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Analyzing Students' Economic Motives through Ultimatum Games and Dictator Games Experiments

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Abstract: This paper examines participants' characteristics in an experiment using Dictator and Ultimatum Game. The experiment was conducted in a university in Switzerland involving university students. Previous researches argue that those who act as 'proposers' have willingness to reward and punish their paired recipients. Here, in general proposers in the ultimatum game were more generous, with 60% fair offers, than proposers in the dictator game - with 40%. After evaluating and analyzing our results, we consider our research goal as achieved with some exceptions. We investigated in conducting a research based on ultimatum and dictator games with bargaining over time. We compared the results from both games and analyzed them. We tried to find out whether proposers in dictator game with bargaining over money and over time behave in a similar way. Last but not least, we came up with some questions for further researches in this field.

Keyword: dictator game, ultimatum game, experimental economics

1. INTRODUCTION

Experimental economics is the application of experimental methods to study economic questions. The data collected in these experiments is used to estimate effect size, test the validity of economic theories, and illuminate market mechanisms. In our research we will focus on two experimental methods: Dictator and Ultimatum game, in order to answer our research questions. Within the experiment we'll also pay attention to the fairness and anonymity considerations. We will not be able to implement different levels, because of the limited scope of the paper. Another important theory behind our research is the prospect theory, describing the decision process between alternatives that involve risk and known probabilities of outcome.

1.1. Ultimatum game

The ultimatum game is a model that is often used in an economic experiment. In this example, an amount of money that is given to them, then the money has to be divided between the two players. The first player will give the proposal on how to divide the sum of money. The second player then can accept or reject it. If the second player does not agree and refuses the proposal, both players receive nothing. If the second player agrees, the money can be split according to the offer of the first player.

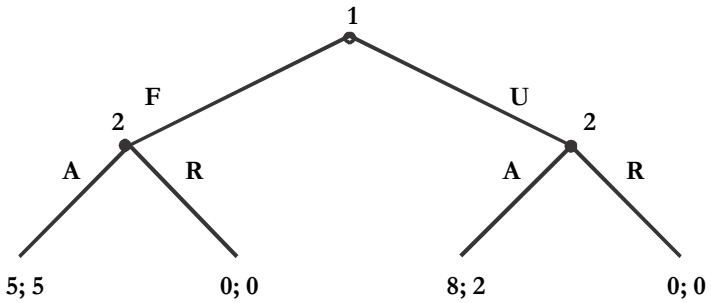

Figure 1: Representation of Ultimatum game tree

In the figure above we can see the basic description in an ultimate game. The first player (proposer) can propose a fair (F) proposal or an unfair (U) proposal. The second player (responder) has a right in determining whether he or she will accept (A) or reject (R). For example, if the amount offered is 10, then the fair split that each player gets is even (5 for the proposer and 5 for the responder). If the proposal is unfair, the proposer gets a sum which will be more to his advantage, and the second player will get less than the gain of the first player (for example 8 for the proposer and 2 for the responder). If the second player rejects the offer, then both players get nothing.

Many experiments have shown that proposers usually offers lower than half of what the second players get. First players' behaviour can be explained by some literatures. Brenner and Vriend (2003) argue that, a reason for fair offers, are fairness and reciprocity concerns of the proposer. The results from an experiment conducted by Roth and Erev (1995) indicate that when the ultimatum game is played repeatedly, for seven rounds or more, proposers become "*simple adaptive learners*", who learn how to set the offers, as high as possible, so that as little offers as possible are rejected by responders. Moreover, the results from their ultimatum game experiments indicate that proposers tend to offer slightly unfair offers, in order to increase the probability of acceptance by the responder (Roth & Erev, 1995). Therefore, proposers prefer to keep a slightly higher portion of the money for themselves, offer a moderate amount of the money to the respondent, in order to avoid rejection (which translates in both players earning nothing).

However, there are several experiments trying to examine whether the decision and its economic aspects are affected by the age of the players. An experiment by Roalf, Mitchell, Harbaugh and Janowsky (2003) measured whether participants' age has an effect over their decisions and attitudes towards risk-taking or risk-aversion. The results showed that younger adults tend to be more impulsive than older adults. This is caused by their danger-challenging and sensation-searching mentality that exists in their very young age. Older adults, on the other hand, tend to be risk-averse. They tend to firmly refuse unfair offers and use their wisdom and logic to determine more fair distribution between the two players. (Roalf et. al.,

2011). They also believe that although older adults have bigger tendency to avoid risks, that does not make them unwilling to become altruistic toward the others. The age gap merely reflects the tendency to accept or refuse unfair offers related to risk avoidance level in social economic contexts. (Roalf *et. al.,* 2011).

There are a lot of cases when second players (responders) are unhappy about the offer from the proposers, which translates into a rejection of the offer. The rejection itself, then tend to increase inequity rather than decrease it. The rejection of unfair offers that *increases* inequity cannot be explained by the social preference for inequity aversion or reciprocity. The simplest explanation when responders reject an unfair offer, is that they are showing a sign of showing some commitments, as their main concern is only to preserve their personal integrity and reputation. (Yamagishi, 2009). Emotionally, responders think that receiving such low offer will only undermine their integrity.

Most people in the ultimatum game see that the best result is a fair share. If the offer is too low, responders can reject it, thus will 'punish' the proposer. We have known the basic rule if the second player refuse the offer, none of the payers receive anything. Then, we can say that the situation where both the responder and the proposer do not get anything is indeed a punishment, especially to the proposer. The 'punishment' is given because the responder thinks that the proposer has given him/her an unfair offer. Unfairness, in society, is seen as an act of irresponsibility toward social norm. (Fehr and Fischbacher, 2003)

In the case of ultimatum game, the responder wants to punish the proposer because he/she thinks that the proposer has done something bad according to social norm, which is being greedy. Consequently, the proposer will most likely obey the social norm by making up to his previous unfair act. He/she will propose more fair offers in the future. Fehr and Fischbacher (2003) made an experiment to take a better look at this situation. They arranged ten proposers who interacted with different responders in ten rounds in a row. The result of the observation showed that proposers who got rejected in the previous round, have tendency to increase the amount of money they offer to responders, in the following round, by 7% of the available sum of money.

Discussing about fairness in an ultimatum game is always a never-ending issue. Since the second players (responder) is more likely to reject the share which they think are unfair, and the first players (proposer) will do their best to gain something out of the divide, then the most frequent outcome/result is a fair share. However, the concept of fairness itself can evolve when the first players already have information of the past agreed deal. The first players can observe the tendency of the deals which will be agreed by the second players, and then change the whole definition of fairness in the end. (Nowak, Page, Sigmund, 2000).

1.2. Dictator game

Dictator game is part of experimental economics. This game is quite similar to the ultimatum game. The outcome of dictator game explains how an individual react in context with economic behaviour. In dictator game, there are two parties - the "Proposer" and the "Receiver" (Cameler & Thaler, 1995, Pradana & Reventiary, 2016). The power, or the capacity to affect the outcome, lies with the proposer. He determines the split of certain endowment, for this case lets consider cash prize. The second party, the receiver simply accepts the split of endowment. As stated above, the receiver has no real influence on the outcome of the game. Hence, one can always argue if dictator game can be qualified as game. In order to qualify as a game, the action of every participant should be in reaction of other participants, which is not the case with dictator games. Despite this, the dictator game is considered as degenerate game in game theory.

Dictator games have a few challenges. Over a period of time, various experiments have been conducted by various individuals, and the outcomes of such studies were highly diverse, which proves or disapproves the rationality in economics is not widely accepted. There are certain group of economist, who believe that the concept of giving money is more superficial. Instead of maximising others benefit, people are actually more concerned about how are they perceived .i.e. There is a fear among the contestants that, if they do not give away a portion of the money, they would be perceived as greedy. There were many conducted experiments to test this hypothesis with mixed results.

In the past two decades, many experiments have been conducted on various aspects of economic behaviour i.e. ultimatum game, dictator game, and trust games. As explained by Henrich et al.(2004) "*Over the past decade, research in experimental economics has emphatically falsified the textbook representation of Homo economicus, with hundred of experiments that have suggested that people not only care about their own material payoffs* but *also about such things like fairness ,equity, and reciprocity."*

Experiment of anonymous dictator game controls the strategic self-control behaviour of the participants by providing total control over distribution of wealth form the proposer to the receiver and complete anonymity from all other including that from experimenter (Hoffman et al., 1996). Under such circumstances, theory predicts that the proposer should act in a complete selfish way. i.e. no transfer of endowment from proposer to receiver. However, the usual outcome has a significant difference from the predicted outcome. Usually, the proposer prefers to share some of his wealth with receiver. Such other regarding choice is another example in which individual behaviour differs from sub-game prediction and supports the call for a new "behavioural game theory" (Camerer, 1997).

In this experiment, the main motive of examiner was to test fairness hypothesis. If the experimenter's conception is right, and fairness is the most important factor affecting the outcome, then the distribution of the offer should be the same, in both dictator and ultimatum games (Madiawati & Pradana, 2016). Different outcomes in the games will conclude that other factors, along with fairness, have an impact over the proposers' behaviour. A second hypothesis was to put to test to if paying subjects makes any difference in the outcome. The pay hypothesis states that the distribution within the games should be identical, irrespective if the payment is made or not. According to economic theory, incentives should make a difference. However, an experiment conducted by Thaler (1986) as mentioned by Fakhri et al. (2014) states that there is no strong evidence of such behaviour. In order to test this hypothesis, the experiment was conducted in two sessions at two different times. The outcome leads to rejection of fairness hypothesis. The results showed that both games differ largely, when payment is made and fairness alone cannot effect the outcome of proposers behaviour.

2. RESEARCH METHOD AND HYPOTHESES

The main target group considered for this paper would be students in the University of Bern. Our main objective is to study their behavior in a dictator and ultimatum game experiments. Important detail is that participants would bargain over waiting time, instead of over money. From previous researches we already know that participants' behavior in the ultimatum game with bargaining over time is more or less the same as when they bargain over money (Berger *et al.,* 2010). Through this research we would like to examine whether this is valid for the dictator game as well. Another objective is to compare the results of the two games and analyze the similarities and dissimilarities in terms of fairness considerations. We would like to know what are

the drivers determining participants' behavior, and what are their main considerations while taking a decision. In order to achieve the set objectives, an in depth literature review, as well as an experiment would be conducted.

2.1. Method

Our research combines both dictator and ultimatum game theories. The only difference is that participants will bargain over waiting time, instead of over money.

The predictions of participants' behavior in the ultimatum game will be based on an interesting research of Berger *et al.* (2010). The main purpose of this research was to reveal the behavior of subjects in an ultimatum game with real losses. It was the first ultimatum game experiment with bargaining over waiting time. The main purpose of creating this experiment was to avoid effects of windfall gains. The experimenters implemented three anonymity conditions: baseline condition; condition with anonymity among the subjects and double-blind condition (the experimenter did not know the division of the waiting time). Their findings suggest that anonymity did not have a significant effect over the behavior of the participants (Berger *et al.,* 2010). Researchers expected to observe different behavior in the ultimatum game bargaining over time compared to ultimatum games bargaining over money.

The findings of Berger, Rauhut, Prade, and Helbing (2010) confirmed previous ultimatum game experiments, in which people bargained over money. The results revealed that the degree of anonymity does not have a significant impact over participants' fairness considerations. On the other hand, the existence of a punishment option played an important role in proposers' choice of setting an offer, which led to a rather balanced division of waiting times among proposers and responders (Berger *et al.,* 2010).

The extension of our experiment consists of a second game - dictator game, where the first player "the proposer" determines the split of the waiting time. The second player, "the receiver", simply receives the remainder of the time left by the proposer. Therefore the receivers' role is entirely passive. In their work Forsythe *et al.* (1994) concluded that in the dictator game, the distribution of X shifts significantly towards zero relative to the ultimatum game (if real money is at stake). On the other hand if only hypothetical questions are asked, no such shift can be observed. It was concluded that in ultimatum game, participants' behavior do not differ significantly when they bargain over money compared to bargain over time.

2.2. Hypotheses

Based on the explanation above, in our research we assume that in dictator game participants' behavior should also not differ significantly when distributing money compared to distributing time. In order to answer the research questions, the following hypothesis would be tested:

> **Hypothesis 1:** Participants behavior in the dictator game, based on distribution of time, should be consistent with the behavior of the participants' when the game is played with money.

Our assumption is based on previous researches. Berger *et al.* (2010) revealed that participants' behavior in ultimatum game with bargaining over money is consistent with their behavior when bargaining over time. The aim of this hypothesis is to check if this statement is relevant for dictator games as well.

> **Hypothesis 2:** Proposers impose significantly more waiting time on the receiver in the dictator game than in the ultimatum game.

In his research Forsythe *et al.* (1994) compared simple ultimatum games with dictator games. The output showed that in the dictator game the distribution of X shifts significantly towards zero relative to the ultimatum game. In our second hypothesis we assume that this conclusion is relevant for both games when the purpose of the game is distribution of time.

Hypothesis 3: Responders offered highly unequal waiting time distribution in the ultimatum game, are more likely to reject the proposers offer, because they might perceive it as unfair.

In his work Bearden, J. N (2001) represents the first experimental study of ultimatum bargaining conducted by Güth, Schmittberger and Schwarze (1982). The authors concluded that participants often rely on what they consider to be a fair or justified result. In another research it was observed that some positive offers were declined by the responders indicating a resistance to unfair allocation (Kahneman, Knetsch and Thaler, 1986).

The experiment would follow the experimental design of Berger, Rauhut, Prade, and Helbing (2010).

2.3. Respondents / Experiment Participants

Research participants were 20 students majoring in different subjects at the University of Bern. Only Bachelor and Master students who are fluent in English were asked to participate. Doctorate students and students who are not fluent in English were excluded from the experiment. The sample was evenly split into 10 students participating in the dictator game experiment and 10 students participating in the ultimatum game experiment. In the dictator game, there were 4 female and 6 male participants, and their age ranged between 22 and 30 years of age. In the ultimatum game, there were 6 female and 4 male participants, and their age ranged between 18 and 30 years of age. All students were recruited on campus, at the University of Bern. Participants were compensated with a chocolate bar for their participation in the experiment.

In our research we use between subject design in which each participant participates in one and only one group. The results from each group will be compared to each other to examine differences. We use the second anonymity condition from Berger, Rauhut, Prade and Helbing (2010): anonymity among the subjects. Our experiment consist of both ultimatum and dictator games and the aim of the whole process is to compare the results from both games.

First part of our experiment consists of ultimatum game with bargaining over time. Ten participants would be randomly allocated to the roles of proposers or responders. Each proposer would be randomly paired with a responder. The participants would be allocated in different rooms, depending on their role, and would not be aware with who they are paired with. Then, each participant would be presented with instructions of the experiment. The proposers would have to divide 10 minutes waiting time and send his decision to their paired responder for the allocation of the time they propose to wait. Participants would be told that responders would be able to influence the proposer's offer, meaning that if the offer is rejected by the responder, both participants would be told that they have to wait the full 10 minutes. Therefore, very unfair offers could be punished by the responder.

The extension of the experiment of (Berger, *et al.* 2010) is the existence of a dictator game. Participants would be randomly allocated in the roles of proposers and receivers. Each proposer would be randomly paired with a receiver. However, participants would be told that receivers would not be able to influence the proposers' offer. Since there would be no punishment, the experiment would be able to measure the true personality of proposers, ranging from very selfish to very altruistic.

After both games for time allocation, participants would have to answer several questions. The aim of the questionnaire would be to understand how participants made their decisions and examine if they were influenced by other external factors.

3. RESULT AND DISCUSSION

3.1. Results from Ultimatum game

It was hypothesized that responders who were offered highly unequal waiting time distribution in the ultimatum game, are more likely to reject the proposers' offer, unless the offer is perceived as fair by the responders. It was also expected that participants' behavior in the ultimatum game, based on distribution of time, is consistent with the behavior of the participants when the game is played with money.

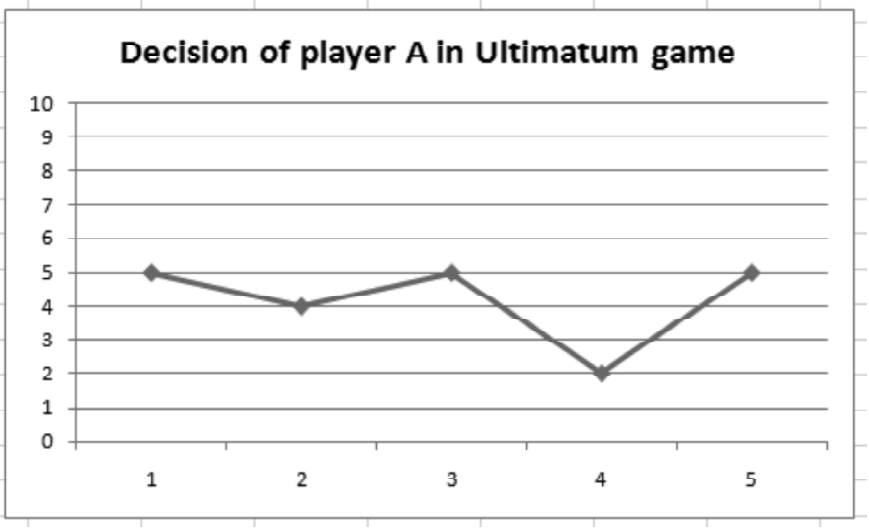

Figure 1: Decision of player A in ultimatum game

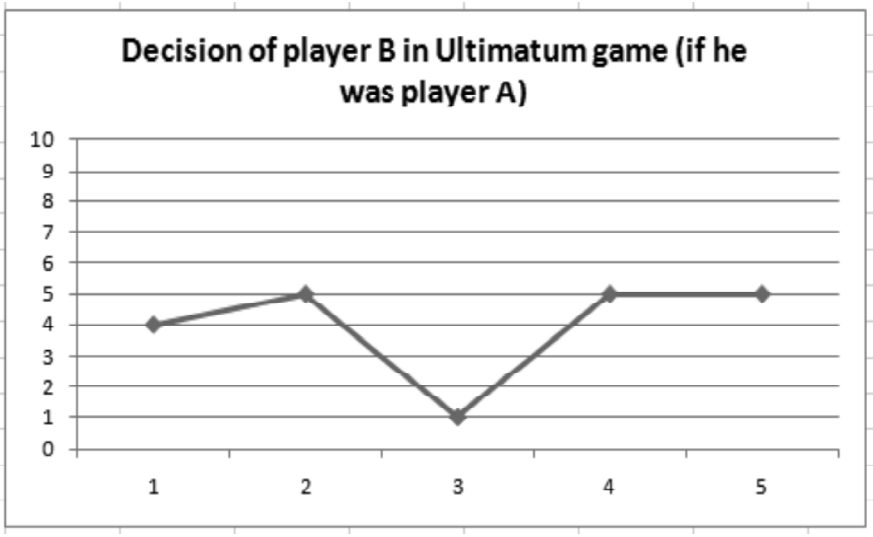

Figure 2: Decision of player B in ultimatum game.

Figure 1 shows the decision of player A (the proposer), and refers to the number of minutes, which the proposer wanted to wait. The total waiting time was ten minutes. Figure 1 reflects how many minutes player A chose to wait in the ultimatum game. Figure 2 reflects how many minutes player B (the responder) would have wanted to wait, if he or she was in the role of player A. The results were consistent with the results of other ultimatum game experiments, where the participants had to allocate monetary units. The most frequent offer was 5 minutes. Sixty percent of the proposers (three out of five) were proposing an equal split of the waiting time. Only one offer was rejected, where the responder was expected to wait for eight minutes, while the proposer wanted to leave after two minutes.

In the post-experimental questionnaire, 60% of the proposers (three out of five players), reported that the main reasons for their decision were fairness considerations and assumptions whether the other player would accept the offer. On the other hand, 40% of proposers (two out of five players) stated that their main concern was waiting as little as possible.

An interesting finding was that one respondent, who was offered an equal split of waiting time (5 minutes each), stated that if he would be the proposer, he would have allocated the waiting time more unevenly. He stated that if he would be player A, he would want to wait one minute, and expected the other player to wait for nine minutes. However, the rest of the respondents stated that, if they would be player A, they would also allocate the waiting time between the two players evenly, offering either a 50% - 50% time split (5 minutes of waiting time for each player) or 40% - 60% time split (proposer waits for 4 minutes and the responder waits for 6 minutes).

The results indicate that participants' behavior was consistent with the participants' behavior in other ultimatum game experiments. Proposers perceived the experiment as a game, where only fair offers would be accepted. This led to a fairly balanced waiting time distribution among proposers and responders. The results indicate that fairness plays an important part in proposers and responders' decision. The results also show that offers which are perceived as unfair by the responders are rejected. Based on these findings, we accept hypothesis 3.

3.2. Results from Dictator Game

It was hypothesized that participants' behavior in the dictator game, based on distribution of time, should be consistent with the behavior of the participants when the game is played with money. It was also expected that proposers would impose significantly more waiting time on the receiver in the dictator game than on the responder in the ultimatum game.

Figure 3 shows the decision of player A (the proposer), and refers to the number of minutes which the proposer decided to wait. The total waiting time was ten minutes. Figure 3 reflects how many minutes player A chose to wait in the dictator game. Figure 4 reflects how many minutes player B (the receiver) would have decided to wait, if he or she was in the role of player A. The most frequent offer was 5 minutes. There were a few strongly unequal offers where player A decided to wait 2 minutes or less, leaving player B to wait 8 minutes or more.

An interesting finding was that some receivers, who were offered an equal slip of waiting time (five minutes each), responded that if they would be the proposer, they would have allocated the waiting time more unevenly. One receiver, who was offered a 50% – 50% time split, stated that, if he would be in the

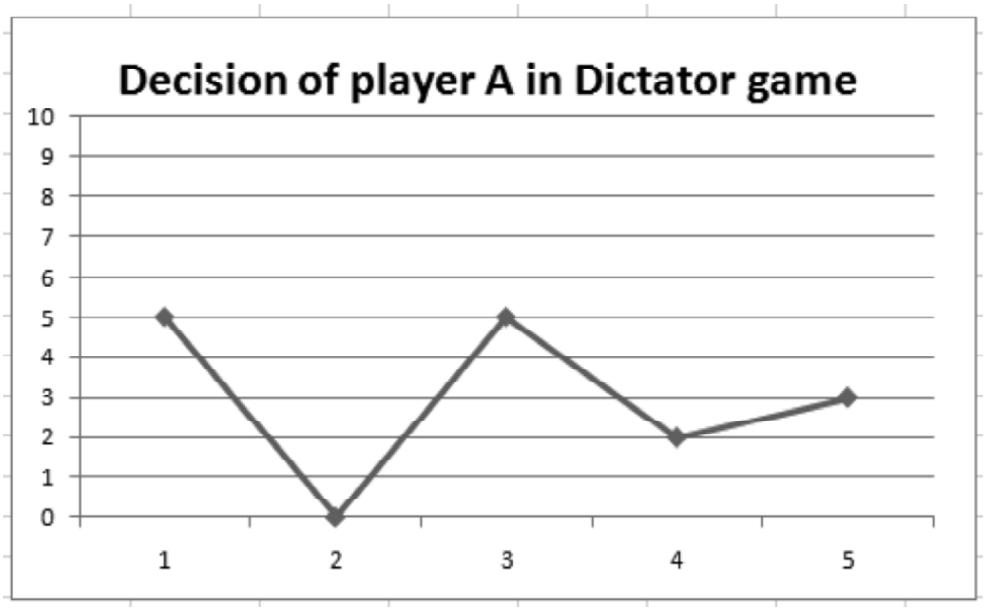

Figure 3: Decision of player A in the dictator game

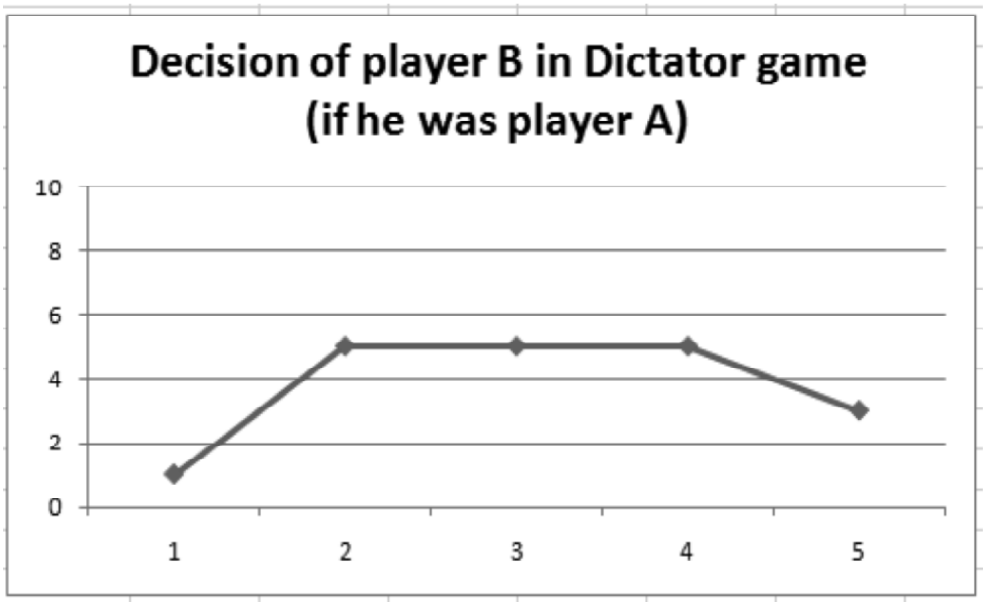

Figure 4: Decision of player B in the dictator game

role of player A, he would have offered to wait one minute, leaving the other player to wait for nine minutes. However, the majority of receivers, who were offered a waiting time between five to seven minutes, stated that if they would be the proposer, they would have allocated the waiting time more evenly, such as 50% - 50% waiting time split. Therefore, highly unequally distributed offers did not provoke receivers to behave in more selfish manner. Instead, receivers responded that they would have offered an equal split of the waiting time for both players.

In the post-experimental questionnaire, 60% of the proposers (three out of five players), reported that they felt sorry for player B, because he or she has no power over the allocation of waiting time. Therefore, they reported that their main concern and reason for their decision were fairness and equality considerations. On the other hand, 40% of the proposers (two out of the five players), reported that they do not feel the need to be fair since they do not know the other player. However, from their comments and reflections, it is clear that the two proposers were aware that their offers would be perceived as unfair. One of the proposers who wanted to wait zero minutes and expected the receiver to wait for ten minutes even stated: "*Since I do not know player B, I would act egoistic*".

In the post-experimental questionnaire, receivers reported that they felt that they have no power over the decision of the proposer. However, they were hoping that the proposer would offer a fair distribution of the waiting time. Furthermore, 40% of the receivers (two out of five players), reported that they felt angry at the proposer after they saw the offer. The reason why they felt angry was that they perceived the offer as unfair, but they could not do anything to change the allocated waiting time.

Hypothesis 2 predicted that proposers impose significantly more waiting time on the receivers in the dictator game than on the responders in the ultimatum game. To test the hypothesis, a comparison between the imposed waiting times over player B in both games was conducted. Figure 5 shows the decision of player A (the proposer) in both, the dictator and the ultimatum game. The total waiting time in both games was ten minutes. Figure 5 represents a comparison of the number of minutes which player A decided to impose on player B in the dictator and ultimatum game.

As expected, the results indicate that the proposers in the dictator game, on average, imposed more waiting time on the receivers. In contrast, the proposers in the ultimatum game were more generous and offered to responders a more equal distribution of the waiting time. Moreover, none of the proposers in the ultimatum game wanted to wait zero minutes, expecting that the responder would agree to wait for ten minutes. Therefore, the lack of power of player B had an impact over the decisions of proposers in the dictator game. On the other hand, the ability of player B to accept or reject the offer, also had an

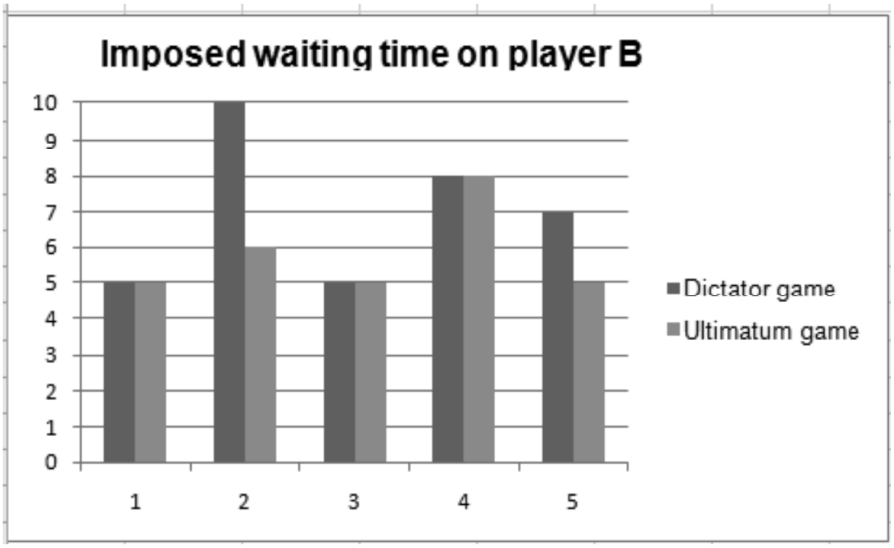

Figure 5: Comparison between the imposed waiting time on player B in the dictator and ultimatum game

impact over the decisions of the proposers in the ultimatum game. Based on those findings, we accept hypothesis 2.

4. CONCLUSION

The goal of our study was to examine participants' behavior in dictator and ultimatum games based on real losses. Participants had to impose waiting time to others in a between subject anonymity environment. Based on their behavior we tried to answer our main research questions and test our hypotheses.

One of the main questions while conducting our research was: would proposers in both games behave in an altruistic or selfish manner? In their study, Forsythe et al. (1994), compared simple ultimatum and dictator games. Their results revealed that, in the dictator game, some of the subjects seemed to be motivated by altruism when the offers were concentrated around the equal split. On the other hand, higher concentration of offers around the equal split in the ultimatum game suggested that behavior could not be fully attributed to altruism. In our experiment we observed both behaviors. In the ultimatum game most of the participants (except one) were concern about the fairness and they did not act in a selfish manner. This behavior could also be explained with the right of player B to respond by accepting or rejecting the offer. More interesting were the results from the dictator game, in which we were able to observe both selfish and altruistic manner of player A. The altruistic manner was explained by "feeling sorry" that player B did not have the right to respond. On the other hand, the selfish manner was explained by not knowing the other participant. These results revealed that people, whose actions were led by fairness or altruism, did not consider the anonymity of their partner as an important factor for their decision. In other words, the fact that they did not know the identity of player B, did not influence their decision to split the waiting time equally between the players. At the same time for selfish people this was a highly important factor.

Another interesting fact, according to Eckel and Grossman (1998), is that women are more socially-oriented (selfless) and men more individually-oriented (selfish). They found out that women, on average, donate twice as much as men to their partner. These results were revealed from dictator game, played in a double-blind environment. Even though we didn't apply this type of anonymity in our experiment, it was interesting to test if our results were consistent with this research. In the dictator game we had two extremely unequal offers, where player A decided to wait 2 minutes or less, leaving player B to wait 8 minutes or more. Both of them were made by men. Furthermore, these players were matched with female receivers (B players). In the post-experimental questionnaire, both women were disappointed and strongly criticized the proposers' unfair allocation of the waiting time. However, when they were asked, how they would have distributed the waiting time, women were highly fair and distribute the waiting time equally. This shows that even though both players were disappointed they would not consider punishing their partner. This outcome highly supports the findings of Eckel and Grossman (1998).

In terms of fairness, our participants were highly sensitive. All equal splits offered by player A were judged as fair in the questionnaire. Besides that, most of the participants were willing to punish the unfair offers. However, we observed some different type of attitudes as well. On one hand, there were participants, player B in both games, who did not punish unfair offers. On the other hand, there was a participant in the ultimatum game who explicitly showed his selfish approach. He received equal split and was satisfied with the division of the waiting time. However, when he was asked, how he would have acted if he was in the role of the proposer, he distributed the waiting time highly unequal, proposing that his partner should wait

for 9 minutes. This result raised the question how do participants respond to different offers and what are the drivers behind punishing fair offers? Do participants tend to copy certain attitude or are there any other considerations involved? Additional research is needed to investigate this concept further.

Another important question while conducting our research was how participants would behave in a dictator game, if they have to bargain over time, compared to bargain over money. In general, comparing both ultimatum and dictator games – proposers in ultimatum games tend to offer more even distributions than proposers in dictator games. There are a lot of researches trying to find the main drivers behind this behavior. The most logical explanation for us as a group, based on our results, is that proposers in the ultimatum game have to consider some additional factors while making their decision. They should coordinate their wish (how long they would like to wait), as well as the probability of acceptance or rejection of their offer by the responder. In the post-experimental questionnaire, most of the comments were related to fairness considerations of the offers, as the main factor driving participants' decisions.

In dictator games, proposers are the main players and the leading figures in the game. This is a precondition for egoistic and selfish behavior, observed in our research as well. Not having any opponents, give proposers the opportunity to decide what is best for them. As we do not perceive the rules of this game as fair, we gave chance to the receivers to express their feelings and opinions in the post-experimental questionnaire. It was important for us to know their point of view, concerning the rules of the game. Even though our sample was quite small, we were able to observe different reactions. Some of the receivers easily accepted that they are dependent on the proposers' decision. They wrote that the only thing they can do, is to hope that they will not have to wait for a long time. There were also participants who were disappointed of not having any rights and evaluated the game as totally unfair. Besides that, we had one extreme case in which the participant commented that, in her opinion, this game does not make sense. She wrote that this game makes receivers feel helpless and dependent and she did not like that.

After analyzing the behavior of our participants, we tried to compare it to previous researches in order to answer our research question. We were not able to find another research based on dictator game with bargaining over time, but there were a couple of experiments comparing dictator games played with or without pay. Therefore, we considered the games with no pay as a main comparative base for our research. In their work, Forsythe et al. 1994, tested a hypothesis stating that the distributions of dictator allocations are identical with and without pay. This hypothesis was based on the economic theory, which suggests that incentives should matter. On the other hand, it considered the work of Thaler (1986), who argues that there is little evidence for this. After conducting their research Forsythe et al. 1994, rejected the "pay hypothesis" in favor of the alternative, stating that dictators are more generous when payments are hypothetical. This result, transferred to our research would mean that proposers should allocate waiting time more evenly, than when they allocate money. Another research conducted by Ben-Ner and Levy (2005) investigated in comparing dictator games, played with actual and hypothetical money. Their research was based on the findings of Forsythe but with a slightly different approach. After concluding that the average amounts transferred in the two experiments were remarkably similar, they decided to investigate participants' personal characteristics. Participants had to fill a self-report inventory which was used to measure five personality factors: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness (Wardhana, 2016). After conducting two researches they found out that differences in allocations of real and hypothetical money are related to individual differences in personality but are

independent of the dictator's gender and cognitive ability. Furthermore, they specified that the differences are related to two of the five personally traits: agreeableness and extraversion. According to them agreeable dictators are "fundamentally altruistic". They are more generous towards recipients when their actions have monetary consequences. On the other hand, extravert dictators are characterized by assertiveness, excitement seeking, positive emotions and warmth. They tend to behave generous when generosity is costless. When their actions bear financial consequences their generosity wanes. In our experiment, we did not have the chance to compare pay versus non pay dictator games, but considering the finding of Ben-Ner and Levy (2005) we can conclude that our questionnaire was not able to reveal such behavior. Future research is required, in order to examine whether the most unfair offers in our dictator game were based of fairness or based on the non-existing monetary consequences?

Finally we compared the proposers' behavior in both ultimatum and dictator games. In general proposers in the ultimatum game were more generous, with 60% fair offers, than proposers in the dictator game - with 40%. Even though our sample was not big enough and the results were not representative we did not find prove for similar behavior among proposers in both games.

After evaluating and analyzing our results we consider our research goal as achieved with some exceptions. We investigated in conducting a research based on ultimatum and dictator games with bargaining over time. We compared the results from both games and analyzed them. We tried to find out whether proposers in dictator game with bargaining over money and over time behave in a similar way. Last but not least, we came up with some questions for further researches in this field.

A possible limitation of the present research is the sample. The sample size might have been not sufficient for answering our research questions. Using a homogeneous sample of students seemed appropriate for the present experiment. However, the external validity of the experiment is questionable. Future studies need to examine, if the findings can be generalized to other age groups, non-students, or other nationalities.

Finally we believe that with our research we managed to enrich our knowledge about bargaining over time in experimental economics. We tried to get insides about different aspect of behavior, combining dictator and ultimatum games. We designed a study providing an overview about the interaction between the participants in both games and the reasoning behind that. This may enable researchers to get deeper knowledge of the multifaceted behavioral process in ultimatum and dictator games with bargaining over time.

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Appendix A – Instructions for Dictator Game

Instructions

In this experiment you are asked to make a choice about how to divide a waiting time between yourself and one other participant. You would be randomly allocated to the roles of either Player A or Player B. Then, you would be randomly paired with one of the participants, who are located in another room. Your identity would not be revealed to the other participant. After the experiment, you will receive a chocolate bar as a "Thank you gift" for your participation.

Please, read the experimental instructions carefully. Please, do not communicate to other participants during the experiment.

Player A

In this experiment, you have to decide how would you want to divide the waiting time between you and one randomly chosen Player B. You have to divide 10 minutes of waiting time. This means that you have to decide how long you and Player B would have to wait before you can collect your participation reward. For example, if you choose to wait 2 minutes, player B would have to wait for 8 minutes. If you choose to wait for 8 minutes, player B would have to wait for 2 minutes. Player B has no influence over the division of the waiting time.

After you decide how you wish to allocate the waiting time, you would have to fill out the "Decision sheet". Then the "Decision sheet" would be brought to Player B. After Player B, receives the Decision sheet, the waiting time begins. The experimenter would let you know, when your waiting time is over. Then you can collect your chocolate bar.

Player B

After Player A decides how to allocate the waiting time, you would receive his/her decision sheet. You will not learn Player A's identity. If Player A decided to wait 3 minutes, you would have to wait for 7 minutes. If Player A decided to wait for 5 minutes, you would have to wait for 5 minutes, before you can collect your participation reward. After you receive the decision sheet, the waiting time begins. The experimenter would let you know, when your waiting time is over. Then you can collect your chocolate bar.

If you have any questions, please raise your hand, and an experimenter would come to help you.

Appendix B – Instructions for Ultimatum Game

Instructions

In this experiment you are asked to make a choice about how to divide a waiting time between yourself and one other participant. You would be randomly allocated to the roles of either Player A or Player B. Then, you would be randomly paired with one of the participants, who are located in another room. Your identity would not be revealed to the other participant. After the experiment, you will receive a chocolate bar as a "Thank you gift" for your participation.

Please, read the experimental instructions carefully. Please, do not communicate to other participants during the experiment.

Player A

In this experiment, you have to decide how would you want to divide the waiting time between you and one randomly chosen Player B. You have to divide 10 minutes of waiting time. This means that you have to decide how long you and Player B would have to wait before you can collect your participation reward. For example, if you choose to wait 2 minutes, player B would have to wait for 8 minutes. If you choose to wait for 8 minutes, player B would have to wait for 2 minutes.

After you decide how you wish to allocate the waiting time, you would have to fill out the "Decision sheet". Then the "Decision sheet" would be brought to Player B. Player B can either accept or reject your offer. If player B accepts the offer, your waiting time will be defined according to the decision sheet you filled. If player B rejects your offer, both of you will have to wait for the whole 10 minutes. After player B, receives the Decision sheet and makes his/her decision, the

waiting time begins. The experimenter would let you know, when your waiting time is over. Then you can collect your chocolate bar.

Player B

After Player A decides how to allocate the waiting time, you would receive his/her decision sheet. You will not learn Player A's identity. If Player A decided to wait 3 minutes, you would have to wait for 7 minutes. If Player A decided to wait for 5 minutes, you would have to wait for 5 minutes before you can collect your participation reward. After you receive the decision sheet, you can decide either to accept or reject player A's offer. If you decide to accept the offer, you'll have to wait as long as it is written on the decision sheet. If you decide to reject the offer, both of you have to wait for the whole 10 minutes. The waiting time begins after you make your decision. The experimenter would let you know, when your waiting time is over. Then you can collect your chocolate bar.

If you have any questions, please raise your hand, and an experimenter would come to help you.

Appendix C – Decision Sheet for Dictator Game

Decision Sheet

Player A: Please write your Player ID: _____.

Player A, please write your decision below:

Player A will wait _____ minutes, and **Player B** will wait _____ minutes.

Player B: Please write your Player ID: _____.

Appendix D – Decision Sheet for Ultimatum Game

Decision Sheet

Player A: Please write your Player ID: _____.

Player A, please write your decision below:

Player A will wait _____ minutes, and **Player B** will wait _____ minutes.

Player B: Please write your Player ID: _____.

Player B, please mark your decision below:

☐ I accept the offer.

☐ I reject the offer.

Appendix E - Questionnaire for Ultimatum and Dictator Game

Questionnaire

Thank you for your participation in the experiment! Please, take a few minutes to answer some follow-up questions. We will not ask you to provide your name or disclose your identity. All information would follow privacy protection guidelines and it would be anonymous to all participants in the experiment.

1. Were you Player A or Player B? *(please tick the box that applies)*

☐ Player A ☐ Player B

2. Did you have any difficulty understanding the instructions of the experiment?

☐ Yes ☐ No

3. What was your main consideration when taking your decision? *(please provide a short answer)*

4. If you were the other player, how would you allocate the waiting time? *(please fill in the blanks)*
Player A waits _____ minutes, and Player B waits _____ minutes.

5. Did you get angry at the other player, at any time during the experiment?

☐ Yes ☐ No

6. Do you think the offer was fair? *(Please circle your answers on a scale from 1 to 10 (where 1 = strongly disagree and 10 = strongly agree).*

1	2	3	4	5	6	7	8	9	10
Strongly disagree									Strongly agree

Additional information:

7. What was your Player ID?

8. What is your age?

☐ 21 and under ☐ 22 - 25 ☐ 26 – 30 ☐ over 30

9. What is your gender?

☐ Male ☐ Female

10. What is your nationality?

☐

11. What is your major?

☐