0,4688	33
312	D	0	0	0,5469	0,5469	1,4063	0,6230	1,0938	0,0000	1,0938	0,5469	0,4688	0,4688	33
312	G	0	0	1,0938	1,6406	0,4688	0,9375	0,5469	1,6406	1,0938	1,6406	0,4688	0,9375	33
312	H	0	0	1,6406	1,6406	0,9375	0,6230	0,5469	1,6406	1,0938	0,5469	0,9375	1,4063	33
312	C	0	0	1,6406	1,6406	0,4688	0,6230	0,5469	0,0000	1,0938	1,0938	1,4063	1,4063	33
312	E	0	1	1,6406	1,6406	0,9375	0,6230	0,5469	0,0000	1,6406	1,6406	1,4063	1,4063	33
312	J	0	0	1,6406	1,0938	0,4688	0,3125	0,5469	1,6406	0,5469	0,5469	1,4063	0,4688	33
312	F	0	0	1,0938	1,6406	0,9375	0,3125	0,5469	0,0000	0,5469	1,0938	0,9375	0,4688	33
312	I	1	0	1,6406	1,6406	0,9375	0,6230	0,5469	1,6406	0,5469	1,6406	1,4063	0,4688	33
312	K	0	0	1,6406	1,6406	0,9375	0,9375	0,5469	0,0000	1,6406	1,6406	0,9375	0,4688	33
313	B	0	0	1,1667	1,0000	0,5833	1,1667	1,5000	0,0000	1,1667	0,5833	0,3333	1,7500	30
313	A	0	0	1,1667	0,6667	1,7500	1,7500	1,5000	1,0000	1,1667	1,7500	0,3333	0,5833	30
313	D	0	0	0,5833	0,3333	1,7500	1,1667	1,0000	1,0000	1,1667	0,5833	0,3333	0,5833	30
313	G	0	0	1,1667	1,0000	0,5833	1,7500	0,5000	0,0000	1,1667	1,7500	0,3333	1,1667	30
313	H	0	0	1,7500	1,0000	1,1667	1,1667	0,5000	0,0000	1,1667	0,5833	0,6667	1,7500	30
313	C	0	0	1,7500	1,0000	0,5833	1,1667	0,5000	1,0000	1,1667	1,1667	1,0000	1,7500	30
313	E	1	1	1,7500	1,0000	1,1667	1,1667	0,5000	1,0000	1,7500	1,7500	1,0000	1,7500	30
313	J	0	0	1,7500	0,6667	0,5833	0,5833	0,5000	0,0000	0,5833	0,5833	1,0000	0,5833	30
313	F	0	0	1,1667	1,0000	1,1667	0,5833	0,5000	1,0000	0,5833	1,1667	0,6667	0,5833	30
313	I	0	0	1,7500	1,0000	1,1667	1,1667	0,5000	0,0000	0,5833	1,7500	1,0000	0,5833	30
313	K	0	0	1,7500	1,0000	1,1667	1,7500	0,5000	1,0000	1,7500	1,7500	0,6667	0,5833	30
314	B	0	0	1,5217	1,9565	0,4348	0,6522	1,6304	1,6304	1,0870	0,5435	0,3261	0,9783	40
314	A	1	0	1,5217	1,3043	1,3043	0,9783	1,6304	0,0000	1,0870	1,6304	0,3261	0,3261	40
314	D	0	0	0,7609	0,6522	1,3043	0,6522	1,0870	0,0000	1,0870	0,5435	0,3261	0,3261	40
314	G	0	0	1,5217	1,9565	0,4348	0,9783	0,5435	1,6304	1,0870	1,6304	0,3261	0,6522	40
314	H	0	0	2,2826	1,9565	0,8696	0,6522	0,5435	1,6304	1,0870	0,5435	0,6522	0,9783	40
314	C	0	0	2,2826	1,9565	0,4348	0,6522	0,5435	0,0000	1,0870	1,0870	0,9783	0,9783	40
314	E	0	1	2,2826	1,9565	0,8696	0,6522	0,5435	0,0000	1,6304	1,6304	0,9783	0,9783	40
314	J	0	0	2,2826	1,3043	0,4348	0,3261	0,5435	1,6304	0,5435	0,5435	0,9783	0,3261	40
314	F	0	0	1,5217	1,9565	0,8696	0,3261	0,5435	0,0000	0,5435	1,0870	0,6522	0,3261	40
314	I	0	0	2,2826	1,9565	0,8696	0,6522	0,5435	1,6304	0,5435	1,6304	0,9783	0,3261	40
314	K	0	0	2,2826	1,9565	0,8696	0,9783	0,5435	0,0000	1,6304	1,6304	0,6522	0,3261	40
315	B	0	0	1,3462	1,1538	0,4808	0,1923	1,4423	1,1538	1,3462	0,6731	0,5769	1,7308	38
315	A	0	0	1,3462	0,7692	1,4423	0,2885	1,4423	1,1538	1,3462	2,0192	0,5769	0,5769	38
315	D	0	0	0,6731	0,3846	1,4423	0,1923	0,9615	1,1538	1,3462	0,6731	0,5769	0,5769	38
315	G	0	0	1,3462	1,1538	0,4808	0,2885	0,4808	1,1538	1,3462	2,0192	0,5769	1,1538	38
315	H	0	0	2,0192	1,1538	0,9615	0,1923	0,4808	1,1538	1,3462	0,6731	1,1538	1,7308	38
315	C	0	0	2,0192	1,1538	0,4808	0,1923	0,4808	1,1538	1,3462	1,3462	1,7308	1,7308	38
315	E	1	1	2,0192	1,1538	0,9615	0,1923	0,4808	1,1538	2,0192	2,0192	1,7308	1,7308	38
315	J	0	0	2,0192	0,7692	0,4808	0,0962	0,4808	1,1538	0,6731	0,6731	1,7308	0,5769	38
315	F	0	0	1,3462	1,1538	0,9615	0,0962	0,4808	1,1538	0,6731	1,3462	1,1538	0,5769	38
315	I	0	0	2,0192	1,1538	0,9615	0,1923	0,4808	1,1538	0,6731	2,0192	1,7308	0,5769	38
315	K	0	0	2,0192	1,1538	0,9615	0,2885	0,4808	1,1538	2,0192	2,0192	1,1538	0,5769	38
316	B	0	0	1,2727	1,6364	0,5435	0,7273	0,5435	0,0000	1,0909	0,5435	0,5435	1,6364	67
316	A	0	0	1,2727	1,0909	1,6364	1,0909	0,5435	1,6364	1,0909	1,6364	0,5435	0,5435	67
316	D	0	0	0,6364	0,5435	1,6364	0,7273	0,3636	1,6364	1,0909	0,5435	0,5435	0,5435	67
316	G	0	0	1,2727	1,6364	0,5435	1,0909	0,1818	0,0000	1,0909	1,6364	0,5435	1,0909	67
316	H	0	0	1,9091	1,6364	1,0909	0,7273	0,1818	0,0000	1,0909	0,5435	1,0909	1,6364	67
316	C	0	0	1,9091	1,6364	0,5435	0,7273	0,1818	1,6364	1,0909	1,0909	1,6364	1,6364	67
316	E	0	1	1,9091	1,6364	1,0909	0,7273	0,1818	1,6364	1,6364	1,6364	1,6364	1,6364	67
316	J	0	0	1,9091	1,0909	0,5435	0,3636	0,1818	0,0000	0,5435	0,5435	1,6364	0,5435	67
316	F	0	0	1,2727	1,6364	1,0909	0,3636	0,1818	1,6364	0,5435	1,0909	1,0909	0,5435	67
316	I	0	0	1,9091	1,6364	1,0909	0,7273	0,1818	0,0000	0,5435	1,6364	1,6364	0,5435	67
316	K	1	0	1,9091	1,6364	1,0909	1,0909	0,1818	1,6364	1,6364	1,6364	1,0909	0,5435	67
317	B	0	0	1,3462	1,4423	0,3846	1,3462	1,4423	1,7308	0,5769	0,3846	0,4808	1,7308	52
317	A	0	0	1,3462	0,9615	1,1538	2,0192	1,4423	0,0000	0,5769	1,1538	0,4808	0,5769	52
317	D	0	0	0,6731	0,4808	1,1538	1,3462	0,9615	0,0000	0,5769	0,3846	0,4808	0,5769	52
317	G	0	0	1,3462	1,4423	0,3846	2,0192	0,4808	1,7308	0,5769	1,1538	0,4808	1,1538	52
317	H	1	0	2,0192	1,4423	0,7692	1,3462	0,4808	1,7308	0,5769	0,3846	0,9615	1,7308	52
317	C	0	0	2,0192	1,4423	0,3846	1,3462	0,4808	0,0000	0,5769	0,7692	1,4423	1,7308	52
317	E	0	1	2,0192	1,4423	0,7692	1,3462	0,4808	0,0000	0,8654	1,1538	1,4423	1,7308	52
317	J	0	0	2,0192	0,9615	0,3846	0,6731	0,4808	1,7308	0,2885	0,3846	1,4423	0,5769	52
317	F	0	0	1,3462	1,4423	0,7692	0,6731	0,4808	0,0000	0,2885	0,7692	0,9615	0,5769	52
317	I	0	1	2,0192	1,4423	0,7692	1,3462	0,4808	1,7308	0,2885	1,1538	1,4423	0,5769	52
317	K	0	0	2,0192	1,4423	0,7692	2,0192	0,4808	0,0000	0,8654	1,1538	0,9615	0,5769	52

318	B	0	0	1.1111	1.1905	0.4762	0.9524	1.6667	0.0000	1.1111	0.3336	0.3336	1.4286	39
318	A	0	0	1.1111	0.7937	1.4286	1.4286	1.6667	1.1905	1.1111	1.6667	0.3336	0.4762	39
318	D	0	0	0.3336	0.3968	1.4286	0.9524	1.1111	1.1905	1.1111	0.3336	0.3336	0.4762	39
318	G	0	0	1.1111	1.1905	0.4762	1.4286	0.3336	0.0000	1.1111	1.6667	0.3336	0.9524	39
318	H	0	0	1.6667	1.1905	0.9524	0.9524	0.3336	0.0000	1.1111	0.3336	1.1111	1.4286	39
318	C	0	0	1.6667	1.1905	0.4762	0.9524	0.3336	1.1905	1.1111	1.1111	1.6667	1.4286	39
318	E	1	1	1.6667	1.1905	0.9524	0.9524	0.3336	1.1905	1.6667	1.6667	1.6667	1.4286	39
318	J	0	0	1.6667	0.7937	0.4762	0.4762	0.3336	0.0000	0.3336	0.3336	1.6667	0.4762	39
318	F	0	0	1.1111	1.1905	0.9524	0.4762	0.3336	1.1905	0.3336	1.1111	1.1111	0.4762	39
318	I	0	0	1.6667	1.1905	0.9524	0.9524	0.3336	0.0000	0.3336	1.6667	1.6667	0.4762	39
318	K	0	0	1.6667	1.1905	0.9524	1.4286	0.3336	1.1905	1.6667	1.6667	1.1111	0.4762	39
319	B	0	0	1.1290	1.6935	0.4839	0.9677	1.2097	1.4316	1.1290	0.3645	0.4839	1.2097	62
319	A	0	0	1.1290	1.1290	1.4316	1.4316	1.2097	0.0000	1.1290	1.6935	0.4839	0.4032	62
319	D	0	0	0.3645	0.3645	1.4316	0.9677	0.8063	0.0000	1.1290	0.3645	0.4839	0.4032	62
319	G	0	0	1.1290	1.6935	0.4839	1.4316	0.4032	1.4316	1.1290	1.6935	0.4839	0.8063	62
319	H	0	0	1.6935	1.6935	0.9677	0.9677	0.4032	1.4316	1.1290	0.3645	0.9677	1.2097	62
319	C	0	0	1.6935	1.6935	0.4839	0.9677	0.4032	0.0000	1.1290	1.1290	1.4316	1.2097	62
319	E	0	1	1.6935	1.6935	0.9677	0.9677	0.4032	0.0000	1.6935	1.6935	1.4316	1.2097	62
319	J	0	0	1.6935	1.1290	0.4839	0.4839	0.4032	1.4316	0.3645	1.4316	1.4316	0.4032	62
319	F	0	0	1.1290	1.6935	0.9677	0.4839	0.4032	0.0000	0.3645	1.1290	0.9677	0.4032	62
319	I	1	0	1.6935	1.6935	0.9677	0.9677	0.4032	1.4316	0.3645	1.6935	1.4316	0.4032	62
319	K	0	0	1.6935	1.6935	0.9677	1.4316	0.4032	0.0000	1.6935	1.6935	0.9677	0.4032	62
320	B	0	0	1.4734	1.4734	0.3738	0.6557	1.2295	0.0000	0.9836	0.4918	0.4918	1.7213	61
320	A	1	0	1.4734	0.9836	1.7213	0.9836	1.2295	1.7213	0.9836	1.4734	0.4918	0.3738	61
320	D	0	0	0.3738	0.4918	1.7213	0.6557	0.8197	1.7213	0.9836	0.4918	0.4918	0.3738	61
320	G	0	0	1.4734	1.4734	0.3738	0.9836	0.4098	0.0000	0.9836	1.4734	0.4918	1.4734	61
320	H	0	0	1.7213	1.4734	1.4734	0.6557	0.4098	0.0000	0.9836	0.4918	0.9836	1.7213	61
320	C	0	0	1.7213	1.4734	0.3738	0.6557	0.4098	1.7213	0.9836	0.9836	1.4734	1.7213	61
320	E	0	1	1.7213	1.4734	1.4734	0.6557	0.4098	1.7213	1.4734	1.4734	1.4734	1.7213	61
320	J	0	0	1.7213	0.9836	0.3738	0.3279	0.4098	0.0000	0.4918	0.4918	1.4734	0.3738	61
320	F	0	0	1.4734	1.4734	1.4734	0.3279	0.4098	1.7213	0.4918	0.9836	0.9836	0.3738	61
320	I	0	0	1.7213	1.4734	1.4734	0.6557	0.4098	0.0000	0.4918	1.4734	1.4734	0.3738	61
320	K	0	0	1.7213	1.4734	1.4734	0.9836	0.4098	1.7213	1.4734	1.4734	0.9836	0.3738	61
321	B	0	0	1.0938	1.4063	0.4688	0.7813	1.4063	1.6406	0.9375	0.3469	0.3469	1.6406	61
321	A	0	0	1.0938	0.9375	1.4063	1.1719	1.4063	0.0000	0.9375	1.6406	0.3469	0.3469	61
321	D	0	0	0.3469	0.4688	1.4063	0.7813	0.9375	0.0000	0.9375	0.3469	0.3469	0.3469	61
321	G	0	0	1.0938	1.4063	0.4688	1.1719	0.4688	1.6406	0.9375	1.6406	0.3469	1.0938	61
321	H	1	0	1.6406	1.4063	0.9375	0.7813	0.4688	1.6406	0.9375	0.3469	1.0938	1.6406	61
321	C	0	0	1.6406	1.4063	0.4688	0.7813	0.4688	0.0000	0.9375	1.0938	1.6406	1.6406	61
321	E	0	1	1.6406	1.4063	0.9375	0.7813	0.4688	0.0000	1.4063	1.6406	1.6406	1.6406	61
321	J	0	0	1.6406	0.9375	0.4688	0.3906	0.4688	1.6406	0.4688	0.3469	1.6406	0.3469	61
321	F	0	0	1.0938	1.4063	0.9375	0.3906	0.4688	0.0000	0.4688	1.0938	1.0938	0.3469	61
321	I	0	0	1.6406	1.4063	0.9375	0.7813	0.4688	1.6406	0.4688	1.6406	1.6406	0.3469	61
321	K	0	0	1.6406	1.4063	0.9375	1.1719	0.4688	0.0000	1.4063	1.6406	1.0938	0.3469	61
322	B	0	0	1.1111	1.6667	0.4762	0.1587	1.6667	1.6667	1.1111	0.3336	0.3336	1.6667	63
322	A	0	0	1.1111	1.1111	1.4286	0.2381	1.6667	0.0000	1.1111	1.6667	0.3336	0.3336	63
322	D	0	0	0.3336	0.3336	1.4286	0.1587	1.1111	0.0000	1.1111	0.3336	0.3336	0.3336	63
322	G	0	0	1.1111	1.6667	0.4762	0.2381	0.3336	1.6667	1.1111	1.6667	0.3336	1.1111	63
322	H	0	0	1.6667	1.6667	0.9524	0.1587	0.3336	1.6667	1.1111	0.3336	1.1111	1.6667	63
322	C	0	0	1.6667	1.6667	0.4762	0.1587	0.3336	0.0000	1.1111	1.1111	1.6667	1.6667	63
322	E	0	1	1.6667	1.6667	0.9524	0.1587	0.3336	0.0000	1.6667	1.6667	1.6667	1.6667	63
322	J	0	0	1.6667	1.1111	0.4762	0.0794	0.3336	1.6667	0.3336	0.3336	1.6667	0.3336	63
322	F	0	0	1.1111	1.6667	0.9524	0.0794	0.3336	0.0000	0.3336	1.1111	1.1111	0.3336	63
322	I	1	0	1.6667	1.6667	0.9524	0.1587	0.3336	1.6667	0.3336	1.6667	1.6667	0.3336	63
322	K	0	0	1.6667	1.6667	0.9524	0.2381	0.3336	0.0000	1.6667	1.6667	1.1111	0.3336	63
323	B	0	0	0.9836	1.7213	0.4098	0.8197	1.7213	1.4734	0.9836	0.3738	0.4918	1.4734	70
323	A	0	0	0.9836	1.4734	1.2295	1.2295	1.7213	1.4734	0.9836	1.7213	0.4918	0.4918	70
323	D	0	0	0.4918	0.3738	1.2295	0.8197	1.4734	1.4734	0.9836	0.3738	0.4918	0.4918	70
323	G	1	0	0.9836	1.7213	0.4098	1.2295	0.3738	1.4734	0.9836	1.7213	0.4918	0.9836	70
323	H	0	0	1.4734	1.7213	0.8197	0.8197	0.3738	1.4734	0.9836	0.3738	0.9836	1.4734	70
323	C	0	0	1.4734	1.7213	0.4098	0.8197	0.3738	1.4734	0.9836	1.4734	1.4734	1.4734	70
323	E	0	1	1.4734	1.7213	0.8197	0.8197	0.3738	1.4734	1.4734	1.7213	1.4734	1.4734	70
323	J	0	0	1.4734	1.4734	0.4098	0.4098	0.3738	1.4734	0.4918	0.3738	1.4734	0.4918	70
323	F	0	0	0.9836	1.7213	0.8197	0.4098	0.3738	1.4734	0.4918	1.4734	0.9836	0.4918	70
323	I	0	0	1.4734	1.7213	0.8197	0.8197	0.3738	1.4734	0.4918	1.7213	1.4734	0.4918	70
323	K	0	0	1.4734	1.7213	0.8197	1.2295	0.3738	1.4734	1.4734	1.7213	0.9836	0.4918	70

324	B	1	0	1.5556	1.6667	0.4444	0.6667	2.0000	1.3333	0.8889	0.4444	0.4444	1.3333	55
324	A	0	0	1.5556	1.1111	1.3333	1.0000	2.0000	1.3333	0.8889	1.3333	0.4444	0.4444	55
324	D	0	0	0.7778	0.5556	1.3333	0.6667	1.3333	1.3333	0.8889	0.4444	0.4444	0.4444	55
324	G	0	0	1.5556	1.6667	0.4444	1.0000	0.6667	1.3333	0.8889	1.3333	0.4444	0.8889	55
324	H	0	0	2.3333	1.6667	0.8889	0.6667	0.6667	1.3333	0.8889	0.4444	0.8889	1.3333	55
324	C	0	0	2.3333	1.6667	0.4444	0.6667	0.6667	1.3333	0.8889	0.8889	1.3333	1.3333	55
324	E	0	1	2.3333	1.6667	0.8889	0.6667	0.6667	1.3333	1.3333	1.3333	1.3333	1.3333	55
324	J	0	0	2.3333	1.1111	0.4444	0.3333	0.6667	1.3333	0.4444	0.4444	1.3333	0.4444	55
324	F	0	0	1.5556	1.6667	0.8889	0.3333	0.6667	1.3333	0.4444	0.8889	0.8889	0.4444	55
324	I	0	0	2.3333	1.6667	0.8889	0.6667	0.6667	1.3333	0.4444	1.3333	1.3333	0.4444	55
324	K	0	0	2.3333	1.6667	0.8889	1.0000	0.6667	1.3333	1.3333	1.3333	0.8889	0.4444	55
325	B	0	0	1.4884	1.9149	0.3319	1.2766	0.3191	0.0000	0.2128	0.7447	0.1064	1.9149	59
325	A	1	0	1.4884	1.2766	1.3957	1.9149	0.3191	2.2340	0.2128	2.2340	0.1064	0.6383	59
325	D	0	0	0.7447	0.6383	1.3957	1.2766	0.2128	2.2340	0.2128	0.7447	0.1064	0.6383	59
325	G	0	0	1.4884	1.9149	0.3319	1.9149	0.1064	0.0000	0.2128	2.2340	0.1064	1.2766	59
325	H	0	0	2.2340	1.9149	1.0638	1.2766	0.1064	0.0000	0.2128	0.7447	0.2128	1.9149	59
325	C	0	0	2.2340	1.9149	0.3319	1.2766	0.1064	2.2340	0.2128	1.4884	0.3191	1.9149	59
325	E	0	1	2.2340	1.9149	1.0638	1.2766	0.1064	2.2340	0.3191	2.2340	0.3191	1.9149	59
325	J	0	0	2.2340	1.2766	0.3319	0.6383	0.1064	0.0000	0.1064	0.7447	0.3191	0.6383	59
325	F	0	0	1.4884	1.9149	1.0638	0.6383	0.1064	2.2340	0.1064	1.4884	0.2128	0.6383	59
325	I	0	0	2.2340	1.9149	1.0638	1.2766	0.1064	0.0000	0.1064	2.2340	0.3191	0.6383	59
325	K	0	0	2.2340	1.9149	1.0638	1.9149	0.1064	2.2340	0.3191	2.2340	0.2128	0.6383	59
326	B	0	0	1.1667	1.7500	0.5000	0.8333	1.0000	1.7500	1.1667	0.5833	0.4167	1.2500	64
326	A	0	0	1.1667	1.1667	1.5000	1.2500	1.0000	0.0000	1.1667	1.7500	0.4167	0.4167	64
326	D	0	0	0.5833	0.5833	1.5000	0.8333	0.6667	0.0000	1.1667	0.5833	0.4167	0.4167	64
326	G	0	0	1.1667	1.7500	0.5000	1.2500	0.3333	1.7500	1.1667	1.7500	0.4167	0.8333	64
326	H	0	0	1.7500	1.7500	1.0000	0.8333	0.3333	1.7500	1.1667	0.5833	0.8333	1.2500	64
326	C	0	0	1.7500	1.7500	0.5000	0.8333	0.3333	0.0000	1.1667	1.1667	1.2500	1.2500	64
326	E	0	1	1.7500	1.7500	1.0000	0.8333	0.3333	0.0000	1.7500	1.7500	1.2500	1.2500	64
326	J	0	0	1.7500	1.1667	0.5000	0.4167	0.3333	1.7500	0.5833	0.5833	1.2500	0.4167	64
326	F	0	0	1.1667	1.7500	1.0000	0.4167	0.3333	0.0000	0.5833	1.1667	0.8333	0.4167	64
326	I	1	0	1.7500	1.7500	1.0000	0.8333	0.3333	1.7500	0.5833	1.7500	1.2500	0.4167	64
326	K	0	0	1.7500	1.7500	1.0000	1.2500	0.3333	0.0000	1.7500	1.7500	0.8333	0.4167	64
327	B	0	0	1.0606	1.3636	0.5303	1.0606	1.5909	0.9091	1.0606	0.5303	0.5303	1.5909	35
327	A	0	0	1.0606	0.9091	1.5909	1.5909	1.5909	0.0000	1.0606	1.5909	0.5303	0.5303	35
327	D	0	0	0.5303	0.4545	1.5909	1.0606	1.0606	0.0000	1.0606	0.5303	0.5303	0.5303	35
327	G	0	0	1.0606	1.3636	0.5303	1.5909	0.5303	0.9091	1.0606	1.5909	0.5303	1.0606	35
327	H	0	0	1.5909	1.3636	1.0606	1.0606	0.5303	0.9091	1.0606	0.5303	1.0606	1.5909	35
327	C	0	0	1.5909	1.3636	0.5303	1.0606	0.5303	0.0000	1.0606	1.0606	1.5909	1.5909	35
327	E	1	1	1.5909	1.3636	1.0606	1.0606	0.5303	0.0000	1.5909	1.5909	1.5909	1.5909	35
327	J	0	0	1.5909	0.9091	0.5303	0.5303	0.5303	0.9091	0.5303	0.5303	1.5909	0.5303	35
327	F	0	0	1.0606	1.3636	1.0606	0.5303	0.5303	0.0000	0.5303	1.0606	1.0606	0.5303	35
327	I	0	0	1.5909	1.3636	1.0606	1.0606	0.5303	0.9091	0.5303	1.5909	1.5909	0.5303	35
327	K	0	0	1.5909	1.3636	1.0606	1.5909	0.5303	0.0000	1.5909	1.5909	1.0606	0.5303	35
328	B	0	0	1.3636	1.7045	0.3409	1.3636	0.6818	1.7045	0.9091	0.5682	0.5682	1.0227	50
328	A	0	0	1.3636	1.1364	1.0227	2.0455	0.6818	1.7045	0.9091	1.7045	0.5682	0.3409	50
328	D	0	0	0.6818	0.5682	1.0227	1.3636	0.4545	1.7045	0.9091	0.5682	0.5682	0.3409	50
328	G	0	0	1.3636	1.7045	0.3409	2.0455	0.2273	1.7045	0.9091	1.7045	0.5682	0.6818	50
328	H	0	0	2.0455	1.7045	0.6818	1.3636	0.2273	1.7045	0.9091	0.5682	1.1364	1.0227	50
328	C	0	0	2.0455	1.7045	0.3409	1.3636	0.2273	1.7045	0.9091	1.1364	1.7045	1.0227	50
328	E	0	1	2.0455	1.7045	0.6818	1.3636	0.2273	1.7045	1.3636	1.7045	1.7045	1.0227	50
328	J	0	0	2.0455	1.1364	0.3409	0.6818	0.2273	1.7045	0.4545	0.5682	1.7045	0.3409	50
328	F	0	0	1.3636	1.7045	0.6818	0.6818	0.2273	1.7045	0.4545	1.1364	1.1364	0.3409	50
328	I	1	0	2.0455	1.7045	0.6818	1.3636	0.2273	1.7045	0.4545	1.7045	1.7045	0.3409	50
328	K	0	0	2.0455	1.7045	0.6818	2.0455	0.2273	1.7045	1.3636	1.7045	1.1364	0.3409	50
329	B	0	0	1.1290	1.4516	0.4839	0.6452	1.2097	1.6935	1.1290	0.5645	0.4839	1.6935	63
329	A	0	0	1.1290	0.9677	1.4516	0.9677	1.2097	0.0000	1.1290	1.6935	0.4839	0.5645	63
329	D	0	0	0.5645	0.4839	1.4516	0.6452	0.8063	0.0000	1.1290	0.5645	0.4839	0.5645	63
329	G	0	0	1.1290	1.4516	0.4839	0.9677	0.4032	1.6935	1.1290	1.6935	0.4839	1.1290	63
329	H	0	0	1.6935	1.4516	0.9677	0.6452	0.4032	1.6935	1.1290	0.5645	0.9677	1.6935	63
329	C	0	0	1.6935	1.4516	0.4839	0.6452	0.4032	0.0000	1.1290	1.1290	1.4516	1.6935	63
329	E	1	1	1.6935	1.4516	0.9677	0.6452	0.4032	0.0000	1.6935	1.6935	1.4516	1.6935	63
329	J	0	0	1.6935	0.9677	0.4839	0.3226	0.4032	1.6935	0.5645	0.5645	1.4516	0.5645	63
329	F	0	0	1.1290	1.4516	0.9677	0.3226	0.4032	0.0000	0.5645	1.1290	0.9677	0.5645	63
329	I	0	0	1.6935	1.4516	0.9677	0.6452	0.4032	1.6935	0.5645	1.6935	1.4516	0.5645	63
329	K	0	0	1.6935	1.4516	0.9677	0.9677	0.4032	0.0000	1.6935	1.6935	0.9677	0.5645	63

330	B	0	0	1,0769	1,3846	0,5385	0,9231	1,3846	1,3846	1,0769	0,5385	0,5385	1,3846	60
330	A	0	0	1,0769	0,9231	1,6134	1,3846	1,3846	0,0000	1,0769	1,6134	0,5385	0,4613	60
330	D	0	0	0,5385	0,4613	1,6134	0,9231	0,9231	0,0000	1,0769	0,5385	0,5385	0,4613	60
330	G	0	0	1,0769	1,3846	0,5385	1,3846	0,4613	1,3846	1,0769	1,6134	0,5385	0,9231	60
330	H	0	0	1,6134	1,3846	1,0769	0,9231	0,4613	1,3846	1,0769	0,5385	1,0769	1,3846	60
330	C	1	0	1,6134	1,3846	0,5385	0,9231	0,4613	0,0000	1,0769	1,0769	1,6134	1,3846	60
330	E	0	1	1,6134	1,3846	1,0769	0,9231	0,4613	0,0000	1,6134	1,6134	1,6134	1,3846	60
330	J	0	0	1,6134	0,9231	0,5385	0,4613	0,4613	1,3846	0,5385	0,5385	1,6134	0,4613	60
330	F	0	0	1,0769	1,3846	1,0769	0,4613	0,4613	0,0000	0,5385	1,0769	1,0769	0,4613	60
330	I	0	0	1,6134	1,3846	1,0769	0,9231	0,4613	1,3846	0,5385	1,6134	1,6134	0,4613	60
330	K	0	0	1,6134	1,3846	1,0769	1,3846	0,4613	0,0000	1,6134	1,6134	1,0769	0,4613	60
331	B	0	0	1,0000	1,5000	0,5000	1,5000	1,5000	1,5000	1,0000	0,5000	0,5000	1,5000	79
331	A	0	0	1,0000	1,0000	1,5000	1,5000	1,5000	0,0000	1,0000	1,5000	0,5000	0,5000	79
331	D	0	0	0,5000	0,5000	1,5000	1,0000	1,0000	0,0000	1,0000	0,5000	0,5000	0,5000	79
331	G	0	0	1,0000	1,5000	0,5000	1,5000	0,5000	1,5000	1,0000	1,5000	0,5000	1,0000	79
331	H	0	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	1,0000	0,5000	1,0000	1,5000	79
331	C	0	0	1,5000	1,5000	0,5000	1,0000	0,5000	0,0000	1,0000	1,0000	1,5000	1,5000	79
331	E	1	1	1,5000	1,5000	1,0000	1,0000	0,5000	0,0000	1,5000	1,5000	1,5000	1,5000	79
331	J	0	0	1,5000	1,0000	0,5000	0,5000	0,5000	1,5000	0,5000	0,5000	1,5000	0,5000	79
331	F	0	0	1,0000	1,5000	1,0000	0,5000	0,5000	0,0000	0,5000	1,0000	1,0000	0,5000	79
331	I	0	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	0,5000	1,5000	1,5000	0,5000	79
331	K	0	0	1,5000	1,5000	1,0000	1,5000	0,5000	0,0000	1,5000	1,5000	1,0000	0,5000	79
332	B	0	0	1,5217	1,6304	0,5435	1,0870	1,6304	0,0000	0,6522	0,5435	0,4348	0,9783	47
332	A	0	0	1,5217	1,0870	1,6304	1,6304	1,6304	1,3043	0,6522	1,6304	0,4348	0,3261	47
332	D	0	0	0,7809	0,5435	1,6304	1,0870	1,0870	1,3043	0,6522	0,5435	0,4348	0,3261	47
332	G	0	0	1,5217	1,6304	0,5435	1,6304	0,5435	0,0000	0,6522	1,6304	0,4348	0,6522	47
332	H	0	0	2,2826	1,6304	1,0870	1,0870	0,5435	0,0000	0,6522	0,5435	0,8896	0,9783	47
332	C	0	0	2,2826	1,6304	0,5435	1,0870	0,5435	1,3043	0,6522	1,0870	1,3043	0,9783	47
332	E	0	1	2,2826	1,6304	1,0870	1,0870	0,5435	1,3043	0,9783	1,6304	1,3043	0,9783	47
332	J	0	0	2,2826	1,0870	0,5435	0,5435	0,5435	0,0000	0,3261	0,5435	1,3043	0,3261	47
332	F	0	0	1,5217	1,6304	1,0870	0,5435	0,5435	1,3043	0,3261	1,0870	0,8896	0,3261	47
332	I	1	0	2,2826	1,6304	1,0870	1,0870	0,5435	0,0000	0,3261	1,6304	1,3043	0,3261	47
332	K	0	0	2,2826	1,6304	1,0870	1,6304	0,5435	1,3043	0,9783	1,6304	0,8896	0,3261	47
333	B	0	0	1,0938	1,1719	0,5469	0,9375	1,4063	0,0000	0,7813	0,5469	0,5469	1,6406	67
333	A	0	0	1,0938	0,7813	1,6406	1,4063	1,4063	1,6406	0,7813	1,6406	0,5469	0,5469	67
333	D	0	0	0,5469	0,3906	1,6406	0,9375	0,9375	1,6406	0,7813	0,5469	0,5469	0,5469	67
333	G	0	0	1,0938	1,1719	0,5469	1,4063	0,4688	0,0000	0,7813	1,6406	0,5469	1,0938	67
333	H	0	0	1,6406	1,1719	1,0938	0,9375	0,4688	0,0000	0,7813	0,5469	1,0938	1,6406	67
333	C	0	0	1,6406	1,1719	0,5469	0,9375	0,4688	1,6406	0,7813	1,0938	1,6406	1,6406	67
333	E	1	1	1,6406	1,1719	1,0938	0,9375	0,4688	1,6406	1,1719	1,6406	1,6406	1,6406	67
333	J	0	0	1,6406	0,7813	0,5469	0,4688	0,4688	0,0000	0,3906	0,5469	1,6406	0,5469	67
333	F	0	0	1,0938	1,1719	1,0938	0,4688	0,4688	1,6406	0,3906	1,0938	1,0938	0,5469	67
333	I	0	0	1,6406	1,1719	1,0938	0,9375	0,4688	0,0000	0,3906	1,6406	1,6406	0,5469	67
333	K	0	0	1,6406	1,1719	1,0938	1,4063	0,4688	1,6406	1,1719	1,6406	1,0938	0,5469	67
334	B	0	0	1,5909	1,7045	0,4545	0,4545	2,0455	0,0000	0,9091	0,4545	0,4545	1,3636	35
334	A	0	0	1,5909	1,1364	1,3636	0,6818	2,0455	1,3636	0,9091	1,3636	0,4545	0,4545	35
334	D	0	0	0,7955	0,5682	1,3636	0,4545	1,3636	1,3636	0,9091	0,4545	0,4545	0,4545	35
334	G	0	0	1,5909	1,7045	0,4545	0,6818	0,6818	0,0000	0,9091	1,3636	0,4545	0,9091	35
334	H	0	0	2,3864	1,7045	0,9091	0,4545	0,6818	0,0000	0,9091	0,4545	0,9091	1,3636	35
334	C	0	0	2,3864	1,7045	0,4545	0,4545	0,6818	1,3636	0,9091	0,9091	1,3636	1,3636	35
334	E	1	1	2,3864	1,7045	0,9091	0,4545	0,6818	1,3636	1,3636	1,3636	1,3636	1,3636	35
334	J	0	0	2,3864	1,1364	0,4545	0,2273	0,6818	0,0000	0,4545	0,4545	1,3636	0,4545	35
334	F	0	0	1,5909	1,7045	0,9091	0,2273	0,6818	1,3636	0,4545	0,9091	0,9091	0,4545	35
334	I	0	0	2,3864	1,7045	0,9091	0,4545	0,6818	0,0000	0,4545	1,3636	1,3636	0,4545	35
334	K	0	0	2,3864	1,7045	0,9091	0,6818	0,6818	1,3636	1,3636	1,3636	0,9091	0,4545	35
335	B	0	0	1,0000	1,5000	0,5000	1,0000	1,5000	1,5000	1,0000	0,5000	0,5000	1,5000	74
335	A	0	0	1,0000	1,0000	1,5000	1,5000	1,5000	0,0000	1,0000	1,5000	0,5000	0,5000	74
335	D	0	0	0,5000	0,5000	1,5000	1,0000	1,0000	0,0000	1,0000	0,5000	0,5000	0,5000	74
335	G	0	0	1,0000	1,5000	0,5000	1,5000	0,5000	1,5000	1,0000	1,5000	0,5000	1,0000	74
335	H	0	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	1,0000	0,5000	1,0000	1,5000	74
335	C	0	0	1,5000	1,5000	0,5000	1,0000	0,5000	0,0000	1,0000	1,0000	1,5000	1,5000	74
335	E	0	1	1,5000	1,5000	1,0000	1,0000	0,5000	0,0000	1,5000	1,5000	1,5000	1,5000	74
335	J	0	0	1,5000	1,0000	0,5000	0,5000	0,5000	1,5000	0,5000	0,5000	1,5000	0,5000	74
335	F	0	0	1,0000	1,5000	1,0000	0,5000	0,5000	0,0000	0,5000	1,0000	1,0000	0,5000	74
335	I	0	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	0,5000	1,5000	1,5000	0,5000	74
335	K	1	0	1,5000	1,5000	1,0000	1,5000	0,5000	0,0000	1,5000	1,5000	1,0000	0,5000	74

336	B	0	0	1,1338	1,4423	0,4808	0,9615	1,1338	1,4423	0,9615	0,4808	0,3769	1,7308	40
336	A	0	0	1,1338	0,9615	1,4423	1,4423	1,1338	0,0000	0,9615	1,4423	0,3769	0,3769	40
336	D	0	0	0,3769	0,4808	1,4423	0,9615	0,7692	0,0000	0,9615	0,4808	0,3769	0,3769	40
336	G	0	0	1,1338	1,4423	0,4808	1,4423	0,3846	1,4423	0,9615	1,4423	0,3769	1,1338	40
336	H	0	0	1,7308	1,4423	0,9615	0,9615	0,3846	1,4423	0,9615	0,4808	1,1338	1,7308	40
336	C	0	0	1,7308	1,4423	0,4808	0,9615	0,3846	0,0000	0,9615	0,9615	1,7308	1,7308	40
336	E	0	1	1,7308	1,4423	0,9615	0,9615	0,3846	0,0000	1,4423	1,4423	1,7308	1,7308	40
336	J	0	0	1,7308	0,9615	0,4808	0,4808	0,3846	1,4423	0,4808	0,4808	1,7308	0,3769	40
336	F	0	0	1,1338	1,4423	0,9615	0,4808	0,3846	0,0000	0,4808	0,9615	1,1338	0,3769	40
336	I	1	0	1,7308	1,4423	0,9615	0,9615	0,3846	1,4423	0,4808	1,4423	1,7308	0,3769	40
336	K	0	0	1,7308	1,4423	0,9615	1,4423	0,3846	0,0000	1,4423	1,4423	1,1338	0,3769	40
337	B	0	0	1,0000	1,5000	0,5000	1,0000	1,5000	1,0000	1,0000	0,5000	0,5000	1,5000	56
337	A	0	0	1,0000	1,0000	1,5000	1,5000	1,0000	0,0000	1,0000	1,5000	0,5000	0,5000	56
337	D	0	0	0,5000	0,5000	1,5000	1,0000	1,0000	0,0000	1,0000	0,5000	0,5000	0,5000	56
337	G	0	0	1,0000	1,5000	0,5000	1,5000	0,5000	1,5000	1,0000	1,5000	0,5000	1,0000	56
337	H	0	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	1,0000	0,5000	1,0000	1,5000	56
337	C	0	0	1,5000	1,5000	0,5000	1,0000	0,5000	0,0000	1,0000	1,0000	1,5000	1,5000	56
337	E	1	1	1,5000	1,5000	1,0000	1,0000	0,5000	0,0000	1,5000	1,5000	1,5000	1,5000	56
337	J	0	0	1,5000	1,0000	0,5000	0,5000	0,5000	1,5000	0,5000	0,5000	1,5000	0,5000	56
337	F	0	0	1,0000	1,5000	1,0000	0,5000	0,5000	0,0000	0,5000	1,0000	1,0000	0,5000	56
337	I	0	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	0,5000	1,5000	1,5000	0,5000	56
337	K	0	0	1,5000	1,5000	1,0000	1,5000	0,5000	0,0000	1,5000	1,5000	1,0000	0,5000	56
338	B	0	0	1,3462	1,7308	0,3846	0,7692	0,8634	1,7308	0,9615	0,6731	0,3769	1,1338	73
338	A	0	0	1,3462	1,1338	1,1338	1,1338	0,8634	0,0000	0,9615	2,0192	0,3769	0,3846	73
338	D	0	0	0,6731	0,3769	1,1338	0,7692	0,3769	0,0000	0,9615	0,6731	0,3769	0,3846	73
338	G	0	0	1,3462	1,7308	0,3846	1,1338	0,2883	1,7308	0,9615	2,0192	0,3769	0,7692	73
338	H	0	0	2,0192	1,7308	0,7692	0,7692	0,2883	1,7308	0,9615	0,6731	1,1338	1,1338	73
338	C	0	0	2,0192	1,7308	0,3846	0,7692	0,2883	0,0000	0,9615	1,3462	1,7308	1,1338	73
338	E	1	1	2,0192	1,7308	0,7692	0,7692	0,2883	0,0000	1,4423	2,0192	1,7308	1,1338	73
338	J	0	0	2,0192	1,1338	0,3846	0,3846	0,2883	1,7308	0,4808	0,6731	1,7308	0,3846	73
338	F	0	0	1,3462	1,7308	0,7692	0,3846	0,2883	0,0000	0,4808	1,3462	1,1338	0,3846	73
338	I	0	1	2,0192	1,7308	0,7692	0,7692	0,2883	1,7308	0,4808	2,0192	1,7308	0,3846	73
338	K	0	0	2,0192	1,7308	0,7692	1,1338	0,2883	0,0000	1,4423	2,0192	1,1338	0,3846	73
339	B	0	0	1,2963	1,1111	0,3704	1,1111	1,6667	1,3889	1,1111	0,6481	0,4630	1,1111	61
339	A	0	0	1,2963	0,7407	1,1111	1,6667	1,6667	1,3889	1,1111	1,9444	0,4630	0,3704	61
339	D	0	0	0,6481	0,3704	1,1111	1,1111	1,1111	1,3889	1,1111	0,6481	0,4630	0,3704	61
339	G	0	0	1,2963	1,1111	0,3704	1,6667	0,3336	1,3889	1,1111	1,9444	0,4630	0,7407	61
339	H	0	0	1,9444	1,1111	0,7407	1,1111	0,3336	1,3889	1,1111	0,6481	0,9239	1,1111	61
339	C	0	0	1,9444	1,1111	0,3704	1,1111	0,3336	1,3889	1,1111	1,2963	1,3889	1,1111	61
339	E	0	1	1,9444	1,1111	0,7407	1,1111	0,3336	1,3889	1,6667	1,9444	1,3889	1,1111	61
339	J	0	0	1,9444	0,7407	0,3704	0,3336	0,3336	1,3889	0,3336	0,6481	1,3889	0,3704	61
339	F	0	0	1,2963	1,1111	0,7407	0,3336	0,3336	1,3889	0,3336	1,2963	0,9239	0,3704	61
339	I	1	0	1,9444	1,1111	0,7407	1,1111	0,3336	1,3889	0,3336	1,9444	1,3889	0,3704	61
339	K	0	0	1,9444	1,1111	0,7407	1,6667	0,3336	1,3889	1,6667	1,9444	0,9239	0,3704	61
340	B	1	0	1,0000	1,5000	0,5000	1,0000	1,5000	1,5000	1,0000	0,5000	0,5000	1,5000	34
340	A	0	0	1,0000	1,0000	1,5000	1,5000	1,5000	0,0000	1,0000	1,5000	0,5000	0,5000	34
340	D	0	0	0,5000	0,5000	1,5000	1,0000	1,0000	0,0000	1,0000	0,5000	0,5000	0,5000	34
340	G	0	0	1,0000	1,5000	0,5000	1,5000	0,5000	1,5000	1,0000	1,5000	0,5000	1,0000	34
340	H	0	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	1,0000	0,5000	1,0000	1,5000	34
340	C	0	0	1,5000	1,5000	0,5000	1,0000	0,5000	0,0000	1,0000	1,0000	1,5000	1,5000	34
340	E	0	1	1,5000	1,5000	1,0000	1,0000	0,5000	0,0000	1,5000	1,5000	1,5000	1,5000	34
340	J	0	0	1,5000	1,0000	0,5000	0,5000	0,5000	1,5000	0,5000	0,5000	1,5000	0,5000	34
340	F	0	0	1,0000	1,5000	1,0000	0,5000	0,5000	0,0000	0,5000	1,0000	1,0000	0,5000	34
340	I	0	0	1,5000	1,5000	1,0000	1,0000	0,5000	1,5000	0,5000	1,5000	1,5000	0,5000	34
340	K	0	0	1,5000	1,5000	1,0000	1,5000	0,5000	0,0000	1,5000	1,5000	1,0000	0,5000	34
341	B	0	0	1,4000	1,8000	0,7000	0,8000	1,8000	1,2000	0,8000	0,4000	0,4000	1,2000	60
341	A	0	0	1,4000	1,2000	2,1000	1,2000	1,8000	0,0000	0,8000	1,2000	0,4000	0,4000	60
341	D	0	0	0,7000	0,6000	2,1000	0,8000	1,2000	0,0000	0,8000	0,4000	0,4000	0,4000	60
341	G	0	0	1,4000	1,8000	0,7000	1,2000	0,6000	1,2000	0,8000	1,2000	0,4000	0,8000	60
341	H	0	0	2,1000	1,8000	1,4000	0,8000	0,6000	1,2000	0,8000	0,4000	0,8000	1,2000	60
341	C	0	0	2,1000	1,8000	0,7000	0,8000	0,6000	0,0000	0,8000	0,8000	1,2000	1,2000	60
341	E	0	1	2,1000	1,8000	1,4000	0,8000	0,6000	0,0000	1,2000	1,2000	1,2000	1,2000	60
341	J	0	0	2,1000	1,2000	0,7000	0,4000	0,6000	1,2000	0,4000	0,4000	1,2000	0,4000	60
341	F	0	0	1,4000	1,8000	1,4000	0,4000	0,6000	0,0000	0,4000	0,8000	0,8000	0,4000	60
341	I	1	0	2,1000	1,8000	1,4000	0,8000	0,6000	1,2000	0,4000	1,2000	1,2000	0,4000	60
341	K	0	0	2,1000	1,8000	1,4000	1,2000	0,6000	0,0000	1,2000	1,2000	0,8000	0,4000	60

342	B	0	0	1,1475	1,7213	0,4918	0,6557	1,4754	1,4754	1,1475	0,5738	0,4098	1,4754	66
342	A	0	0	1,1475	1,1475	1,4754	0,9836	1,4754	0,0000	1,1475	1,7213	0,4098	0,4918	66
342	D	0	0	0,5738	0,5738	1,4754	0,6557	0,9836	0,0000	1,1475	0,5738	0,4098	0,4918	66
342	G	0	0	1,1475	1,7213	0,4918	0,9836	0,4918	1,4754	1,1475	1,7213	0,4098	0,9836	66
342	H	0	0	1,7213	1,7213	0,9836	0,6557	0,4918	1,4754	1,1475	0,5738	0,8197	1,4754	66
342	C	0	0	1,7213	1,7213	0,4918	0,6557	0,4918	0,0000	1,1475	1,1475	1,2295	1,4754	66
342	E	0	1	1,7213	1,7213	0,9836	0,6557	0,4918	0,0000	1,7213	1,7213	1,2295	1,4754	66
342	J	0	0	1,7213	1,1475	0,4918	0,3279	0,4918	1,4754	0,5738	0,5738	1,2295	0,4918	66
342	F	0	0	1,1475	1,7213	0,9836	0,3279	0,4918	0,0000	0,5738	1,1475	0,8197	0,4918	66
342	I	1	0	1,7213	1,7213	0,9836	0,6557	0,4918	1,4754	0,5738	1,7213	1,2295	0,4918	66
342	K	0	0	1,7213	1,7213	0,9836	0,9836	0,4918	0,0000	1,7213	1,7213	0,8197	0,4918	66
343	B	0	0	1,4286	0,6122	0,5102	0,4082	2,1429	0,6122	0,8163	0,6122	0,7143	2,1429	62
343	A	0	0	1,4286	0,4082	1,5306	0,6122	2,1429	0,6122	0,8163	1,8367	0,7143	0,7143	62
343	D	0	0	0,7143	0,2041	1,5306	0,4082	1,4286	0,6122	0,8163	0,6122	0,7143	0,7143	62
343	G	0	0	1,4286	0,6122	0,5102	0,6122	0,7143	0,6122	0,8163	1,8367	0,7143	1,4286	62
343	H	0	0	2,1429	0,6122	1,0204	0,4082	0,7143	0,6122	0,8163	0,6122	1,4286	2,1429	62
343	C	0	0	2,1429	0,6122	0,5102	0,4082	0,7143	0,6122	0,8163	1,2245	2,1429	2,1429	62
343	E	1	1	2,1429	0,6122	1,0204	0,4082	0,7143	0,6122	1,2245	1,8367	2,1429	2,1429	62
343	J	0	0	2,1429	0,4082	0,5102	0,2041	0,7143	0,6122	0,4082	0,6122	2,1429	0,7143	62
343	F	0	0	1,4286	0,6122	1,0204	0,2041	0,7143	0,6122	0,4082	1,2245	1,4286	0,7143	62
343	I	0	0	2,1429	0,6122	1,0204	0,4082	0,7143	0,6122	0,4082	1,8367	2,1429	0,7143	62
343	K	0	0	2,1429	0,6122	1,0204	0,6122	0,7143	0,6122	1,2245	1,8367	1,4286	0,7143	62
344	B	0	0	1,2766	1,2766	0,5319	1,2766	1,2766	1,2766	1,0638	0,5319	0,4255	1,2766	53
344	A	0	0	1,2766	0,8511	1,5957	1,9149	1,2766	1,2766	1,0638	1,5957	0,4255	0,4255	53
344	D	0	0	0,6383	0,4255	1,5957	1,2766	0,8511	1,2766	1,0638	0,5319	0,4255	0,4255	53
344	G	0	0	1,2766	1,2766	0,5319	1,9149	0,4255	1,2766	1,0638	1,5957	0,4255	0,8511	53
344	H	0	0	1,9149	1,2766	1,0638	1,2766	0,4255	1,2766	1,0638	0,5319	0,8511	1,2766	53
344	C	1	0	1,9149	1,2766	0,5319	1,2766	0,4255	1,2766	1,0638	1,0638	1,2766	1,2766	53
344	E	0	1	1,9149	1,2766	1,0638	1,2766	0,4255	1,2766	1,5957	1,5957	1,2766	1,2766	53
344	J	0	0	1,9149	0,8511	0,5319	0,6383	0,4255	1,2766	0,5319	0,5319	1,2766	0,4255	53
344	F	0	0	1,2766	1,2766	1,0638	0,6383	0,4255	1,2766	0,5319	1,0638	0,8511	0,4255	53
344	I	0	0	1,9149	1,2766	1,0638	1,2766	0,4255	1,2766	0,5319	1,5957	1,2766	0,4255	53
344	K	0	0	1,9149	1,2766	1,0638	1,9149	0,4255	1,2766	1,5957	1,5957	0,8511	0,4255	53
345	B	0	0	1,1475	1,7213	0,5738	0,9836	1,4754	1,4754	0,6557	0,4918	0,5738	1,2295	50
345	A	0	0	1,1475	1,1475	1,7213	1,4754	1,4754	0,0000	0,6557	1,4754	0,5738	0,4098	50
345	D	0	0	0,5738	0,5738	1,7213	0,9836	0,9836	0,0000	0,6557	0,4918	0,5738	0,4098	50
345	G	0	0	1,1475	1,7213	0,5738	1,4754	0,4918	1,4754	0,6557	1,4754	0,5738	0,8197	50
345	H	1	0	1,7213	1,7213	1,1475	0,9836	0,4918	1,4754	0,6557	0,4918	1,1475	1,2295	50
345	C	0	0	1,7213	1,7213	0,5738	0,9836	0,4918	0,0000	0,6557	0,9836	1,7213	1,2295	50
345	E	0	1	1,7213	1,7213	1,1475	0,9836	0,4918	0,0000	0,9836	1,4754	1,7213	1,2295	50
345	J	0	0	1,7213	1,1475	0,5738	0,4918	0,4918	1,4754	0,3279	0,4918	1,7213	0,4098	50
345	F	0	0	1,1475	1,7213	1,1475	0,4918	0,4918	0,0000	0,3279	0,9836	1,1475	0,4098	50
345	I	0	1	1,7213	1,7213	1,1475	0,9836	0,4918	1,4754	0,3279	1,4754	1,7213	0,4098	50
345	K	0	0	1,7213	1,7213	1,1475	1,4754	0,4918	0,0000	0,9836	1,4754	1,1475	0,4098	50
346	B	0	0	1,7500	1,5000	0,6250	1,5000	1,5000	1,5000	0,2500	0,5000	0,1250	1,5000	31
346	A	0	0	1,7500	1,0000	1,8750	2,2500	1,5000	0,0000	0,2500	1,5000	0,1250	0,5000	31
346	D	0	0	0,8750	0,5000	1,8750	1,5000	1,0000	0,0000	0,2500	0,5000	0,1250	0,5000	31
346	G	0	0	1,7500	1,5000	0,6250	2,2500	0,5000	1,5000	0,2500	1,5000	0,1250	1,0000	31
346	H	0	1	2,6250	1,5000	1,2500	1,5000	0,5000	1,5000	0,2500	0,5000	0,2500	1,5000	31
346	C	0	0	2,6250	1,5000	0,6250	1,5000	0,5000	0,0000	0,2500	1,0000	0,3750	1,5000	31
346	E	0	0	2,6250	1,5000	1,2500	1,5000	0,5000	0,0000	0,3750	1,5000	0,3750	1,5000	31
346	J	1	0	2,6250	1,0000	0,6250	0,7500	0,5000	1,5000	0,1250	0,5000	0,3750	0,5000	31
346	F	0	0	1,7500	1,5000	1,2500	0,7500	0,5000	0,0000	0,1250	1,0000	0,2500	0,5000	31
346	I	0	1	2,6250	1,5000	1,2500	1,5000	0,5000	1,5000	0,1250	1,5000	0,3750	0,5000	31
346	K	0	0	2,6250	1,5000	1,2500	2,2500	0,5000	0,0000	0,3750	1,5000	0,2500	0,5000	31
347	B	0	0	1,1667	1,5000	0,5000	1,0000	1,5000	1,5000	0,8333	0,5000	0,5000	1,5000	48
347	A	0	0	1,1667	1,0000	1,5000	1,5000	1,5000	0,0000	0,8333	1,5000	0,5000	0,5000	48
347	D	0	0	0,8333	0,5000	1,5000	1,0000	1,0000	0,0000	0,8333	0,5000	0,5000	0,5000	48
347	G	0	0	1,1667	1,5000	0,5000	1,5000	0,5000	1,5000	0,8333	1,5000	0,5000	1,0000	48
347	H	0	0	1,7500	1,5000	1,0000	1,0000	0,5000	1,5000	0,8333	0,5000	1,0000	1,5000	48
347	C	0	0	1,7500	1,5000	0,5000	1,0000	0,5000	0,0000	0,8333	1,0000	1,5000	1,5000	48
347	E	0	1	1,7500	1,5000	1,0000	1,0000	0,5000	0,0000	1,2500	1,5000	1,5000	1,5000	48
347	J	0	0	1,7500	1,0000	0,5000	0,5000	0,5000	1,5000	0,4167	0,5000	1,5000	0,5000	48
347	F	0	0	1,1667	1,5000	1,0000	0,5000	0,5000	0,0000	0,4167	1,0000	1,0000	0,5000	48
347	I	1	0	1,7500	1,5000	1,0000	1,0000	0,5000	1,5000	0,4167	1,5000	1,5000	0,5000	48
347	K	0	0	1,7500	1,5000	1,0000	1,5000	0,5000	0,0000	1,2500	1,5000	1,0000	0,5000	48

348	B	0	0	1,1864	1,5234	0,4237	0,6780	1,5234	1,2712	0,8475	0,5932	0,5932	1,7797	47
348	A	1	0	1,1864	1,0169	1,2712	1,0169	1,5234	0,0000	0,8475	1,7797	0,5932	0,5932	47
348	D	0	0	0,5932	0,5085	1,2712	0,6780	1,0169	0,0000	0,8475	0,5932	0,5932	0,5932	47
348	G	0	0	1,1864	1,5234	0,4237	1,0169	0,5085	1,2712	0,8475	1,7797	0,5932	1,1864	47
348	H	0	0	1,7797	1,5234	0,8475	0,6780	0,5085	1,2712	0,8475	0,5932	1,1864	1,7797	47
348	C	0	0	1,7797	1,5234	0,4237	0,6780	0,5085	0,0000	0,8475	1,1864	1,7797	1,7797	47
348	E	0	1	1,7797	1,5234	0,8475	0,6780	0,5085	0,0000	1,2712	1,7797	1,7797	1,7797	47
348	J	0	0	1,7797	1,0169	0,4237	0,3390	0,5085	1,2712	0,4237	0,5932	1,7797	0,5932	47
348	F	0	0	1,1864	1,5234	0,8475	0,3390	0,5085	0,0000	0,4237	1,1864	1,1864	0,5932	47
348	I	0	0	1,7797	1,5234	0,8475	0,6780	0,5085	1,2712	0,4237	1,7797	1,7797	0,5932	47
348	K	0	0	1,7797	1,5234	0,8475	1,0169	0,5085	0,0000	1,2712	1,7797	1,1864	0,5932	47
349	B	0	0	1,1338	1,4423	0,5769	0,1923	1,4423	2,0192	0,7692	0,5769	0,5769	1,7308	64
349	A	0	0	1,1338	0,9615	1,7308	0,2885	1,4423	0,0000	0,7692	1,7308	0,5769	0,5769	64
349	D	0	0	0,5769	0,4808	1,7308	0,1923	0,9615	0,0000	0,7692	0,5769	0,5769	0,5769	64
349	G	0	0	1,1338	1,4423	0,5769	0,2885	0,4808	2,0192	0,7692	1,7308	0,5769	1,1338	64
349	H	0	0	1,7308	1,4423	1,1338	0,1923	0,4808	2,0192	0,7692	0,5769	1,1338	1,7308	64
349	C	0	0	1,7308	1,4423	0,5769	0,1923	0,4808	0,0000	0,7692	1,1338	1,7308	1,7308	64
349	E	0	0	1,7308	1,4423	1,1338	0,1923	0,4808	0,0000	1,1338	1,7308	1,7308	1,7308	64
349	J	0	0	1,7308	0,9615	0,5769	0,0962	0,4808	2,0192	0,3846	0,5769	1,7308	0,5769	64
349	F	0	0	1,1338	1,4423	1,1338	0,0962	0,4808	0,0000	0,3846	1,1338	1,1338	0,5769	64
349	I	1	1	1,7308	1,4423	1,1338	0,1923	0,4808	2,0192	0,3846	1,7308	1,7308	0,5769	64
349	K	0	0	1,7308	1,4423	1,1338	0,2885	0,4808	0,0000	1,1338	1,7308	1,1338	0,5769	64
350	B	0	0	1,1475	0,9836	0,4918	1,1475	1,4734	1,7213	0,9836	0,4918	0,4918	1,4734	66
350	A	0	0	1,1475	0,6557	1,4734	1,7213	1,4734	0,0000	0,9836	1,4734	0,4918	0,4918	66
350	D	0	0	0,5738	0,3279	1,4734	1,1475	0,9836	0,0000	0,9836	0,4918	0,4918	0,4918	66
350	G	0	0	1,1475	0,9836	0,4918	1,7213	0,4918	1,7213	0,9836	1,4734	0,4918	0,9836	66
350	H	0	0	1,7213	0,9836	0,9836	1,1475	0,4918	1,7213	0,9836	0,4918	0,9836	1,4734	66
350	C	0	0	1,7213	0,9836	0,4918	1,1475	0,4918	0,0000	0,9836	0,9836	1,4734	1,4734	66
350	E	0	1	1,7213	0,9836	0,9836	1,1475	0,4918	0,0000	1,4734	1,4734	1,4734	1,4734	66
350	J	0	0	1,7213	0,6557	0,4918	0,5738	0,4918	1,7213	0,4918	0,4918	1,4734	0,4918	66
350	F	0	0	1,1475	0,9836	0,9836	0,5738	0,4918	0,0000	0,4918	0,9836	0,9836	0,4918	66
350	I	1	0	1,7213	0,9836	0,9836	1,1475	0,4918	1,7213	0,4918	1,4734	1,4734	0,4918	66
350	K	0	0	1,7213	0,9836	0,9836	1,7213	0,4918	0,0000	1,4734	1,4734	0,9836	0,4918	66
351	B	0	0	1,1864	1,5234	0,4237	0,3390	1,5234	1,7797	1,1864	0,5932	0,5932	1,2712	69
351	A	0	0	1,1864	1,0169	1,2712	0,5085	1,5234	0,0000	1,1864	1,7797	0,5932	0,4237	69
351	D	0	0	0,5932	0,5085	1,2712	0,3390	1,0169	0,0000	1,1864	0,5932	0,5932	0,4237	69
351	G	0	0	1,1864	1,5234	0,4237	0,5085	0,5085	1,7797	1,1864	1,7797	0,5932	0,8475	69
351	H	0	0	1,7797	1,5234	0,8475	0,3390	0,5085	1,7797	1,1864	0,5932	1,1864	1,2712	69
351	C	0	0	1,7797	1,5234	0,4237	0,3390	0,5085	0,0000	1,1864	1,1864	1,7797	1,2712	69
351	E	0	1	1,7797	1,5234	0,8475	0,3390	0,5085	0,0000	1,7797	1,7797	1,7797	1,2712	69
351	J	0	0	1,7797	1,0169	0,4237	0,1695	0,5085	1,7797	0,5932	0,5932	1,7797	0,4237	69
351	F	0	0	1,1864	1,5234	0,8475	0,1695	0,5085	0,0000	0,5932	1,1864	1,1864	0,4237	69
351	I	1	0	1,7797	1,5234	0,8475	0,3390	0,5085	1,7797	0,5932	1,7797	1,7797	0,4237	69
351	K	0	0	1,7797	1,5234	0,8475	0,5085	0,5085	0,0000	1,7797	1,7797	1,1864	0,4237	69
352	B	0	0	1,2069	1,8103	0,5172	0,8621	1,5517	0,0000	1,0345	0,5172	0,5172	1,2931	59
352	A	0	0	1,2069	1,2069	1,5517	1,2931	1,5517	1,0345	1,0345	1,5517	0,5172	0,4310	59
352	D	0	0	0,6034	0,6034	1,5517	0,8621	1,0345	1,0345	1,0345	0,5172	0,5172	0,4310	59
352	G	0	0	1,2069	1,8103	0,5172	1,2931	0,5172	0,0000	1,0345	1,5517	0,5172	0,8621	59
352	H	0	0	1,8103	1,8103	1,0345	0,8621	0,5172	0,0000	1,0345	0,5172	1,0345	1,2931	59
352	C	0	0	1,8103	1,8103	0,5172	0,8621	0,5172	1,0345	1,0345	1,0345	1,5517	1,2931	59
352	E	1	1	1,8103	1,8103	1,0345	0,8621	0,5172	1,0345	1,5517	1,5517	1,5517	1,2931	59
352	J	0	0	1,8103	1,2069	0,5172	0,4310	0,5172	0,0000	0,5172	0,5172	1,5517	0,4310	59
352	F	0	0	1,2069	1,8103	1,0345	0,4310	0,5172	1,0345	0,5172	1,0345	1,0345	0,4310	59
352	I	0	0	1,8103	1,8103	1,0345	0,8621	0,5172	0,0000	0,5172	1,5517	1,5517	0,4310	59
352	K	0	0	1,8103	1,8103	1,0345	1,2931	0,5172	1,0345	1,5517	1,5517	1,0345	0,4310	59

Appendix 9 – Post Study Statement Results – All Groups

Confidence			Difficulty			Frustration			More Alternatives			Satisfaction			Time			Well Informed		
GroupA	GroupB	GroupC	GroupA	GroupB	GroupC	GroupA	GroupB	GroupC	GroupA	GroupB	GroupC	GroupA	GroupB	GroupC	GroupA	GroupB	GroupC	GroupA	GroupB	GroupC
7	6	6	7	2	3	3	4	2	7	3	1	7	6	6	1	1	2	6	6	6
3	6	6	2	1	6	2	1	3	3	3	7	6	7	2	1	2	2	3	3	3
7	3	3	1	3	4	1	4	2	4	1	2	7	6	6	1	2	10	7	6	3
6	4	6	2	3	2	1	4	2	7	4	2	6	4	6	1	3	3	3	4	6
3	4	6	2	3	7	3	2	6	3	4	2	4	3	3	2	1	4	4	3	3
4	7	6	4	6	3	3	2	1	4	4	4	3	6	6	1	1	3	4	6	6
4	3	4	1	4	3	3	3	2	7	3	4	3	3	3	1	2	6	3	3	4
3	4	6	2	2	2	2	2	2	4	4	2	6	3	6	1	1	3	3	3	6
7	6	6	1	3	3	1	1	3	6	2	2	7	6	6	1	4	3	7	7	3
3	3	6	2	3	6	3	1	3	6	2	2	3	3	6	1	3	3	3	3	6
6	3	6	2	6	6	2	3	1	7	4	1	6	3	7	1	3	2	6	2	6
7	3	3	1	6	2	1	3	2	7	6	1	3	3	4	1	3	3	4	3	6
3	4	4	2	3	3	2	3	3	4	1	2	3	3	3	1	1	4	3	2	7
3	4	4	1	3	3	1	7	3	7	4	3	4	4	3	1	2	1	4	3	3
7	6	6	1	2	2	1	2	1	1	3	2	7	6	7	1	2	4	7	4	6
4	6	4	1	3	6	1	2	3	7	2	1	4	6	3	1	2	3	4	6	4
7	7	3	4	2	3	4	2	2	4	1	2	7	6	3	1	2	3	7	6	3
7	7	4	1	1	2	2	1	3	7	3	6	7	7	7	1	1	1	4	7	3
3	4	6	3	3	7	3	3	3	6	3	3	3	3	3	1	2	2	3	3	4
6	3	3	1	2	3	1	1	4	3	6	2	7	4	4	1	1	3	7	3	4
6	7	4	2	7	4	2	1	4	7	7	2	6	7	4	2	7	4	6	7	4
1	3	4	3	4	3	3	3	3	7	6	2	3	3	4	1	1	2	4	3	6
6	3	3	2	3	4	1	6	4	7	3	3	6	3	6	1	1	4	3	4	3
3	3	6	2	2	3	3	2	3	3	6	6	6	6	3	3	1	4	4	6	3
6	3	7	6	3	1	6	4	6	6	7	2	6	6	6	1	2	1	6	6	1
4	1	3	1	3	4	3	7	6	6	4	2	6	3	6	1	2	1	6	4	3
7	6	6	2	2	3	1	1	3	7	4	1	3	6	7	1	1	3	3	6	6
3	3	6	1	2	3	2	3	2	6	6	4	3	6	3	1	2	2	6	6	6
6	4	7	2	3	1	1	7	2	6	4	2	6	4	6	1	1	2	3	4	6
6	3	6	2	3	3	1	6	6	3	2	2	6	4	3	1	2	3	4	4	4
3	7	3	2	1	2	2	3	3	7	1	6	7	7	6	1	1	3	6	4	3
7	3	4	1	2	1	1	3	1	7	3	1	7	4	3	1	2	1	2	3	4
6	6	3	2	3	3	2	2	3	7	6	4	6	3	3	1	2	2	6	3	6
3	6	4	2	2	4	2	3	2	7	3	2	6	6	3	1	1	2	3	6	3
6	6	4	2	3	7	4	2	3	3	1	7	6	6	4	1	2	7	6	7	4
3	6	3	3	1	3	2	2	3	4	1	3	3	7	6	3	1	2	4	7	3
6	4	3	1	3	2	1	2	2	4	2	1	7	3	6	2	2	1	6	3	6
3	3	6	1	3	2	1	3	1	7	6	3	7	3	6	1	3	3	6	3	6
7	3	3	1	3	3	1	4	3	1	3	2	7	6	3	2	2	1	7	6	3
3	3	3	2	3	3	2	1	1	7	1	4	6	3	3	6	3	3	7	4	6
6	4	3	1	3	2	1	3	2	7	7	2	6	4	3	1	11	1	6	4	6
6	6	4	1	7	3	1	7	3	6	1	6	6	6	3	1	1	3	3	6	3
6	7	2	2	2	3	2	1	2	6	1	2	6	7	4	1	2	3	3	6	4
4	6	3	2	2	3	2	6	4	3	2	3	6	6	4	1	1	2	3	6	3
7	3	4	1	3	6	1	3	1	7	2	1	7	3	6	2	1	2	7	3	6
4	4	6	1	4	1	1	4	1	7	2	4	4	6	2	3	2	2	4	3	3
6	3	3	2	3	7	2	4	7	7	3	4	3	3	7	1	1	8	2	3	3
3	7	3	3	3	6	3	4	3	6	3	6	3	6	3	2	3	3	3	4	6
	7	7		3	2		1	1		2	1		6	7		2	15		7	6
	2	6		3	2		3	3		3	2		3	6		1	4		3	6
		6			2			4			7			6			3			6
		2			3			4			7			3			6			4

Appendix 10 – EC Microsoft Internet Explorer Case - Remedy



Browser
order
presented
randomly

Source: Microsoft (Tying), Case COMP/39.530, [2009].

Appendix 11 – Decision of the Ethics Boards and Commissions



**T.C.
HACETTEPE ÜNİVERSİTESİ**
Genel Sekreterlik

GİZLİ

Sayı : 76000869/ **437-2059** **29 Haziran 2015**

SOSYAL BİLİMLER ENSTİTÜSÜ MÜDÜRLÜĞÜNE

İlgili: 11.06.2015 tarih ve 2611 sayılı yazınız.

Enstitünüz İktisat Anabilim Dalı İngilizce İktisat Bilim Dalı yüksek lisans programı öğrencisi **Yalçın YALÇIN**'ın öğretim üyesi **Yrd. Doç. Dr. Selcen ÖZTÜRK**'ün danışmanlığında yürüttüğü "**İyi, Kötü ve Çirkin; Seçenek Fazlalığının Karar Verme Sürecindeki Üç Yönlü Boyutu**" konulu tez çalışması, Üniversitemiz Senatosu Etik Komisyonunun **23 Haziran 2015** tarihinde yapmış olduğu toplantıda incelenmiş olup, etik açıdan uygun bulunmuştur.

Bilgilerinizi rica ederim.


Prof. Dr. Ömer UĞUR
 Rektör a.
 Rektör Yardımcısı

Ek: Tutanak

Hacettepe Üniversitesi Genel Sekreterlik 06100 Sıhhiye-Ankara
 Telefon: 0 (312) 305 1003 - 1004 • Faks: 0 (312) 310 5552
 E-posta: yazimd@hacettepe.edu.tr • www.hacettepe.edu.tr

Ayrıntılı Bilgi için:
 Yazı İşleri Müdürlüğü
 0 (312) 305 1008

Hasan Bey

Appendix 12 – Authenticity Report

 HACETTEPE ÜNİVERSİTESİ SOSYAL BİLİMLER ENSTİTÜSÜ YÜKSEK LİSANS/DOKTORA TEZ ÇALIŞMASI ORJİNALLİK RAPORU
HACETTEPE ÜNİVERSİTESİ SOSYAL BİLİMLER ENSTİTÜSÜ İKTİSAT ANABİLİM DALI BAŞKANLIĞI'NA
Tarih: 24.03.2016
Tez Başlığı / Konusu: THE GOOD, THE BAD AND THE UGLY: TRILATERAL DIMENSIONS OF CHOICE OVERLOAD IN DECISION MAKING PROCESS Yukarıda başlığı/konusu gösterilen tez çalışmamın a) Kapak sayfası, b) Giriş, c) Ana bölümler ve d) Sonuç kısımlarından oluşan toplam 91 sayfalık kısmına ilişkin, 21/03/2016 tarihinde tez danışmanım tarafından Turnitin adlı intihal tespit programından aşağıda belirtilen filtrelemeler uygulanarak alınmış olan orijinallik raporuna göre, tezin benzerlik oranı % 15 'tir. Uygulanan filtrelemeler: 1- Kabul/Onay ve Bildirim sayfaları hariç, 2- Kaynakça hariç 3- Alıntılar dahil 4- 5 kelimeden daha az örtüşme içeren metin kısımları hariç Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü Tez Çalışması Orijinallik Raporu Alınması ve Kullanılması Uygulama Esasları'nı inceledim ve bu Uygulama Esasları'nda belirtilen azami benzerlik oranlarına göre tez çalışmamın herhangi bir intihal içermediğini; aksinin tespit edileceği muhtemel durumda doğabilecek her türlü hukuki sorumluluğu kabul ettiğimi ve yukarıda vermiş olduğum bilgilerin doğru olduğunu beyan ederim. Gereğini saygılarımla arz ederim.
24.03.2016  Tarih ve İmza
Adı Soyadı: Yalçın Yalçın Öğrenci No: N11221694 Anabilim Dalı: İKTİSAT Programı: İKTİSAT Statüsü: ☒ Y.Lisans ☐ Doktora ☐ Bütünleşik Dr.
DANIŞMAN ONAYI UYGUNDUR.  YRD. DOÇ. DR. SELCEN ÖZTÜRK

ÖZGEÇMİŞ

Kişisel Bilgiler

Adı Soyadı : Yalçın YALÇIN

Doğum Yeri ve Tarihi : Ürgüp / 02.09.1983

Eğitim Durumu

Lisans Öğrenimi : Başkent Üniversitesi İ.İ.B.F. İşletme Bölümü

Yüksek Lisans Öğrenimi : Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü / İktisat

Bildiği Yabancı Diller : İngilizce

Bilimsel Faaliyetleri : Davranışsal İktisat Yaklaşımıyla Rekabetçi Piyasa Analizi, Rekabet Kurumu, Ankara

İş Deneyimi

Stajlar : Orta Anadolu İhracatçı Birlikleri, (Ağustos 2005)

Çalıştığı Kurumlar : Rekabet Kurumu, (Ocak 2009 - ...)

İletişim

E-Posta Adresi : yalcinyalciner@gmail.com

Tarih : 24.3.2016