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# Economic Choices Among Different Groups According to the Cognitive Economics and Social Judgement Theory

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**Abstract:** Decision making, social judgement and human reasoning process is an important research area for experimental micro-economics. Social judgement happens with previous learning, reasoning and decision making processes and by the synchronized appearance of these cognitive functions, so the brain relates decision utility to anticipated and experienced utility. In the brain system, this neural synchronization is realized by the executive functions which seem to be located in the limbic system and frontal lobes. These neuroscientific researches are also effective on social sciences and ethical discussions. This study generally provides examples from the relevant literature about the instruments used by the neurological applications to investigate the behaviours of individuals, how they are used to study interactions between individuals and how they can be used in modelling social dynamics as well as evaluating the effects of these studies on individuals and society. In this study, some behavioral perspectives on trust and reciprocity, fairness and altruism, justice and social norms were searched with the help of behavioral experiments presented in the game theory literature. The research part of the study includes the design, statistical results and findings of the experiment that we applied to the undergraduate students and public staff in Istanbul. The data was evaluated by ANOVA difference tests were conducted. The results of the analyses show that individuals don't only try to behave rationally when they make economic judgements but also take decisions by involving their educations and social roles into the judgement processes. There are also significant differences between university students and public employees. The last part discusses the practical results of these studies and their possible effects on social sciences. One of the basic criticisms on the experimental studies of economic decision making is that the experiments in a laboratory environment may systematically vary from the behaviours in real life.

**Keywords:** Cognitive Economics, Decision Making, Experimental Game Theory, Social Judgement, Ultimatum Game

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## 1. Introduction

An interdisciplinary effort in recent years between neurology, psychology and economics is studying the neural connections associated to decision making and reacting through the game theory. Human behaviours consist of customized sub systems that are in exchange with each other rather than a single process [1]. Neural imaging studies and outcoming results [2] indicate that there is a consistent behaviour pattern based on learning through conditioning from primary needs like eating as a certain group to reacting to more abstract awards like money and social gains (like reciprocity, equality and cooperation). Similarly, neural

circuits and structures are shaped in coordination with this group under conditioning through reinforced learning. Most importantly, reinforced learning creates a certain system in the brain for the evaluation and decision making mechanisms. However, detailed studies combining different value judgements and decision making mechanisms will provide more important explanations on the nature of human behaviours [3]. People often make decisions which seem economically unreasonable. For example, they may engage in behaviors that reduce their absolute wealth. An explanation for these behaviors concerns people not only with their own rewards, but also with the rewards of others [4]. People are social beings, use different decision making strategies and evaluate the previously learned behaviors as

well [5]. Studies reveal that humans do not only try to act rationally when taking economic decisions, but also include their experience, education, welfare levels and social roles into decision making process. It is possible that these researches would change the face of social sciences and expand our philosophical knowledge [6].

Current work points to new aspects of decision-making research. The first part of the study generally provides examples from the relevant literature about the instruments used by the neurology application to investigate the behaviours of individuals, how they are used to study interactions between individuals and how they can be used in modelling social dynamics as well as evaluating the effects of these studies on individuals and society. The second part includes the design, statistical results and findings of the experiment that we applied to the undergraduate students and public staff. The data was evaluated by SPSS and ANOVA difference tests were conducted. The last chapter discusses the practical results of these studies and their possible effects on fields like management and organization, economics, ethics and ergonomics.

## **2. Reasoning and Decision Making Process According to Cognitive Economics**

The study area of neurology consists of many scientific branches. These sciences deal with the brain and its functions which comprise the most important part of the human personality and uniqueness. Therefore, it is inevitable that these studies will bring about several ethical problems and discussion areas. Some thinkers suggest that potential problems to breach internal uniqueness of individuals may be caused by the studies that involve imaging of brain activities, researching, defining and organizing brain functions.

Cognitive neurology attempts to determine decision making cycles and ways of individuals. It is observed that choice among alternative reactions is among the tasks of the working memory and it causes activation in the prefrontal cortex of the brain. When a new problem is faced, activation appears in different parts of the brain particularly in prefrontal cortex. Activation focuses in time on certain customized regions related to the assumed task.

Traditional economic theory is based on the idea that people take rational decisions and act to maximize profits. However, this approach fails to explain some findings which caused economists to question these basic assumptions during the course of time. Researches reveal that individuals don't only try to act logically when taking their decisions, but also include their experience, education, welfare levels and social roles into decision making process. Especially, Tversky and Kahneman [7] drew attention to points where people go away from rationality when making decisions. It is possible that these researches would change the face of fields like informatics, economics, management, ergonomics and ethics and expand our philosophical knowledge.

The social dimension of this approach -in essence- can also be studied by looking through a more radical perspective at the test protocols of the ultimatum game which are general used in experimental economics. Another social parameter which may affect the ultimatum game is the existence of the experimenter. In the ultimatum game, there are numerous variations like players mutually change their places, it is played against computer and within pre-determined scenarios, it is known that the opponent takes decisions other than his own control. However, the protocol is explained to players by an experimenter in almost every study and players know that their decisions will be known by this experimenter. In other words, it is almost impossible to get the ultimatum game out of its social content. Therefore, the mechanisms we use to explain the findings should always include a social dimension. We already face this approach more frequently. For example, with a similar approach, Beugré models [8] the ways of people to build their equity judgement and their reactions to relevant circumstances based on the neuroscience fields of neuroeconomics, organizational justice and social cognition.

### ***2.1. Decision Making in Organizational Context***

Work environment is naturally an environment where it is expected and even crucial to take rational decisions. However, the studies show that even this crucial importance doesn't always lead persons to take rational decisions. On the other hand, studies on decision making and systematic faults show that these faults are common but avoidable. Elbanna and Child [9] present one of the comprehensive models on taking strategic decision. According to this model, reasoning, intuition and political behavior are decisive in the effectiveness of strategic decisions. In addition, this relation is open to effects from the quality of decision, environmental factors and qualities of the organization.

In the point where the disciplines of psychology and economics cross, ask similar questions and try to find answers through similar methods, it is seen that literature on experimental economics develops rapidly. In a study defining the areas where cognitive psychology and industry and organization psychology do and may cross, Hodgkinson states that there is an increasing importance of studies towards overcoming some cognitive constraints of people by including ergonomics as well. Based on this requirement, a collateral benefit of this study will be a conclusion on the ways of environmental conditions (social conditions are represented by superior-subordinate relation particularly in this study) to affect the said decision making mechanisms and forming a basis for the works to change or improve these conditions to ensure expected behavior [10].

### ***2.2. Judgement and Decision Making From the Perspective of Psychology of Economics***

Social judgement theory is based on the idea that there is a causal structure among the incidents in the world [11]. An individual adapts successfully as much as his cognitive

perception of the world conforms to the causal structure of the world. However, this adaptation is not easy as it is difficult to be aware of the causal structure of the world as a whole. The cause of the causal uncertainty is that the environmental hints (properties of objects and humans) don't perfectly match with the basic causal mechanisms that produce them. In this process, the hints serve to be signals about the basic causal structures and the possibility of occurrence of the future incidents. Individuals who take correct decisions determine these informative hints and use this information to make sense of their environments. Theoretically, the effective uses of the hints help people achieve their desired results [12].

The internal and external stimulants that shape the decision making of people between individuality and altruism bear variety and contradiction. A similar contradiction is caused by the differences of social and personal levels between individualism and collectivism. If an individual cannot develop inventive methods to cope with this intensity and conflict, there won't be savings from the effort and time to be spent despite the similar problems faced. However, by an adaptive structure, the decision making processes use previously experienced methods for the problems that are encountered, develop short ways to process and solve a problem and use these short ways as a part of solution by applying them to different problems. Sharing cultural values based on experience is a part of social exchange. The effort requiring processes are internalized and automated in time by the sharing of inventive methods that gained cultural specific formation [13]. Although there are various methods being used for the problems including different and contradicting stimulants, the experience reduces the number of these methods, differentiate the ones that can or cannot be combined and standardizes the short ways.

One of the basic criticisms on the experimental economics studies is that the experiments in a laboratory environment may systematically vary from the behaviours in real life [14]. The possible reasons of this differentiation can be summarized as follows: 1) the existence of moral and ethical rules, 2) ability of the others to view the behaviours of the person, 3) the context of the decisions given, 4) selection of the decision making individuals and 5) possible gains and losses. When we consider all these potential causes of variability, an experiment design that simulates real life is almost impossible.

### **2.3. Studying the Decision Making Through the Game Theory**

People cannot fully behave rationally due to the limitations of memory, interest and neurology, inadequacy of education and practice and conditions which don't avail possibility calculation. Rationality can be divided into three: absolute rationality where risk and benefit can be precisely calculated, dependent rationality that uses inventive methods (heuristics) to make decisions and bounded rationality (social and cultural rationality) emerging from social benefit. Game theory is the method that is used in the field of experimental

economics to study social and cultural rationality. The Ultimatum game includes an initial bonus to be split between two players, one of which is the offer owner and the other is the responder. In this single shot game, the participant who is proposing a section for dividing the donation and the responder then has the option to accept or reject the offer of the proposer. In the game, the proposer decides how much money to offer. If the responder accepts the offer, the responder receives the bid amount and the offer owner holds the remainder of the offer. If the responder rejects the offer, then no player will receive anything.

If the participant accepts the offers in ultimatum game, both players will be rewarded using the proposed division. If the participant rejects the proposal, then neither party will receive the award [15].

Theoretically, a rational decision maker should accept any offer, because getting something to maximize profit is always better than getting nothing at all [16]. According to the traditional theory of economics, a rational player in the ultimatum game is theoretically expected to take every amount regardless of the rate offered by the opponent while in practice the players react to the offers of %25 and less and usually reject these offers. Those who reject prefer returning empty handed than being subject to injustice. That is, players perceive low offers as injustice and want to punish this behaviour. Their reactions may vary during experiments when they see the picture of the opponent or a picture of computer. Encountering unfair offers can cause offers to be negatively affected and rejected, even though the offer is greater than zero [17, 18]. These investigations indicate that executive control should be applied to invalidate the emotional impulse in order to punish injustice at personal cost [18, 19].

In the lab, people refuse unfair offers in the Ultimatum Game even in single-shot decisions, if they are not likely to meet again with the person who submitted the offer [15, 20]. Players who face unfair offer by opponents experienced increased activation in the bilateral preinsula, front part of the cingulate cortex and dorsolateral prefrontal cortex [21]. The activations of the front part of the insula and the dorsolateral prefrontal cortex increase against an unfair offer. If the insula activation is higher than the activation of the prefrontal cortex, the subjects tend to reject the offer and vice versa [1].

The experiment results of the ultimatum games indicated that the generosity of the players is altruist behaviours rather than strategic ones [22]. However, the punishment behaviour in the ultimatum game can be understood while this cannot be explained by the direct altruist behaviour. On the other hand, the feeling of blind trust where the karma kind understanding where doing good things will bring good things seems pointless from the perspective of economics while it is also possible that total efficiency is higher than the communities without these beliefs in addition to the fact that these behaviour patterns are effective in various cultures and societies [22]. Moreover, knowledge of the social distance (close friends, acquaintances and unknowns) and the

responder's identity by the offer owners affects the behaviors of the proposers in the ultimatum game [5].

#### **2.4. Behavioral Game Theory and Decision Making by Ultimatum Game**

The ultimatum game among the experiment protocols frequently used in the field is observed in the triangle of rational decision making, economic decisions and social relations. Ultimatum game is an experiment which has been frequently used in the field of neuro-economy and the investigation of the human fairness recently [23, 24, 25, 26, 27]. Ultimatum game based on game theory and developed by Güth, Schmittberger and Schwarze [15] is based on dividing a certain amount of money between two players only in one round. One of the players is expected to divide this amount into two by a ratio of his choice and offer this division to the other player. After first player makes his offer, other player may accept or reject this offer. If the second player accepts the offer, both players hold what they have but if the second player rejects the offer neither players can take anything. The expected result through the rational decision making processes which are the basis of traditional economic theory is that the first player offers the smallest amount other than zero and the second player accepts this offer. However, many studies that are done with this protocol demonstrate that the median value of the offers is usually 50% and average value is usually between 40% and 45% [28]. Responders generally accept average bids and will usually reject offers below 20 percent [29]. An important finding is that participants in the experiments do not change their decisions significantly as the gain increases [30, 31, 32]. Humans have an advanced cognitive process that immediately balances their interests. It is following a path directly to penalize associates for unfair transactions [33]. Despite the fact that it is profitable, the rejection of low proposals is in fact a reflection of the costly punishment of unfair behavior that deceives the social norm of justice [4, 34]. On the other hand, some studies show that people with a medium welfare level hardly say that they would not offer any money to the other players. The tendency of not giving share to the other player is higher among the subjects with low and high welfare level compared to the subject with medium level welfare.

Obtaining similar results in almost all studies based on the ultimatum game and various variations of it makes one think that decision making mechanisms are affected by the same factors almost universally. However, an intercultural study with small scale societies [28] provides a serious test to his assumption. Ultimatum game was played by participants in 15 small scale societies in various parts of the world. The reason of selecting this participant profile is the fact that different social rules apply in these societies than the market rules in the big scale, industrialized societies. When the ultimatum game was played under these conditions as suggested by researchers, findings were different than the overall literature of ultimatum game. An interesting finding in this study is that if the market conditions of the studied

society are similar to those in industrialized societies and if a cooperation based interaction in daily life is higher, then the behavior of the members of that society focuses on offers observing the interests of the other player. These findings, although not presenting absolute evidence, show that behaviors of players in the ultimatum game are shaped by the social and environmental effects. In another study, although they are aware that it will be costly for them, participants chose the punish inequality. If participants are to accept, they may choose rejection of options that would break inequality in favor of them. Clearly, they prefer 50% rather than 80% to be offered to them. All subjects, including women, were found to offer mainly 50% equal share which reduces the ratio of rejection.

In previous studies, ultimatum game is mostly focused on changing the decisions of opponents by intervening moods or attributes of participants [35, 36]. On the other hand, in a mutual process of economical decision making, participants who previously played the role of their opponents and were allowed to make a choice learned the judgment process and tended towards more rational selections taking the interests of both parties into consideration than those who didn't assume the roles of their opponents yet. The results obtained don't comply with the economic individual defined by the classical economics theory and but reveal qualities evaluating circumstances socially and reacting as a result of internal judgment processes [6]. The findings of another experiment show that the responses of participants are shaped by their relations rather than their social roles [5].

### **3. The Method and Experiment Design**

The research part includes the procedure of ultimatum game, statistical results and findings of the test we applied. A mini-ultimatum game consisting of 3 rounds of 225 times was played through the convenience sampling method by the participants who consisted of students of various undergraduate and graduate programs at various universities, particularly at the Marmara University, and the public employees in Istanbul. The first round included the question to the participants whether they would accept the offer of 20 YTL by the opponent when he had the chance to offer 80 YTL or 20 YTL. The participants had the alternatives of offering 20 YTL or 50 YTL in the second round and 20 YTL or 0 YTL in the third round when they had 100 YTL.

The experiment was organized to be played with a computer and a response box (Figure 1). The players don't see each other and therefore real money or awarding system couldn't be used. This design involves some systematic limitations. Not using real money, playing the game through a computer instead of having the players see each other and having the players think that they are watched by the experimenter may cause them to declare the decisions that they are supposed to take instead of their real decisions. The data was evaluated through SPSS 16 and ANOVA difference tests were conducted.



Figure 1. Response Box connected to the computer used in the experiment.

### 4. Findings

The average age of the 112 students participating in our study was 23,27 and the average age of the 113 public employees was 37,36. The groups don't have normal distribution.

The difference analyses we conducted to compare the students and public employees included a significant difference ( $t=-3,118$   $p=.002$ ) in the offer of "taking 80 giving 20, taking 20 offering 80" with regard to the decision making ways. The public employees tend to reject more (Figure 2).

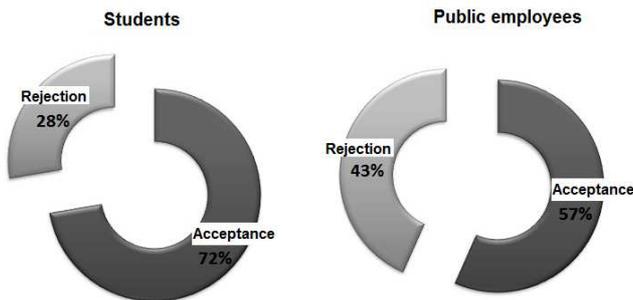


Figure 2. Acceptance/Rejection Rates if the offer is taking 20 and offering 80 instead of taking 80 and giving 20.

Among the alternatives of "taking 80 giving 20" or "sharing equally by 50-50", the public employees tend to offer the 50-50 offer more ( $t=-2,074$   $p=.040$ ). Students prefer the equal sharing less (Figure 3). When we compare the gender, women tend to offer equal sharing that is the 50-50 offer more than the men among the alternatives of 20 or 50 ( $t=2,093$   $p=.037$ ). The other two rounds didn't have any difference between genders.

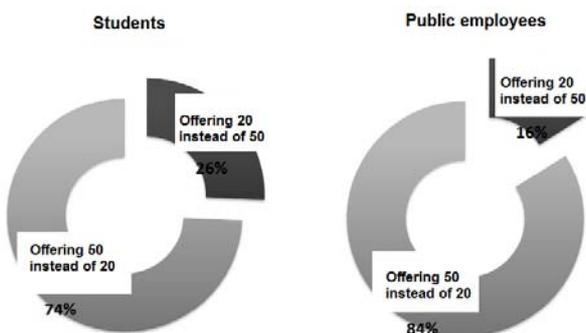


Figure 3. Taking 50 Giving 20 or Equal Sharing by 50-50.

Among the alternatives of "taking 80 giving 20" or "taking 100 giving 0", public employees tend to choose taking 80 offering 20 more ( $t=2,261$   $p=.025$ ). Students prefer giving 0 more than two times (Figure 4).

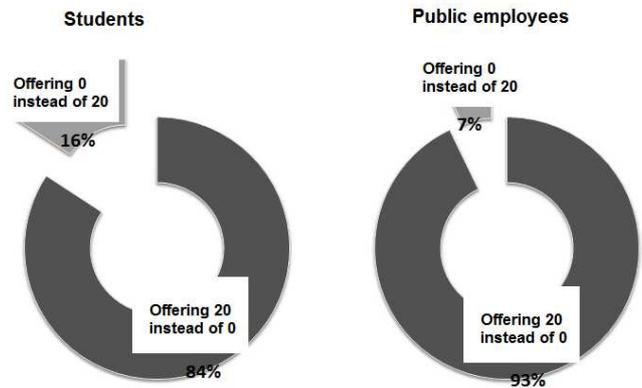


Figure 4. Rates of Taking 0 Giving 20 instead of taking 100 giving 0.

The public employees tend to reject by more than 40% the offer of the opponent to give 20 instead of taking while the university students display rational behaviours as defined by the classical economics and have the tendency to accept more. The offering rounds involve significant choices of students for increasing revenues for themselves.

### 5. Conclusion

This study has examined how the difference between being a student or a public employee makes a difference. The result of the statistical analyses show that individuals don't only try to behave logically when they make decisions but also take decisions by involving their economic freedom, educations and social roles into the judgement processes. Students take decisions which are more compliant with the classical economics framework while older public employees are far from rationality defined in this framework. With regard to the difference between men and women, it is seen that women prefer the offer of giving 50 instead of 20. Men tend to become more competitive and give low offer due to the testosterone hormone as stated in the literature. The results obtained contradict with "homo economicus" defined by the classical economics theory and but reveal qualities evaluating circumstances socially and reacting as a result of distributed cognitive mechanism and internal judgment processes. Within the framework of classical economics, the traditional rationality approach where the people would maximize their interests in every circumstance doesn't match with the findings and it is shown that humans take decisions according to the situational factors, conditions they face in social transactions, roles they take and their internalized experiences.

### 6. Discussion and Limitations

The classical "invisible hand" example of Adam Smith actually indicates about the unexpected situations that a

centralized and competitive market is created when a complex system reaches to a critical dimension where it is automatically organized [37]. When the decision making processes are studied, prefrontal cortex in addition to various parts of the brain is structured similarly and assumes managing functions. This analogy may bring a different perspective to the works of memory and conscience as well as the decision making behaviour. More realistic models can be established when we consider several economic phenomenon as a complex system in addition to social dynamics and when we study network structures [38]. When the human groups are observed under controlled conditions as a complex adaptive system, they were found to be as rich as describing the formation of group phenomenon in addition to reaching data as it is easier to make sense than the real world [39], but multidisciplinary studies are accompanied by difficult designs to be applied in Turkey.

The decision-making models in the traditional economics are based on the basic assumption that humans are rational actors to maximize the subjective benefits of decision-makers [40]. Within the framework of traditional economics, the rationality approach where the people would maximize their interests in every circumstance doesn't match with our findings and it is shown that people take decisions according to the situational factors, conditions they face, roles they take and their experience. People are social beings, use different decision making strategies and evaluate the previously learned behaviors as well. The conflict that needs to be examined here can be considered as the asymmetry between personal choices, demographic qualities and rules. That is, although the rules were introduced to foresight and limit the choices of individuals, real choices can be re-organized according to rules which make it impossible for the rules to serve the intended goals. The information obtained from studies on economic games can be used to update economic theories to better correlate with current human behavior [41].

On the other hand, evolutionary human reactions in social structuring can also create problems in terms of the system and neo-institutionalism. If the penalist is not legitimate to give a moral lesson because he is not connected to a social norm, the penalized person can see the penalty as unjustified coercion. Instead of being involved in norm conformity, acting according to personal jurisdictions and acting on contextualized competition mechanisms can lead to corrupt societies against the wider social formation of productive cooperatives [42, 43]. In fact, corruption between those responsible for enforcing the rules and those who do not comply with the rules is regarded as an important source of the failure of social institutions [44].

Possible alternative studies might be to use different experimental games that test the justice and obedience of social norms such as public games. Providing a social environment and sufficient encouragement to bring about consistent responses to real-world situations is crucial to collecting reliable data. The most important tangible constraint of the study is the fact that the experiment was not played with real money, however, the results of this study

form an important infrastructure to design scenarios to be played with real money. The second important constraint of the study is the fact that the results were not supported by fMRI data. However, this process is caused by the fact that this study area is an emerging area in Turkey as we particularly mentioned in the discussion section, but functional MRI studies towards cognitive behaviors require a separate process design and specialism in different disciplines.

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## References

- [1] Sanfey, A. G., Loewenstein, G., McClure, S. M. and Cohen J. D. (2006) Neuroeconomics: cross-currents in research on decision-making, *TRENDS in Cognitive Sciences* 10 (3), March.
- [2] Montague P. R., McClure, S. M. and York, M. K. (2004) The Neural Substrates of Reward Processing in Humans: The Modern Role of fMRI, *Neuroscientist* 10 (3), pp. 260–268.
- [3] Montague P. R., King-Casas B. and Cohen, J. D. (2006) Imaging Valuation Models in Human Choice, *Annu. Rev. Neurosci.* 29, pp. 417–48.
- [4] Fehr, E. and Schmidt, K. M. (1999) A theory of fairness, competition, and cooperation. *The Quarterly Journal of Economics*, 114 (3), pp. 817–868.
- [5] Uslu, T. (2015) Behavioral Game Theory in Organizational Context, *International Conference on Modern Researchs in Management, Economics and Accounting*, 27 July 2015, Istanbul, ISBN: 978-9944-0203-10-2.
- [6] Uslu, Tuna (2011) Neuroscientific Researches of Reasoning and Decision Making and the Effects on Business, Ethics and Cognitive Ergonomics, *The Knowledge Economy*, Avcı Ofset Matbaacılık-Istanbul, ISBN: 978-9944-0203-8-1, pp. 467-480.
- [7] Tversky, A. and Kahneman, D. (1981) The framing of decisions and the psychology of choice. *Science*, 211, pp. 453-458.
- [8] Beugré, C. D. (2009) Exploring the neural basis of fairness: A model of neuro-organizational justice, *Organizational Behavior and Human Decision Processes*, 110, pp. 129-139.
- [9] Elbanna, S. and Child, J. (2007) Influences on strategic decision effectiveness, *Strategic Management Journal*, 28, pp. 431-453.
- [10] Hodgkinson, G. P. (2003) The interface of cognitive and industrial, work and organizational psychology, *Journal of Occupational and Organizational Psychology*, 76, pp. 1-25.
- [11] Hammond, K. R., Stewart, T. R., Brehmer, B. and Steinmann, D. O. (1986). Social judgment theory, in H. Arkes and K. Hammond (eds.), *Judgment and decision making*. Cambridge: Cambridge University Press, pp. 56-76.
- [12] Byrnes, J. P. (1998). *The nature and development of decision-making: A self regulation model*. USA: Earlbaum Manwah NJ.
- [13] Geary, David C. (2005) *The origin of mind: Evolution of brain, cognition, and general intelligence*, first edition, American Psychology Association, Washington, p. 182.

- [14] Levitt, S. D. and List, J. A. (2007) What do laboratory experiments measuring social preferences reveal about the real world? *Journal of Economic Perspectives*, 21 (2), p. 154.
- [15] Güth W., Schmittberger, R. and Schwarze, B. (1982) An experimental analysis of ultimatum bargaining. *J Econ Behav Organ* 3 (4): 367–388.
- [16] Thaler, R. H. (1988) Anomalies: The Ultimatum Game. *Journal of Economic Perspectives*, 2, pp. 195–206.
- [17] Pillutla, M. M. and Murnighan, J. K. (1996). Unfairness, anger, and spite: Emotional rejections of ultimatum offers. *Organizational Behavior and Human Decision Processes*, 68, pp. 208-224.
- [18] Sanfey, A. G., Rilling, J. K., Aronson, J. A., Nystrom, L. E. and Cohen, J. D. (2003). The neural basis of economic decision-making in the Ultimatum Game. *Science*, 300, pp. 1755-1758.
- [19] Tabibnia, G., Satpute, A. B. and Lieberman, M. D. (2008) The sunny side of fairness preference for fairness activates reward circuitry (and disregarding unfairness activates self-control circuitry). *Psychol. Sci.* 19, pp. 339–347.
- [20] Hoffman, E., McCabe, K. and Smith, V. L. (1996) Social distance and other regarding behavior in dictator games. *American Economic Review*, 86, pp. 653–660.
- [21] Sanfey, A. G., Rilling, J. K., Aronson, J. A., Nystrom, L. E. and Cohen, J. D. (2004). The neural correlates of theory of mind within interpersonal interactions, *NeuroImage* 22, pp. 1694-1703.
- [22] Camerer, C. F. (2003) *Behavioral Game Theory: Experiments in Strategic Interaction*. Princeton University Press: Princeton NJ, p. 56-90.
- [23] Güth, W. (1995). On ultimatum bargaining experiments-A personal review, *Journal of Economic Behavior and Organization*, 27 (3), pp. 329-344.
- [24] Szolnoki, A., Perc, M. and Szabó, G. (2012) Defense mechanisms of empathetic players in the spatial ultimatum game. *Phys. Rev. Lett.* 109, 078701.
- [25] Corradi-Dell'Acqua, C., Civai, C., Rumiati, R. I. and Fink, G. R. (2013) Disentangling self- and fairness-related neural mechanisms involved in the ultimatum game: an fMRI study. *Soc. Cogn. Affect. Neurosci.* 8, pp. 424–431.
- [26] Rand, D. G., Tarnita, C. E., Ohtsuki, H. and Nowak, M. A. (2013) Evolution of fairness in the one-shot anonymous Ultimatum Game. *Proc. Natl. Acad. Sci. USA* 110, pp. 2581–2586.
- [27] Güth, W. and Kocher, M. G. (2014) More than thirty years of ultimatum bargaining experiments: Motives, variations, and a survey of the recent literature. *Journal of Economic Behavior & Organization*, 108, pp. 396–409.
- [28] Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., McElreath, R., Alvard, M., Barr, A., Ensminger, J., Henrich, N. S., Hill, K., Gil-White, F., Gurven, M., Marlowe, F. W., Patton, J. Q. and Tracer, D. (2005) Economic Man in Cross-Cultural Perspective: Ethnography and Experiments from 15 Small-Scale Societies, *Behavioral and Brain Sciences*, 28 (6), pp. 795-815.
- [29] Camerer, C. and Thaler, R. (1995) Anomalies: More Ultimatum and Dictator Games, *Journal of Economic Perspectives* 9 (2), pp. 209-219.
- [30] Slonim, R. and Roth, A. E. (1998). Learning in High Stakes Ultimatum Games: An Experiment in the Slovak Republic, *Econometrica*, 66 (3), pp. 569-96.
- [31] Cameron, L. A. (1999) Raising the Stakes in the Ultimatum Game: Experimental Evidence from Indonesia, *Economic Inquiry*, 37 (1), pp. 47-59.
- [32] Munier, B. and Zaharia, C. (2002) High Stakes and Acceptance Behavior in Ultimatum Bargaining: A Contribution from an International Experiment, *Theory and Decision*, 53 (3), pp. 187-207.
- [33] Roth, A. (1995). Bargaining Experiments, In *The Handbook of Experimental Economics*, ed. John Kagel and Alvin Roth. Princeton: Princeton University Press.
- [34] Henrich, J., McElreath, R., Barr, A., Ensminger, J., Barrett, C., Bolyanatz, A., Cardenas, J. C., Gurven, M., Gwako E., Henrich, N., Lesorogol, C., Marlowe, F., Tracer, D., and Ziker, J. (2006). Costly punishment across human societies. *Science*, 312, pp. 1767-1770.
- [35] Solnick, S. J. and Schweitzer, M. (1999). The influence of physical attractiveness and gender on ultimatum game decisions. *Organizational Behavior and Human Decision Processes*, 79, pp. 199–215.
- [36] Harlé, K. M. and Sanfey, A. G. (2007). Incidental sadness biases social economic decisions in the Ultimatum Game. *Emotion*, 7, pp. 876–881.
- [37] Smith, L. L. (2002) Economies and markets as complex systems: Looking at them this way may provide fresh insight, *Business Economics*, 37 (1).
- [38] Medin, D. (2005) *Social Networks*, 12<sup>th</sup> International Summer School in Cognitive Science, Sofia, Bulgaria, New Bulgarian University.
- [39] Goldstone, R. L. (2005) *Human Collective Behavior as a Complex Adaptive System*, 12<sup>th</sup> International Summer School in Cognitive Science, Sofia, Bulgaria, New Bulgarian University.
- [40] Edwards, W. (1954) The theory of decision making, *Psychological Bulletin*, 51 (4), pp. 380-417.
- [41] Duñez-Guzmán, E. A. and Sadedin, S. (2012) Evolving righteousness in a corrupt world. *PLoS ONE* 7.
- [42] Camerer, C. F., Loewenstein, G. and Rabin, M. (2011) *Advances in behavioral economics*, Princeton University Press.
- [43] Abdallah, S., Sayed, R., Rahwan, I., LeVeck, B. L., Cebrian, M., Rutherford, A. and Fowler, J. H. (2014) Corruption drives the emergence of civil society. *Jou. R. Soc. Interface* 11 (93), pp. 1-14.
- [44] World Bank. (2004). *World Development Report 2004: Making Services Work For Poor People*. Oxford University Press, Oxford.