Research Paper Education

The Effect of General Trust on Game Decision-Making in Young Adults

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ABSTRACT

A large number of behavioral economic experiments have proved that game decision-making is affected by some irrational factors such as trust. This study used the InterpersonalTrust Scale (ITS) and trust game task to investigate 135 undergraduates' generaltrust and game decision-making, and try to explain the effect of general trust on game decision-making.

KEYWORDS General trust, Trust, Game decision-making, Strategic analysis

INTRODUCTION

Game decision-making is a form of behavioral decision which involved two or more players sharing common interests.Trust is an positive interpersonal attitude which will motivate pro-social behavior. Weber(1995)classified trust into special trust and general trust. The former is based on blood lineage or personal relationship, the latter is based on personality. Trust's development is a historical progress, individualsmake judgments of trustiness based on accumulated experiences in association with others(Chen&Ye,2009). Prisoner's dilemma, trust gameand centipede game are the paradigms often used to study trust. Among them, trust game is the best one to investigate the effect of trust on game decision. Berg's (1995) model is directly used to investigate it. The basic paradigm is: the investor have assets of X. He can choose to hold these assets or invest. If he invested W of assets and kept(X-W) of them. Then the invested part can obtain a return in (1+r)%. At last he would get (X-W) +W(1+r)%. The other player(the agent) must decide how to share the profits W(1+r)%. According to hypothesis of rational economic man, the agent should't share any with investor. But many experiments results denied this hypothesis. Half of investors chose to invest and half of the agents returned money more than the amount of investment. An increasing number of researches in economics field had proved individuals were not completely rational in game decision. And game decision was affected by irrational factors such as trust, reciprocity, equity and so on.

Behavioral economics usually used sample survey, artificial simulation test and computer imitation test.Dufwenberg(2004) used experimental method and proved altruism played an important role in the process of establishing trust. Xia(2003) who divided personal preferences into self-interesting, altruism and reciprocity believed there was no trust in the frame of completely rational and self-interesting and only the ones with high level of altruism and reciprocity were trustiness.

Crosonand Buchan (1999)used trust game to investigate and compare performances of American, Chinese, Japanese and Korean, and found females returned more money than males. Chaudhuri, Ananishand Gangadharan (2003),Jacobsen and Sadrieh(1996) found subjects cared more about how to get more profits when being investors than being agents in the study of role effect.

In spite of the fact that all these studies have proved trust could affect game decision, all of them were limited to ignore analysis of mental strategic mechanism. Why did participants decide to do so? What were they thinking during making decisions? These questions were remained. Therefore, this study was designed to reveal the mental strategic mechanisms preliminarily of the effect of trust on game decision-making.

Method

Participants

The participants were 135 undergraduates from two Universities in Sichuan Province of China.We chose 20% students of each grade with different gender, grades and majors.There were 31students of grade one,31 of grade two, 39 of grade three, 34 of grade four. Among them, 76 students were females and 59 are males. All of them were healthy, and could finish the task smoothly.

Study tool

Interpersonal Trust Scale

Rotter compiled Interpersonal Trust Scale (ITS) in 1976. This scale uses 5 ratings. From 1 point to 5 point represents from totally agree to totally disagree. The range of total points is from 25 points to 125 points, the median is 75 point. The split-half reliability is .76. The test-retest reliability with the average time interval between test and retest is seven months is .56, and the test-retest reliability with three months time interval is .68 (Wang, Wang, & Ma, 1999). The scale contains two dimensions, one is about the trust to family members, the other is about the unknown people. According to our study purpose, we only used the latter part of this scale.

The post of trust game rules

We told the rules of trust game to participants. In order to control the factor of memory, a rule poster was put up in front of them through out the entire process of experiment.

Procedures

The experiment was conducted in a bright and quiet classroom.Step 1: The experimenter read the instructionas follows:"You are playingthis game with several strangers in another classroom. He or she has the same age and gender with you. Results of this game wouldn't have any impactson your

future life. This is an investment game with two roles, investor and agent. First, you play as an investor playing this game with the stranger 1 who plays as an agent. Then, you play as an agentplaying the game withthe stranger 2 who plays as an investor. You won't know the choice of counterparts until the end of the game."

Step 2: The experimenter told participants the rules as follows, and then they read the rule poster until fully understood the rules clearly.

Playing as the investor, you have 10,000 yuan, and have two choice: A. not invest, B. invest. If you choose A.not invest, you can obtain 10,000 yuan and the agent obtain 0 yuan. Then the game is over. If you choose B. invest, then the original funds will become fourfold, that is, you have 4,0000 yuan and give all to the agent. At this point, there are two options for the agent: C. return, D. not return. If the agent choose C. return, the agent and you obtain 2,0000 yuan each. If the agent choose D. not return, you can not obtain money, but the agent obtain 4,0000 yuan.

Do you understand it ? If it isclear then we will start.

Step 3: Finish trust game.

Playing as the investor, the participants need to answer the questions on the answer sheet. Questions are as follows:

(1) As the investor, which one will you decide to choose :A. invest or B. not invest?

(2) If you choose B., you will have the right to choose the amount of investment, how much you will invest?

Playing as the agent the participants need to answer the questions as follows on the answer sheet.

(1) As the agent, which one will you decide to choose : C. return or D. not return? (2) If you choose C, you will have the right to choose the amount of return, how much will you return ?

Step 4: Ask the questions for strategic analysis.

When participants act as investors, if they choose B , then questions for strategic analysis are as follows: (1) Why did you choose B? (2) Why did you invest this amount of money to the agent?

When participants act as investors, if they choose A , then the strategic question is: Why did you choose A?

When participants act as agents, if they choose C , then the strategic questions are as follows: (1) Why did you choose C? (2) Why did you return this amount of money to the investor ?

When participants act as agents, if they choose D, then the strategic question is: Why did you choose D?

Step 5: Complete the ITS.

After finished experiment, all participants got notebooks as rewards. It had proved that there was no significant difference when virtual or material objects were as the reward in adults' game decision task (Kühberger, Schulte-Mecklenbeck, & Perner, 1999).

Scoring

(1) In trust game, when participants acting as the investor chose invest, got 1score otherwise got 0 score. The total investment amount was divided into 0-10scores. For example, investing 9,000 yuan meansget 9 scores.
(2) Strategy classification was based on the answers of questions for strategic analysis .

Result

1. The performances of general trust measure

Table 1 Participants' Scores of General Trust (N= 135)

Min	Max	M	SD
50	101	76.39	9.02

From Table 1, we knew the mean value of general trust was in the middle level.

2. The results of difference analysis of trust level of participants from different grades

Table 2 Trust Level of Participants from Different Grades

Grade One	Grade Two	Grade Three	Grade Four	F	sig
84.03	77.45	72.13	73.35	15.58***	<.001

Single factor variance analysis(ANOVA) results (showing at Table2) indicated that there was a significant difference between grades (F=15.58,p<.001). According to the standard of the power of a statistical test and the effect size of ANOVA (Hu&Dai, 2011),the effect size of participants'general trust on grades was of a big effect size ($\eta 2$=0.263),and the power of a statistical test was 1.00.The results of multiple comparison showed that students of grade one had the highest level of general trust. There was a obvious decline in grade two, but no significant difference between grade three and grade four.

3. The results of difference analysis of gender and major on general trust

Table 3 Differences of Gender and Major of General Trust

Group	n	M	SD	t	p
Male	59	73.92	8.92	2.89**	.005
Female	76	78.32	8.67		
Science	70	77.86	9.09	1.979*	.05
Liberal Art	65	74.82	8.734		

The T-test of general trust level (showing at Table 3) found that there was a significant difference between genders, and females' level was bit higher than males. And there was a significant difference between subjects of liberal arts and science.

4. The results of investment strategies classifying and comparison

According to the participants' answers of strategic questions we classified strategies of participants' investment decision into three types, showing at Table 4.

Table 4 Classification of Investment Strategies

Strategy Types	Example	Analysis
Profit-driven Type	"There will be profits and return." "I can get profits after investing." "Get more profits."	Participants based their decision on the desire of pursuit of profits.
Rational Investment Type	"To get return, you must invest." "Investment can make profits."	It's different with profit-driven type. Because they not only considered profits, but also considered no investment means no profits. Moreover, they considered there might be no return .
Risk-seeking Type	"Although there is risk, but there also is profits." "Life is too short, the few opportunities must be grasped." "Be brave." "Take a chance."	Their decisions were out of spirit of adventure. They will take a risk even they don't know wether the agent would invest.

Trust Type	"To trust is to give a chance to others, and is to give a chance to self." "I believe the agent." "I won't invest my money to someone I don't believe."	Their decisions were out of the trust to the agent.

5. The results of comparison of the number of participants on different investment strategies

We also classified the strategies of choosing not investing, showing at Table 5.The profit-driven type and the rational investment type had both 39 students; the number of trust type was 24 and risk-pursuing type was 22; and there were 11 students choosing not to invest, 5 of them did this choice-for avoiding risk and the rest were for not trusting the agent.

Table 5 Classification of not Investment Strategies

Decision Types	Examples	Analysis
Risk Aversion Type	"Investing is risky." "Need to be careful."	Participants based their decision on their desire of avoiding risk.
Distrust Type	"Don't believe the agent."	They made decision based onthe distrust to other people.
Fast and Frugal Heuristic Type	"I'm going to get 10000 yuan instead." "It's so exhausting to think. "	They hesitated to spend time and energy to think, and usually use a simple way to make decisions.

6.The results of investment strategies of low and high trust level groups.

According to the scores of ITS, the highest 27% students made up the high level of trust group, and the lowest 27% ones made up the low level group. Trust strategy was more used by participants of high level group. There were 10 participants with high trust level chose trust strategy, but no one chose this strategy in low trust level group.The investment strategies comparison results are showing at Table 6.

Table 6Investment Strategiesof Low and High trust Level groups

Trust level	Profit-driven Strategy	Trust strategy	Risk -seeking strategy	Rational investment strategy	Risk Aversion strategy	Distrust strategy
High	34.28%	31.43%	14.28%	20%	2.8%	0
Low	47.05%	0	14.7%	32.35%	2.9%	2.9%

7.The result of investment amount

The statistic results of investment amount indicated that M was 5.94, SD was 2.745. And there were 27 participants invested all money, 58 invested half amount. This result was consistent with the results of previous studies.

8.The results of the return

The statistic results of return ratio suggested that there were 88 participants returning half profits, and account for 65.185% of the total number. There were 30 participants returning less than half, 17 returning more than half, and 4 chose not to return. Most participants chose to return half profits for the consideration of fairness.

9.The results of the return strategy

According to the agents' strategic analysis,we got the return strategies classification. It was presented in Table 7.

Table 7Classification of Return Strategies

Strategy Types	Example	Analysis
Return Trust Type	"Be honest." "Build a trust relationship." "The fund came from the investor."	Choosing return was out of the trust to investor.
Reciprocal and Profit-driven Type	"We can get mutual win-win." "Have a long term cooperation and everyone can get money."	Choosing return was for further profits, and for mutual win-win.
Self-interest Type (not return)	"There is a big difference between 40,000 yuan and 20,000." "The game is only one turn,so can make a lot of profits."	Choosing not return was out of current profits. They didn't take the long-term cooperation into consideration.

Discussion

1. The level of general trust of participants

The present study found that the trust levelof college students was slightly higher than the mean level of adults. Gender and grade differences existed on the general trust.

Freshmen have the highest degree of general trust,but there was an obvious decline in grade two. The results were in line with the findings of previous studies, such as Luoet al.(2006) and Wang et al.(2010). We believed that the gender difference was related to personality differences between boys and girls. Mao's et al. (2005)study showed the degree of general trust in girls was higher than boys.What's more the mutual understanding between girls was also significantly stronger than boys. Girls prefer setting up friendship via conversation, just like chatting private messages, while boys set up friendships through sports, online games, and so on. Undergraduates of Liberal Art have a higher degree of general trust than Science ones. The reason may be there are differences in the way of learning and thinking for a long time.

2. The Investment Strategies

According to the participants' answers of strategic questions, their investment strategies were divided into six categories (showing at Table 6).The number of the profit-driven and the rational investment types were the largest. According to the Three-forces-driven Interpersonal Trust System Model(Zhang,2006), we learned trust could come into being under the drive of bounded rationality, economic profits, social identity and self-actualization conditions. Under the incomplete information situation, investors facing with the profitsattraction could not ensure the agent being abode by moral rules.Therefore, investors still may make a "to invest"decision although distrust the agents.So only 24people who chose investment because of trust could be called a really trust investor.The total number of profit-driven and rational investment types is 78, so it's easy to get most people choosing investing were driven by profits.

3.Investment amount

Current risk decision theory which combined ecological rationality with bounded rational perspective(Xiao,2003) believes when people are in uncertain conditions, they tend to make a risk aversion decision to reduce improper decisions. When the participants acted as investors,they can't predict whether the agents will return but at the same time they can realize the agents were faced with moral choice.Because in that circumstances, limited in cognitive ability,they can't predict future events. Meanwhile, they also want to realize decision-making objectives. So they often decide to have a try.In this game, investors realized more investment would get more return. However, it was possible that more return might lead to lose all money. That was why they were inclined to invest half amounts of money .

4.Return strategy

The result showed that most agents chose to return. Social Exchange Theory(Liang&Xiang,2009) suggests that the reason why people can keep exchange relationship is that they can get return. The agent choose to return may not for the trust to investor but for getting persistent cooperation. Therefore,if agents wants to get lasting cooperation with the investor, they must return.

Conclusions

The present study indicated that the trust levelof under graduates was higher slightly than the middle level. Students of grade one was significantly higher than ones of other grades, and the gender difference existed. And females were higher than males .There was a difference between liberal arts and science undergraduates. There were five investment strategies: profit-driven type, risk aversion type, rational investment type, risk-seeking type and trust type.Trust strategy was used more by participants of high trust level group. The mean value of investment amount is 5.94, and most undergraduates chose risk aversion strategy. And there were three return strategies: return trust type,reciprocal and profit-driven type, self-interest type.

REFERENCES

[1]Berg, J., Dickhaut, J., & McCabe, K. (1995). Trust, reciprocity, and social history. Games and Economic Behavior, 10(1), 122-142. | [2]Chaudhuri, A., Ananish, &Gangadharan, L. (2003) Sending Money in the Trust Game: Trust or Other Regarding Preferences. Working Paper, Department of Economics, University of Auckland, Auckland, New Zealand. | [3]Chen, J.(2008). A Study on Development and Psychological Mechanism of Static Game Decision-Making in Children (Doctor's thesis, Southwest University, China). | [4]Chen, X., & Ye, H.(2009). About the Research on Trust in the Perspective of Behavioral Game Theory. Psychological Science (In Chinese),32(3), 636-639. | [5] Croson, R., & Buchan, N. (1999). Gender and culture: International experimental evidence from trust games. American Economic Review, 89, 386-391. | [6]Dufwenberg, M., & Kirchsteiger, G. (2004). A theory of sequential reciprocity. Games and Economic Behavior, 47(2), 268-298. | [7]Hu, Z., & Dai, H. (2011). The Comparison for Assessing Methods of the Effect Size and Statistical Power of ANOVA.Psychological Exploration (In Chinese), 31(3), 254-259. | [8]Jacobsen, E., & Sadrieh, A. (1996). Experimental proof for the motivational importance of reciprocity (No. 386). University of Bonn, Germany. | [9]Kühberger, A., Schulte-Mecklenbeck, M., & Perner, J. (1999). The effects of framing, reflection, probability, and payoff on risk preference in choice tasks. Organizational behavior and human decision processes, 78(3), 204-231. | [10]Liang, Y., & Xiang, J. (2009). The Review of the Origin of Thought Current Social Exchange Theory. The South of China Today, 5, 127. | [11]Luo, R.,Zhou, Q.,&Xl, H. (2006). Investigation on interpersonal trust among college students in Guangzhou.Chinese Journal of School Doctor,20(4), 364-366. | [12]Mao, X., Ji, H., & Zhang, J. (2005). Dormitory interpersonal Relationship of College Students . Chinese Mental Health Journal, 19(7), 473-475. | [13]Wang, X.,Wang, X.,&Ma, H.(1999). Mental Health Assessment Scale.Chinese Mental Health Journal, (supplementary issue) :180 - 182. | [14]Wang, X., & Zhao, B. (2010). The Current Status of College Students'Interpersonal Confidence and Personality Characteristics and Their Relationship. Journal of Huangshan University (In Chinese), (8),121-124 . | [15]Weber, M. (1995). Confucianism and Taoism. The Commercial Press. | [16]Xiao, R. (2003). Risky Decision Under Uncertainty Condition. Nankai Economic Studies (In Chinese), (1), 34-37. | [17]Zhang, H.(2006).Three-forces-driven Inter- personal Trust System. Journal of Xian Jiaotong University: Social Sciences (In Chinese),26(3), 29-33. |