

Trust, Gender and Social Capital: Experimental Evidence from Three Western European Countries

Matteo Migheli*

(University of Torino and Catholic University of Leuven)

March 2007

Abstract

The economic literature has discussed the links between trust and gender, and trust and social capital. Given that some empirical evidence shows also that gender and trust are somehow related and specifically women tend to trust less than men, I try to investigate the effect of social capital on generalized trust, controlling also for the “gender effect”. This latter could be due to the fact that women are less prone to invest in social capital than men, as the literature highlights. Using the tools of experimental economy, I performed the same experiment in Oslo, Leuven and Torino, in order to obtain a mixed Western European sample. In this one I included Scandinavia, Central and Mediterranean Europe. My measure of social capital is more complete than the usual one: I add informal networks (such as phone conversations, time spent with friends, etc.) to formal ones (basically voluntary associations). Analysing the obtained results through both comparisons of conditional means and econometrics, I find out some influence of social capital on trust. Furthermore, also after controlling for social capital, gender differences persist still. Thus I can conclude that behavioural differences due to gender are not a mere reflex of different investments in social capital. I also found evidence that some kinds of formal and informal networks exert positive influence on generalized trust.

Keywords: social capital, investment game, generalized trust, gender effect, formal networks, informal networks

JEL Classification: C90, J16, Z13

* Università degli Studi di Torino, Department of Economics and Finance “G. Prato” Via Real Collegio, 30 – 10024 Moncalieri (TO) – Italy and Katholieke Universiteit Leuven, Department of Economics.

Email: migheli@econ.unito.it

Acknowledgments: I would like to thank Mario Deaglio, Erik Schokkaert, Giuseppe Bertola, Geert Dhaene, Elsa Fornero, Massimo Marinacci, Alessandro Sembenelli, Tiziano Razzolini, and the audiences of my seminars at the Katholieke Universiteit Leuven, Università degli Studi di Torino and Stony Brook University for their precious comments and remarks.

1. Mixed evidence

In 1993 an American sociologist, Robert Putnam, made economists (re)interested in social capital. Although social capital is a concept whose borders are not clearly identified¹, it has been widely used in economics during last years. Putnam (1993) focuses on the relationship existing between social capital and the quality of institutions, but economists have widened research to development, public goods, etc. as Grootaert and van Bastelaer (2002) and Durlauf and Fafchamps (2004) highlight.

On another side, a new stream of economics has fast grown during last years: behavioural economy, which has been empirically supported by experimental economists. Through experiments it has been proved that human behaviour is lead not only by profit maximization, but there are also other factors influencing it. For example Anderson, Mellor and Milyo (2004) show that social capital affects contributions in a public good game.

Both streams have contributed to the extant economic literature with several findings; among these a common point seems to emerge very often: women tend to invest less in social capital, and they tend to trust less [see Croson and Buchan (1999)]. This can be due to genetic factors, or lesser trust could reflect also lower investments in social capital, as several scholars point out social capital as one of the main promoters of generalized trust. In addition, it would be interesting to study the contribution of social capital to the outcomes of a basic investment game.

This paper measures generalized trust through the basic setup of Berg, Dickhaut and McCabe (1995)'s trust game, and social capita partly à la Putnam (1993) through time spent within different types of voluntary associations, and partly by introducing other indicators representing informal networks². Among these informal networks I include the usage of telephone; differently from Fisman and Khanna (1999) I account for time spent on phone calls with friends instead of the raw number of possessed telephones. As Guiso, Sapienza and Zingales (2004) show, other indicators of social capital are possible, but I prefer to use more traditional ones for purposes of comparability with other analogous studies.

¹ A widely accepted, though general, definition of social capital is the one proposed by Lin(2000): “[...] *social capital may be defined as investment and use of embedded resources in social relations for expected returns.*” However some more and good definitions can be found in Stone (2001), Grootaert and van Bastelaer (2002) and Durlauf and Fafchamps (2004).

² See for example Grootaert and van Bastelaer (2002).

The aim is twofold: firstly I want to analyze the link between social capital and the outcomes of the trust game; secondly if social capital exerts an effect on generalized trust, as measured by the game, I would like to see if the gender effect is still persistent. In the lights of Karlan (2005), I prefer refer to this game as “investment game”.

In order to answer these questions, I repeated the basic treatment of the investment game in three Western European countries (namely Belgium, Italy and Norway) to work on a wide and composite dataset, characterized by a small socio-cultural variance³. Limiting cultural variance is very important, as membership in (and thus time spent within) associations is found to be a relevant indication for some cultures, but not for some others, as discussed in Grootaert and van Bastelaer (2002). In addition Henrich (2000) detects strong influence of culture on the results of an ultimatum game, and Henrich et al. (2002) found that people “[...] when faced with a novel situation (the experiment), they looked for analogous in their daily experience [...] and then acted in a way appropriate for the analogous situation.”⁴ They continue showing that this “appropriate way” is strongly cultural-dependent. Participants were all selected as pseudo-volunteers according to Eckel and Grossman (2000) definition, and they were all undergraduate students.

The main results of this paper support the hypothesis that social capital is positively linked to the outcomes of a trust game, though some effect is weak⁵; secondly the gender effect is persistent even after controlling for social capital.

2. Experimental design and procedure

The investment game originally proposed by Berg, Dickhaut and McCabe (1995) is a two-player and two-stage game. The set up is as follows. Participants are divided into two groups, A and B. Each person A_i is randomly and anonymously matched to person B_i . In the first stage A_i receives the possibility of splitting between himself and B_i the notional sum of S euro⁶. We denote as $\alpha_i S$ the amount given to B_i by A_i , where $\alpha_i \in [0, 1]$. The quantity $\alpha_i S$ is interpreted as a measure of A_i 's generalized interpersonal trust. Molm, Takahashi and Peterson (2000) point out that this behaviour is more manifest when exchanges are non-

³ Notice that cultural background (at national level) exerts strong effects on the outcomes of a game, as shown, for example, by Henrich et al. (2002).

⁴ Henrich et al. (2002) p. 76.

⁵ Also Anderson et al. Are somewhere disappointed by the unexpected weakness of some of their results.

⁶ Of course, the currency depends on the country where the game is played. In addition, some experimenters [see for example Fershtman and Gneezy (2001)] use tokens or points.

negotiated, but reciprocal; by using their words: “No matter how established the relation, how predictable the other’s behaviour and how long the ‘shadow of the future’, each act of giving still remains a declaration of trust that the other will reciprocate, and each act of reciprocity confirms that trust.”⁷ The experimenter triples A_i ’s decision and hence B_i receives $3\alpha_i S$, $i=0, \dots, N$. In stage two, each player of type B decides which amount out of the received one he wants to give back to his partner. I denote this quantity as $\beta_i 3\alpha_i S$, $\beta_i \in [0, 1]$. It is clear that if A_i totally trusts B_i (which means he is confident in the fact that B_i will reciprocate) the best strategy would be $\alpha_i = 1$. In fact, if B_i ’s behaviour is fully reciprocating, then he will choose $\beta_i = 0.5$; in which case, A_i would yield a return equal to 50%. Strategies suggested by Nash equilibrium application are different: the subgame perfect Nash equilibrium is $\beta_i = 0$ ⁸; since A_i knows this, then he will choose $\alpha_i = 0$. This holds under the hypothesis that players’ utility function is:

$$u_p = u_p(m)$$

where m is the possessed quantity of money. No other factor affects utility. As it can be seen in Croson and Buchan (1999), the Nash equilibrium occurs in a small minority of cases; as Bouckaert and Dhaene (2004) point out “*In experimental settings where anonymous players play the game only once, a typical finding is that player [A] transfers a positive amount to player [B], and that player [B] responds by transferring a positive amount back to player [A].*”⁹

In my design both types of players share the same set of information; this means that both receive a full description of the game before starting to play it¹⁰. At the end a couple is randomly drawn and paid according to their decisions. This lottery is a necessary incentive for the participants to take the game seriously. In addition they are paid separately, in order to prevent them meeting. This is important to rule out any psychological pressure: if they met, they would prefer to seem generous, hence amounts would be affected by generosity.

At times literature on Experimental Economics casts doubts on the use of lotteries in experiments. These criticisms are based on Allais’ preferences: in his view, when facing uncertainty, people’s decisions are not consistent with the independence axiom of expected utility theory. In other words: the presence of lotteries leads choices not to coincide with

⁷ Molm, Takahashi and Peterson (2000) p. 1423.

⁸ When $\alpha_i = 0$, this will be the only possible answer in any case.

⁹ Bouckaert and Dhaene (2004) p. 873.

¹⁰ An English translation of the used instructions and questionnaire is attached as appendix.

preferences. If this were the case, my experimental results would be biased. However, according to Cubitt, Starmer and Sugden (1998) “[...] *the system [of lotteries] does appear to be unbiased when applied to choices among simple prospects.*”¹¹ Hence, I think that our outcomes are not influenced by the presence of a lottery.

According to Eckel and Grossman (2000), our players are pseudo-volunteers, in the sense that they were not asked whether they desired to participate or not; they were just involved in the experiment. All of them received a copy of instructions (the same for both groups), a paper on which they had to write down their decision and a two-page questionnaire. The experiment lasted about 15 minutes. The same decision papers (containing A’s choices) were randomly passed to players of type B. The two stages took place on different days and in different buildings. In order to ensure maximum neutrality of the environment, we chose the course classroom.

Eckel and Grossman (2000) would raise some distrust in our recruiting mechanism. Their experiment points out that pseudo-volunteers tend to evaluate monetary incentives less than recruited participants¹². I do not want to rebut this outcome here; nevertheless I believe that there is no certainty about which method is best or least unbiased. Volunteers could be motivated by self-selection, i.e. by a subjective higher evaluation of money, and thus they could constitute a particular sub-sample of the population¹³. Since there is no evidence against this interpretation of Eckel and Grossman’s results, I do not account for the selection procedure as a source of bias.

Additional disturbances could have arisen if the Professor of the course had invited his students to participate. In such a case they could have behaved to please him. In order to rule out this possible effect, no information was communicated before the game took place. Furthermore, the experimenter and not the Professor explained the rules and distributed the copies¹⁴.

¹¹ Cubitt, Starmer and Sugden (1998) p. 130.

¹² Following Eckel and Grossman, we define “free participants” as those players recruited through public announcements. This procedure ensures only the motivated getting involved. In Eckel and Grossman’s definition, these players are called “volunteers”.

¹³ In this case, recruiting players through a public announcement would generate a biased (or at least non representative) sample.

¹⁴ In this case the experimenter was helped by a couple of assistants. They were strangers to the students.

As stated above, I replicated the standard investment game, as described in Berg et al. (1995). Each experiment was a one-off (i.e. not repeated).

In order to provide an incentive for participants to play according to their real preferences, a lottery was attached to the experiment. A couple for each city received a payment equal to the final amounts produced by their decisions. The initial sum was sufficiently high to constitute a good incentive, despite the low winning probability.

A total of 506 students were involved in phase A and a total of 345 as players B. In particular 405 Flemish (250 A and 155 B), 257 Norwegians (155 A and 102 B), and 256 Italians (138 A and 116 B)¹⁵.

Belgian students were from the Faculty of Law (group A) and from the Faculty of Bioengineering (group B); Norwegian participants were from Economics (group A) and Statistical Methods (group B); eventually Italian students were all from the Faculty of Economics (course in Business and Administration).

3. Methodology

I analyse the data through two different methodologies. The first one is based on descriptive statistics, whilst the second one is an econometric analysis. Although descriptive statistics are the most widely used analytical tool for experimental data [see Camerer (2003)], I think that some hidden effect could bias the results. For this reason, I also run an OLS regression.

I analyze group B's results also through an ordered probit and a multinomial logit.. In particular group B is divided into three categories: the first one (denoted as 0) gathers players B who sent back an amount of money such that their A counterpart ends up worse than them; the second subgroup (indicated by 1) represents those players B who decided to equally split the total cake; finally the last sub-sample (denoted by 2) collects individuals of type B, who chose to pass back a sum such that their A partner ended up better than them. On one hand these outcomes can be ordered, as players can calculate their counterpart's

¹⁵ These figures refer to valid sheets. Some students did not understand the rules of the game, and therefore their answers were dropped. As players were pseudo – volunteers [see Eckel and Grossman (2000)], there was no perfect match in the number of group components. Hence the difference (particularly big in the Flemish case) between groups A and groups B.

final payoff. Hence an ordered probit seems to be the most appropriate tool. On the other hand, using an ordered probit means to impose the restriction that the magnitude of marginal effects is always the same across categories. A multinomial logit approach could avoid this problem, and (or though) does not necessarily impose to data the order given by the experimenter. However, the shortcoming of probit estimation affects only the coefficients, but not the marginal effects. In addition a major problem with multinomial logit is that it very likely that the hypothesis of independence from irrelevant alternatives does not hold. As a consequence, ordered probit estimates (particularly marginal effects) appear to be the best to use.

Given the limited availability of observations, some networks show an exiguous usage; as done in a previous paper some associations can be clustered according to their ends; furthermore informal nets (especially those linked to active communication) can be grouped as well (though in this case no exiguity of observations exists). As a result, I gather pro-social associations, and communication networks.

As regards descriptive statistics, I also perform a comparison of means based on Hotelling's method. The aim of this is to investigate the effect of gender, ethnic feeling, nationality and geographical position, when all the other variables are simply not considered. This method also allows analysis as to whether there be significant differences in stocks of social capital across genders and countries. This point is important to verify if students' self – reported social capital is consistent to the data of the *World Value Survey*.

Accordingly with Migheli (2007) I expect a decreasing stock of social capital going south, and, as a consequence, a diminishing value for both trust and reciprocity.

4. Results

4.1 Descriptive statistics.

I expose and comment results first for player of type A, and then for type B. On average individuals A passed 91.16 Euro, equal to 45.58% of the received notional amount. However noticeable differences are present. The Norwegians passed 112.01 Euro (56.00%), the Flemish 83.43 Euro (41.71%), and eventually the Italians 87.36 Euro (43.68%). The difference between the Norwegians and the others (Flemish and Italians) is significant at

99% level, and the difference for Flemish and the others is significant at 95% level. The Italians are not different from the others taken together, and neither is significantly different from the Flemish's average. The difference between the Italians and the Norwegians is significant at 99% level, as well as the one between the Flemish and the Norwegians.

These results are in contrast with my expectations: the Flemish players were supposed to pass less than the Norwegians (which is true), but more than the Italians (which is not the case).

On average male students passed more than their female colleagues: 98.53 Euro (49.26% of the initial endowment) and 85.01 Euro (42.50%) respectively. This difference is significant at 99% level. This result was expected. Now we can look inside each country. The Norwegian males passed 109.04 Euro (54.52%), against the females' 113.59€ (56.79%). Although this difference is not significant, it constitutes an exception with respect to the general behaviour. Henrich and al. (2001) point out that general cultural environments are very effective on players' decisions; Scandinavian countries (among which Norway) are well known for the emancipation of women; this character of those societies could reflect also in the outcomes of an investment game. The opposite happens in both the Flemish and the Italian samples. In the first case I have a male average of 95.44€ (47.72%) against a female's figure of 76.24€ (38.12%); Italian men passed 95.71€ (47.85%), and Italian women 78.35€ (39.17%). These differences are significant at 99% and 90% level respectively.

Not to be born in the living country does not affect players' behaviour neither in the three – city sample, nor in each single country. This result could appear in partial contrast with La Ferrara (2000). In reality given the high degree of education of players included in this sample and the quite high level of integration offered by the three considered cities (especially Oslo and Leuven), the result is not exactly stupefying.

A better check for La Ferrara's (2000) is to consider self – felt ethnicity and whether it affects player's behaviour or not. Students answered a question as to whether they felt more from their own region, country, a macro aggregate¹⁶ or something else. An increasing

¹⁶ This was the EU for Italians and Flemish, Scandinavia for Norwegians.

code from 0 to 4¹⁷ identifies each “degree” of self – reported ethnicity. I expect trust (i.e. passed amount) to increase with this variable. However, when the three – country sample is analyzed, no difference is significant. The 30 Flemish, who feel they belong to the EU passed 115.43€ against 78.98; this difference is significant at 99% level. The Norwegian case is more complicated. 2 people have a value 0 for ethnicity and passed 13.5€ significantly less than the average of the other group (113.71€). Seventy students answered that they felt Norwegian: they passed 120.43€ vs. 99.73€ of the others; this difference is significant at 90% level. Eventually, 17 players self – defined “Scandinavian”: they gave 79.41€ vs. 119.60€ with a significance of 95%. This evidence is rather mixed, although the results for Norwegians and Scandinavians seem to suggest that a stronger nationalist sense induces less trust. On the contrary, a wider sense of “citizenship” is linked to more trust¹⁸.

With regard to players of type B, the whole three – nation sample shows an average passed amount of 94.93€ vs. a received sum of 278.40€ Hence, students B gave back 34.10% of what they received. If we investigate the behaviour of the three subgroups, we see that the Norwegians reciprocated 38.51% of what they had, vs. 21.38% of the others (significance level of the difference: 99%). Comparing the Norwegians to the Flemish, we see that the former passed back more than double the latter (38.51% against 16.11%) with a significance of 99%. When Norwegians are compared to Italians, the difference is still in favour to the former and significant at 99% level, but it is reduced: 38.51% vs. 27.40%. The difference between the Italians and the Flemish is significant at 99% level as well. Once again the data do not fulfil the initial expectation. However, the difference between Nordic Europe and Mediterranean Europe is noticeable and does exist.

There is a possible “ethnic” interpretation for the “Flemish” anomaly: the two linguistic groups of the country (French and Flemish) have always been in severe contrast. Although all the students knew their opponent to be a Flemish person¹⁹, problems linked to the internal situation could be responsible for the low level of trust displayed by Flemish players.

¹⁷ 4 was given to those students who answered “citizen of the world” or similar; 0 denotes answers more restrictive than the own region (i.e. their own village, group of friends, etc.). However, out of 506 respondents, only 10 belong to this last category.

¹⁸ Reverse causality is here very likely.

¹⁹ If the KUL there are also Wallonian students, but they are a very thin minority.

For group B to be born in a foreign country does not affect the amount passed back. This is true both for the whole sample and for each national subgroup as well.

Gender does not affect for reciprocity. At least, this is the result of my sample, and it holds for the usual subdivisions. In reality I expected some influence of respondent's sex also in phase B. Unfortunately I have to highlight an unwanted anomaly. As declared, A's sheets were passed to players B randomly. In the Italian case, chance had it that women received on average more than men (288.25€ vs. 226.81€ with a significance of 90%). Could this fact have biased the results? I am not able to answer this question. However, taking passed amounts in percentage of received ones, as I did here, should avoid any problem linked to chance.

Self – reported ethnicity exerts some influence. In particular data show that players who feel they belong to their region passed back 17.38% of what they received against 28.70% of the others (significant at 99% level). Students feeling they belonged to their own country gave back 29.17% vs. 23.24% (significant at 99% level). If I decompose the sample in the three citizenships, the differences are no longer significant. Looking into data deeper suggest that at the aggregate level the regional sentiment captures the Flemish component. As we already know, the Flemish passed back significantly less than the others, therefore the shown aggregate difference has to be imputed to nationalist differences and not to the self – reported nationality. These results are a partial proof of my initial claim: using descriptive statistics can lead to biased results due to hidden effects.

In the next subsection I will comment upon the results coming out from an OLS regression.

4.2 Econometric results

The research about so – called “experimetrics” is at its embryonic stage [see Camerer (2003) and Bardsley and Moffatt (2003)]. The aim of this branch of econometrics is to provide experimenters with powerful tools to investigate experimental data. Unfortunately, at the moment this discipline is still too underdeveloped to be used here. In a previous paper [see Migheli (2006)] I analysed data through an instrumental variable regression using GMM technique. The hours spent out with friends were instrumented by using an important variable, living in a student's room, which is not exploitable in the whole

sample, as Italian students are used to living in their parents' home. Hence I would rule out almost an entire part of my sample. As a consequence I use OLS here for the whole dataset. Moreover, a Durbin – Wu – Hausman test shows that no endogeneity problem affects data. Thus an OLS regression is consistent. However heteroschedasticity may be present, then I use robust standard errors.

I will comment here on the results for *Group A*. I will distinguish between formal and informal networks, as previously assessed. I will also control for nationality, using the Italians as a basic case. Several formal organizations apart from one display a significant positive result.

Tables 1 and 2 summarize econometric results for group A. In Table 1 networks are analyzed one by one, whilst some aggregation is performed in Table 2. Table 1 shows that spending time within religious, political and youth associations is positively and significantly linked to passed amount.

First of all, participation in religious associations is positively linked and the coefficient is big. It is not surprising that people, who believe in religious principles, trust a higher number of unknown partners. It is interesting that this result appears despite different confessions and different cultural approaches to religious beliefs.

Joining a political party is strongly significant and displays a positive coefficient. The more time a person spends within a political organization, the more likely he is to have a high level of trust. This is consistent with my hypotheses. In some sense, political parties are kinds of pro-social organizations. Hence I have a further confirmation of the fact that social-aimed groups foster generalized trust.

Activity in youth organizations has a significant positive effect, although the coefficient is smaller than for the previous variable. Once more my findings corroborate the initial expectations. Social life and frequent contacts with other people are a good sign of being trustful.

Formal networks display in general a positive link with generalized trust. This is true especially for religious and youth organizations. Despite my expectations, social associations do not appear to be linked with generalised trust.

When considering informal networks, we can notice that the use of the Internet is significantly and positively correlated to the amount passed. This means that active communication²⁰ through the WWW represents a form of social capital. In fact the virtual net allows distant people to keep each other in contact; in economic terms this means to lower the depletion rate of social capital. It is likely to claim that distance and time together erode friendships. But when and where there exists the possibility of continuation for interpersonal contacts, time and distance exert a diminished (or null) weakening effect. Hence Internet communication is very valuable in order to preserve both the individual and collective stock of social capital.

The number of text messages sent presents a negative and significant coefficient. At first sight, this result could appear in contrast with my initial hypotheses, but there is a possible interpretation in favour of them. According to Barkhuus (2005) shy people use a larger number of text messages, than the average population. Shyness could be a cause of “generalized distrust” or, in any case, of a lower level of generalised trust. Interpreted in this way, my result is consistent with my expectations. The net constituted by messages represents a lack of social capital, rather than a valuable asset in this sense.

Phone calls do not display any significant effect, even though the coefficient is strongly positive and almost significant (85% level). This result is only partially different from Fisman and Khanna (2001), who found a positive and significant contribution of the number of owned telephones. Also time spent out with friends is not significantly related to passed amounts. Nevertheless, I found out some evidence that also informal networks are part of social capital.

The usual gender effect is detected: male players gave more than female colleagues. This can be due to the different perception of risk, fairness and opportunities of the two sexes, as outlined by Andreoni and Vesterlund (2001) and Simpson (2003). Apparently the

²⁰ I would like to remember here that the questionnaire explicitly asked the player to indicate the amount of time spent in active communication with friends, so data measure no other activity involving the use of the Internet.

fact that women associate less than men [see Migheli (2007)] is also mirrored by their lower level of generalized trust.

Self-reported ethnicity is not significant, but Norwegian players display a higher level of trust, whilst Flemish participants are not different from Italians (here taken as basic case).

Table 2 shows the results when the frequentations of some types of associations are summed up, as written in section 4. In particular *prosocial* represents time spent in social, political and environmental groups, whilst religious ones have been excluded, as one of my major aims is to study the effects of religious affiliations separately. *comm1* is the sum of time spent in active communications, through telephone and the Internet; *comm2* is the sum of hours of phone conversations and the number of sent sms²¹, but not the time spent out with friends; *comm3* includes the number²² of sms, and time spent communicating through phone and the Internet. Eventually *comm4* contains also the time spent out with friends. When *comm1* is used a control, passed amounts are positively and significantly correlated with it, and negatively with the number of sent text messages. Pro-social activities also show a positive and significant influence, as well as religious ones, whose coefficient is more than double, evidencing a stronger impact. The number of sisters also appears to be positively correlated with passed money. Youth organizations show a positive and highly significant coefficient, as well as cultural associations, but in this latter case the coefficient is not significant (pvalue = 0.106).

When sms and phone communication are gathered, they are not significant²³, while the time spent in the Internet show a positive and significant coefficient. Notably active participation in cultural associations and passed amounts are positively and significantly linked, and the magnitude of the coefficient is bigger than before.

Now I examine results for **Group B**. In this case, very few variables are significant; nevertheless I found out strong geographical differences (my reference term is represented

²¹ As hours and absolute numbers can not be summed up, I normalized time spent in active communications through the Internet and the phone, hours spent with friends out, and the number of sent sms. Then I summed up these means. All these variables are on weekly base.

²² Always normalized.

²³ The “driving apart” forces exerted by text messages (negative), and the Internet (positive) render the coefficient non significant.

by Italian players). In addition to the amount passed, I also build a discrete variable measuring the final outcome for players of kind A and players of type B. Basically I calculate the difference between the sum that A and B have at the end of the game. I rank 0 the case $B > A$, 1 the case $B = A$, and eventually 2 the case $B < A$. I analyze this new variable through ordered probit (and I always use robust standard errors).

First I consider the amount passed in percentage of the received one as dependent variable. The absolute sum received is positively and significantly correlated. This means that reciprocity is influenced by trust and that some anger attains people receiving small pieces of the cake.

Nationality counts: the Flemish are less reciprocating than the Italians, who in turn do not differ significantly from the Norwegians. This is in contrast with my initial geographical hypothesis, even if the coefficient for the Norwegians is larger than for the Italians. In addition, the Flemish suffer ethnic tensions within their country (Belgium).

Participation in religious associations matters: the coefficient is significant. This is consistent with my initial claims. Religious capital can be considered a part of social capital. On the one hand it generates social contacts, and hence joining a religious organization is equivalent to joining any other association; on the other hand religious values also promote civil values, and hence they further increase social capital [see Putnam (1993)].

People spending time in associations caring for the environment and for animals' rights also reciprocate more. The sign of the latter coefficient is in contrast with the sign of Group A. Although this result is consistent with my initial hypotheses, I recall the exiguity of respondents who are members of organizations for the defence of animals' rights. I think that this coefficient better represents the real link between the two considered variables: the result I had for the previous group could be spurious as a consequence of some other hidden effect. However the number of non null observations is too small to allow me a reliable interpretation. The coefficient obtained for environmental associations is in line with my hypotheses: developing environmental sensibility enhances reciprocation.

The more time is spent within social organizations, the more reciprocating the player's behaviour. Again, this result is in line with my expectations. People caring for social problems are more likely to behave in a more reciprocating way.

The number of text messages sent is here again significant, but in this case the coefficient is positive.

An interesting result is that the coefficient for self-reported ethnicity is not significantly different from zero²⁴. This could have two interpretations. The first is that ethnicity is not felt important by university students, because their high education surpasses this sentiment. This can partially be due to good integration in the framework in which they live. Basically Leuven, Torino and Oslo are multicultural cities. Here tensions are weaker than in other contexts, especially than those, where scholars performed studies and/or experiments on the influence of ethnicity [see Borjas (1995), La Ferrara (2000), Humphreys, Posner and Weinstein (2002), Soroka (2003), Miguel and Gugerty (2005)]. As a consequence, it can be that ethnicity is not felt to be an important discriminating factor.

In what follows, I examine the results of the ordered probit estimate. My dependent variable is defined above. In practice this is another way to treat the same problem as before, but now I am considering the total end result (although from player A's viewpoint). Again, I require STATA to perform the calculations using robust standard errors.

The main results are quite similar to the ones obtained in the previous case, with some difference. The larger the amount of money received, the lower the probability for A to end up better than B. This means that in general when B players received a huge quantity of money, they did not pass back a sum sufficient to restore equality between the two players. On the other hand when A passed a low amount of his initial endowment, it is likely that A ended better than B.

In the probit regression, to be Flemish does decrease the probability for A to end up better than B, whilst the opposite happens for Norwegians. The basic case is represented by the Italians, as usual. If we rely on La Ferrara (2000) and Miguel and Gugerty (2005), living

²⁴ About the importance of ethnicity for individual choices, see for example Borjas (1992), La Ferrara (2000) and Humphreys, Posner and Weinstein (2002).

in an environment characterized by ethnic tensions lowers the level of social capital. Hence the results I got are still consistent with my initial hypotheses.

Only formal networks display significant coefficients in probit estimates. In particular I can highlight that spending time within own-faculty associations increases the probability of having A better than B. Also participation in other students' organizations, in environmental groups and associations for the protection of animals' rights enhances reciprocity. These findings are consistent with my initial claim that formal organizations foster trust and reciprocity. In other words, that social capital, measured as in the present work, promotes both generalized trust and reciprocity. Informal networks, ethnicity and gender are not influential in this case.

In conclusion, I have some positive evidence in favour of my initial hypotheses. In particular not only formal networks (the traditional measure of social capital) but also informal ones are part of social capital, as they promote trust and reciprocity.

When considering marginal effects, we can notice that the probability of passing from 1 (even final distribution of money) to 2 (A ends up with more than B) is positively linked with time spent in formal organizations (especially students', environmental, and others). Informal networks do not display significant correlations with the dependent variable. However, this could be due to the fact that absolute values for these variables are in a wider range than those of formal organizations. To be Flemish exhibits a negative significant coefficient, while the opposite happens for being Norwegian.

Results for passing from 1 to 0 (B ends up with more money than A) show several negative and significant coefficients. Again they are all among formal associations (students', environmental, groups for the defence of animals' rights). Only time spent in political parties has a positive coefficient. The dummy for being Norwegian shows a negative coefficient.

The inclusion of aggregated variables (those used for Group A) in the analysis of data for Group B does not change the results. Estimates (not shown) indicate that aggregated variables are not significant, while some of their components singularly taken are. This notable difference can be due to the fact that passed amounts proxy different dependent

variables; hence it would be incorrect to expect the same controls to exert the same (or similar) influence. So it would be erroneous to suppose that controls be significant in both cases.

5. Gender, social capital and the investment game

In the present work I attained three main results. The first one is providing evidence that also informal networks matter for trust and reciprocity, and hence they should be considered part of individual social capital. The second is an investigation about which kind of networks foster generalized trust and reciprocity. The third issue is evaluating the gender effect net of social capital. The rationale for this last point comes from the observation that women join voluntary associations less than men [see Migheli (2007)].

My results provide evidence for informal networks to be considered among components of social capital. In particular telecommunications show significant coefficients.

As for the types of networks that I should consider as social capital, we can notice that some organizations have no significant effect. In particular this is the case of sports and cultural associations²⁵. Hypothetical networks due to siblings are either not significant or not captured by considering the number of brothers and sisters. Surprisingly the time spent out with friends is not significantly correlated with trust and reciprocity. However I think that self reported figures for this variable could be distorted by subjective interpretation: some respondents could also have included the time spent in some organizations with friends. In this case duplication would occur, and in any case data about this variable would be inconsistent internally.

We observe the usual gender effect: women trust less than men. Although a huge amount of literature has recently appeared on this topic [see Croson and Buchan (1999), Andreoni and Vesterlund (2001), Camerer (2003) and Simpson (2003)], a definitive explanation for this phenomenon has not yet been provided. However my results are in line with the general international evidence [see Croson and Buchan (1999) and Camerer (2003)]. What I would like to highlight is the following: in Migheli (2007), I found some evidence for women to join voluntary associations less than men. Memberships to these

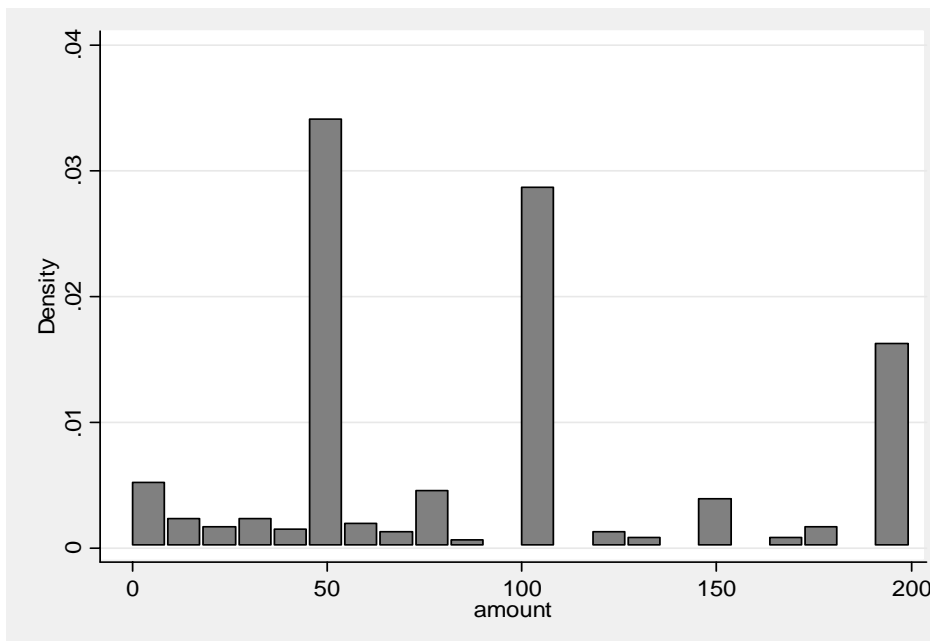
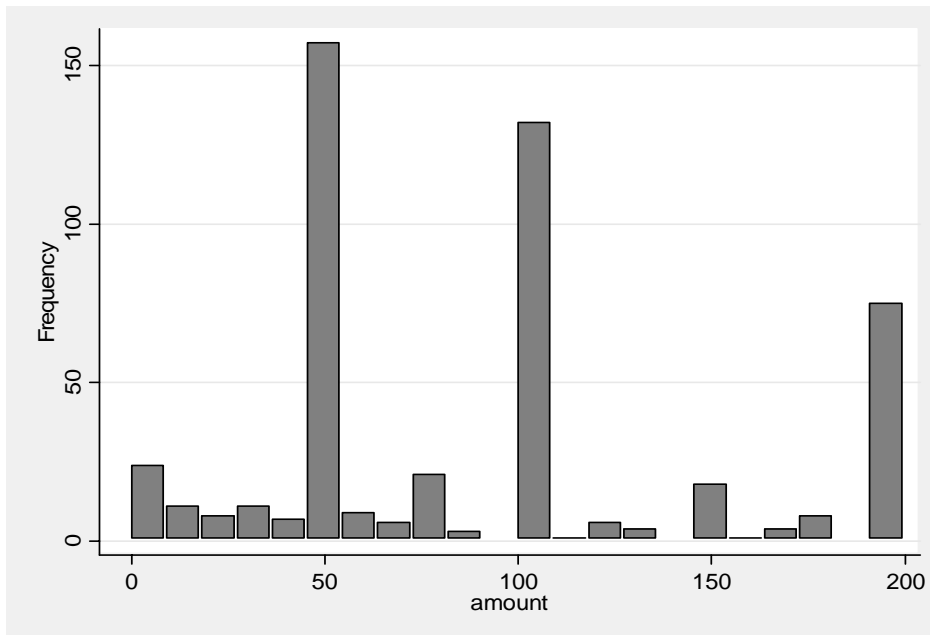
²⁵ In Migheli (2005) we referred at them as “neutral associations”, arguing that they do not enhance social capital, given their specific purpose. This hypothesis appears to be verified here.

organizations are generally viewed as the most important part of social capital [see Putnam (1993) and Durlauf and Fafchamps (2004)], and most of the literature considers generalized trust as a product of social capital [see Durlauf and Fafchamps (2004) and Guiso, Sapienza and Zingales (2004)]. As a consequence of all this, the lower level of women's trust could simply be due to females having a lower level of social capital. Hence by controlling for this last variable, the gender effect should have weakened or disappeared. This is not the case for trust. As for reciprocity the problem is more controversial [see Camerer (2003)]. My conclusion here is then that a gender effect does exist, which is not linked to the endowment of social capital (provided that I am measuring the latter in a right way).

In conclusion, my work leads us to think that not all formal networks can be included in an individual's stock of social capital. In particular neutral²⁶ voluntary associations should be excluded. Secondly I show that also some informal networks matter and hence should be taken into account when measuring social capital. Eventually I strengthen the common finding that gender per se influences trust.

²⁶ See Migheli (2005).

Figure 1. Passed amounts (Groups A: all the countries)



**Figure 2. Passed amounts in percentage of the received sum
(Groups B: all the countries)**

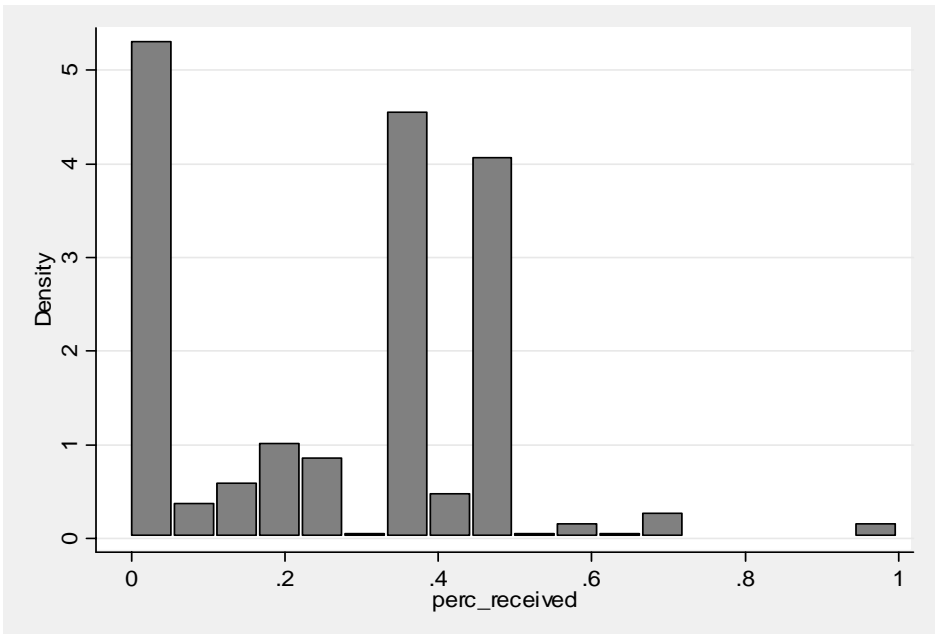
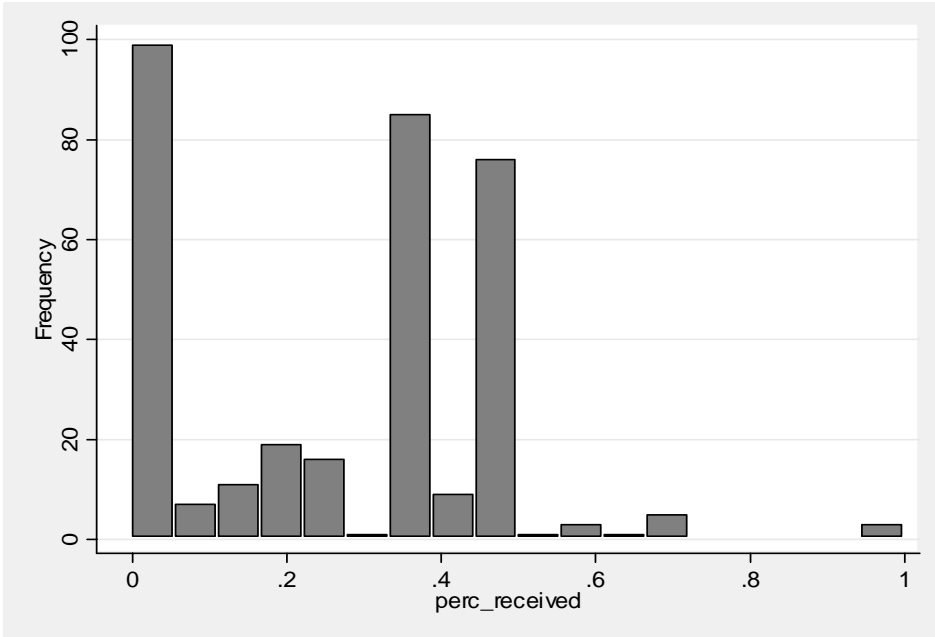


Table 1. OLS estimation for Groups A and B (with robust standard errors)

	Group A	Group B
Received amount		0.00064*** (0.00005)
Sport	0.26579 (0.97483)	-0.00273 (0.00293)
Cultural	2.26805 (2.39840)	-0.00237 (0.00524)
Faculty	-0.69943 (2.32861)	0.00067 (0.00281)
Other student	0.35542 (2.72587)	0.00305 (0.00273)
Religious	4.12314* (2.43982)	0.01405* (0.00873)
Environmental	-11.86547 (10.60009)	0.03552* (0.02015)
Animal rights	-86.3604** (39.46027)	0.03467*** (0.00972)
Political	4.99683*** (1.37667)	-0.01413 (0.00992)
Youth Organizations	2.67570*** (0.97074)	0.00491 (0.00395)
Social	0.12526 (1.32027)	0.01041** (0.00358)
Others	0.21983 (4.17581)	0.00878 (0.01120)
Telephone	1.33550 (0.93088)	0.00078 (0.00492)
SMS	-0.20408* (0.10523)	0.00081** (0.00036)
Internet	0.34997*** (0.08893)	0.00145 (0.00165)
Friends	-0.30070 (0.25568)	0.00002 (0.00064)
Brothers	-0.03858 (2.97318)	-0.00123 (0.01264)
Sisters	4.33180 (3.44675)	-0.00054 (0.00950)
Job	-2.20926 (6.4074)	
Born in the city where studying	-3.47339 (10.87764)	0.00652 (0.02159)
Room		-0.01651 (0.02418)
Ethnicity	2.0295 (3.62478)	0.00000 (0.01395)
Gender	14.24493** (5.84131)	0.01239 (0.01951)
Flemish	-1.96596 (7.38568)	-0.07474** (0.03501)
Norwegian	31.74061*** (9.65463)	0.05773* (0.03007)
Cosntant	66.96959	0.01324
	Obs.:456	Obs.: 325
	R ² =0.116	R ² =0.478

Dependent variable: passed amount (A) and percentage of received amount (B)

Note: participation in both formal and informal networks is measured in hours per week, but SMS measured in absolute numbers. Subjective ethnicity was measured by the question: "Which cultural-ethnic group do you feel to belong to more?"

Table 2. OLS estimation for Group A

	1	2	3	4
Sport	-1.06189 (1.09410)	-0.87238 (1.09330)	-0.86388 (1.09480)	-0.84467 (1.10168)
Cultural	3.68128 (2.27083)	4.00486* (2.31681)	4.05157* (2.31503)	3.88855* (2.36647)
Faculty	-1.27818 (1.68562)	-1.41782 (1.74255)	-1.38508 (1.72556)	-1.42457 (1.68923)
Other student	-0.13275 (3.05305)	-0.55685 (3.21116)	-0.581227 (3.20709)	-0.71196 (3.14698)
Religious	6.20334** (2.44295)	6.61349** (2.58938)	6.59006** (2.57909)	6.79645*** (2.54866)
Prosocial	2.90548** (1.32967)	2.75757** (1.29281)	2.76363** (1.28808)	2.88116** (1.34724)
Youth Organizations	3.12011*** (0.77799)	2.89133*** (0.76330)	2.89277*** (0.76113)	2.77915*** (0.78230)
comm1	0.42175*** (0.14585)			
comm2		1.20465 (1.99616)		
comm3			1.59047 (1.12195)	
comm4				0.89140 (1.05058)
SMS	-0.20287* (0.11045)			
Internet		0.281256* (0.15707)		
Friends	-0.36118 (0.26826)	-0.378058 (0.266508)	-0.37323 (0.26710)	
Brothers	1.31119 (3.49601)	0.84118 (3.48842)	0.83448 (3.48319)	0.88530 (3.52047)
Sisters	7.71450** (3.75406)	7.55340** (3.77070)	7.48100** (3.75329)	7.06243* (3.78989)
Job	-3.21258 (6.93086)	-4.52496 (7.02770)	-4.65253 (7.01156)	-5.20620 (7.07880)
Room	-0.98437 (7.90967)	-2.87337 (7.97754)	-3.03985 (7.93779)	-4.38911 (7.85772)
Ethnicity	1.74628 (3.82509)	1.94152 (3.82844)	1.92407 (3.82049)	2.10935 (3.82051)
Gender	11.63242* (6.51308)	11.42911* (6.54692)	11.63928* (6.50252)	11.68511* (6.51931)
Flemish	-5.29752 (9.27400)	-1.32018 (9.51032)	-0.79409 (9.30880)	0.94884 (9.28435)
Norwegian	31.4382*** (11.00336)	28.82867*** (10.98934)	28.81964*** (9.30880)	29.7887*** (9.28436)
Cosntant	69.96037	66.85206	66.15447	63.86246
	Obs.:434	Obs.: 434	Obs.: 434	Obs.: 434
	R ² =0.134	R ² =0.124	R ² =0.124	R ² =0.118

Dependent variable: passed amount (A) and percentage of received amount (B)

Note: participation in both formal and informal networks is measured in hours per week, but SMS measured in absolute numbers. Subjective ethnicity was measured by the question: "Which cultural-ethnic group do you feel to belong to more?"

Table 3. Ordered Probit (marginal effects) regressions for Group B

Dep. Var. classed final outcome	y = 1	y = 2
Received amount	0.00083*** (0.00015)	-0.00150*** (0.00016)
Sport	0.00166 (0.00467)	-0.00300 (0.00844)
Cultural	-0.00832 (0.00853)	0.01502 (0.01508)
Students (own faculty)	-0.00977* (0.00553)	0.01765* (0.00974)
students (other faculties)	-0.01266* (0.00691)	0.02285* (0.01229)
Religious	0.00978 (0.01262)	-0.01767 (0.02234)
Environmental	-0.05684* (0.03349)	0.01026* (0.05957)
Animal rights	-0.63896** (0.27666)	1.15386** (0.46092)
Political	0.02780** (0.01176)	-0.05019*** (0.01877)
Youth Organizations	-0.00945 (0.00746)	0.01707 (0.01332)
Social	-0.01339 (0.00891)	0.02417 (0.01591)
Others	-0.04892* (0.02995)	0.08836* (0.05352)
Telephone	-0.00722 (0.00832)	0.01304 (0.01477)
SMS	-0.00021 (0.00034)	0.00038 (0.0006)
Internet	-0.00135 (0.00249)	0.00245 (0.00449)
Friends	0.00122 (0.00113)	-0.00221 (0.00201)
Brothers	0.01310 (0.01681)	-0.02356 (0.03063)
Sisters	0.00791 (0.01315)	-0.01429 (0.02361)
Job	-0.03735 (0.03847)	0.06528 (0.06542)
Non foreigner	-0.05238** (0.02254)	0.13142 (0.08944)
Room	0.04219 (0.03568)	-0.07469 (0.06196)
Ethnicity	0.01470 (0.01851)	-0.02655 (0.03372)
Gender	-0.01026 (0.02955)	0.01845 (0.05277)
Flemish	0.06990* (0.04074)	-0.13751* (0.08467)
Norwegian	-0.16913** (0.06436)	0.26608*** (0.08616)

Obs.: 335

Table 4. Descriptive statistics for formal networks participation (Group A)

	Membership rate		Missing	Average time spent ²
	Absolute number	% of sample ¹		
Sport	309	56.91	12	4.69
Cultural	92	16.94	13	2.97
Faculty	131	24.13	16	1.77
Other Student	34	6.26	9	2.80
Environment	15	2.76	9	0.75
Animals	15	2.76	9	0.50
Politic	49	9.02	9	2.47
Youth Organizations	313	57.64	0	4.33
Social	36	6.63	9	2.68
Religious	52	9.58	9	2.15
Others	32	5.89	9	2.29

1 543 people (includes missing values)

2 Hours per week, excluding non members

Table 5. Descriptive statistics for informal networks participation (Group A)

	Membership rate		Missing	Average time spent ²
	Absolute number	% of sample ¹		
Telephone	528	97.24	9	2.29
SMS	533	98.16	10	31.07
Internet	527	97.05	9	7.37
Friends	542	99.82	16	13.80

1 543 people (includes missing values)

2 Hours per week, except SMS (absolute numbers)

Table 6. Geographical composition (Group A)

	Absolute number	% of sample ¹	Missing
Flemish	250	46.04	0
Italian	138	25.41	0
Norwegian	155	28.55	0
Foreigners	32	5.89	1

1 543 people (includes missing values)

Table 7. Descriptive statistics for formal networks participation (Group B)

	Membership rate		Missing	Average time spent ²
	Absolute number	% of sample ¹		
Sport	182	52.60	0	4.50
Cultural	72	20.81	0	3.44
Faculty	69	19.94	0	3.56
Other Student	16	4.62	0	5.13
Environment	24	6.94	0	1.02
Animals	3	0.87	0	1.83
Politic	24	6.94	0	3.12
Youth Organizations	228	65.90	0	5.19
Social	28	8.09	0	2.88
Religious	22	6.36	1	2.21
Others	17	4.91	1	2.06

1 346 people (includes missing values)

2 Hours per week, excluding non members

Table 8. Descriptive statistics for informal networks participation (Group B)

	Membership rate		Missing	Average time spent ²
	Absolute number	% of sample ¹		
Telephone	335	96.82	0	1.84
SMS	342	98.84	0	34.09
Internet	340	98.27	0	5.16
Friends	346	100.00	0	15.97

1 346 people (includes missing values)

2 Hours per week, except SMS (absolute numbers)

Table 9. Geographical composition (Group B)

	Absolute number	% of sample ¹	Missing
Flemish	128	36.99	0
Italian	116	33.53	0
Norwegian	102	29.48	0
Foreigners	20	5.78	1

1 346 people (includes missing values)

References

- **Anderson, Lisa R.; Mellor, Jennifer M. and Milyo, Jeffrey.** 2004. “Social Capital and Contributions in a Public-Goods Experiment” *The American Economic Review – Papers and Proceedings of the One Hundred Sixteenth Annual Meeting of the AEA*, 94(2): 373 – 376.
- **Andreoni, James and Vesterlund, Lise.** 2001. “Which Is the Fair Sex? Gender Differences in Altruism” *The Quarterly Journal of Economics*, 116(1): 293 – 312.
- **Bardsley, Nicholas and Moffatt, Peter G.** 2005. “The Experimentics of Public Goods: Inferring Motivations from Contributions” CeDEx Discussion Paper n. 2005-09.
- **Barkhuus, Louise.** 2005. “Why *Everyone* Loves to Text Message: Social Management with SMS”. Paper presented at the 2005 international ACM SIGGROUP conference on Supporting group work.
- **Berg, Joyce; Dickhaut, John and McCabe, Kevin.** 1995. “Trust, Reciprocity, and Social History” *Games and Economic Behaviour*, 10(1): 122 – 142.
- **Borjas, George J.** 1995. “Ethnicity, Neighbourhoods, and Human – Capital Externalities” *The American Economic Review*, 85(3): 365 – 390.
- **Bouckaert, Jan and Dhaene, Geert.** 2004. “Inter-Ethnic Trust and Reciprocity: Results of an Experiment with Small Businessmen” *European Journal of Political Economy*, 20(4): 869 – 886.
- **Camerer, Colin F.** 2003. *Behavioural Game Theory. Experiments in Strategic Interaction*. Princeton: Princeton University Press.
- **Croson, Rachel and Buchan, Nancy.** 1999. “Gender and Culture: International Experimental Evidence from Trust Games” *The American Economic Review*, 89(2): 386 – 391.
- **Cubitt, Robin P.; Starmer, Chris and Sugden, Robert.** 1998. “On the Validity of the Random Lottery Incentive System” *Experimental Economics*, 1(2): 115 – 131.
- **Durlauf, Steven N. and Fafchamps, Marcel.** 2004. “Social Capital” NBER Working Paper Series n. 10485.
- **Eckel, Catherine C. and Grossman, Philip J.** 2000. “Volunteers and Pseudo-Volunteers: the Effect of Recruitment Method in Dictator Experiments” *Experimental Economics*, 3(2): 107 – 120.
- **Fisman, Raymond and Khanna, Tarun.** 1999. “Is Trust a Historical Residue? Information Flows and Trust Levels” *Journal of Economic Behavior and Organization*, 38(1): 79 – 92.

- **Grootaert, Christian and van Bastelaer Thierry.** 2002. “Understanding and Measuring Social Capital” Forum Series on the Role of Institutions in Promoting Economic Growth.
- **Guiso, Luigi; Sapienza, Paola and Zingales, Luigi.** 2004. “The Role of Social Capital in Financial Development” *The American Economic Review*, 94(3): 526 – 556.
- **Henrich, Joseph.** 2000. “Does Culture Matter in Economic Behavior? Ultimatum Game Bargaining Among the Machiguenga of the Peruvian Amazon” *The American Economic Review*, 90(4): 973 – 979.
- **Henrich, Joseph; Boyd, Robert; Bowles, Samuel; Camerer, Colin; Fehr, Ernst; Gintis, Herbert and McElreath, Richard.** 2001. “In Search of Homo Economicus: Behavioural Experiments in 15 Small-Scale Societies” *The American Economic Review - Papers and Proceedings of the One Hundred Thirteen Annual Meeting of the AEA*, 91(2): 73 – 78.
- **Humphreys, Macartan; Posner, Daniel N. and Weinstein, Jeremy M.** 2002. “Ethnic Identity, Collective Action, and Conflict: an Experimental Approach”. Paper presented at APSA, Boston, September 2002.
- **Karlan, Dean.** 2005. “Using Experimental Economics to Measure Social Capital and Predict Financial Decisions” *The American Economic Review*, 95(5): 1688 – 1699.
- **La Ferrara, Eliana.** 2000. “Inequality and Group Participation: Theory and Evidence from Rural Tanzania” IGER Working Paper n. 161.
- **Lin, Nan.** 2000. “Inequality in Social Capital” *Contemporary Sociology*, 29(6): 785 – 795.
- **Migheli, Matteo.** 2007. “Exogenous Individual Characteristics and Social Capital in Western Europe” Working paper, University of Torino.
- **Migheli, Matteo.** 2006. “The Importance of Formal and Informal Networks on Generalized Trust in Flanders: an Experimental Approach to Social Capital” Working paper, University of Torino.
- **Miguel, Edward and Gugerty, Mark Kay.** 2005. “Ethnic Diversity, Social Sanctions, and Public Good in Kenya” *Journal of Public Economics*, 89 (11-12): 2325 – 2368.
- **Molm, Linda; Takahashi, Nobuyuki and Peterson, Gretchen.** 2000. “Risk and Trust in Social Exchange: an Experimental Test of a Classical Proposition” *The American Journal of Sociology*, 105(5): 1396 – 1427.
- **Putnam, Robert.** 1993. *Making Democracy Work. Civic traditions in Modern Italy.* Princeton: Princeton University Press.
- **Simpson, Brent.** 2003. “Sex, Fear, and Greed: a Social Dilemma Analysis of Gender and Cooperation” *Social Forces*, 82(1): 35 – 52.

- **Soroka, Stuart N.; Johnston, Richard and Banting, Keith.** 2002. “Ethnicity, Trust, and the Welfare State” in *Diversity, Social Capital and the Welfare State*, eds. Fiona Kay and Richard Johnston, 33 – 57. Vancouver: University of British Columbia Press.