Trust and Investment Game between Different Types of Education
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Abstract. This paper systematically analyzes the identity and trust among different class groups through the virtual questionnaire of the small investment game with the penalty mechanism introduced on the basis of the trust investment game. We analyze public school's students and private international school's students to represent two class groups in society. The basic survey results show that both groups have a tendency to choose sample of private international schools as trusted partners; this is most likely the result of the social identification with different classes. Under the same conditions of return on investment, these two groups have different trust decisions. This may be due to the different expectations of different groups for the return of others. There is little difference between groups in punishment decisions.

Keywords: Investment Game; Experiment Social Preferences; Social Trust.

1. Introduction

Trust is the most important component of social capital which was found improving economic growth. (Knack and Keefer,1997)

Income inequality in today's Chinese society is increasing, while inequality of opportunity is increasing even faster. (It can cite the Gini index of responses and OECD website statistics.) If opportunity is not equal, it means solidifying at the grassroots level. The lack of mobility among classes will lead to deeper hostility and distrust between classes, which will lead to the decline of the trust level of the whole society. However, this would have a huge impact on long-term economic growth. So how serious is class distrust in China right now? There is no direct empirical evidence exists on this question. In this paper, a 2* 3 trust game experiment structure is designed. We looked at how much trust between classes differed from within classes by introducing Truster and Trustee classes of two types of status -- students from exclusive international schools and regular state schools.

2. Review of Related Literature

The hypothesis of "economic man" in neoclassical economics holds that when a person is faced with a choice involving economic reward, his behavior is primarily Self-Regarding. Therefore, at the beginning, economists tend to interpret trust between people as a Positive Reciprocity -- reciprocating the kindness and generosity of the other party with friendly and generous help. We call this kind of intrinsic motivation Conditional Reciprocity, it is based on the identity and behavior of the other party, rooted in the depths of human emotion, this kind of reciprocity has evolved for thousands of years in human history. However, this kind of reciprocal behavior can only play its role under the condition that the reputation effect exists in the long-term cooperation. The trust game proves that trust between people cannot be completely explained by positive reciprocity. There's a lot of experimental evidence that trust between people is influenced by a lot of other preferences. Preferences that affect trust can be divided into two categories according to whether they involve social risks: Social Preference and Non-social Preference. Among them, Social Preference can also be divided into Positive Social Preference promoting cooperation (such as Other-Regarding Preference) and Negative Social preferences that discourage cooperation (such as Betrayal Aversion).

Firstly, Positive Social Preference: Other-Regarding Preference. The positive reciprocity emphasized by mainstream economists is often different from Other-Regarding Preference: the former is conditional goodwill; the latter is unconditional goodwill. As defined by Cox, Other-
Regarding Preference refers to an individual's preference for considering the material interests of others as well as his own. [2] As shown by the Dictator Game of Hoffman et al., there is a widespread preference for considering the interests of others. [3] Altruism is one of the altruism explanations of the motivations behind Other-Regarding Preference, there are different explanations for the motivations behind Other-Regarding Preference, Andreoni and Miller [4] and Cox et al. [5] think it is caused by altruistic preference; However, Fehr and Schmidt [6] and Bolton and Ockenfels [7] believe that inequality avoidance plays a role. Charness and Rabin [8] interpret the Other-Regarding Preference [9] as the consideration of individual's Pareto optimality for social welfare maximization, and some scholars believe that it is based on the consideration of efficiency.

The experimental results of Smith [10] and Cox [11] show that altruistic preference plays an important role in trust behavior. Among them, Cox designs a three-in-one experiment, namely the standard BDM game, the three-fold value-added dictator game and the modified dictator experiment. The three-fold value-added dictator experiment designed by Cox can measure the altruistic preferences of the principal while keeping the variable parameters unchanged. The experimental results show that the subjects' trustrank and trustworthiness are significantly affected by altruistic preference. Cox's experiment is "Between Subjects Design", on the basis of which Ashraf et al. designs "Within Subjects Design" [12] and obtains the same results. Data from different sample subjects in different countries, such as Holm and Danielson's experiment in Switzerland [13] and Johansson Stenman et al. [14] in Bangladesh, show that Other-Regarding Preference affect trust between people in addition to reciprocity preferences. Moreover, whether the principal has been appointed an agent will significantly affect his trust behavior even if there is no significant change in the principal's expectation of the agent's behavior and the final income obtained.[15] When faced with a hypothetical question, only 38% of the participants are willing to choose trust, while when the participants has already played the trust game, 56% of the participants choose trust.[16] The results of these experiments all demonstrate that engaging in Other-Regarding Preference positively increases a client's trust investment. Participants who are more generous in the dictator game also have higher trustworthiness when playing the role of agent, which further indicates that altruistic preference can predict the return behavior of agent.

Secondly, Negative Social Preference: Betrayal Aversion. Such a concern for the well-being of others and the consideration of their own interests raises another difficult question: how does the act of trust deal with betrayal and cheating -- the free-riding of trust. From the perspective of biological evolution, it is believed that human beings have developed a self-protection mechanism to cope with being betrayed by others over millions of years, and that is Betrayal Aversion -- refusing to be in a situation where others might betray them. The concept of Betrayal Aversion is first proposed by Bohnet and Zeckhauser in a multi-country study. [17] [18] In Bohnet's experiment, a MAP of the lowest acceptable probability is designed to measure the difference of people's willingness to Trust each other or the computer in Risky Dictator Game and Trust Game respectively. The experimental results show that compared with trusting the computer, people need a higher probability of getting the return before they are willing to trust the other party. Therefore, it is found that people may generally have Betrayal Aversion. Bohnet believes that if people choose to trust and suffer losses in the trust game, they will have a very strong feeling of being betrayed. The negative emotion brought by this feeling is very uncomfortable, and the huge disutility brought by this feeling needs to be compensated by a higher probability of return expectation. Aimone and Houser [19] further verified the existence of Betrayal Aversion from the perspective of agents in a follow-up experiment and discussed the effect of Betrayal Aversion on cooperation. 18 Aimone and Houser also use a standard binary trust game as a control in which there is no Betrayal Aversion in an experiment where the agent knows that his decision will not affect the principal's final payoff, which is randomly determined by the computer based on the payoff ratio of all the agents' choices. The experimental results show that the agent has higher trustworthiness when the other party has Betrayal Aversion. On the one hand, the existence of Betrayal Aversion improves the client's MAP, thus hindering the emergence of cooperation. On the other hand, due to the existence of Betrayal Aversion, the agent's
return amount is increased, and the cooperation is promoted. According to the experimental results, the facilitation effect is greater than the hindrance effect, so that in the presence of Betrayal Aversion, people's behavior will show a higher level of cooperation.

In addition to the above preferences related to people's sociality, economists have also tested whether other non-social preferences, especially risk preference, have a significant impact on trust behavior. At the beginning of its design, the Trust Game is considered by some researchers to be a kind of risk Investment Game in nature, so it is often called "Investment Game". [20] Trust and risk are ostensibly investments that people make in the face of Uncertainty. The difference between the two is that the former is faced with unknown uncertainty that others may make different choices, while the latter is faced with natural uncertainty with a certain fixed probability. Many scholars have tried to find some correlation between individual trust behavior and risky decision-making behavior. Among them, Eckel and Wilson's experiment finds that the results of each risk attitude scale cannot predict the trust investment behavior of the subjects in the trust game. [21] Houser et al. conduct a comparative analysis of subjects' trust behaviors in front of computers and in front of others. [22] They find that when people face computers, their decisions are significantly correlated with their risk attitude test results. However, when faced with live people, there is no significant correlation between their decision-making and the test results of risk attitude. Therefore, Houser believes that there is a significant difference between trust behavior and risky decision-making behavior. If trust is a risky decision, then the necessary condition for this assertion is that trust should be like risky decision, and the investor's behavior must change with the change of investment rate of return. However, the research of Fetchenhauer and Dunning finds that the trust amount of the principal in the game does not change significantly when the possibility of the agent's return is changed. This shows that trust behavior is not completely equivalent to people's risky decision-making behavior. Researchers' attempts to find the connection between trust and risk are essentially still based on the hypothesis of "economic man", which is a kind of inertial thinking, and they try to explain this behavior from the material benefits of trust. However, a large number of trust game results show that the average return of trust behavior is zero, and trust behavior will not change with the change of the rate of return in the experimental design, which indicates that trust and risk are not the same thing.

In addition to the existing literature, this paper studies the differences between inter-class trust and intra-class trust through students from international schools and public schools.

3. Experimental Design and Research Hypothesis of Virtual Investment Game

3.1 Experimental Design

In this study, questionnaire survey is used. There are 100 participants in the experiment, and they play the role of investors. The main subgroups in our questionnaire design are private international school students and public general school status.

The experiment is divided into four groups: AN (international school - no status), AA (international school - international school), AB (international school - public school), BN (public school - no status), BA (public school - international school), BB (public school - public school)

The methods to send the questionnaire: Three types of questionnaires (-N, -A and -B) are randomly distributed. -N is the investor revealed; -A: the inveree is a student of a private international school; -B is the inveree who is a student of a public domestic school, as shown in Table 1 below:

The questionnaire is presented with a small game consisting of an investment game. First, suppose the investor gets $m of capital. Then, the investor needs to choose to invest a sum S (0≤S≤10) of no more than 10 yuan to the hypothetical invessee. Once the invessee gets that investment, the amount of money will become 3 times the amount of money invested, that is 3S. Finally, the investor assumes that the invessee returns a sum of money to the investor. The amount of money returned by the invessee to the investor (0≤R≤10) can be any proportion of 3 times the amount of money invested, either in full or not at all. Depending on the return of the presumed investor, the Investor may choose
to punish or not punish the investee. The penalty mechanism is that the investee can lose 3 yuan for every 1 yuan paid by the investor. After that, the experiment is over. In this case, the final game reward of the investor is m-S+R, and the final game reward of the investee is 3S-R. The investment game tree is shown in Figure 1 below:

**Table 1.** Questionnaire distribution structure

<table>
<thead>
<tr>
<th>Questionnaire for Private International Schools (A)</th>
<th>Questionnaire for General Public Schools (B)</th>
<th>No Specific Group Questionnaire (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private international school (A)</td>
<td>AA</td>
<td>AB</td>
</tr>
<tr>
<td>General public school (B)</td>
<td>AB</td>
<td>BB</td>
</tr>
<tr>
<td>Private international school (A)</td>
<td>AN</td>
<td>BN</td>
</tr>
</tbody>
</table>

![Fig 1. Experimental Game Tree](image)

For example, if the investor invests 8 yuan, the investee will get 24 yuan. Suppose the investee chooses to return 1 yuan. The final reward of the investor is 3 yuan, and the final reward of the investee is 23 yuan. Under the assumption of economically rational man, it can be seen from the third step of the experiment that the optimal strategy of the investee is not to return, so the optimal strategy of the investor is not to invest, and the optimal strategy of the whole experimental decision tree is not to invest.

In the design of the questionnaire, the survey samples are grouped according to their private international school and general public-school status. The main decision problem is which investor would prefer to be the investee among several identities and how much money the investor is willing to invest under the preceding selection conditions.

Through these two questions, this paper studies whether private schools and public schools are more likely to choose this type of school as a trusted partner. In addition, the question "If you invest 5 yuan to the investee and he returns 0 yuan to you, you are allowed to punish him with 1 yuan of your own money, making him lose 3 times of the money" is included in the questionnaire to explore whether private international schools and ordinary public schools have different punishment decisions. Through these three decision questions, we can empirically analyze the similarities and differences of trust decision and punishment decision between private schools and public schools. The two questions in the questionnaire, "How much money do you guess the investee in your group will return to you at least" and "how much do you guess the investee in your group will return to you at most", are subjective predictions and also the explained variables in our study. The educational background and years of education of the sample are explanatory variables, for which corresponding questions should be added into the questionnaire. The gender, age, occupation and education level of the survey samples are all control variables of this experiment.

### 3.2 Composition of Sample

To study the influence degree of interpersonal trust between different kinds of school groups and education and culture on interpersonal trust, a total of 112 participants are selected in this paper,
among which 100 valid survey samples are selected, including 68 from ordinary public schools and 32 from private international schools. Among them, 43 are male and 57 are female. Due to politics, regional characteristics and other uncontrollable factors, the number of questionnaires collected is limited.

3.3 Research Hypothesis

Although different class groups tend to favor other class groups, they differ in their internal group identity. The unique education, culture and life experience of a class group may deepen the group's sense of identity. This sense of identity leads to the difference between this class group and other groups in their subjective understanding of the outside world, including investment preference and interpersonal trust. Therefore, this paper aims to investigate whether different school groups affect interpersonal trust through a small investment game. If school type is an important factor affecting interpersonal trust, students in private international schools and students in public regular schools are more likely to choose their own group as a partner in the virtual investment experiment. Accordingly, punishment decisions may vary depending on whether the partners are in the same group or not.

Therefore, we propose the following three hypotheses:

Hypothesis 1: Both private international schools and public schools are more likely to choose this group of people as trusted partners.

Hypotheses 2: Private international schools differ from public schools in trusting and punishing decisions.

Hypotheses 3: The difference in trust decisions between private international schools and ordinary public schools may be due to their different expectations of return to others.

4. Experimental Result

The sample of this survey is from college, middle school students. The sample includes different genders, age groups, and life backgrounds. The survey is completed in late September 2022. The values and meanings of data variables are shown in the following table.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Variable declaration</th>
<th>Variable assignment and its meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of investee</td>
<td>If you are an investor, who do you prefer to choose as the investee</td>
<td>0= different group, same group =1</td>
</tr>
<tr>
<td>Investment amounts</td>
<td>If you are an investor, how much will you choose to invest (Please fill in the number between 0 and 10, also can be 0 or 10)</td>
<td>0-10, the higher the number, the more trust the investor has on investee.</td>
</tr>
<tr>
<td>Punishment decision</td>
<td>If you invest 5 yuan to the investee, he returns 0 yuan to you. You are allowed to punish him with 1 yuan of your own money, causing him to lose three times the amount of money. Do you want to punish him? How much do you choose to spend?</td>
<td>From 0 to 5, the higher the number, the more the investor appreciates being betrayed</td>
</tr>
<tr>
<td>The minimum amount of money returned</td>
<td>How much money do you think the investees in your group will at least return to you?</td>
<td>0-10 yuan, the subjective prediction of investors reflects the trust between ethnic groups</td>
</tr>
<tr>
<td>The highest amount of money returned</td>
<td>How much money do you think the investees in your group will at most return to you?</td>
<td>0-10 yuan, the subjective prediction of investors reflects the trust between different educated group.</td>
</tr>
<tr>
<td>Gender</td>
<td>Your gender</td>
<td>1= male, 2= female</td>
</tr>
<tr>
<td>Age</td>
<td>Your age</td>
<td>1= after 60, 2= after 70, 3= after 80, 4= after 90, 5= after 00</td>
</tr>
</tbody>
</table>
"If you are an investor, who do you prefer to choose as an investee?" In this decision-making problem, that is, the variable "selection of investee", 0 and 1 respectively represent that investors choose different groups of people as investee and people from different groups as trust partners. The statistical results show that the mean is 0.745 and the standard deviation is 0.380. Among the original 100 samples participating in the questionnaire survey, individual choice is indifferent, people are willing to choose private international schools as partners, and 3 people are willing to choose ordinary public schools. In the variable of "punishment decision", namely, question 3 in Table 2 (for every cost of 1 yuan paid by the investor, the investee loses 3 yuan), the largest proportion is paying 1 yuan, 5 yuan and 2 yuan. After processing the data of this problem, the mean value is 2.260 yuan and the standard deviation is 1.332. The amount of money spent by Uighurs to punish investee for this decision is relatively high. The degree to which factors such as age, years of education and type of school affect interpersonal trust is measured by a five-star scale with a minimum value of 1 and a maximum value of 5. The mean and standard deviation of the index data of school type affecting trust are 2.628 and 1.042, respectively. The average value and standard deviation of the index data of education years affecting group trust were 2.775 and 1.103, respectively. The decision data of the private international school group and the public general school group in the survey sample on these variables are not different. The variable amount of investment, which is the question "how much would you choose to invest if you were an investor", has an average of 5.051. The two core dependent variables, the minimum return and the maximum return, are not analyzed descriptively in the data processing software.
Table 3. Descriptive statistics

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selection of investee</td>
<td>100</td>
<td>0.745</td>
<td>0.380</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Investment amount</td>
<td>100</td>
<td>5.051</td>
<td>1.677</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Penalty decision</td>
<td>100</td>
<td>2.260</td>
<td>1.332</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Influence of age</td>
<td>100</td>
<td>2.657</td>
<td>1.131</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Gender</td>
<td>100</td>
<td>1.525</td>
<td>0.501</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Age</td>
<td>100</td>
<td>4.367</td>
<td>0.731</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Occupation</td>
<td>100</td>
<td>2.674</td>
<td>0.611</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Years of education</td>
<td>100</td>
<td>2.775</td>
<td>1.103</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>School type</td>
<td>100</td>
<td>2.628</td>
<td>1.042</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>International or domestic education</td>
<td>100</td>
<td>2.778</td>
<td>1.022</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Level of education</td>
<td>100</td>
<td>4.891</td>
<td>1.07</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Going abroad</td>
<td>100</td>
<td>1.636</td>
<td>0.489</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

4.1 Statistical Analysis

Fig 2. The Proportion of Private International Schools and General Public Schools Choosing the Same group as Their Trusted Partner

Fig 3. Average Investment Decisions of Private International Schools and Pubic General Schools Choosing the Same Group
Fig 4. Average Investment Decisions of Private International Schools and Public General Schools Choosing the different Group

In Figure 2, in the trust investment game experiment, the proportion of private international schools choosing the same group of investors is 64%, which is significantly higher than the proportion of public schools (7%). The average investment of 5.3 for the same group of investment returns in Figure 3 is also higher than the average investment of public schools (5.55).

We believe that this may be the result of social recognition of the international private school community. In 2021, according to the research data of the new theory, the average tuition fees of international schools in the four first-tier cities of Beijing, Shanghai, Guangzhou and Shenzhen were 175,000 yuan/year, 158,200 yuan/year, 146,000 yuan/year and 138,000 yuan/year, respectively. While in 2021, China's per capita disposable income was just 24,100 yuan. To bear the high tuition proves a family's economic level, which also means the recognition of the family's ability and credibility. Since the reform and opening up, the gap between rich and poor of our country has been gradually expanding with the rapid economic development and continuous improvement of people's living standard. Income inequality exists between urban and rural areas, between urban residents and between industries, which is still growing. The private international school group with higher income level is also more tolerant to risk, so the whole society is more inclined to invest in this group.

Fig 5. Mean difference of punishment decision between private international schools and General Public Schools

Fig 6. Mean values of punishment decisions of for different groups selected by private international schools and general public schools
From Figure 5 and Figure 6 above, we can see that the punishment decision of the group of private international schools in the same group of the survey sample is 2, which is lower than 2.6 of the population. For different groups, it is 2 for private international schools and 2.6 for regular public schools. It can be seen that both groups punish the private international school group the most. This may be due to higher levels of trust in private international schools, leading to higher penalties for betrayal by investee. It also suggests that society is less tolerant of mistakes by the rich than by other classes.

Fig 7. Average value of money return decisions for the same group of private international schools and public general schools

In Figure 7, for the same group prediction, the sample group of private international schools guesses that the average of the lowest amount of money returned by investee is 5.45, while the sample of public general schools subjectively predicts that the average of the lowest amount of money returned by investee is 5.09. The sample of private international schools predicts the highest amount of money returned by investee, with an average of 8.36, compared with 6.57 for public schools. In Figure 8, for different groups, the sample group of private international schools guesses that the average of the lowest amount of money returned by investee is 4.57, and the sample of public general schools subjectively predicts that the average of the lowest amount of money returned by investee is 4.36. The sample of private international schools predicts the highest amount of money returned by investee, with an average of 6.0, compared with 5.65 for regular public schools. The private international school group has a higher degree of trust in people in the same group as themselves, and is more inclined to choose people in their own group as investee in the investment trust game experiment out of trust, and it is predicted that the trust partner will return more money. However, public general schools’ students do not have this tendency, and they are more biased towards the
investee of international schools. In the investment, the investment amount of both groups is less than that of private international school investors, and they are more sensitive to the risks in investment and financing. This may have something to do with the education culture and more cautious character of the public general schools.

5. Conclusion and Policy Recommendations

Through experiments and questionnaires, this paper systematically analyzes the identity and trust of different classes of education groups. The analysis results show that both private international school groups and public general schools’ groups have a preference and some differences for private international schools. The two groups make roughly the same trust decisions when faced with a uniform situation. In the face of betrayal by investors in the group, the punishment decisions of the two groups are different. While this difference does come from the difference in the expectation of return between the two peoples. Due to some reasons, the number of samples participating in the survey is not large, which may affect the accuracy and robustness of the experimental results. Why different class groups are more likely to choose the same group as a trusted partner needs further study in the future. Are class and stereotypes important factors in investment decisions and punishment decisions? This problem also needs to be further explored in the future. Over the past three decades of reform and opening up, China has made remarkable achievements in its socialist modernization drive. With the in-depth exploration of socialist material and spiritual civilization, various social resources have also prospered. The unequal distribution of power, wealth and prestige in the society makes the social group divided into different levels. Social stratification is an objective existence and a necessary condition for the normal operation of society. The analysis and research of each stratum in the objective existence and development is of great importance and practical significance to ease the stratum contradiction, find the way to coordinate the interests of each stratum of society, and to the stability and harmonious development of society.

References


