

Social Preferences in Behavioral Economics: The Study of Reciprocal Altruism under Different Conditions

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Abstract: Different external interventions prompt people to perceive different motivation which in turn causes different reactions. In our study, we propose that under different circumstances, the degree of the “reciprocal altruism heuristic” varies. This paper is aiming at carrying out an ultimatum game under two scenarios and compares the results to demonstrate the effect of different external interventions on the tendency of reciprocal altruism. All 10 participants in the experiment, as a result, have shown different inclination under the implementation of various external interventions, which strongly suggests the existence of determinants that control the inclination of mutual cooperation and the provide insights for future psychological and educational related research to develop a more advanced system of human cognitive models under external interferences.

Keywords: *Reciprocal Altruism, Ultimatum, Heuristic, External Intervention.*

1. Review of Literature

Development of Cognitive Model for Reciprocity and Altruism: The long history of human and its evolution have proved themselves for having a major effect on human cognitive models which people possess during the process of social interaction. In a sense, it can be seen as if the development of human’s genetic basis and the aforementioned cognitive mechanism are evolving correspondently. Grasping the behaviors in relation to the broader trend of human evolution makes the study of social exchange a main target for social scientists’ endeavors in multiple disciplines, namely the field of Behavioral Economics where the scientists hope to utilize the model or conclusion of social exchange to exemplify daily practices of people that seem unreasonable when being placed under the self-regarding situation. Social exchange can be practiced in many forms, but it has been admitted by the majority of the scientists that two main reasons explain this ubiquitous phenomenon, “kin selection” and “reciprocal altruism.” Kin selection takes place when close relatives favor each other based on the consideration that acting.

In such way may well benefit the whole family in terms of the collective goods. As a matter of fact, theories have been proposed to support the hypothesis that kin selection might be one crucial step for human race toward reciprocal behavior (Haldane, 1995). However, opposite evidences suggest that explanation of reciprocal altruism may be less than sufficient if one relies solely on the extension of kin selection since it is oftentimes considered to be designed to meet the purpose of “inclusive fitness,” that is, kin selection works only under circumstances when it is deemed to be beneficial to the genes and human reproduction among one particular family. So, when it comes to interaction between non-relatives, this model is simply not enough for scientists to draw reasonable conclusions. Based on these earlier findings and theories, scientists speculate that alternative cognitive modules are behind the impulse of reciprocity and altruism behaviors. The most conspicuous evidence of reciprocal altruism can be found in the iterated Prisoner Dilemma (PD) game which was conducted by Axelrod (1984) through a series of computer simulations.

In such simulation which all possible solutions are included, the Tit-For-Tat Strategy outperforms all other strategies while showing signs of evolution under a broad scope of alternatives in the additional experiments which further help testify the aforementioned relationship between human evolution and the development of certain reciprocal mental model. When it comes to one-shot games, the reaction of the participants varies. Under a normal iterated game, participants are able to demonstrate two major traits. One, according to Cosmides (1989) and Cosmides and Tooby (1989), is the ability to distinguish the real cooperators. It is very necessary for human beings to develop a cognitive model specifically designed to encounter social exchange given the importance and benefits of mutual cooperation, and the product of this lengthy evolution, is “cheat detection.” Given the evidence provided by Axelrod and his computer simulation, Cosmides reaches the conclusion that the minimum requirement for people to participate in mutual cooperation is the ability to

detect cooperators from defectors. As a matter of fact, Axelrod (1984), in his experiment, proposes 14 ways of algorithms that a person may be capable of possessing during the process of mutual cooperation, and cheat detection is also on the list. The process of social exchange may only be facilitated under the condition where both cognitive mechanisms are brought into effective action.

While Cosmides and Tooby (1989) dedicate their endeavors on arguing that cheat detection is of central importance to reciprocal altruism, this article focuses its research on latter characteristic of social exchange. Being the inadequate necessity of the social exchange process, cheat detection is of no use for the effectuation of reciprocal altruism unless the participants is willing to destruct its own interests in returns for the collective good. This seemingly self-evident argument is, in reality, backed up by substantial evidences collected by Pruitt and Kimmel (1977) who have reviewed and accumulated data for over 1000 Prisoner's Dilemma games. Following their close examination and review, Pruitt and Kimmel reach the conclusion that achievement of mutual cooperation in PD game requires the following two elements: first, transferring the self-regarding pursuit to attainment of mutual cooperation, and second, expectation that the other participant may as well forgo the narrowly egoistic pursuit and aims for mutual cooperation. Therefore, it may be reasonable to draw the conclusion that since human beings have evolved a specialized mental model used solely for cheat detection, they may as well develop another cognitive mechanism specialized for persuading people to give up self interest pursuit. This article adopts the definition proposed by Kiyonari (2000) and name this cognitive model "reciprocal altruism heuristic."

2. Reciprocal Altruism Heuristic

Subjective Transformation of Ultimatum Game (UG): Consider a normal ultimatum game. According to Güth (1982), two participants in total will be involved in the experiment. One of the two participants is in charge of distributing a fix amount of money based on his/her own will, and the other is simply going to make a decision between whether or not to accept this offer. Notice that a typical ultimatum game is a one-shot, anonymous game, which gives the participant who distributes the money a large amount of leeway to decide how much is to be distributed since for the participant who makes decision, there's no reason to turn down a free lunch no matter how small the amount is. If we consider the participant who gives out money self-regarding, in some cases they are, the ideal amount of money given out to the second participant would be \$1, and the rest of the money will be kept by the first participant. However, after numerous ultimatum experiments have been conducted, hardly anyone has witnessed the aforementioned situation which the ratio between the money distributed and the money kept is 99:1 in the majority of cases.

Which include but not limited to Roth (1991), Camerer (2003), around 50% of the money is generously given to the second participant despite the fact that it is not "economical" in a normal sense, and in a few cases, an offer below 25% of the total amount is highly likely to be turned down by the second participant who, by doing so, attempts to criticize the first participant for not being generous enough. The notion of reciprocal altruism heuristic, as one may have seen in the above experiments, may have been the major contributor to the trend above. As Kiyonari (2000) has mentioned in his work, the "social exchange heuristic" is capable of transforming a PD game into an Assurance Game (AG) which no dominant strategy exist. In those particular cases, namely the experiment conducted by Kollock (1997), the participants do treat the normal PD game as if it is an Assurance Game, and they also turn out to be more inclined to mutual cooperation in such cases. Based on these early findings and conclusion, it is reasonable to believe that this potential reciprocal altruism heuristic is, to a certain degree, able to alter the perception of the participants, which in return would viewed this game from a different perspective, potentially a perspective that favored mutual benefits over self-interest, thus increase the amount of money being distributed.

To put this issue in an abstract and quantitative way, assume that the participant makes his/her decision based on the following utility equations:

$$\begin{aligned} \max U(w_1, w_2) &= U(w_1) \\ \max U(w_1, w_2) &= U(w_1, V(w_2)) \end{aligned}$$

In this case, U stands for the utility of the first participant with the money he/she keeps, V stands for the utility of the second participant with the money he/she keeps. W_1 stands for the amount of money kept by the first participant while W_2 refers to the amount of money that the second participant receives. If the

participants are inclined to benefit themselves rather than putting mutual cooperation at the priority, in other words, extreme self-regarding, the experiment will likely follow the first equation in which the maximum utility of both participants equals to the utility of the first participant. This is the case that many economists have predicted prior to the experiments. However, as the results of the previous experiments begin to unfold, one may witness that it is oftentimes the second equation that comes into effect. In most cases, the maximum utility of the two participants equals to the sum of the utility of the two participants, this conclusion is rarely seen in the prediction based on the premise that the participants are self-centered. This further adds credibility to the argument that human beings subjectively transform the game into a mutual cooperation situation.

Potential Influential Factors of Reciprocal Altruism Heuristic: Believing the fact that reciprocal altruism heuristic is not an index that is determined by a single decisive factor, this article's analysis dedicate its attention to unwrapping the potential factors that might be influential to the reciprocal altruism heuristic. Some social scientists and economists would rather view reciprocal altruism heuristic a constant which has only slight differences between different people and different conditions. However, this article thinks otherwise. Adopting theories proposed by B.F. Skinner, this article blends in the idea of external reinforcement and punishment with social exchange, aiming to reveal the outcome, degree, and inclination of reciprocal altruism heuristic under different circumstances, and propose several hypotheses.

Positive Reinforcement: According to the definition given by Diedrich (2010), positive reinforcement refers to the presentation of a reward immediately following a desire behavior intended to make the behavior more likely to occur in the future. Miltenberger (2008) further adds to that definition by pointing out the critical effect of external intervention on behavior modification, that is, certain behaviors can often be controlled or eliminated with behavior intervention. The use of positive reinforcement, according to Diedrich, is widely accepted in many disciplines, namely the fields of education and psychology. According to Chitiyo and Wheeler (2009), positive reinforcement is oftentimes being used to help promote the demonstration of certain positive behaviors in classroom, and the use of positive reinforcement as an effective, high-impact strategy for improving students' behaviors has been supported by documented research under various circumstances, including those of individual students and those of groups, so does Wheeler (2009) say.

The use of positive reinforcement varies in types, but they do share a common purpose, which is to improve the overall environment by increasing positive social interactions. The study of Conroy (2009) indicates that among all methods that aims to conduct positive reinforcement, praise is considered to be the most widely-used and most effective mean of positive reinforcement. Praise is a specific type of positive reinforcement. According to Conroy, many teachers consistently opt for praising to increase the occurrence of people's positive social and academic behaviors. Though appears to be simple and easy to maneuver, scientists have proclaimed that praising in fact involves a complex reciprocal process with both parties, teachers and students, are involved in. Based on the aforementioned findings, it occurs to us that reciprocal altruism heuristic could be as well considered as one of the so called "positive behaviors" which can be fostered and promoted through external behavioral intervention. Thus, we propose the following hypothesis: Hypothesis 1: Positive reinforcement as an external intervention will greatly increase the tendency of reciprocal altruism heuristic.

Negative Reinforcement: Negative reinforcement is a procedure in which certain behaviors are strengthened by involving terminating a stimulus that is present or postponing the delivery of an otherwise forthcoming stimulus. In essence, negative reinforcement differs from its positive counterpart in that it focuses on cancelling a relatively nonpreferred stimulus in order to allow the participants to demonstrate certain wanted behaviors. It may seem that negative reinforcement shares some similarities with punishment in that both of them have a nonpreferred stimulus engaged in the process. It is generally recognized by psychologists like Tauber (1998) that although negative reinforcement provides certain motivation for the participants to display positive behaviors or traits, its motivation stems from avoiding a possible negative outcome instead of anticipating something good to show up. Let's not forget, punishments come with stimulus that may well arouse the participants' eagerness to avoid certain behaviors from happening.

Therefore, this article believes that when it comes to real life experiences, the outcome of negative reinforcement may not be as effective as the outcome of the positive ones. Nevertheless, negative

reinforcement does provide the participants with a certain degree of positive stimulus, and substantial cases and studies have indicated that motivation proves to be more effective than merely forcing the participants to avoid a potential punishment. Therefore, we propose the second hypothesis: Hypothesis 2: The effect of negative reinforcement on increasing the inclination of reciprocal altruism heuristic is less than the effect of positive reinforcement but more than the effect of punishment. At the same time, it is not meticulous to ignore the effect of punishment on the participants' sense of fearing which could affect the possible outcome. Though generally being categorized as abusive, it is unreasonable to exclude the possibility in which the fear of certain punishment proves to be more effective than passive motivation. With that being said, we hereby present an alternative hypothesis: Alternative Hypothesis 2: the effect of negative reinforcement is less effective than both positive reinforcement and positive punishment. Therefore, it is reasonable to believe that with an external stimulation of positive reinforcement, the tendency and inclination of reciprocal altruistic heuristic are likely to increase by a relatively large percentage.

Positive Punishment: Positive punishment refers to a procedure in which responding is weakened by its consequences, which involve adding something to its environment (Poling, Ehrhardt, Ervin, 2002). Positive punishment procedures can be generally categorized into two categories: presenting the participants an external stimulus and requiring the participants to engage in nonpreferred behaviors. Although it is generally considered that the utilization of positive punishment serves to help rectify certain behaviors of people by adding a negative stimulation to prevent certain actions from happening, some scientists argue that this process, unlike the process of positive reinforcement, may involve bidirectional effects. Edward Thorndike, later in his life, comes to believe that punishment is not effective in reducing the target behaviors. His finding is based on an experiment conducted on several college students who engage in studying Spanish words by learning its English synonyms. According to the experiment result, students tend to learn more by hearing right over wrong when making mistakes. Subsequent evidences also indicate similar result. B.F Skinner proposes similar argument in which he argues that despite the fact that positive punishment could be used as a mean to rectify certain unreferred behaviors, its effects is short lived and could not eradicate the target behavior.

Result such as these, as well as the ethical and moral considerations, prompts Skinner to evaluate positive punishment in a relatively negative perspective. In his work *Science and Human Behavior*, he argues that punishment is a "questionable" technique for it could oftentimes being used abusively while its effect is not very long lasting. Moreover, compared to the outcome of positive reinforcement, it is very likely that punishment could direct straightly to negative and oftentimes strong responding. Other scientists, though they admit the effects of positive punishment is somewhat similar to those of positive reinforcement, proclaim an alternative view on the issue in which they argue that rather than subjectively rectifying their own behaviors, the participants who engage in punishment is in fact avoiding the possible punishment. Therefore, one can argue that they are not actually correcting or displaying the wanted behaviors willingly. According to the above theories and findings, it can be said that although positive punishment could cause an increase in the tendency in reciprocal altruism behavior, its outcome is not as effective as the outcome of positive reinforcement. Therefore, we hereby propose the third hypothesis: Hypothesis 3: Positive punishment could increase the tendency of reciprocal altruism heuristic, but its effect is less than that of the positive reinforcement.

Negative Punishment: Negative punishment generally involves a procedure in which the removal or prevention of the delivery of a stimulus as a consequence of behavior weaken (Poling, Austin, Snycerski, Laraway, 2002). It is a process in which a positive treatment is removed if the participants conduct any improper behaviors. For negative punishment to be successful, the stimulus that is removed must have "positive hedonic value." Fehr and Gächter (2002) once argued that the essence of negative reinforcement is weakening a particular kind of behavior by removing a current available positive reinforcer.

However, evidence has shown that the negative punishers in most cases that involve negative punishment may never serve as positive reinforcers. For instance, according to Poling, a child is given a CD player, and it will be confiscated if the child misbehaves. In this case, CD serves as the negative punisher. However, the CD is given to the child without taking his behavior into consideration. In other words, it is independent from the child's actions which haven't been strengthened by the CD. Thus, it cannot be said that the CD serves as

positive reinforcer. Negative and positive punishment shares quite a lot of similarities. The most noticeable one is that both of them may have a potential of causing a bidirectional effect. In the previous section, the theories of Thorndike and B.F Skinner state that rather than promoting certain behaviors, punishment, both positive and negative, would only cause strong and negative responding.

However, compared to positive punishment, the absence of a positive punisher may cause the reaction of the participant to be slightly milder since they would not have to be forced to make decision because of fear. Based on the above information, it is reasonable to propose the fourth hypothesis: Hypothesis 4: the effect of negative punishment on the inclination of reciprocal altruism heuristic is less than the effect of positive reinforcement and positive punishment. Its quantitative relationship with negative reinforcement is still to be determined. If self-esteem does affect the reciprocal altruism heuristic in a relatively effective way, it is necessary to take it into consideration as one of the external intervention variables. And it makes intuitive sense that if one truly cares about his/her image in other people's opinions; he/she is more likely to engage in reciprocal altruism behavior which is generally considered to be socially acceptable.

Esteem: Thomas Hobbes, in his famous work *The Leviathan*, once argued that human species has a tendency to pursue fame and recognition, and one must admit that a big reason for many people to engage in reciprocal altruism is self-esteem. Cooley (1902) argues that there has been a concept called "man in the mirror" that reflect the influence of self-esteem in other-regarding behavior. When a person is aware that his/her behavior might be influential to his social status, fame, sense of recognition, and friendship, it is oftentimes the case that he/she will scrutinize his/her behavior to make sure that his/her actions meet the expectation of the others. Thus, we hereby propose the fifth hypothesis: Hypothesis 5: the bigger role self-esteem plays in the process, the more the inclination of reciprocal altruism heuristic increases. Below is the format that we use during the experiment. In the format, there are five main categories.

3. Methodology

In order to quantify the reciprocal altruism heuristic and test the aforementioned five different hypotheses, we run the ultimatum experiment under two different scenarios with four different types of intervention. Below is the format that we use during the experiment. In the format, there are five main categories.

Table					
PARTICIPANT	None	P. R	N. R	P. P	N. P
A					
B					
C					
D					
E					
F					
G					
H					
I					
J					
MEAN					
MODE					

Each participant plays this ultimatum experiment under one scenario once, and a total of two scenarios are played. They receive instructions from the testers before the experiment. Afterwards, like normal ultimatum experiment, they are told to distribute 100 RMB between them and one of their classmates in the other room. Along the process, the testers sequentially lay out the two reinforcements and the two punishments and ask the participants to reconsider their decisions based on each of these premises. After the participants complete all items listed on the format, they are then guided from an isolated classroom where the first scenario is set

to the large lecture hall with some of their classmates accompanying them. They are told to redo the experiment under the circumstance of being watched. When all procedures of the whole experiment are fulfilled properly, the data is collected while the participants receive the details and principles of the test. During both scenarios, the testers, when the participant made decisions, recorded the corresponding data. Notice that the whole essence of the experiment is to measure the degree of the reciprocal altruism heuristic of the participants at the moment when they make their decisions; this ultimatum game does not thus necessarily have to involve the second participant who should be playing the role of the other decision maker.

Therefore, the testers would tell the participants that there is one other classmate who will be deciding whether to accept or deny the offer, but in reality, there is no such second participant since our main goal focuses on reaction of the previous participant rather than the latter. When forming the experimental group for our experiment, we recruited a total of 10 participants from a participant pool of about 80 at a Chinese high school in Beijing. The reason why our sample size was arguably a little small is that during the period when we conducted the experiment, it was already summer vacation and not many students were still at school; however, we do believe that even a small sample may be enough to generate the outcome of the study if the experiment can be carried out correctly. This selection of participants was completely random, regardless of gender, age and whether or not the participant is familiar with game theory. As a result, 5 students of our sample group were male, and the other 5 were female, which allowed us to observe the difference between males and females on the degree of the "reciprocal altruism heuristic." Meanwhile, only about half of the participants from the pool have been introduced with the basics of game theory during Microeconomics class in which the professor illustrates the principles of dominant strategy and Nash equilibrium, which has possibly made our results applicable to a larger population.

Full Experiment under the First Scenario: In the first scenario, each participant was brought to in isolated classroom where he/she was told that all their following actions were totally secret and that their decisions would be neither recorded nor disseminated among their peers. A total of 100 RMB was presented to each participant, and he/she was told to follow the instruction to distribute the current money he/she had with the "phony" participant in the other room, a participant that did not necessarily exist. The first money distribution was done under the circumstances where no external intervention was imposed. The average amount of money that participants in this round were willing to give to the other person was 41.5 RMB. This set of data was used by us as the control group. After the participant made his/her first decision, the tester proclaimed that the next decision they made contained a prize.

Which is, supposed that the "phony participant" was willing to accept the offer made by this participant, this participant was rewarded with double the amount he/she kept for himself/herself. At this time, the average number increased to 49.8 RMB. The third round, after the participant finished the second round, involved a negative reinforcement. The tester reassured the participant that as long as the other participant accepts the offer, his/her identity would not be exposed to the public. That is to say, the other participant would never find out who was making such offer. By presenting this negative reinforcer, the testers were actually implying that if the offer made by the first participant was not "generous" enough, the other participant, which "happened to be one of the classmates" of the first participant, could have taken retaliatory actions which might be mutually destructive, and such situation was definitely categorized as a nonpreferred stimulus. Now, the new average number became 44.5 RMB. After the two rounds of reinforcements, the two types of punishment were then introduced to the participant. In the positive punishment case, the participant was told that if, for example, his/her offer was refused, the participant, beside losing all the money he kept, was to be fined double the amount of the money he left for himself. The tester would then let the participant to reconsider the offer he/she was going to make. Surprisingly, the average number this round dramatically went up to 60 RMB. In the final round, a negative punisher was involved.

Full Experiment under the Second Scenario: The second scenario differed with the first one only in that it was conducted in the Lecture Hall with multiple students watching the participant while he/she made the same type of decision. Before the test began, the testers asked in the Lecture Hall for the sake of recruiting a certain number of volunteers to help watching the participant. The participant, supposed their offer was rejected, would not be offered the SAT and TOEFL practice test which would be very attractive and enticing, and the average number in this final round was 55.9 RMB. The rest of the experiment under the second

scenario resembled that of the first scenario. Putting the participants in front of the public was intended to test the effect of their self-esteem on their reciprocal altruism heuristic while they were making their own decisions on how to distribute the limited amount of money. The results under this new scenario, with the same order as the first scenario, were 50, 56, 51.3, 67, and 54.9 RMB. After both procedures under the two scenarios were completed, the participants were told the principles of the experiment.

Table 1: The Amount of Money Dictator Offers in the First Scenario

PARTICIPANT	None	Positive	Negative	Positive	Negative
		Reinforcement	Reinforcement	Punishment	Punishment
A	50	60	50	60	70
B	45	53	50	55	55
C	30	40	40	50	40
D	50	70	50	60	50
E	30	15	30	50	50
F	30	45	40	60	40
G	50	55	40	55	50
H	40	40	45	70	55
I	50	60	50	80	99
J	40	60	50	60	50
MEAN	41.5	49.8	44.5	60	55.9
MODE	50	60	50	60	50

Table 1 The amount of money dictator offers in the first scenario

Table 2: The Amount of Money Dictator Offers in the second Scenario

PARTICIPANT	None	Positive	Negative	Positive	Negative
		Reinforcement	Reinforcement	Punishment	Punishment
A	55	55	50	60	35
B	50	45	48	65	45
C	60	60	50	55	60
D	50	65	50	80	50
E	30	55	45	60	50
F	55	60	50	75	50
G	55	55	60	60	55
H	50	60	50	90	99
I	45	55	50	60	55
J	50	50	60	65	50
MEAN	50	56	51.3	67	54.9
MODE	50	55	50	60	50

Table 2 The amount of money dictator offers in the second scenario

4. Findings

After recording and sorting out the valuable data which excludes data that gives the testers an impression that the participant never took this game seriously, we make the following format based on the aforementioned form which included all variables that were supposed to be tested in the experiment: Measuring the precise mean and mode of the amount of money the first participant offers gives us a direct impression on how various external interventions interfere with reciprocal altruism heuristic while allowing us to draw readily acceptable conclusions more concisely.

Hypothesis 1: As shown in both Table 1 and Table 2, the mean and mode of the amount of money being distributed under the circumstance where a positive reinforcement is imposed are both higher than those

under normal condition. This set of data clearly indicates that when a positive reinforcer takes effect on the participants, participants tend to become more generous than they are under normal circumstance by offering more money to the other. The degree of the effect, also can be seen through the chart, is also conspicuous in terms of the difference between the money being distributed under two different circumstances. In scenario 1, the difference between the average amount of money being distributed is (49.8-41.5=8.3) while the difference appears in scenario 2 is (56-50=6). Among all four reinforcements and punishments under both scenarios, an average difference of 7.15 should be apparently considered to have an implication that positive reinforcement has a relatively big effect on influencing the tendency of reciprocal altruism. Thus, Hypothesis 1 is clearly supported by the evidence.

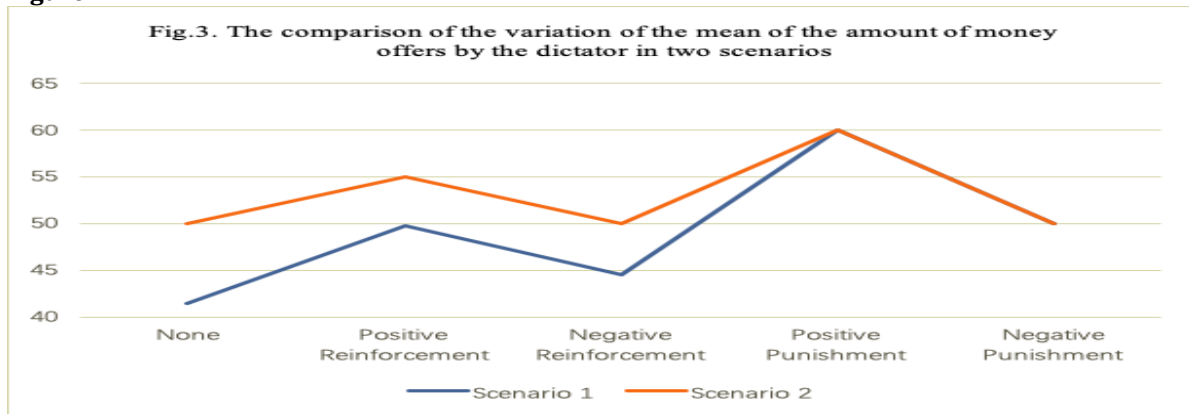
Hypothesis 2 vs. Alternative Hypothesis 2: To find out the degree of effect of positive reinforcement, negative reinforcement, and positive punishment, considers the average gap between normal conditions and conditions with each of the three external interventions being implemented effectively. As mentioned in the previous section, the average difference in the situation of a positive reinforcement takes place is 7.15. Compare with that, the same type of number appears in the negative reinforcement and positive punishment cases are 2.15 and 17.75. Obviously, based on the comparison within this particular set of data, one can easily infer that compared with positive reinforcement and positive punishment, the degree of effect of negative reinforcement is ever so slight. Therefore, the evidence clearly supports Hypothesis 2 while rebutting the alternative one.

Hypothesis 3: Our prediction regarding the third hypothesis which focuses on the relationship between positive reinforcement and punishment fails to gain conspicuous support from the evidence. It is originally predicted that the effect of positive reinforcement ought to surpass the influence of the positive punishment. But as it turns out, the result is clearly the opposite as an average difference of 17.75 is far greater than 7.15 in such an experiment. The reason why the result of this experiment immensely deviates from the original prediction is yet to be excavated, but we do propose several guesses that might be useful in explaining such unexpected phenomenon. We propose that although both Skinner and Thorndike argue against the implementation of punishment by claiming that it may lead to unpleasant responding while encouraging the avoidance of behaviors rather than rectification, these theories simply may be no longer applicable under a one-shot game where iterated responding does not exist. Thus, it is the difference between the reinforcer and the punisher that determine the reaction of the participant under such circumstances. In this experiment, the positive reinforcement is double the money while the positive punisher is double the fine, our supposition suggests that for most of the people, losing their own money is a more effective stimulus, regardless of its positiveness, than earning the money they are not afraid of losing. We thus explain the “unexpected” situation happened in this round of experiment.

Hypothesis 4: The related evidence of hypothesis 4 impresses us by providing two opposite outcomes under different scenarios. In the second scenario, the difference in the average number confirms the validity of hypothesis 4 which states that the effect of negative punishment is less than the influence of both positive reinforcement and punishment. However, as one may see in the first table, the effect of negative punishment, reflected through an average difference of 14.4, is greater than the effect of positive punishment. It may be that for high school students, SAT and TOEFL tests prove to be more intriguing, which explains the phenomenon in scenario 1, but the opposite situation within the two scenarios is still waiting for a valid and authoritative explanation.

Hypothesis 5: The idea proposed by hypothesis 5 can be readily seen through the following chart:

Figure



As shown in figure 3, the red line which represents the average money distributed in the second scenario is in most cases higher than the blue one which represents the mean of the first scenario the difference reflected through the chart resembles the idea of “pseudo-altruism.” That is, the degree of reciprocal altruism is being magnified when the participants value their self-esteem and social status when making decisions. In this case, this is conducted by letting the experiment being implemented in the lecture hall where the volunteers were watching the participants. Thus, hypothesis 5 can be proved.

Discussion of Results

The overall message being conveyed by the experiment is conspicuous. For almost all participants, adding an external intervention, regardless of its positiveness, proves to be effective in terms of motivating them to opt for reciprocal altruism even when they have already demonstrated a certain degree of reciprocal altruism heuristic. When it comes to the degree of impact, however, different types of external interventions vary between each other, a phenomenon that we have partially expected yet not fully understood. No matter in which scenario, positive punishment (60 RMB in the first scenario and 67 RMB in the second) always generates the highest tendency for people to give more money. Specifically, negative punishment (55.9 RMB), positive reinforcement (49.8 RMB), and negative reinforcement (44.5 RMB) are accordingly the second, third, and fourth place in the first scenario. In the second scenario, positive reinforcement (56 RMB), negative punishment (54.9 RMB), and negative reinforcement (51.3 RMB) are accordingly the second, third, and fourth place. However, the most noticeable deviation appears in hypothesis 3 which proposes that positive punishment is less effective than positive reinforcement.

As mentioned in the previous section, we suggest that it might be because our experiment is a one-shot game which involves no further interaction. The findings of our experiment may also have implications for other disciplines, namely psychology and management. If human behaviors can be affected through such intervention, future psychological and educational related research could develop a more advanced system of human cognitive models under external interferences. This could have a major impact in effectively rectifying people’s behaviors while promoting more socially optimal results. Our findings may also be useful in the field of management since it sort of provides a deeper thinking regarding the theory of effective wage which prompts the employer to pay his/her employees more than the market price. In such cases, it is the wages that play the role of positive reinforcer which propel the employees to work harder as if they are repaying the debt of gratitude. Such explanation may be useful in future development of the science of management.

5. Conclusion and Recommendations

The degree of the “reciprocal altruism heuristic” can indeed vary under various external interventions, and the so-called “pseudo-altruism” is proven to be really existed when the same participant shows different willingness to give away the money under two different scenarios. The study itself gives people more insights into how people sometimes make “irrational” decisions, and how they tend to alter their behaviors under different circumstances. However, the flaw of the mechanism of the experiment prompts us to reconsider the possible errors that may contain in the result. As a matter of fact, when collecting the data, we abandoned one

set of data given by a participant who insist to give out half of the money regardless of situation. We tend to believe that the appearance of this kind of data is because the participant didn't really take this game seriously, which, according to Kiyonari (2000), could affect the cooperation rate significantly. This particular incident clearly reveals several serious limitations of our experiment which need to be solved if we get the chance to do it again. For example, fixing the mechanism of the experiment is one crucial thing to do to assure that the results we obtain are accurate and usable, and rather than only select 10 participants, we can enlarge our sample size to perhaps 100 participants or replicate each condition after that person have done the first time so that the data we derive can be more accurate and capable of proving our hypothesis.

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