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Can Trust Be Induced in High Schools?

Empirical study using the trust game

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Abstract:

This paper investigates the link between pedagogic structure on the high-school level and levels of trust and trustworthiness. This is done through conducting a field experiment where individuals from two different schools play the trust game. One school has a global profile, focusing on group work and global welfare, whereas the other is more traditional. No significant difference between the schools could be observed. However, previous research suggests that stake size and other factors could affect player behavior. Further research is required to deduce whether a change in pedagogic focus can increase trust, trustworthiness, social capital and eventually economic welfare.

Key words: trust game; altruism; pedagogy, reciprocity, trust

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"We're never so vulnerable than when we trust someone
– but paradoxically, if we cannot trust, neither can we find love or joy"

- Walter Anderson

Introduction:

Ever since Adam Smith published *Of the Wealth of Nations,* economic theory has been dominated by the concept of the economic man, a rational egoist who always seeks to maximize his own utility, usually defined as material well-being. However, it has, over time, become increasingly apparent that a large part of human behavior cannot be explained by material incentives alone. Instead, people often act in an altruistic manner, giving up resources in order to increase the utility of others. While some of this (such as helping neighbors to move) can, at least partly, be explained by a clever calculation of reciprocal behavior which will generate future benefits, even an extended form of rational egoism fails to explain all charitable actions (Andreoni 2004). More specifically, there is evidence of both trusting behavior, which may be based on expectations on reciprocity, as well as trustworthy behavior which actually does reciprocate trust.

A subject of hot debate is why people engage in altruistic behavior. On the specific issue of trust, considerable research has been dedicated to the motivating factors behind trust and trustworthiness, with reciprocity, expectations thereof, kindness and a desire for social esteem all being advanced as such factors (Chaudhuri&Ganadharan 2003).

This paper, however, takes a largely different approach. It aims, instead, to investigate the causes of trusting and trustworthy behavior, since those phenomena are somewhat more tangible than the elusive concept of altruism. This paper will, within the broader field of altruism, focus on the causes of this behavior rather than the specific nature of these traits, since an overwhelming body of academic theory and empirical research indicates that society benefits extensively from it, regardless of underlying motives (Chaudhuri&Ganadharan 2003). In particular, it will therefore be explored whether educational differences can incite different attitudes towards trust. Can different institutions on the high-school level change the propensity to act in a trusting and trustworthy manner or is it ruled by other factors? For this purpose we will study two schools with different pedagogic structures and see whether they display any significant differences in behavior when playing a modified version of the classic trust game.

Review of Related Literature:

Trust and Altruism

Several different terms are juggled about in the literature on altruism. We will therefore start off by reviewing a number of articles discussing the concepts of trust, trustworthiness, altruism and social capital, starting at the fundamentals of the concept of altruism. Andreoni's 1990 paper *Impure Altruism and Donations to Public Goods: a Theory of Warm-Glow Giving* established a model of impure altruism where the utility of the individual depends on private consumption, x_i, donation to the public good, g_i, and the total amount of all donations to the public good, G. It is assumed that the individual has wealth, w_i, which can be divided between x_i and g_i. Andreoni points out that a pure altruist would not care about g_i wheras an egoist would care only about x_i. He then goes on to show that under a model of impure altruism it will be more optimizing for a government to encourage contributions to public goods by subsidizing them then by taxing people and funding the public good directly. He also shows that donations to the public good will not be independent of income distribution, as long as one assumes that altruism is not evenly spread across all individuals. Andreoni also displays data and empirical studies showing that the traditional model of pure altruism does not fit with observed reality and that altruism varies with income in different ways across income groups, with higher income brackets showing a positive correlation between income and altruism while intermediary ones show a clear negative correlation. This indicates that donations to the public good can be increased by selective taxation policies taxing the middle-class more and high-income earners less (Andreoni 1990).

In their 2007 paper, *Altruism in Experiments*, Andreoni, Harbaugh & Vesterlund review a large number of experiments linked to altruism. The findings are varied, but what emerges is that there is solid evidence for altruism existing, even though it is partly influenced by warm-glow and confusion. They also cite Thomas Nagel as defining altruism as "By altruism I mean not abject self-sacrifice, but merely a willingness to act in consideration of other persons, without the need of ulterior motives." Since Andreoni, Harbaugh & Vesterlund define warm-glow as an ulterior motive they move on to see what experimental research has shown on the prevalence of warm-glow as a factor in altruistic behavior. One of the problems in researching altruistic behavior is that we can only research it negatively, that is, observe a lack of altruism. It thus plays the role of a factor capturing that part of behavior we cannot explain by something else. Research on prisoners' dilemma games comparing games allowing for reputation-building with games where partners are constantly changed has shown

that around 20% of people are altruistic. When looking at linear public goods games there is again evidence of altruism although the authors finds that about half can be attributed to confusion (people acting irrationally) rather than a conscious willingness to give. Further research has failed to establish whether it is warm-glow or genuine altruism which is the main explanatory factor behind this giving. The authors also find that the crowding-out effect is 85%, which is significantly different both from the 100% predicted by pure altruism and the 0% expected under warm-glow altruism. In dictator games where one party divides an endowment freely and the other party must accept 25% is on average shared. There is some evidence that sharing falls once the dictator is made anonymous even to the researcher but this issue is not clearly settled. Other research has shown that most people are rational altruists but indicate large differences across gender and individuals. Research on gift-exchange games indicate that around half of the giving in these games are motivated by altruism (with the rest being reciprocity) (Andreoni, Harbaugh & Vesterlund 2007).

Thus, it appears that there is solid evidence for altruism existing, although it is subject to certain constraints and its exact nature is still not clearly understood. Despite this, it is evident that altruism interacts to some extent with trust and trustworthiness.

So why is it important to study trust? To quote Chaudhuri and Gangadharan, “recent research suggests that ‘social capital’ as embodied in the tendencies to ‘trust’ and to ‘reciprocate’ trust influence a wide range of economic phenomena and activities.”(Chaudhuri&Ganadharan 2003 p3). Several empirical studies comparing different countries have established correlations between indicators such as corruption, judicial efficiency and general economic performance on the one hand and trust on the other (see for instance Knack and Keefer 1997; La Porta, et al. 1997). On the other hand, Johnson and Mislin find in their meta-study that there is no significant correlation between social capital and trust whereas there is significant correlation between trustworthiness and social capital (Johnson and Mislin 2008). This is in line with Hardin, who argues that what matters to society and individuals in most cases is not trust, but rather trustworthiness and that definitional confusion is to blame for trust being so often cited as the more important factor (Hardin 2001). Likewise, Glaeser et al. claim to have shown that attitudes towards trust as measured in surveys actually predict trustworthiness (Glaeser et al. 2000). Finally, Gintis and Khurana advance the notion that trust and trustworthiness are essential for functioning companies and markets and that these values rely on an instutional framework of a common culture in order to flourish (Gintis&Khurana 2007).

The Trust Game and what it Measures

So, how does the trust game[1] relate to these issues and in particular to the concepts of trust and trustworthiness? The game itself has received a lot of attention after being brought to fame by Berg, Dickhaut and McCabe and many subsequent papers have used the trust game to test their hypotheses (Berg, Dickhaut & McCabe 1995).

The basic setup of the game is that player A gets an endowment and sends an amount X which can be a share between 0% and 100% to player B. The experimenter triples the amount before B receives and B can then send back any share between 0% and 100% of the amount received[2]. The trust game thus measures two factors: trust and trustworthiness. Sending money in the first stage of the game is normally assumed to indicate trust in the other party to return at least some of it, whereas sending back in the second stage of the game indicates this trust being rewarded, i.e. trustworthiness of the receiver (Etang, Fielding & Knowles 2007).

Considerable research has been devoted to establishing what factors explain trust and trustworthiness and which is more important for society. Although the specific features of the game itself will be discussed in detail further on, it is of interest to note the on-going debate on what behavior the trust game actually captures and how the results are affected by various contextual factors. For instance, Chaudhuri and Gangadharan side with Gneezy et al. in arguing that trust-like behavior depends largely on trust and reciprocity and not, as Cox has argued, on altruism (Chaudhuri&Gangadharan 2003; Cox 2004; Gneezy 2000). This is further corroborated by Brülhart and Usunier who use an experiment with within-subject treatments and find that trust is the dominant factor behind trust-like decisions. (Brülhart & Usunier 2010). If we are to believe Ashraf, Bohnet and Piankov this may be because different people have different motivating forces varying both across individuals, countries and gender (Ashraf, Bohnet & Piankov 2003)

Johnson and Mislin, drawing on studies by Cox and Ashraf, Bohnet and Piankov, argue that, while trust is largely motivated by expectations of reciprocity, trustworthiness is largely motivated by kindness, or altruism (Ashraf, Bohnet & Piankov 2006; Cox 2004; Johnson & Mislin 2008). In connection with this, it is highly interesting to note the findings by Chaudhuri and Gangadharan that while trustworthiness implies trust, the reverse is not true (Chaudhuri & Gangadharan 2003). It would seem,

[1] Sometimes also called “The Investment Game”

[2] A more detailed description of the trust game follows further down under “Method”

then, that trusting behavior is contingent on individual expectations on reciprocity, risk-preferences, etc whereas trustworthiness is more closely linked to the type of institutions that society can choose between. For a society making policy choices it would seem that efforts to induce trustworthiness in order to in turn inspire trust would the best course of action. This is also in line with the findings of Goldin and Katz (Goldin & Katz 1999), that Lutheran religion correlates with trust on the community level, and the contrasting findings by Glaeser et al., that it does not on the individual level, again indicating that trust is simply a response based on expectations that varies in a more random fashion between individuals, while trustworthiness is more dependent on institutional factors (Glaeser et al. 2000). This is also what Bohnet & Huck find, running an experiment on the effect of exposure to institutional environments on trust and trustworthiness. They write: "the more trustworthiness subjects have recently experienced, the more willing they are to trust" whereas, on the contrary, "trust does not breed trustworthiness."(Bohnet & Huck 2003). This is similar to Glaeser et al. who observe that trust is predicted by previous experiences of others being trustworthy (Glaeser et al, 2000). Bohnet and Huck also find that the institutional framework has stronger effects on trustworthiness than on trust. Finally, they conclude that these findings "might have important implications for issues in institutional design and education" and, more specifically, that interactions in small groups can play a role in fostering trust and trustworthiness (Bohnet & Huck 2003).

Based on this, it seems that one could argue that the education system may play a role in fostering trustworthiness which in turn increases both trust and social capital within society as a whole, in order to increase the overall welfare of society (leaving aside for the moment the possibility of trust and trustworthiness being morally preferable qualities in and of themselves).

There has also been substantive debate on wherefrom trust originates. A paper by Cesarini et al. where pairs of identical twins are studied shows that 10-20% of behavior in the trust game is determined by genetic factors but that the rest is due to environmental factors. While the authors argue that these traits are to an extent, then, hereditary, the conclusion remains that environmental factors dominate as explanatory variables (Cesarini et al. 2007). This would confirm the validity in studying educational effects on trust and trustworthiness since education constitutes an important environmental factor in a child's upbringing. Yamagishi claims that "higher education makes students of elite colleges high trusters" (Yamagishi 2001, p130), that is, not only do those attending better universities trust more, this higher level of trust is a result of attending those better universities. Yamagishi suggests that this link between success and trust may be caused by those who are more

trusting being more willing to engage in social interaction and through these interactions reaching a higher level of social intelligence, thus becoming better at dealing with social situations (Yamagishi 2001).

Relevant Field Studies

So what does the trust game measure, exactly? It has been shown that small variability in the setting of the game can change the actions of the players. This has led economists to try out the game with different settings trying to learn about how changing conditions affect the choices of players. Some of the results from previously performed games are of interest to this paper and will be summarized below.

Playing both roles in the trust game (Burks, Carpenter & Verhoogen 2003) shows that people does not behave the same way when they know that they will play both roles. The results show that people tend to give less than otherwise when they play both roles. It is thought to be a consequence of the fact that each action taken by a player now has less impact on the counterpart. Burks, Carpenter and Verhoogen call it the *reduced responsibility* hypothesis.

In the dictator game and other games used in game theory it has been shown that the stake size does not significantly change the behavior of the player. People behave the same, independent of the amount involved. It has been shown that this is not true for the trust game. In the paper *Does stake size matter in trust games?* (Johansson-Stenman, Mahmud & Martinsson 2004) it is clearly demonstrated that in games with higher stakes people give less (in relative terms, not absolute numbers). One explanation for this behavior is that the first transfer does not only depend on altruism and trust; risk is also a substantial factor. With bigger stakes at risk, people are less willing to take risks.

The trust game behind the veil of ignorance: a note on gender differences. (Vyrastekova & Onderstal 2005) show that male and females have different giving distributions. Males tend to be more bimodal, that is either giving zero (going for the subgame perfect Nash equilibrium) or everything (the Paretoefficient frontier). Females on the other hand have a more unimodal distribution, peaking at transferring half of the money and then returning at least the amount received from the sender. The subject of gender differences regarding trust and has also been studied by Chaudhuri and Gangadharan. Their work also shows that women tend to have a lower level of trust, and that it probably is due to a

greater degree of risk aversion. Instead, women seem to be more generous and show a higher level of reciprocity (Chaudhuri & Gangadharan 2002).

Development of Positive Attitudes among Youth and the Trust Game (Migheli 2008) looks at youngsters and see whether different activities from their spare time affect their behavior in the trust game. They look at three variables; Spending time with friends, doing sports, and being active in youth organizations (Scouts for example). No significant correlation can be found between actions in the trust game and time spent with friends or sports. Only time spent in youth organizations had a positive and significant correlation with trust and trustworthiness.

Johnson and Mislin have also quantified effects of various alterations to the game design, based on a meta-analysis of 84 previous studies involving the trust game. They regress trust (share sent by player A) and trustworthiness (share sent back by player B) on a number of methodological variables. They find that trust is lower when the receiver is endowed (has some resources at the beginning of the game), when the stakes are higher and when payment is randomized (for instance by only some subjects receiving their final earnings through the drawing of lots). For trustworthiness they find that the rate of return (the factor by which the experimenter multiplies the amount sent in stage 1), the receiver being endowed and higher stakes all increase trustworthiness, presumably because it makes the receiver more wealthy and thus more inclined to give. Students are also less trustworthy than non-students, which are assumed to be due to older people being more charitable in general, according to many studies (Johnson & Mislin 2008).

To briefly summarize, then, previous research indicates that trustworthiness is more important than trust, that institutional factors can have significant effects, that there can be large differences between different demographics but not in ways that are entirely clear and, finally, that the outcomes of the trust game are sensitive to the specific setup of the game.

Method:

This section consists of three parts. First there is a description of the specific version of the trust game that was used. Then, we take a look at the subjects and how they were chosen. Finally, the instructions

given to the participants are related so as to allow the reader to understand the context in which the participants were acting.

The Game:

The Trust Game is an extension of the Dictator Game. It is a non-zero sum sequential game for two players (A and B). A is given a quantity of goods. He can then choose to give any amount to player B; all, nothing or anything in between. The amount B receives is multiplied by 3. B can then choose to give any amount back to A.

The first step is equal to the dictatorship game. But the new twist is where the dictator (A) can gain something from trusting B. Together they can get 1.5 times the original amount if A gives all to B and B gives half back. The problem is that B has no incentive to give anything back and if A knows this she will not send anything in the first place.

To increase the sample size, the game was played twice with each class. Thus each individual played as both A and B. This is therefore a modified version of the trust game.

As real money is a scarce commodity the game did not involve real money. Instead "points" where used that would later be converted into candy (gummy bears).

The Participants:

The Trust Game was played at two different schools, and two different age groups. The schools that participated were Värmdö gymnasium (Gullmarsplan, Stockholm) and Globala gymnasiet (Södermalm, Stockholm). Both a first and a second year class played the game, giving one group with 16-17 years old student with one year at their current school and a group of 17-18 years old students with two years.

Globala gymnasiet has a particular model of education. On their homepage they point to a project-oriented way of working and state their focus on global injustices and environmental issues. Project-work, described as a form of working which demands cooperation and responsibility, is singled out as the most central pedagogic method of the school. They also have close relationship with help organizations like Plan Sverige, WWF and other help organizations. (Globala gymnasiet 2010) Globala

gymnasiet can thus be described as an environment designed to promote solidarity, cooperation and trust.

Värmdö gymnasium is, on the other hand, a more traditional municipal Swedish school. In its presentation the school focuses on the role of traditional education, the importance of school lunches and its strong academic record. While there are mentions of pupil representation and group assignments, this is more in line with average Swedish schools. (Värmdö gymnasium 2010). We also used available statistics on grade averages to compare the schools (Gymnasiekvalitet 2010). While Värmdö scored slightly higher (16.9 versus 16.4 in grade average the difference was sufficiently small that it should not distort the results in a significant manner. We therefore believe that Värmdö gymnasium serves as a reasonable control group for Globala gymnasiet.

The Instructions:

The games took place in the students own classrooms at their own schools. The instructions were given by us, both verbally and written down on the white board[3]. Each student was also assigned a number for later identification.

The instructions given to the participants where:

- The rules of the game.
- That they were not playing with real money, but that the "points" in the games would convert into a desirable good based on how many points one earned.
- A hint, asking them to think through how each player in the game could maximize their profit, both when cooperation is possible and when it is not.

[3] The original instructions, both written and oral, were all in Swedish but have been translated by the authors.

- A clarification that game 1 and game 2 are different games. Any good from game A is not a part of game B.

The game starts and a form with the following layout was handed to the participating students:

Number: XX

Game 1:

You have 50

You give __ to B

Where XX is the identification number and the empty space is for the student to fill in. The forms where recollected and the results were used to fill in. Each student (Playing role A in game 1) was then randomly paired with another student (Playing role B in game 2). The results from game 1 were noted and form for game 2 was prepared.

Number: XX

A gave you: __

You then receive 3x __ *=*__

A have __ *le*ft

You send __ to A

Where the first three lines were already filled and the only task is to decide on how much to send back to A

In the end the students were also asked to fill in a form with the following questions:

Sex: Male/Female

Do you believe in God? Yes/No/Dont Know

Did you understand the game? Yes/No

What is your mother's occupation?

What is your father's occupation?

Do you have any siblings? Yes/No

Everything was handed in and the participants received their pay-offs and were then given the opportunity to ask questions.

The selection of questions is a compromise between keeping the experiment as simple as possible and taking other factors into account that have been shown to affect the player behavior. In this experiment it was also necessary not to be seen as too intrusive on personal integrity, given the fact that the participants were minors, as well as the limited time available. Some of the variables in the list above have been mentioned in the literature review. Gender differences is discussed by Vyrastekova and Onderstal, and Andreoni, Harbaugh and Vesterlund discuss how lack of understanding can lead to more trust-like behavior (Andreoni, Harbaugh & Vesterlund 2007; Vyrastekova & Onderstal 2005). The question about God is related to morality. People who believe in God might also have a different view of morality, thus behaving differently in the trust game. Parental income could both affect the participant's childhood consumption and maybe political or ideological view, all of which have the potential to change player's strategy (see Johnson & Mislin 2008 for a discussion on how perceived wealth can influence players). We also believe that individuals with siblings might behave differently. They are likely to have experienced more situations that required cooperation and, maybe more importantly, the task of distributing resources (for example candy) among all siblings. Since previous experiences can

affect trust and trustworthiness (Bohnet & Huck 2003) the outcomes of these experiences might affect their behavior.

Data:

Below is a comprehensive list of all variables on which we have data from the experiments, with brief descriptions. In warranted cases, more detailed variable descriptions are provided in the appendix.

give – the amount (out of 50) that player gave in the first stage of the game.
giveback – the amount individual gave back at the second stage of the game.
receive – the amount received in the first transfer (triple what was sent).
gender – a dummy that takes on value 1 if the individual is a male.
siblings – a dummy that takes on value 1 if the individual has any siblings.
religion – a dummy that takes on value 1 if the individual believes in God.
familyincome – a variable taking on values of 1-3 depending on household income[4]
give% – the amount given in round one divided by starting amount (50).
giveback% – the amount given back in round two divided by the amount received in round one.
total – the total amount the individual obtained at the end of the experiment. Both games are included.
trust – a dummy that takes on value 1 if the individual gave at least 50% of the initial endowment
trustworthy – a dummy that takes on value 1 if the individual returned at least 1/3 of what was received
understanding – a dummy that takes on value 1 if the individual claims to have understood the game.
GG – a dummy that takes the value 1 if the individual studies at *Globala gymnasiet*
year - a dummy that takes the value 1 if the individual is currently in the second year.
DiD – A dummy that takes the value 1 if both GG and year have the value 1

Normality: Both the Shapiro-Wilk test and Shapiro-Francia test for normality reject the hypothesis that our variables *give%* and *giveback%* in our sample would come from a normal distribution even at the 1% significant level. How much people gave back depend, of course, on how much they received and for this reason we here use the percentages.

[4] See Appendix for explanation of how this variable was measured

It can also clearly be seen by looking at *Graph 1* and *Graph 2* (see appendix) that they are not normally distributed. Giving has a distribution that looks like a normal distribution, but with an extremely fat tail at the "give all" end. Surprisingly there is no fat tail at the other end of the spectrum. Very few players decided to give nothing.

The giveback variable was not normally distributed either. Many give back nothing, and then we see a declining slope. Also at the giveback variable we see a fat tail with a few people giving back everything (!). From now on robust standard errors will be used as both the tests and common sense tell us that our variables are not normally distributed. We also tried out various changes such as squaring and logarithmizing the variables, but this did not affect the results in any way.

Dataset: We will label the set of students from Globala gymnasiet as "GG" and the set of students from Värmdö gymnasium as "VG". First year students will be referred to as "Y1" ´, second year ones as "Y2" and if we want to refer to the subsets they will be named "GG1", "GG2", "VG1" and "VG2". For GG1 n=42, for GG2 n=32, for VG1 n=17 and finally for VG2 n=16, for a total of n=107 observations.

Regressions: The computer software STATA version 9.2 was used when analyzing the data. We ran both regressions with and without control variables.

Difference in difference regressions:

$$give\% = \beta_0 + \beta_1 GG + \beta_2 year + \beta_3 DiD + u$$

$$giveback\% = \beta_0 + \beta_1 GG + \beta_2 year + \beta_3 DiD + u$$

With control variables:

$$give\% = \beta_0 + \beta_1 gender + \beta_2 religion + \beta_3 \text{familyincome} + \beta_4 siblings + \beta_5 year + \beta_6 GG + \beta_7 understanding + \beta_8 DiD + u$$

$$giveback\% = \beta_0 + \beta_1 gender + \beta_2 religion + \beta_3 \text{familyincome} + \beta_4 siblings + \beta_5 year + \beta_6 GG + \beta_7 understanding + \beta_8 DiD + \beta_9 receives + u$$

$$trust = \beta_0 + \beta_1 gender + \beta_2 religion + \beta_3 \text{ familyincome} + \beta_4 siblings + \beta_5 year + \beta_6 GG + \beta_7 understanding + \beta_8 DiD + u$$

$$trustworthy = \beta_0 + \beta_1 gender + \beta_2 religion + \beta_3 \text{ familyincome} + \beta_4 siblings + \beta_5 year + \beta_6 GG + \beta_7 understanding + \beta_8 DiD + \beta_9 receives + u$$

Results[5]

For the entire sample the average share given by As was 62%, or 31 out of 50. Bs then received an average of 93 and sent back, on average, 43 of those 93, equal to 43%. For GG1 the average share given away in the first round was 62%, for GG2 65%, for VG1 65% and for VG2 52%. Bs in GG1 on average sent back 44%, in GG2 37%, in VG1 51% and in VG2 47%. Since income equality tends to decrease trust and trustworthiness we compared the standard deviation of family income between the GG and VG and found that there was no statistically significant difference between the two.

Before proceeding, it is vital to tackle the causality problem, namely that pupils may choose a school based on their beliefs rather than the school forming said beliefs. To get around this problem, two classes from each school were used, one first year and one second year, so as to allow the differencing out of the self-selection bias. Ideally, the experiment would be conducted on pupils just accepted into the school and other (preferably, of course, the same pupils 3 years later) pupils on the verge of graduation. Due to the time restraints of both the authors of the thesis and those pupils about to take their final exams this was not, however, possible.

In the differences in differences regression we see the students at *Värmdö gymnasium* as a control group and *Globala gymnasiet* as the treatment group. The "treatment" will be one year of pedagogy from *Globala gymnasiet.* The school (GG) variable will take care of any initial difference and the casuality problem. The *year* variable will count for the natural change in trust caused by ageing. The *DiD* variable will then show the additional trust/ trustworthiness gain by studying at *Globala gymnasiet* compared to Värmdö gymnasium.

[5] The detailed result of all regressions as well as summary statistics for all variables can be found in the appendix.

Strictly speaking, it should be noted that a DiD estimator cannot be used, since this is not panel data – our second-year students are not our first-year students one year later but a different set of older students. While this is unfortunate, it could, as noted above, not be avoided. For the results to be valid one must assume that the difference between two different years (more precisely the difference between second-year students today and first-year students in one year) is not sufficiently large so as to distort the results. Without anything else to go by we are wary of making such a bold assumption.

We begin by running two simple regressions, the percentage sent and the percentage sent back, respectively, on year, school and a DiD estimator. For percentage sent DiD and year have p-values of around 20% which is not strong enough to show significance and for percentage sent back year has a similar p-value. Except for school in regression 1 and DiD in regression 2 the magnitudes were fairly large, ranging from 7 percentage points to 14 percentage points. In both regressions the signs on year and school are negative, indicating that those going to GG are less trusting and less trustworthy and that second-year students are also less trusting and less trustworthy. The DiD estimator is positive for both giving and giving back.

We also ran the regressions with our control variables. This did not significantly affect the explanatory variables which remained insignificant, although significance for GG in the fourth regression was as low as 15%, with the sign being negative and the effect being 13 percentage points. The DiD estimator is positive in both regressions, with a magnitude of 13 percentage points in regression 3 and 4 percentage points in regression 4, although the p-values were as high as 32% and 74% respectively. Some of the explanatory variables did, however, show some life. Family income was almost significant in both regression 3 (p-value of 14%) and in regression 4 (p-value of12%)[6]. Having siblings was significant in regression 3 on the 10% level and had a sizeable coefficient of 12 percentage points. In all cases the sign was negative, i.e. a larger family income led to lower percentages sent in both stages of the game and having siblings led to lower percentages being sent (sign for siblings in regression 4 was also negative but highly insignificant). Gender was significant at around 15% and 25% respectively, with the sign being positive in both cases and the magnitudes being 14 and 10 percentage points respectively. That is, men both gave more and gave back more than did women. Given the weak significance, however, the gender issue should be approached with caution. Finally, as has been found in most previous studies, amount received was highly significant in regression 4, with a p-value of 2% and capturing more than a third of

[6] Magnitude is a meaningless concept for this variable, since it is an arbitrary index

the explanatory power in the regression. In other words, the more one had received the larger the share sent back (specifically, for each extra 6 points received about 1 percentage point more was sent back).

The same regression as above was also run but with trust and trustworthy as explained variables. The results were similar to above. For trust, gender and understanding were significant, the first at the 10% level and the second at the 5% level. Gender was positive (i.e. being a man increased the probability of being trusting by 21 percentage points) while understanding was negative (i.e. understanding the game decreased the probability of being trusting by 22 percentage points). For trustworthiness school was highly significant (p-value of 0.5%) and negative, so being GG decreased the probability of being trustworthy by 39 percentage points. Again, it should be noted that DiD was positive with a p-value of about 20% and a coefficient of 0.2, so while the students who enter Globala gymnasiet may have a lower share of trustworthy students there is no evidence that the school makes them so. Religion was also significant, at the 10% level, and positive, so claiming to believe in God increased the probability of being trustworthy by 20 percentage points. Finally, once again, amount received was highly significant (p-value of 0.3%) and again accounted for about a third of the explanatory power in regression 4 (every extra point received increased the probability of trustworthy behavior by about 0.3 percentage points.

Discussion

Our results seem to be broadly in line with those observed in previous studies. We find that, going by the Johnson and Mislin meta-study, the average share sent by As across the studies was 51% while the average share sent back was 37%.We can thus see that the level of trust was considerably higher in our study, while the level of trustworthiness was also somewhat higher (62% and 42%). The plausible explanation for this is that our subjects were paired with class-mates, although anonymously, whom it is reasonable to trust more than utter strangers and towards whom greater feelings of trustworthiness may be felt. This is further strengthened by the fact that it is unlikely to be due to Sweden-specific reasons, since other international comparisons have shown Sweden to be about in the middle of the "altruism ladder" (Breman 2008).

That family income had a negative effect on both trust and trustworthiness seems contrary to previous studies indicating that wealthier agents give more. In this case, however, it is important to note that there may be a difference between children this age, who have not earned their money and adults

who have. Family income here is more likely to reflect values instilled when growing up than behavior associated with having a high income later on in life. Given the low significance this could also be a statistical anomaly.

An important question that arises is of course whether the lack of effect from the different schools is simply due to the amount of exposure. On one hand one might think that the effects are so immediate, that using students who have already attended for almost a year as a control group distorts the results because they already have assimilated the effects of their education. This is belied, however, by the fact that the variable GG has a negative coefficient in all of the regressions. On the contrary, it is possible that the exposure is instead too low. A couple of years of education during one's late teens might simply not be enough to have any kind of effect. A couple of points can be made here. Firstly, the exposure does seem significant given the amount of time pupils spend in their schools and with their schoolmates. Secondly, previously mentioned studies by Glaeser et al and Bohner and Huck indicate that past experiences have considerable effects even if limited in scope.

A final point can be made in an attempt to explain the lack of effect from Globala gymnasiet. It is imaginable that it is harder to instill trust and trustworthiness in a group which has very little of it to begin with. That is, the ease by which one can change these variables, relative to the starting point, may be dependent on that starting point. If such is the case the lower starting level of trust and trustworthiness for GG-students might explain why their levels of trust and trustworthiness were not significantly raised by attending the school. A study that did follow the same subjects over time might be able to shed light on that issue.

Sources of error:

Is the explanatory variable relevant? It may be that there is no actual difference between Värmdö gymnasium and Globala gymnasiet. While we have been to the schools during the experiments and also have some personal testimonials from both environments to rely on from before it is an unavoidable fact that the description draws largely on the schools' own description of their pedagogy. However, strictly speaking, the hypothesis need not assume that Globala gymnasiet actually promotes trust and trustworthiness. It only needs to assume that they have done all that could be reasonably expected to achieve such an environment. If those efforts are actually without effect (due to, say, the pupils being resilient, such ideas getting squandered on the way by teachers too stuck in traditional thinking, etc) that would simply show that the model does not work in reality.

Sample size: The total sample size is 107 observations, which is small but not greatly smaller than in most trust games (the average in (Johnson & Mislin 2008) being 140). Of course, wanting to divide it into 4 groups (first-year and second-year students in the respective schools) makes each subgroup fairly small. We find the size is still acceptable for our purposes, although further studies in the area would preferably use more pupils.

It should be noted that based on Johnson and Mislin we should expect trust to be relatively high and trustworthiness to be relatively low given the specific set-up of the experiment (such as participants playing both roles, stakes being low, etc). This also seems to be the case, when comparing to the average in their meta-study (Johnson & Mislin 2008). Furthermore, there may be a bias involved in the fact that the test subjects are not complete strangers to each other. While the pairs were anonymous and unknown to each other they still knew that the other person would be a class-mate and not a complete stranger. It is reasonable to expect this to lead to higher values for both trust and trustworthiness, which is in line with the relatively high values we obtained.

A final point is stake size. In this experiment stake size was unusually low. Apart from the already noted effects it is possible that a very low stake size tends to iron out all behavioral differences between groups, something which is supported by the low significance for most of the variables employed in our regressions.

Conclusion:

Based on previous research it seems likely that one can affect trustworthiness through an institutional environment and that this in turn can increase trust levels and social capital in society, which, finally, increases the overall level of well-being in society. As was seen we were unable to find any statistically significant differences between the two schools. It cannot, however, be ruled out that this is due to deficiencies in the experimental setup – ideally one would have access to more control variables, real monetary pay-offs and the same groups of students over time. This particular study has been somewhat hampered by temporal and financial constraints. That being said, we believe this study does indicate that the specific pedagogic model of Globala gymnasiet has not made the pupils there significantly more trusting or trustworthy. This is not in and of itself an indictment of that model – for all we know there may be other important benefits from employing it. If one takes seriously the issue of increasing trust, trustworthiness and social capital in society more research is thus needed in this field if

we are to use education policy as a tool to improve social capital in society. The model of Globala gymnasiet may not be the answer, but the search for institutions that can foster trustworthiness is far from over.

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Appendix:

Extended variable description

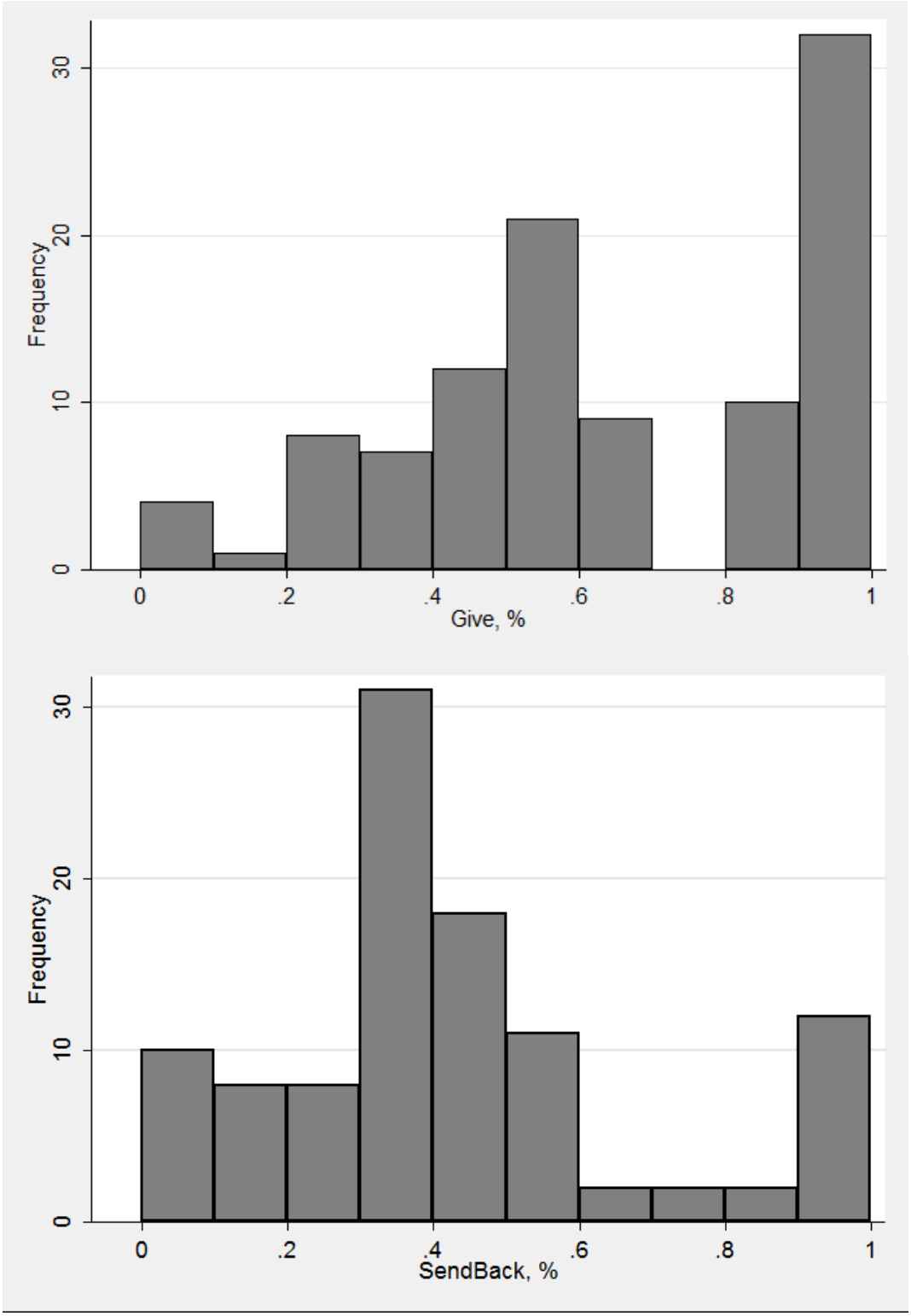
Family income: we asked participants to indicate what their parents worked with. Each occupation was then assigned a number by us indicating its income-level. A simple average of the numbers for both parents was then assigned familyincome. The reason why this was done in this fashion was simply that we suspect children at this age often have a vague idea of how much their parents make and what economic class they are in. The vagueness of some of the replies we received further confirms this notion. While the measure we arrived at is far from perfect, we still believe it to be the best measure of an important control variable that we were able to obtain.

Trustworthy and trusting: it should be noted that this variable is interesting in the sense that player B must send back at least a third of what she receives in order for it to pay off for A to send anything in the first place. Therefore, the variable clearly indicates whether B was trustworthy or not. For trusting the cut-off is somewhat more arbitrary but we have used the same figure as Chaudhuri and Gangadharan (Chaudhuri& Gangadharan, 2003).

Summary statistics

Variable	**Totalt**	**Globala gymnasiet**	**Värmdö gymnasium**	**Year 1**	**Year 2**		**Note**
give	30.9	31.7	29.3	31.5	30.3		*out of 50*
giveback	42.9	43.1	42.5	44.5	41.0		*maximum 150*
gender	17.9%	16.7%	20.6%	22.8%	12.2%		% males
siblings	93.3%	93.0%	93.9%	91.1%	95.8%		% with at least 1 sibling
religion	26.7%	18.8%	43.9%	25.4%	28.1%		% beliving in god
familyincome	4.0	3.8	4.5	4.0	4.0		relative value
givepercent	61.9%	63.4%	58.6%	63.0%	60.5%		% given
givebackpercent	43.3%	40.6%	48.9%	45.9%	40.2%		% given back
total	111.93	113.43	108.65	113.08	110.53		Total revenue from both games
trust	67.6%	70.3%	61.8%	64.4%	71.4%		% give > 50%
trustworthy	72.4%	64.8%	88.2%	68.4%	77.1%		% giveback > 1/3
understanding	67.3%	66.7%	68.8%	71.4%	62.5%		% understanding the game

Normal distribution test; Graphs



STATA regressions raw data

```
reg givepercent year GG DiD, r

Linear regression                               Number of obs =     107
                                                F(  3,   103) =    0.85
                                                Prob > F      =  0.4716
                                                R-squared     =  0.0166
                                                Root MSE      =  .30976

------------------------------------------------------------------------------
             |               Robust
 givepercent |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        year |  -.1181618   .0909532    -1.30   0.197    -.2985459    .0622224
          GG |   -.027507    .085147    -0.32   0.747     -.196376     .141362
         DiD |    .145007    .119114     1.22   0.226    -.0912275    .3812415
       _cons |   .6494118   .0680453     9.54   0.000       .51446    .7843636
------------------------------------------------------------------------------

reg givebackpercent year GG DiD, r

Linear regression                               Number of obs =     104
                                                F(  3,   100) =    1.23
                                                Prob > F      =  0.3043
                                                R-squared     =  0.0324
                                                Root MSE      =  .26997

------------------------------------------------------------------------------
             |               Robust
givebackpe~t |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        year |  -.0982788   .0727071    -1.35   0.180    -.2425277    .0459701
          GG |  -.0742453   .0793358    -0.94   0.352    -.2316453    .0831548
         DiD |    .026738   .0999168     0.27   0.790    -.1714941    .2249702
       _cons |   .5113768   .0617271     8.28   0.000      .388912    .6338416
------------------------------------------------------------------------------
```

```
reg givepercent year GG DiD gender religion understanding familyincome siblings, r

Linear regression                               Number of obs =     103
                                                F(  8,    94) =    2.19
                                                Prob > F      =  0.0348
                                                R-squared     =  0.0941
                                                Root MSE      =  .30489

------------------------------------------------------------------------------
             |               Robust
 givepercent |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        year |  -.0872079    .108566    -0.80   0.424    -.3027682    .1283524
          GG |  -.0613402   .1037773    -0.59   0.556    -.2673925    .1447121
         DiD |   .1335893   .1338115     1.00   0.321    -.1320966    .3992752
      gender |    .138861   .0977607     1.42   0.159    -.0552452    .3329673
    religion |  -.0863961   .0916676    -0.94   0.348    -.2684043     .095612
understand~g |  -.0222284   .0737628    -0.30   0.764    -.1686863    .1242294
familyincome |   -.047812    .031844    -1.50   0.137     -.111039    .0154149
    siblings |  -.1249574   .0745045    -1.68   0.097    -.2728878    .0229731
       _cons |   .9814543   .2144783     4.58   0.000     .5556027    1.407306
------------------------------------------------------------------------------

reg givebackpercent year GG DiD gender religion understanding familyincome siblings recive, r

Linear regression                               Number of obs =     100
                                                F(  9,    90) =    2.41
                                                Prob > F      =  0.0169
                                                R-squared     =  0.2072
                                                Root MSE      =  .25148

------------------------------------------------------------------------------
             |               Robust
givebackpe~t |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        year |  -.0810355   .0864714    -0.94   0.351     -.252826    .0907549
          GG |  -.1311732   .0923434    -1.42   0.159    -.3146296    .0522832
         DiD |   .0401427   .1193987     0.34   0.737    -.1970637    .2773492
      gender |    .104252   .0905636     1.15   0.253    -.0756684    .2841724
    religion |   .0332994   .0666105     0.50   0.618     -.099034    .1656329
understand~g |   .0065886   .0578514     0.11   0.910    -.1083434    .1215206
familyincome |  -.0417081   .0264285    -1.58   0.118     -.094213    .0107968
    siblings |  -.0924501   .1278497    -0.72   0.471    -.3464459    .1615457
      recive |   .0016692   .0007041     2.37   0.020     .0002704     .003068
       _cons |   .5951973   .2124097     2.80   0.006     .1732084    1.017186
------------------------------------------------------------------------------
```

```
reg trust year GG DiD gender religion understanding familyincome siblings, r

Linear regression                               Number of obs =     103
                                                F(  8,    94) =    1.98
                                                Prob > F      =  0.0575
                                                R-squared     =  0.0908
                                                Root MSE      =  .46576

------------------------------------------------------------------------------
             |               Robust
       trust |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        year |  -.0420128    .189361    -0.22   0.825    -.4179936     .333968
          GG |   -.081354   .1647209    -0.49   0.623    -.4084112    .2457032
         DiD |   .2136499   .2146478     1.00   0.322    -.2125384    .6398381
      gender |   .2140558   .1213863     1.76   0.081    -.0269595    .4550711
    religion |  -.0956873   .1469033    -0.65   0.516    -.3873674    .1959927
understand~g |  -.2243338   .1120466    -2.00   0.048    -.4468049   -.0018627
familyincome |  -.0581624   .0416917    -1.40   0.166    -.1409422    .0246173
    siblings |  -.1493115   .1500689    -0.99   0.322    -.4472769     .148654
       _cons |   1.200298   .2963206     4.05   0.000      .611946    1.788649
------------------------------------------------------------------------------

reg trustworthy year GG DiD gender religion understanding familyincome siblings recive, r

Linear regression                               Number of obs =     100
                                                F(  9,    90) =    4.37
                                                Prob > F      =  0.0001
                                                R-squared     =  0.2393
                                                Root MSE      =  .41278

------------------------------------------------------------------------------
             |               Robust
 trustworthy |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
        year |  -.0602074   .1290208    -0.47   0.642    -.3165298     .196115
          GG |  -.3911587    .137102    -2.85   0.005    -.6635357   -.1187816
         DiD |   .2093132   .1676673     1.25   0.215    -.1237872    .5424136
      gender |   .0946608   .1179391     0.80   0.424    -.1396458    .3289673
    religion |   .1960243   .1128684     1.74   0.086    -.0282085    .4202571
understand~g |  -.0689833   .1035591    -0.67   0.507    -.2747216     .136755
familyincome |  -.0484674   .0435277    -1.11   0.268    -.1349427    .0380079
    siblings |   .1520851   .1530076     0.99   0.323    -.1518913    .4560615
      recive |   .0030048   .0009888     3.04   0.003     .0010405    .0049691
       _cons |   .6870527   .3052017     2.25   0.027     .0807162    1.293389
------------------------------------------------------------------------------
```