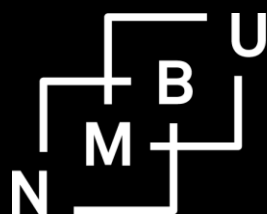# How Do Social Preferences and Norms of Reciprocity affect Generalized and Particularized Trust?

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Norwegian University of Life Sciences
Centre for Land Tenure Studies

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How Do Social Preferences and Norms of Reciprocity affect Generalized and Particularized Trust?[1]

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Abstract

We study how social preferences and norms of reciprocity are related to generalized and particularized trust among members of youth business groups in northern Ethiopia. Members of these groups are recruited among land-poor rural youth. The Ethiopian government promotes youth employment among land-poor rural youth by allocating them rehabilitated communal lands for the formation of sustainable businesses. The groups are organized as primary cooperatives, elect their own board, make their own bylaw and prepare a business plan that has to be accepted by the local government. The typical sustainable production activities that the groups are allowed to invest in include apiculture, forestry, horticulture, and livestock production. A recent study found that they to a large extent organize themselves according to Ostrom's Design Principles (Ostrom 1990; 2010; Holden and Tilahun 2018) and that group performance, including trust, is positively correlated with the degree of compliance with the Design Principles.

Our study has used incentivized experiments to elicit social preferences and trust. We use data from 2427 group members in 246 functioning business groups collected in 2019. We find that members with altruistic preferences have stronger norms of reciprocity and are more trustworthy and trusting both in outgroup and ingroup contexts. The norm of reciprocity is stronger in groups with a higher share of altruistic members and this enhances both generalized and particularized trust. The average levels of trust and trustworthiness among group members were low, even in the African context, but there were large variations in average levels of trust and trustworthiness across groups. We can, therefore, rule out that high levels of trust and particular social preferences are necessary for the stability achieved by the majority of these recently established youth business groups in northern Ethiopia. This indicates that the model is quite robust and may be replicable elsewhere.

Keywords: Social preferences, norm of reciprocity, trust, trustworthiness, youth, sustainable business.

JEL codes: D22; D64; D71; D91; C93.

1. Introduction

The pressures on the natural resource base from population growth, economic development, and climate change is increasing and making it harder for people to carve out sustainable livelihoods within vulnerable agro-ecologies. Such pressures are particularly increasing in parts of Sub-Saharan Africa where population densities are very high and rainfall is limited and variable. The Ethiopian highlands is one such "environmental hot-spot" where rural transformation is needed to meet the needs of the new generation in search of new livelihood opportunities as they cannot only continue in the footpaths of their parents (Bezu and Holden 2014). The shrinking farm sizes have now reached a level that implies that further splitting of farms among the children leads to micro-farms that require complementary sources of income for those having such farms. One policy initiative in northern Ethiopia has been to allocate rehabilitated communal lands to groups of landless and land-poor youth that aim to establish a livelihood in their rural home community. A census of more than 700 such groups by Holden and Tilahun (2018) found that these groups were quite well organized and formalized as primary cooperatives. They found that the groups to a large extent organized themselves based on Elinor Ostrom's Design Principles (Ostrom 1990; 2010), and a set of performance indicators were positively correlated with their degree of compliance with these Design Principles (Holden and Tilahun 2018). One of these performance indicators was the perceived level of within-group trust. That study was based on group leader interviews carried out in 2016 and the measure of trust was survey-based. This study is a follow-up study of a sub-sample of close to 250 groups that were surveyed in 2019 with individual group member interviews and experiments to measure generalized as well as in-group trust of group members. Our scope is therefore narrowed in on the relationship between social preferences, norms of reciprocity and trust and the variation in these across and within youth business groups that represent recently formed social-ecological systems (SES) (Ostrom 2009). Our focus is thus on one of ten second-level variables identified by Ostrom (2009) to be crucial for the ability of groups to self-organize. Many may question whether youth are able to organize themselves and jointly manage a common-pool resource in a sustainable way. It is therefore both a bold and a risky policy initiative that we are studying.

Trust, norms of reciprocity and social preferences represent forms of social capital and they may explain as well as be the result of development (Putnam et al. 1993; Ostrom and Ahn 2007). Other-regarding preferences are recognized to be important for economic and social outcomes such as cooperation in the workplace (Fehr and Fischbacher 2002). Trust has been found to play an important role in terms of enhancing group cooperation (Rothstein and Uslaner 2005; Ostrom 2010). Our study builds on second-generation collective action theories which acknowledge that a significant proportion of individuals have non-selfish preferences (Camerer 2003; Frey 1994; 1997; Fehr et al. 2009). Social motivations and endogenous preferences play important roles in second-generation collective action theories (Rabin 1993; Fehr and Schmidt 1999; Bolton and Ockenfels 2000; Charness and Rabin 2002; Bowles 1998; 2000). Ostrom and Ahn (2007) sees

trust as a core link between various forms of social capital and collective action. Trusting other people is risky and trust is based upon beliefs about the trustworthiness of others (Gambetta 2000). Repeated interactions are needed to verify the beliefs and the outcome of such verifications can affect the beliefs and thereby the level of trust over time in small groups. Even selfish individuals find it beneficial to be trustworthy in such situations when their reputation matters for their future outcomes (Ostrom and Ahn 2007).

There exists no consensus on how best to define and measure generalized and particularized trust. We follow Fehr (2009) and Coleman (1990) and define and measure trust as the sending behavior of trustors in the standard trust game (Berg et al. 1995). And, we define and measure trustworthiness by the returning behavior of trustees in the trust game. By varying the players that the trust game is played with we obtain measures of generalized trust and particularized (ingroup) trust and trustworthiness. By use of a set of simple binary incentivized dictator games, we elicit generalized and particularized social preferences building on Fehr et al. (2013) and Bauer et al. (2014). Rothstein (2000) emphasizes the importance of norms in creating and maintaining generalized trust. We have included survey questions on the norm to reciprocate in our study and assess how this norm is related to social preferences, trustworthiness, and trust.

We build on the recommendation by Manski (1993) for the study of endogenous social effects to collect more and richer data by combining experimental data with observed behavioral data and perception data. There is still a shortage of studies that combine these three types of data although the number of experiments has increased, including field experiments. Agrawal and Chhatre (2006) also call for more targeted use of quantitative and statistical analyses and Agrawal (2014) calls for use of more sophisticated methods, including experiments, in the analysis of commons and common-pool resources outcomes. Our study is utilizing a large sample compared to most studies of experimental trust and is unique in assessing how generalized trustworthiness and trust are related to social preferences and norms of reciprocity and the formation of ingroup trustworthiness and trust in youth business groups.

The overall objective of this study is to examine the level of trust within these recently formed youth business groups and how it relates to generalized individual trust and social preferences and group performance. We aim to answer the following research questions. How do social preferences and norms of the youth group members influence outgroup and ingroup trust and trustworthiness? And, how much within-group and between-group variation is there in social preferences, norms of reciprocity and generalized trust and trustworthiness and does this affect trust-building within groups? How do social preferences, trustworthiness, and trust among youth in these groups compare to that found in other studies? To what extent can the good performance by the youth business groups be due to such preferences, norms, and trust and are these very different from that of youth other places? This matters for whether the youth business group organizational model is likely to be transferable to other places.

The specific objectives are to a) assess the variation in individual outgroup and ingroup trust and trustworthiness and how these are related to social and economic preferences, social norms of reciprocity and social relations in the groups; b) assess the variation in group-level trust and how it is related to group characteristics in terms of the distribution of social preferences and norms,

outgroup trustworthiness, and social relations in the groups; and c) assess the extent to which social preferences and norms enhance or constrain ingroup trust-building and group performance. Our findings are likely to be of high relevance for the sustainability of the youth group model in the study areas and for its generalized relevance other places.

2. Context

Population growth will continue to be high in Sub-Saharan Africa (SSA) for several decades and combined with climate change there will be a formidable policy challenge to create sustainable livelihood opportunities for the growing population. Much of the population growth will take place in rural areas. Creating youth employment is therefore high on the agenda in many SSA countries, including Ethiopia. There is a need to increase the absorption capacity of rural areas to limit rural-urban migration as well as international migration, which is becoming increasingly unpopular in receiving countries.

Land-use intensification and rural transformation are keys to enhancing the absorption capacity of rural areas, protecting the natural resource base and creating sustainable livelihoods. A lot has been done in this direction in our study areas in Tigray Region in northern Ethiopia, which are characterized by a semi-arid climate with a long dry season and erratic rainfall. Large investments have been made in soil and water conservation, tree planting, and protection of the natural vegetation. Local collective action has played a central role with support from the outside to halt land degradation and facilitate rehabilitation of large areas. Tigray Region received the Future Policy Gold Award 2017 from the World Future Council and the United Nations Convention to Combat Desertification (UNCCD) for its youth-inclusive land restoration policy (World Future Council 2017). This policy has for many years included a community-level approach to watershed management where all able-bodied adult members had to contribute 20-60 days per year of free labor for investment in local public goods. This has been combined with food-for-work and cash-for-work with additional funding from the outside such as from the UN World Food Program, The World Bank and other donors.

To tackle growing rural landlessness the youth business group initiative we study was initiated around 2011 by the regional government (Holden and Tilahun 2018). Holden and Tilahun (2018) made a census of 740 such groups in five districts in Tigray in 2016. The groups can be categorized into two main types, temporary mineral groups (about 300 of the groups) and groups provided rehabilitated communal lands to establish a sustainable natural resource-based business. The mineral groups were given a temporary license to extract a mineral resource to accumulate capital. When this capital level has been reached, they "graduate" and are expected to find another livelihood where they can invest the starting capital they have raised as members of the mineral group. This study focuses on the other category of groups that are allocated more permanent rights to rehabilitated communal land areas.

Formally, these groups are established as primary cooperatives based on local cooperative law. To be eligible the youth have to be registered as landless or near landless in their home community (*tabia*) and apply to join the program. Group members have typically self-selected themselves

within a neighborhood to form groups. The groups self-organize by electing a board of five members (leader, vice-leader, secretary, accountant, and treasury), establish their own bylaw, and make a business plan that has to be accepted by the local authorities. Their bylaws include rules for organizing group activities such as group meetings and group work activities, sharing rules for responsibilities and incomes, and punishment rules for violations. Their accounts are also subject to auditing by the local authorities. Some support and monitoring is provided by local youth associations. Some groups have benefitted from donations and have obtained credit for investments.

Each formally registered group is provided a demarcated area, typically a rehabilitated communal land area, for their activity. They are required to manage this area in a sustainable way and protect the indigenous species growing there. At the same time, enrichment planting with e.g. eucalypts is allowed, and so is the planting of other trees and bushes and harvesting of grass as fodder for animals. Apiculture, livestock (cattle fattening, sheep and goat fattening, dairy), irrigation (vegetables and fruits), and forestry are the dominant group production activities on the allocated land areas (Holden and Tilahun 2018).

Holden and Tilahun (2018) found that the youth groups to a large extent complied with Ostrom's Design Principles and that their degree of compliance with these was positively correlated with group trust, group size stability, Youth Association ranking and group income per member. They assessed trust with a 5-level Likert scale ranking by the group leader.

3. Theoretical framework and conceptual model

Ostrom (2009) identified norms and social capital (moral and ethical standards regarding how to behave in groups including norms of reciprocity and trust) as one of ten crucial second-level (set of) variables that can reduce the transaction costs in reaching agreements and lower costs of monitoring (Baland and Platteau 1996; Trawick 2001; Ostrom 2005).

Trust can be an important indicator of group performance and be associated with the characteristics of group members, their preferences, norms, and expectations that are crucial for solving collective action problems and making groups work better. The relations between individual social and economic preferences, norms, expectations and behavior in form of trust and trustworthiness are complex in closely-knit groups. We build on second-generation theories of collective action and take heterogeneous preferences seriously (Ostrom and Ahn 2007). We, therefore, take social preferences as independent and non-reducible reasons why some individuals are more trustworthy than others and have stronger norms to reciprocate. Our basic assumption is that such preferences and norms and the distribution of these in groups may be important explanations for the building of within-group trust, which is an important basis for collective action (ibid.). We present a simple conceptual model (Figure 1) to illustrate the core parts of these relations. We will later use group member data and group level data to empirically estimate these relations.

We distinguish outgroup and ingroup trust and trustworthiness. By outgroup trust, we mean the generalized trust that group members have towards others outside their own group. By ingroup trust we mean the level of trust that group members feel towards other (anonymous) members of

their own group, and likewise for trustworthiness. Generalized trust depends on social preferences, cultural norms, social stability and many other factors that we do not aim to investigate here. We take social preferences as given individual characteristics. We use three-level categorical variables to capture variation in norms of reciprocity in the generalized (outgroup) and particularized (ingroup) settings.
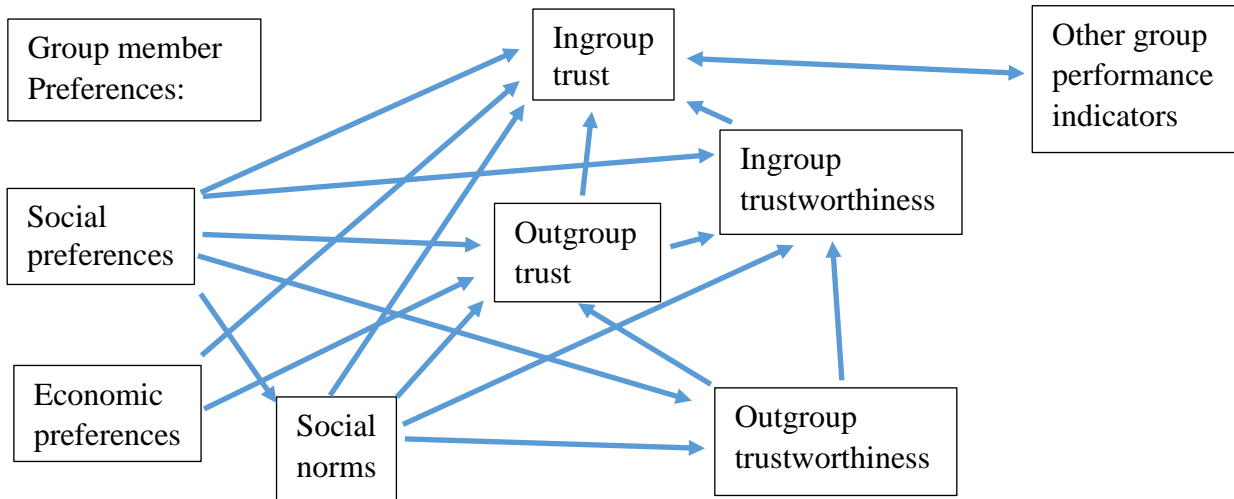

Figure 1. Conceptual model

We use incentivized trust games (Berg et al. 1995) to get measures of ingroup and outgroup trust and trustworthiness. We also use incentivized experiments to reveal indicators of social and economic preferences of group members, building on Fehr et al. (2013), Bauer et al. (2014) and Gneezy and Potters (1997). We have identified members that are altruistic, egalitarian, spiteful or selfish in experiments with other unknown outgroup members. We assess how such social preferences may affect or be correlated with a norm to reciprocate, and thereby also affect individual trustworthiness as a basis for trust, both generalized trust, and ingroup trust. Ostrom and Ahn (2007) propose that dense social networks also enhance reciprocity norms through the transmission of information across individuals about who is trustworthy and who is not. We assess the extent of and difference in such norms of reciprocity in the outgroup (generalized) and ingroup contexts.

Repeated interactions within closely-knit groups hold the potential to build trustworthiness and trust within a short period of time but this depends on the ability of groups to function well. We use indicators for the social relations in the groups as additional indicators of group performance. Finally, we assess the correlation between ingroup trust and these other indicators of group performance. We expect high ingroup trust and trustworthiness to be positively related to the general social relations in the groups.

Trusting people is risky (Gambetta 2000; Ostrom and Walker 2003). Economic preferences in terms of risk tolerance may therefore also play a role in determining outgroup and ingroup trust. Trust may therefore also depend on expected trustworthiness to the extent that trust has more

Figures 2a and 2b. 2a: Ingroup versus outgroup trust investment. 2b: Net trust gain (share).

Figure 2a shows that there was a large difference in the ingroup versus outgroup trust. About 25% invested nothing in an outgroup member while less than 5% invested nothing in an anonymous ingroup member. The median amount invested in the ingroup trust game was the double of that invested in the outgroup trust game. The trustworthiness of outgroup trustees was limited, however, the majority returned a smaller amount than that sent by the trustors who sent some money. The median respondent only felt somewhat obliged to return an amount as large as that sent by an anonymous outgroup trustor.

4.2. Social preferences and the norm of reciprocity

Social preferences may contribute to explain trust and cooperation within groups as well as the behavior towards anonymous outgroup members. Building on the simple social preference games of Fehr et al. (2009; Fehr et al. 2013; Chowdury, Sutter & Zimmermann 2018; Bauer, Chytilova & Pertold-Gebicka 2014), we applied the extended version proposed by Bauer et al. (2014) and classified respondents as altruistic, egalitarian, spiteful and selfish towards outgroup and ingroup members with the remaining being lumped together as one category with weaker preferences in these directions. The details of the experimental protocol are presented in Appendix A1.

The set of experiments consists of four binary dictator games that each are played with and outgroup and an ingroup framing. Afterward, one is randomly chosen to become real. The games are: a) Costly prosocial game: Choice between (20, 20) and (40, 0) distribution between oneself and the other (outgroup or ingroup) player[2]; b) Costless prosocial game: Choice between (20, 20) and (20, 0); c) Costless envy game: (20, 20) versus (20; 40); and d) Costly envy game: (20, 20) versus (30, 40). Fehr et al. (2013) used games a)-c) and Bauer et al. (2014) added game d) that we also included.

Table 1. Summary statistics for key variables

	Mean	Median	St. err.	Std. dev.
Ingroup trust, share invested	0.413	0.333	0.005	0.265
Outgroup trust, share invested	0.227	0.167	0.004	0.216
Net trust gain	0.186	0.167	0.004	0.217
Outgroup trustworthiness, share returned if receiving 30 ETB	0.225	0.167	0.005	0.227
Outgroup norm to reciprocate	1.923	2.000	0.015	0.740
Outgroup altruist dummy	0.102		0.006	0.302
Outgroup egalitarian dummy	0.167		0.008	0.373
Outgroup spiteful dummy	0.011		0.002	0.103
Outgroup selfish dummy	0.326		0.010	0.469
Ingroup trustworthiness, share returned if receiving 30 ETB	0.315	0.333	0.005	0.225
Ingroup norm to reciprocate	1.480	1.000	0.013	0.635
Ingroup altruist dummy	0.252		0.009	0.434
Ingroup egalitarian dummy	0.183		0.008	0.387

[2] The numbers represent Ethiopian Birr (ETB).

	Ingroup spiteful dummy		0.002	0.001	0.050

Ingroup spiteful dummy 0.002 0.001 0.050
Ingroup selfish dummy 0.277 0.009 0.448

Source: 2019 Youthbus Baseline survey and experimental data for 2427 group members of 246 youth business groups.

A norm for reciprocation may be important for the extent to which respondents return money in the trust game. This norm may be an important determinant of own trustworthiness but may also affect expected trustworthiness and thereby trust.

In relation to outgroup anonymous trustors we asked the following question: As a receiver (trustee) in the game, how obliged do you feel to return an amount at least as big as the amount sent by the sender (trustor)? They had to choose among the following three responses: 1=Extremely obliged, 2=Somewhat obliged, 3=Not obliged at all. Table 2 presents the responses for ingroup and outgroup players.

Table 1 shows that about 10% of the respondents behave altruistically towards anonymous outgroup members, 17% behave in an egalitarian way (prioritize equal sharing), 33% behave selfishly and only 1% behave in a spiteful way in the game. The remaining respondents express weaker preferences in these directions in the games.

Bauer et al. (2014) found in a sample of 4-12 years old children in the Czech Republic that 16% were altruistic, 9% inequality averse, 6% spiteful and 40% selfish. They found that spitefulness was associated with low education and poverty of parents. Fehr et al. (2013) assessed these social preferences in 8-17 years old children in Tyrol, Austria. They found that spitefulness declines in frequency with age but was still more common than strong altruism and strong egalitarianism in 16/17-year-olds in ingroups as well as in outgroups of adolescents.

The lower levels of education and more serious poverty in our sample than that of Bauer et al. (2014) and Fehr et al. (2013) have not made our sample relatively worse with respect to the distribution of these other-regarding preferences. We have very few spiteful individuals in our sample. It is possible that this is an age effect as spitefulness was found to decline with age. It is also possible that the group selection process eliminates spiteful individuals but we do not have any information about this.

Table 2 provides a more detailed breakdown and shows that close to 32% feel extremely obliged to return an amount at least as large as the amount sent by the trustor in the outgroup trust game while 24% do not feel obliged at all, demonstrating substantial variation in the perception of this norm. In the ingroup context, 60% feel extremely obliged to return an amount at least as large as the amount sent by the trustor, demonstrating the dense group effect on the norm to reciprocate. It is only 8% that do not feel obliged at all to reciprocate in the ingroup context.

Table 2. Ingroup and outgroup reciprocity norm distribution

Norm	Ingroup Freq.	Percent	Outgroup Freq.	Percent
Extremely obliged	1,448	59.7	764	31.5
Somewhat obliged	793	32.7	1,085	44.7
Not obliged at all	186	7.7	578	23.8

| Total | 2,427 | 100 | 2,427 | 100 |

Source: Youthbus baseline survey data 2019.

4.3. The distribution of social preferences across groups

We have so far looked only at the overall distribution of preference and norm types in the outgroup and ingroup contexts. In addition, what is important in our study is to study the variation in these distributions across groups. Figures 3a-3d present the variation in ingroup and outgroup social preference distributions. Figure 3a shows the distribution of altruists in the outgroup and ingroup contexts across groups. We see substantial variation across groups and particularly so in the ingroup context. This indicates that group members are more likely to behave altruistically towards ingroup members. More altruistic preferences may also become "epidemic" within groups. Figure 3b shows that egalitarian preferences are more common in the outgroup context than altruistic preferences but they are less likely to change when moving from the outgroup to the ingroup context. Figure 3c shows that spiteful preferences are rare in both ingroup and outgroup contexts but there are a few groups with more spiteful members, particularly in the outgroup context. Figure 3d shows that selfish preferences are most common but the share with selfish preferences tends to be reduced in the ingroup context.
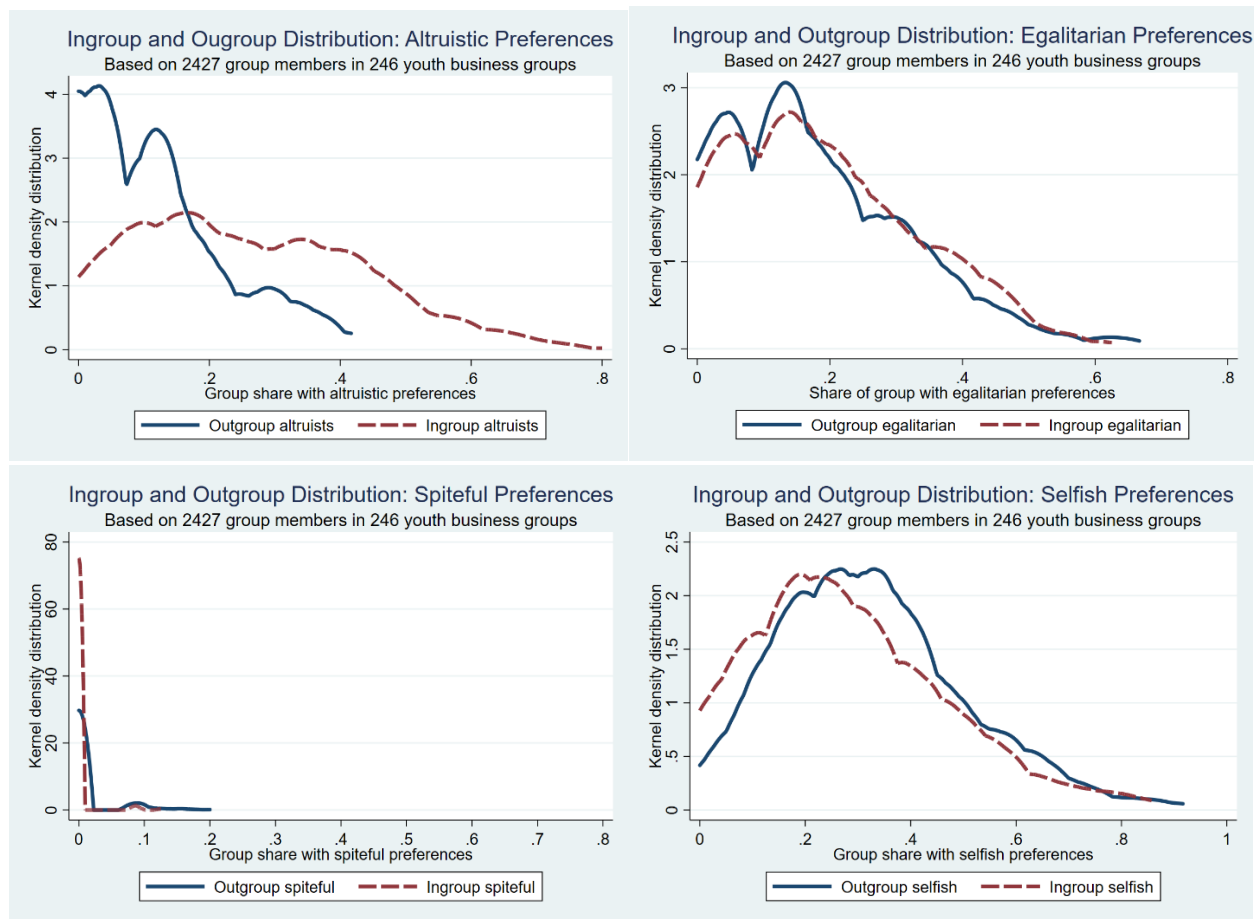
Figure 3 a-d. The distribution of ingroup and outgroup preference types across groups.

4.4. Group level variation in trust and trustworthiness

We are particularly interested in the across-group variation in trust and trustworthiness and how it relates to other group characteristics and their performance. We assess this by using group average responses from group members.
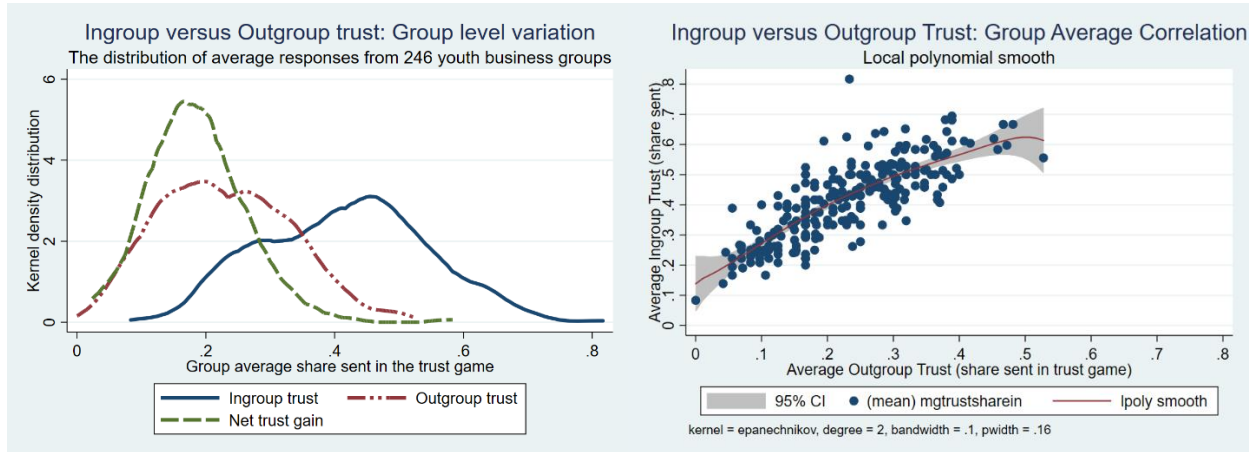
Figures 4a and 4b. Average ingroup and outgroup trust, net trust gain and ingroup and outgroup trust correlation

Figure 4a shows a substantial difference between ingroup and outgroup trust but also that there is a large variation in both these across groups and even that average ingroup trust in some groups is lower than outgroup trust in some groups. The group average net trust gain (the difference between average outgroup and ingroup trust) is also varying substantially but is positive for all groups. Figure 3b inspects the correlation between the ingroup and outgroup average trust measures, showing that they are quite strongly positively correlated. It indicates that when measuring ingroup trust we should take the outgroup trust into account. It is possible that it is net trust gain that is a better measure of the "trust effect" in the group than ingroup trust per se.

4.5. Other group performance indicators

Tables 3 and 4 gives an overview of some additional performance indicators for group leaders, group performance, and social relations in groups, and whether groups are perceived to be polarized/fractioned into sub-groups.

7.5% of the group members answered that their group was polarized and fractioned in sub-groups. This was associated with poor social relations in the group as assessed by group members. Figures 5a – 5e show the variation in these group performance indicators across the 246 groups.

Table 3. Group leader satisfaction and group performance since the beginning

Satisfaction with group leader			Group performance since beginning		
	Freq.	Percent		Freq.	Percent
Very satisfied=5	1,115	45.9	Much improved=5	164	6.8
Quite satisfied=4	689	28.4	Improved=4	1,458	60.1
Acceptable performance=3	311	12.8	Stable=3	551	22.7
Not so satisfied=2	61	2.5	Declined=2	200	8.2
Very unsatisfied=1	31	1.3	Much declined=1	54	2.2
Leader	220	9.1			
Total	2,427	100	Total	2,427	100

Source: Youthbus baseline survey data 2019. Leaders did not respond to the questions regarding their own performance.

Table 4. Social relations in groups and assessment of own performance

Social relations in group ranking by members			How do you rate your own performance in the group from the beginning till today?		
	Freq.	Percent		Freq.	Percent
Very good=5	569	23.4	Much improved=5	89	3.7
Quite good=4	1,370	56.5	Improved=4	1,536	63.3
Ok=3	450	18.5	Stable=3	640	26.4
Not so good=2	32	1.3	Declined=2	141	5.8
Very bad=1	6	0.3	Declined=1	21	0.9
Total	2,427	100.0	Total	2,427	100.0

Source: Youthbus baseline survey data 2019.
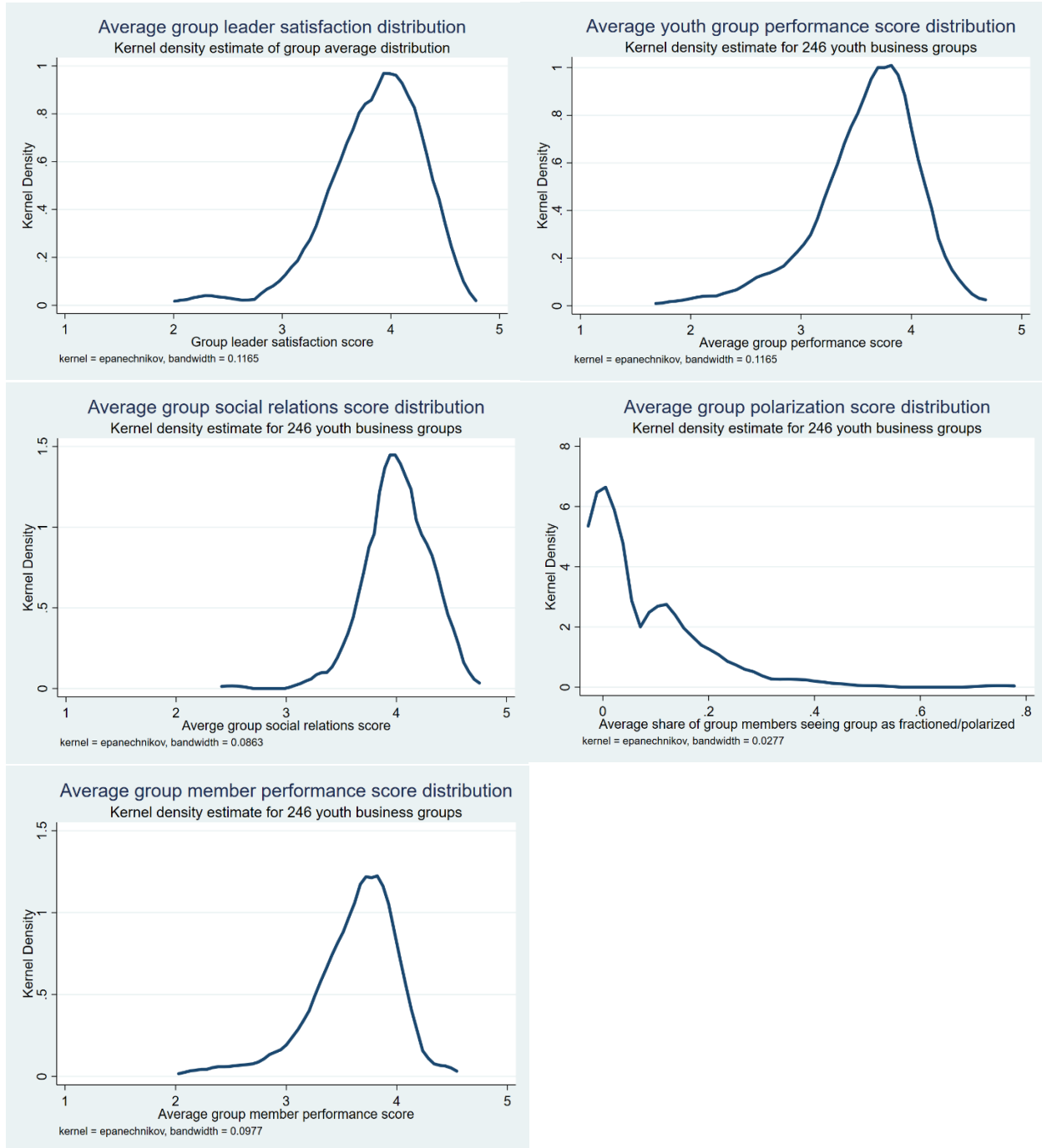
Figures 5a-e. Average group performance score distributions.

5. Model specifications and hypotheses

We consider outgroup trust as a measure of generalized trust among young adults that live under similar conditions in the same district. We use this as a benchmark (control) to assess ingroup trust

that may depend on group performance and the social relations within groups on top of the factors that affect generalized trust and trustworthiness. We regard ingroup trust as a group performance indicator (Holden and Tilahun 2018). Based on the conceptual model in Figure 1 we will estimate the following models:

1) $SNO_{gi} = oprob\left(SPO_{gi}, E_t\right) + e_{sno}$

Where *SNO* represents the norm to reciprocate in the trust game when playing it with unknown outgroup members. *SNO* is assumed to be partly a function of the social preferences (*SPO*) that we have measured, but also to have an independent individual component. We represent the social preferences by a dummy vector where each dummy variable represents members with altruistic, egalitarian, spiteful and selfish preferences with the remaining members with less strong preferences being the base category. The social obligations are represented by the categorical variable with three levels; 1=strong obligation to reciprocate, 2=weak obligation to reciprocate, 3=no obligation to reciprocate). We hypothesize that altruists and egalitarians have stronger norms for reciprocation than the base category and that spiteful and selfish respondents have weaker norms for reciprocation than the base category. The *Z* variable is representing community fixed effects as we assume community-level norms have such a locality nature.

Next, we present a simple linear model for generalized individual (outgroup) trustworthiness and assume that it is influenced by social preferences and the norm for reciprocation.

2) $TWO_{gi} = TWO_{gi}^0 + \alpha_{sp}SPO_{gi} + \alpha_{so}SNO_{gi} + E_c + e_{two}$

where *TWO* represents individual outgroup trustworthiness which we hypothesize is enhanced by altruistic and egalitarian preferences and stronger social norms for reciprocation while spiteful and selfish individuals are hypothesized to demonstrate lower levels of generalized trustworthiness. We assess the endogeneity of the obligation to reciprocate by running this model without and with the social obligation norm variable to assess how it affects the coefficients for the social preferences. This can reveal whether or to what extent the social preference variables operate through the norm or have a more direct effect. Additional controls are used for further robustness assessment (alternatively district or community fixed effects and experimental enumerator fixed effects).

Next, we specify the model for generalized individual (outgroup) trust

3) $TO_{gi} = TO_{gi}^0 + \beta_{sp}SPO_{gi} + \beta_{so}SNO_{gi} + \beta_{two}TWO_{gi} + \beta_{exo}EXO_{gi} + \beta_r R_{gi} + e_{to}$

Where *TO* is outgroup trust, *EXO* is the expected return from an unknown outgroup member and *R* represents risk tolerance such that economic preferences and expectations have been included and we hypothesize that trust increases with expected return and risk tolerance[3]. Furthermore, we

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[3] Expected return in the trust game is clearly endogenous and ideally we should estimate it separately. However, it is represented by a categorical variable that only partly is ordered. We have therefore chosen to include it directly in the main models presented. However, as a robustness check we endogenized expected returns in the outgroup and ingroup contexts with ordered probit models including the four first categories of the expectations categorical variables. This

hypothesize that individuals with altruistic and egalitarian preferences trust more while selfish and spiteful individuals are less trusting, those with stronger norms for reciprocation trust more and so do the more trustworthy.

We now move to the ingroup models. We have the same logical sequence as for the outgroup models but in addition, assume that the outgroup models feed into ingroup responses. We also obtained data on ingroup social preferences and obligation to reciprocate. We model the ingroup social norm to reciprocate (*SNI*) on the ingroup social preferences (*SPI*) and assume that the outgroup social preferences influence through the predicted outgroup trust and trustworthiness variables. This helps to assess whether ingroup social preferences have a separate direct effect beyond what the outgroup social preferences have in the outgroup model structure. This depends on the degree to which ingroup social preferences differ from outgroup social preferences. The added value also depends whether the ingroup social norm of reciprocation is different from that norm in the outgroup context. Our modeling approach allows us to test for such significant additional direct effects on ingroup trustworthiness (*TWI*) and trust (*TI*).

4) $SNI_{gi} = oprob\left(SPI_{gi}\right) + e_{sni}$

5) $TWI_{gi} = TWI_{gi}^{0} + \eta_{spi} SPI_{gi} + \eta_{sni} SNI_{gi} + \eta_{two} TWO_{gi} + \eta_{to} TO_{gi} + e_{twi}$

6) $TI_{gi} = TI_{gi}^{0} + \mu_{spi} SPI_{gi} + \mu_{sno} SNI_{gi} + \mu_{two} TWO_{gi} + \mu_{to} TO_{gi} + \mu_{exi} EXI_{gi} + \mu_{r} R_{gi} + e_{ti}$

We hypothesize that ingroup social preferences and social norms to reciprocate contribute to enhance ingroup trust. We also hypothesize that ingroup trustworthiness is enhanced by outgroup trustworthiness and trust. Furthermore, we hypothesize that ingroup trust-building goes through the same channels as outgroup trust and is further strengthened through formation of stronger ingroup social preferences and norms of reciprocity that also build ingroup trustworthiness. Finally, we hypothesize that ingroup trust also has an economic dimension as trusting people is risky and therefore more risk tolerant people invest more in the trust game and so do those with more optimistic expectations (*EXI*) about the return from their investment.

We acknowledge that multiple endogenous variables represent a formidable estimation challenge. However, we think that the six equation recursive system goes far in capturing indirect endogenous effects. We do not claim that we have obtained fully unbiased and consistent estimates of the parameters. The system estimation results can be assessed in relation to theory and be compared with the results from the naïve models with step-wise introduction of additional controls for consistency. The advantage of those models is that they reveal more about the explained within-

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implied a loss of observations in the estimation (n=1703). However, the main results remained robust to this alternative specification in terms of parameter signs, although there were changes in the sizes and significant levels of some variables. The predicted expectations variables were significant and with positive sign showing that expectations matter for trust investment in both outgroup and ingroup settings.

group and between-group variation as additional controls are added. The functional form assumptions as well as possible interactions and omitted latent variables are likely to play a role.

6. Estimation issues, data and estimation strategy

Our data are such that we have two-stage sampling where groups were sampled first and then group members were sampled in the second stage. As groups are small we have to take into account that data from group members are not independent and standard errors should be corrected for clustering at group level when analyzing individual-level data.

To a large extent, there was also self-selection of members into groups and this could contribute to stronger ingroup social relations than outgroup social relations. We are to a limited degree able to separate this selection effect from the ingroup social relation formation effects after group formation. Many of the group members knew each other before they formed the group and they typically came from the same neighborhood (*got*) within the larger village (*kushet*) and municipality (*tabia*). The other selection criteria relate to eligibility for joining a youth business group, which is related to being landless or very land-poor and being a resident of the *tabia* as well as aiming to establish a livelihood in the community and thereby demanding to join such a group. After joining, there could also be attrition that varies across groups as an additional selection mechanism, which could be influenced by many individual, group, community, and exogenous factors. We lack detailed data on dropped out members and cannot, therefore, assess the effect of this attrition.

Our empirical strategy is to assess how generalized trust and trustworthiness are related to basic social preferences and norms of reciprocity based on experimental measures of these where the youth group members played the games with unknown youth in other groups in their district. We assume that individual ingroup trust and trustworthiness also depend on these individual outgroup characteristics, complicating the analysis of ingroup trust and trustworthiness. We first do simple correlation analysis for the key variables and stepwise add variables as we move from one dependent variable to the next in the (recursive) conceptual model. We assess whether and to what extent adding variables increases the part of the variance that can be "explained" and how the within-group and between-group variance is affected by the RHS variables in each model. We also assess the stability and significance of the coefficients to get a first impression of their direct and potential indirect effects through added endogenous variables.

To deal with endogeneity, we run systems equations models in a recursive system based on the conceptual model. The identification strategy is as follows. We assume social norms are influenced at the community level and therefore use community (*tabia*) fixed effects in the ordered probit model for the social norm to reciprocate which has three levels (strong, weak and no obligation to reciprocate). The next level is outgroup trustworthiness, which was elicited with the strategy method by our experimental enumerators. This may have resulted in some enumerator bias in the data and we use enumerator dummies as instruments for identification. We had 12 enumerators to interview one group member each in each youth group. This was done both to ensure no communication among group members during experiments and interviews and to avoid correlation between group variables and eventual enumerator bias. For outgroup trust we added economic

preferences in form of risk tolerance and outgroup expected returns in the game (a categorical variable). Trusting people is risky and more risk tolerant people are therefore expected to invest more but this would also depend on their expected returns.

For ingroup trustworthiness, we assume it is a function of outgroup trust and trustworthiness and use predicted values of these. In addition, we assume that ingroup social preferences and norm of reciprocity affect ingroup trustworthiness. Ingroup norm of reciprocity is modeled on the ingroup social preferences with an ordered probit model, like the case of outgroup social norm was modeled on the outgroup social preferences. Finally, ingroup trust is modeled on the predicted ingroup trustworthiness, predicted ingroup social norm, predicted outgroup trustworthiness, predicted outgroup trust, ingroup social preferences, risk tolerance, and ingroup expected returns in the trust game.

Based on the assessment of the single-equation models with random group effects that did not control for endogeneity or error correlations, but which provided insights about the extent of within-group versus between-group variation that is explained, we constructed the average group-level variables to dig deeper into the assessment of group effects.

The main advantage of this is that we can assess the group composition effects for social preferences. We, therefore, run models where the shares of altruists, egalitarians and selfish group members are included as additional variables that may influence individual norms, trustworthiness, and trust in the outgroup and ingroup contexts. We included the shares of each social preference type in an alternative system estimation model. This implies a re-specification of model equation 1 as follows:

1a) $$SNO_{gi} = oprob\left(SPO_{gi}, \overline{SPO}_g, E_t\right) + e'_{sno}$$

and likewise for equations 2-6. We hypothesize that these shares have a separate group effect on the dependent variables beyond the individual direct effects on their own norm, trustworthiness, and trust. We can then assess whether the outgroup and ingroup variation in norm, trustworthiness, and trust only is affected by the individual level social preferences or whether there is an additional effect of the frequency of or distribution of these norms in their group. We hypothesize that there are such group effects in the ingroup context but not in the outgroup context. More specifically, in groups with more altruists (egalitarians), we hypothesize that this has an additional positive effect on ingroup trustworthiness and trust. Likewise, we hypothesize that ingroups with a larger share of selfish ingroup members demonstrate a significantly lower level of average ingroup trust and trustworthiness. We also hypothesize that these effects partly go through changing the ingroup norm of reciprocity.

7. Results

We start by assessing simple single equation models with latent group effects to assess the extent of within and between-group variation that can be explained by included variables. We also assess the effect of including additional controls on the explained variation and on key parameters.

7.1. Single equation models: Social preferences, norm to reciprocate and generalized trust
Table 5 presents results for the relationship between the generalized (outgroup) norm to reciprocate and how it is related to the social preferences of the respondents. We see that altruistic respondents are much more likely to feel extremely obliged to reciprocate than respondents with weaker social preferences. Respondents with egalitarian preferences also have stronger norms to reciprocate than the others but not as strong as altruists. Model (1) shows that there is substantial explained variation across groups with between-group R-sq. of 0.37 compared to the within-group R-sq. of 0.09.

Table 5. Social preferences and social norm to reciprocate: Linear panel versus poisson panel model

	(1) xtreg Social norm to reciprocate	(2) xtpoisson Social norm to reciprocate
Altruist, Outgroup, dummy	-0.565***	-0.364***
	(0.044)	(0.027)
Egalitarian, Outgroup, dummy	-0.281***	-0.173***
	(0.041)	(0.023)
Spiteful, Outgroup, dummy	0.205	0.091
	(0.144)	(0.067)
Selfish, Outgroup, dummy	0.042	0.022
	(0.035)	(0.017)
Constant	1.789***	0.586
	(0.030)	(0.036)
Ln alpha		-19.386
		(1.492)
Alpha		0.000
		(0.000)
N	2427	2427
R-sq., within	0.087	
R-sq., between	0.368	
R-sq., overall	0.155	
Wald chi2	496.4	
P-value	0.0000	

Note: Dependent variable: Ingroup obligation to return an amount at least as large as the amount sent by anonymous ingroup member in the trust game: 1=Extremely obliged, 2=Somewhat obliged, 3=Not obliged at all. The model presents marginal effects. The models included youth group random effects, district fixed effects and enumerator fixed effects that are left out from the table to save space. Cluster robust standard errors in parentheses. * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 6 presents the linear random effects models with the social preference variables and without and with the social norm variables and the social preference variables. We see that the explained variation increases substantially when adding the social norm dummy variables while the coefficient on the significant social preference variables are much reduced but remain highly significant. This indicates that altruistic and egalitarian preferences both have a direct effect and an indirect effect through the norm to reciprocate. By adding the social norm variable the explained

within-group variation increases from 0.10 to 0.31 and the explained between-group variation increases from 0.43 to 0.74, showing the importance of the indirect effect and that there is substantial variation in this norm across groups (across-group heterogeneity).

Table 6. Outgroup trustworthiness variation, social preferences and norm to reciprocate

	(1) two1	(2) two2
Altruist, Outgroup, dummy	0.143***	0.0538***
	(0.017)	(0.015)
Egalitarian, Outgroup, dummy	0.0900***	0.0465***
	(0.014)	(0.012)
Spiteful, Outgroup, dummy	-0.058	-0.016
	(0.033)	(0.033)
Selfish, Outgroup, dummy	-0.0282**	-0.0188*
	(0.011)	(0.009)
Strong Outgroup obligation to reciprocate Base		
Somewhat obliged, dummy		-0.188***
		(0.011)
Not obliged at all, dummy		-0.318***
		(0.011)
Constant	0.264***	0.399***
	(0.020)	(0.017)
N	2427	2427
R-sq., within	0.096	0.313
R-sq., between	0.428	0.739
R-sq., overall	0.179	0.414
Wald chi2	655.4	2080.1
P-value	0.0000	0.0000

Note: Dependent variable: Outgroup trustworthiness measured as the share of 30 ETB returned as a trustee in the trust game when the game is played with an anonymous member of another unknown youth group in the same district. The table presents marginal effects from linear panel data models with youth group random effects, district fixed effects and enumerator fixed effects (left out of the table to save space). Cluster-robust standard errors in parentheses, clustering at youth group level. Significance levels: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

In Table 7 we present linear random effects models for generalized (outgroup) trust while adding endogenous controls from the first parsimonious model including the social preferences, district fixed effects, and enumerator fixed effects. The added controls include expected return in the trust game, risk tolerance (the invested share in the Gneezy and Potters (1997) risk investment game), and outgroup trustworthiness. Again the purpose is to assess the explained within-group and between-group variation and how the coefficients of the social preferences and norm variables change when adding the endogenous controls. Because they are likely to partly work through the

Table 7. Outgroup trust, individual member linear models with group random effects and additional controls.

	(1) trustshareout	(2) trustshareout	(3) trustshareout	(4) trustshareout
Altruist, Outgroup, dummy	0.226***	0.163***	0.141***	0.131***
	(0.014)	(0.013)	(0.016)	(0.015)
Egalitarian, Outgroup, dummy	0.100***	0.068***	0.048***	0.039***
	(0.012)	(0.011)	(0.011)	(0.010)
Spiteful, Outgroup, dummy	-0.031	-0.005	0.000	0.002
	(0.039)	(0.035)	(0.021)	(0.020)
Selfish, Outgroup, dummy	-0.016	-0.012	-0.011	-0.007
	(0.010)	(0.009)	(0.007)	(0.008)
Strong Outgroup obligation to reciprocate Base				
Somewhat obliged, dummy		-0.120***	-0.099***	-0.063***
		(0.009)	(0.009)	(0.009)
Not obliged at all, dummy		-0.232***	-0.122***	-0.062***
		(0.011)	(0.011)	(0.012)
Outgroup expected return: <1/3, base				
One third, dummy			0.010	0.006
			(0.012)	(0.012)
Half, dummy			0.063***	0.048***
			(0.013)	(0.013)
More than half, dummy			0.071**	0.046*
			(0.023)	(0.022)
Nothing as I sent nothing, dummy			-0.185***	-0.185***
			(0.011)	(0.011)
Nothing, although I sent some, dummy			0.0340*	0.025
			(0.017)	(0.016)
Risk tolerance			0.039***	0.038***
			(0.010)	(0.010)
Outgroup trustworthiness				0.211***
				(0.024)
Constant	0.247***	0.339***	0.326***	0.250***
	(0.018)	(0.017)	(0.018)	(0.019)
N	2427	2427	2427	2427
R-sq., within	0.146	0.260	0.392	0.421
R-sq., between	0.378	0.601	0.704	0.720
R-sq., overall	0.190	0.328	0.456	0.482
Wald chi2	511.1	1122.4	3227.5	3182.8
P-value	0.0000	0.0000	0.0000	0.0000

Note: Dependent variable: Outgroup trust, measured as the share invested when playing the trust game with an anonymous group member in another youth group in the same district. The models include district and enumerator

fixed effects and youth group random effects. The table presents the marginal effects. Standard errors (in parentheses) are corrected for clustering at youth group level. Significance levels: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

added endogenous controls their coefficients are expected to be reduced. If they are becoming insignificant their while the effect may be indirect. Table 7 shows that we get the expected pattern with shrinking coefficients for social preferences and norm as we add expected returns, risk tolerance, and outgroup trustworthiness. But highly significant direct effects appear to remain. However, economic preferences (risk tolerance) and expected returns also matter, indicating that trusting people is perceived to be risky and amount sent in the trust game is to some extent influenced by expected returns. The explained within-group variation increased from 0.26 to 0.39 when adding risk tolerance and expectations on top of social preferences and norm of reciprocity variables., while the between-group explained variation increased from 0.60 to 0.70. This seems to indicate that the between-group variation is particularly large for social preferences and norms. Adding the trustworthiness variable to the model further raises the overall explained variation of the model from 0.46 to 0.48 and similarly the explained within and between variation. Those who were more trustworthy towards an unknown youth group member in an unknown group in their own district were also significantly more trusting after having controlled for social and economic preferences and the norm to reciprocate. We see that particularly the social norm parameters were reduced when adding the trustworthiness variable[4].

7.2.System estimation: Combining outgroup and ingroup models
Next, we go to the system estimation models to deal more directly with the endogenous variables and to assess the robustness of the findings in the linear random effects models.

Table 8 presents the results of the base 6-equation system models for generalized and particularized trustworthiness and trust, assuming that these are driven by social preferences and the norm to reciprocate. Trust is in addition driven by risk tolerance and expectations. We will highlight the following findings from Table 8. Social preferences in the form of altruistic and egalitarian preferences and the norm to reciprocate remain highly significant throughout the outgroup models showing that these preferences are important for trustworthiness and trusting behavior. Selfish individuals are less trustworthy. The obligation norm to reciprocate is an important explanatory variable for generalized trustworthiness and trust and is strong among individuals with altruistic and egalitarian preferences, and particularly so for the altruists. Economic preferences also had the expected and significant results, not very different from in the linear random effects models. Overall, the results for generalized trust and trustworthiness the results remained robust and consistent across the linear random effects and the system estimation models.

We inspected the direct versus indirect effects of outgroup social preferences on outgroup trustworthiness where the indirect effect goes through the social obligation norm to reciprocate by returning an amount at least as large as that sent by the trustor. This can be obtained from the two

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[4] We have included additional linear models in Appendix 2 for ingroup trust and trustworthiness for inspection.

Table 8. System of Equations Models: Recursive system Outgroup -> Ingroup social preferences, norms, trustworthiness and trust

	(1) Outgroup Norm to Reciprocate	(2) Outgroup Trustworthiness	(3) Outgroup Trust		(4) Ingroup Norm to Reciprocate	(5) Ingroup trustworthiness	(6) Ingroup trust
Outgroup Altruist, dummy	-1.007*** (0.088)	0.053*** (0.013)	0.141*** (0.012)	Ingroup Altruist, dummy	-0.587*** (0.073)	0.018* (0.008)	0.037** (0.012)
Outgroup Egalitarian, dummy	-0.508*** (0.069)	0.051*** (0.011)	0.036*** (0.010)	Ingroup Egalitarian, dummy	-0.485*** (0.084)	0.015 (0.009)	0.012 (0.012)
Outgroup Spiteful, dummy	0.297 (0.227)	-0.001 (0.035)	0.006 (0.032)	Ingroup Spiteful, dummy	0.737* (0.364)	-0.040 (0.038)	-0.086*** (0.022)
Outgroup Selfish, dummy	0.053 (0.056)	-0.030*** (0.009)	-0.009 (0.008)	Ingroup Selfish, dummy	0.292*** (0.059)	-0.009 (0.008)	-0.022* (0.010)
Outgroup norm to reciprocate, predicted		-0.168*** (0.005)	-0.034*** (0.006)	Ingroup norm to reciprocate, predicted		-0.064*** (0.005)	-0.057*** (0.008)
Outgroup trustworthiness, predicted			0.225*** (0.018)			0.664*** (0.022)	0.106*** (0.028)
Outgroup trust, predicted						0.048** (0.017)	0.555*** (0.028)
Outgroup expected return: <1/3, base				Ingroup expected return: <1/3, base			
One third, dummy			0.013 (0.012)	One third, dummy			-0.028 (0.022)
Half, dummy			0.057*** (0.013)	Half, dummy			0.018 (0.022)
More than half, dummy			0.051** (0.017)	More than half, dummy			0.043 (0.023)
Nothing as I sent nothing, dummy			-0.166*** (0.013)	Nothing as I sent nothing, dummy			-0.158*** (0.023)
Nothing, although I sent some, dummy			0.023 (0.015)	Nothing, although I sent some, dummy			0.036 (0.028)
Risk tolerance			0.034*** (0.010)				0.030* (0.013)

	(1)	(2)	(3)		(4)	(5)	(6)
Enumerator FE	No	Yes	No		No	No	No
Tabia FE	Yes	No	No		No	No	No
Constant		0.296***	0.220***			0.245***	0.321***
		(0.016)	(0.018)			(0.013)	(0.029)
N	2427	2427	2427		2427	2427	2427
var(e.outgroup trustworthiness)		0.031***		var(e.ingroup trustworthiness)		0.018***	
		(0.002)				(0.001)	
var(e.outgroup trust)			0.0251***	var(e.ingroup trust)			0.038***
			(0.001)				(0.002)

Note: Six equations system model based on the Conceptual model in Figure 1. Estimated with GSEM in Stata. Standard errors are corrected for clustering at the youth group level. Outgroup and Ingroup social norm models for obligation to reciprocate are estimated as ordered probit models. Significance levels: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

first equations in the system of equations where the obligation to reciprocate equation is the first and is estimated with an ordered probit model. The results are summarized in Table 9. Figures 6a and 6b show the predicted indirect and direct effects of altruistic and egalitarian preferences through the norm to reciprocate on generalized trustworthiness based on the two first equations in the system equation model.

Table 9. Estimated direct, indirect and total effects of social preferences and norms on outgroup trustworthiness.

	Direct effect	Std. Err.	Indirect effect	Std. Err.	Total effect	Std. Err.
Outgroup norm to reciprocate	-0.168***	0.006			-0.168***	0.006
Outgroup Altruist, dummy	0.053***	0.013	0.170***	0.015	0.223***	0.020
Outgroup Egalitarian, dummy	0.051***	0.011	0.085***	0.012	0.137***	0.016
Outgroup Spiteful, dummy	-0.001	0.036	-0.023	0.024	-0.026	0.043
Selfish, Outgroup, dummy	-0.030***	0.009	-0.010	0.009	-0.038**	0.013

Note: Estimates based on two-equation non-linear mediation model. The social nom model is estimated with ordered probit, the trustworthiness model is a linear model. The estimation is done in Stata 15.1 with the gsem command and indirect and total effects are estimated with the nlcom command.
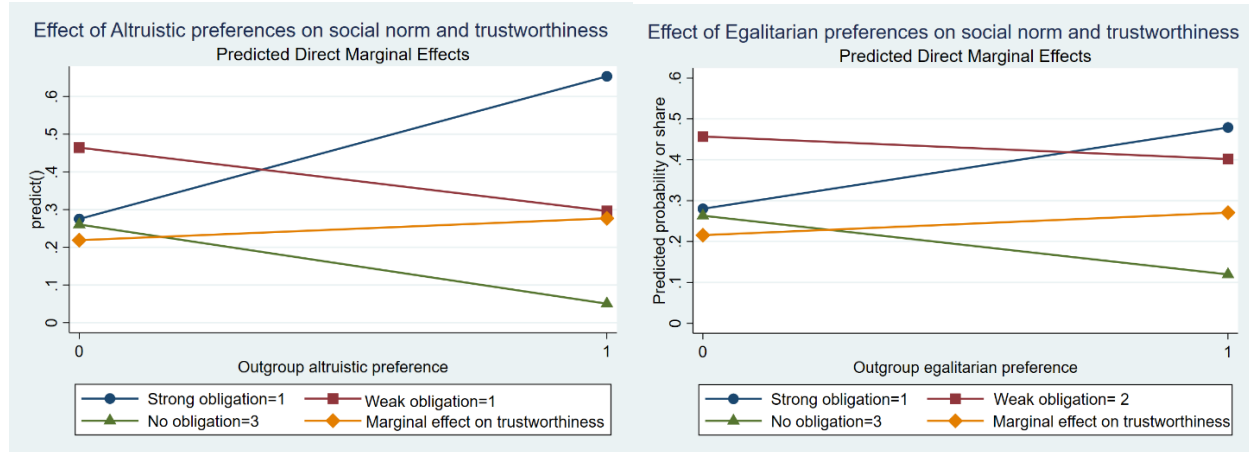
Figures 6a and 6b. Indirect and direct effects of altruistic and egalitarian preferences on generalized trustworthiness.

Table 9 shows that altruistic, egalitarian and selfish preferences have both direct and indirect effects on outgroup (generalized) trustworthiness. The indirect effect of altruistic preferences on trustworthiness is substantially stronger than that of egalitarian preferences but both types of preferences pull in the same direction of enhancing outgroup trustworthiness. If we compare Figures 6a and 6b we see that the likelihood of being strongly obliged to reciprocate increases to above 0.6 from below 0.3 at mean for altruists and almost to 0.5 for those with egalitarian preferences. The direct effects of these two types of preferences on trustworthiness are, as can be seen in Table 9 and Figures 6a and 6b, similar in magnitudes.

The direct and indirect effects of selfish preferences are much smaller in magnitude and of opposite sign compared to that of altruists and egalitarians (reducing outgroup trustworthiness). There were

very few spiteful members in the sample and that may explain the lack of significance although the signs are in the expected direction (lowering trustworthiness).

We now turn to the ingroup models in Table 8. We first examine the results from the ingroup norm to reciprocate model. The signs for the social preference variables are consistent with that in the outgroup model but coefficients are smaller for altruistic preferences and the coefficient for selfish preferences has become significant and pulls in the opposite direction. This may mean that the within-group norm to reciprocate is sensitive to the within-group variation in the distribution of these preferences. The fact that only the altruistic preference variable is significant (at 5% level) in the ingroup trustworthiness model demonstrates that the indirect effect through the norm of reciprocation is most important and where three of the preference variables were highly significant (at 0.1% levels). We recall the substantial variation in the distribution of ingroup social preferences in Figures 3a-3d. This may potentially explain a substantial share of the between-group variation. We recall a large explained between-group variation in the linear random effects models. A weaker norm to reciprocate reduces ingroup trustworthiness less than it reduces outgroup trustworthiness but both these predicted effects are highly significant (at 0.1% levels).

We see that outgroup trustworthiness has strong predictive power and enhances ingroup trustworthiness. Individual generalized trustworthiness therefore also matters for ingroup trustworthiness. Predicted individual outgroup trust, in addition, has a positive and significant effect on individual ingroup trustworthiness.

Finally, we assess the ingroup trust model which is the last equation in the system model. Table 8 shows that predicted outgroup trust and trustworthiness have highly significant positive effects on individual ingroup trusting behavior. The sizes of the coefficients for these predicted variables have been reversed compared to that in the ingroup trustworthiness model. Three of the ingroup social preference variables are significant. The coefficient for spiteful individuals has become highly significant and with a negative sign, showing that spiteful individuals are much less trusting in the ingroup context than other individuals. Selfish individuals are also significantly less trusting while altruists are significantly more trusting even after controlling for their differences in the norm to reciprocate. Finally, we see that the expected returns and risk tolerance variables were less significant than in the outgroup models but they had the expected signs, with risk tolerance being significant at the 5% level.

So far we have only assessed the individual preference and norm characteristics and their effects on individual trust and trustworthiness. We have not assessed how the variation in the within-group composition of these may indirectly affect the outgroup and ingroup individual trustworthiness and trust variables. To assess the extent of group effects from the variations in the compositions of the social preferences within groups we run the system of equations when also the within-group shares of altruists, egalitarian and selfish preferences are included. We hypothesized that these are important for within-group trustworthiness and trust but not for generalized trustworthiness and trust. The model results are presented in Table 10.

The first model in Table 10 for the outgroup norm to reciprocate we see that there are highly significant individual as well as group effects indicating that the outgroup norm to reciprocate is

less exogenous than we hypothesized. The norm to reciprocate towards unknown persons is stronger in groups with larger shares altruistic and egalitarian members. These effects are highly significant (at 0.1% level). Comparing the results in Tables 8 and 10 we see that the group mean effect in Table 10 on outgroup trustworthiness was captured as a direct effect in Table 8. We learn two things from this. The first is that the mechanism for change in the social norm to reciprocate is a group effect that varies with group composition in social preferences. This is showing that the generalized norm to reciprocate also can be influenced in the short to medium run in such small groups. The second is that what appeared as a direct effect also is partly an indirect group effect. We see that groups with a higher share of altruists in the group both are more trustworthy and more trusting in the outgroup context, *ceteris paribus*, while groups with more selfish individuals are on average significantly less trusting (these effects are significant at 5% levels).

Next, we look at the group composition effects in the ingroup context where we hypothesized to see such effects (unlike in the outgroup context). For the ingroup norm formation we again find highly significant group effects in the same direction as in the outgroup model. It is the proportions of altruists and egalitarians that enhance the likelihood that group members express a stronger ingroup norm to reciprocate. The proportion of selfish group members, on the other hand, had no significant effect on this norm, like in the outgroup context. This may indicate that selfish individuals are less active in terms of attempting to influence the norms of other group members.

The social preference group effects primarily works through changing the group member norms in affecting ingroup trustworthiness and trust. However, groups with more altruistic members also have significantly higher average ingroup trust. Trust is about more than reciprocation and may be associated with higher generosity and expectations. As we have controlled for expectations, this may be a group generosity effect.

Finally, we assess correlations between ingroup trust and five (other) group performance indicators based on the assessment by individual youth group members, see Tables 3 and 4 and Figures 5a-e for an overview and Table 11 for the correlations. For each of the other group performance indicators, we have included the individual assessment as well as group average assessments. Table 11 shows that the average group leader satisfaction score is positively correlated with ingroup trust (significant at 1% level). Individuals who rate social relations higher are significantly (at 5% level) more trusting. Ingroup trust is significantly (at 1% level) lower in groups which are identified as polarized by a larger share of their members. Finally, individuals who rate their own performance in the groups better are also significantly (at 5% level) more trusting. All the significant variables, therefore, point in the expected direction.

Table 10. System of Equations Models: **With Group Mean proportions of social preference types**

	(1) Outgroup Norm to Reciprocate	(2) Outgroup Trustworthiness	(3) Outgroup Trust		(4) Ingroup Norm to Reciprocate	(5) Ingroup trustworthiness	(6) Ingroup trust
Outgroup Altruist, dummy	-0.842***	0.0409**	0.134***	Ingroup Altruist, dummy	-0.436***	0.014	0.027*
	(0.089)	(0.016)	(0.016)		(0.073)	(0.008)	(0.013)
Outgroup Egalitarian, dummy	-0.394***	0.042**	0.035**	Ingroup Egalitarian, dummy	-0.301***	0.012	0.011
	(0.074)	(0.013)	(0.011)		(0.083)	(0.009)	(0.013)
Outgroup Spiteful, dummy	0.277	-0.002	0.006	Ingroup Spiteful, dummy	0.690	-0.039	-0.084***
	(0.252)	(0.034)	(0.020)		(0.429)	(0.036)	(0.022)
Outgroup Selfish, dummy	0.024	-0.0215*	-0.002	Ingroup Selfish, dummy	0.227***	-0.005	-0.017
	(0.059)	(0.010)	(0.007)		(0.062)	(0.008)	(0.011)
Outgroup Altruist share in group	-1.407***	0.105*	0.069*	Ingroup Altruist share in group	-0.916***	0.032	0.0701*
	(0.288)	(0.049)	(0.033)		(0.242)	(0.023)	(0.035)
Outgroup Egalitarian share in group	-0.900***	0.055	0.001	Ingroup Egalitarian share in group	-1.200***	0.022	0.002
	(0.241)	(0.034)	(0.027)		(0.235)	(0.028)	(0.037)
Outgroup Selfish share in group	0.304	-0.053	-0.056*	Ingroup Selfish share in group	0.210	-0.018	-0.026
	(0.229)	(0.029)	(0.025)		(0.242)	(0.027)	(0.033)
Outgroup norm to reciprocate, predicted		-0.162***	-0.031***	Ingroup norm to reciprocate, predicted		-0.063***	-0.055***
		(0.006)	(0.006)			(0.005)	(0.005)
Outgroup trustworthiness, predicted			0.218***			0.659***	0.1000***
			(0.023)			(0.023)	(0.028)
Outgroup trust, predicted						0.0447**	0.549***
						(0.017)	(0.028)
Outgroup expected return: <1/3, base				Ingroup expected return: <1/3, base			
One third, dummy			0.012	One third, dummy			-0.030
			(0.012)				(0.022)
Half, dummy			0.0577***	Half, dummy			0.015
			(0.013)				(0.021)
More than half, dummy			0.0506*	More than half, dummy			0.040
			(0.022)				(0.022)

Nothing as I sent nothing, dummy			-0.166*** (0.011)	Nothing as I sent nothing, dummy			-0.160*** (0.022)
Nothing, although I sent some, dummy			0.022 (0.016)	Nothing, although I sent some, dummy			0.032 (0.028)
Risk tolerance			0.0363*** (0.010)				0.032* (0.013)
Enumerator FE	No	Yes	No		No	No	No
Tabia FE	Yes	No	No		No	No	No
Constant		0.515*** (0.023)	0.225*** (0.021)			0.238*** (0.019)	0.314*** (0.033)
Cut 1	-0.793*** (0.150)				-0.225 (0.143)		
Cut 2	0.564*** (0.151)				1.065*** (0.150)		
N	2427	2427	2427		2427	2427	2427
var(e.outgroup trustworthiness)		0.0309*** (0.002)		var(e.ingroup trustworthiness)		0.018*** (0.001)	
var(e.outgroup trust)			0.0249*** (0.001)	var(e.ingroup trust)			0.038*** (0.002)

Note: Six equations system model based on the Conceptual model in Figure 1. Estimated with GSEM in Stata. Standard errors are corrected for clustering at the youth group level. Outgroup and Ingroup social norm models for obligation to reciprocate are estimated as ordered probit models. Significance levels: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 11. Correlations between ingroup trust and five other group performance indicators

	(1) trustsharein	(2) trustsharein	(3) trustsharein	(4) trustsharein	(5) trustsharein
Average leader satisfaction score	0.0518**				
	(0.019)				
Individual leader satsifaction score	0.006				
	(0.003)				
Average group performance score		0.004			
		(0.019)			
Individual group performance score		0.011			
		(0.007)			
Average group social relations score			0.052		
			(0.029)		
Individual group social relations score			0.022*		
			(0.008)		
Average group polarization score				-0.200**	
				(0.076)	
Individual group polarization dummy				-0.028	
				(0.021)	
Average group member performance score					0.019
					(0.023)
Individual group member performance score					0.0208*
					(0.009)
Constant	0.292***	0.546***	0.339**	0.524***	0.621***
	(0.078)	(0.079)	(0.123)	(0.019)	(0.094)
N	2427	2427	2427	2427	2427

Note: Linear models with random group effects and enumerator fixed effects (left out from the table). Standard errors corrected for clustering at group level. Significance levels: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

8. Discussion

The scope of our study was to contribute within a sub-set of variables that Ostrom (2009) identified as one of ten deeper level sub-set of variables of likely high importance for whether groups are able to establish collective action and that can prevent a 'tragedy of the commons' outcome (Hardin 1968). We have shown how this sub-set of variables relate internally and that altruistic and egalitarian preferences are important for the degree to which individuals posit norms to reciprocate and are trustworthy and trusting. We have also demonstrated that particularized trust and trustworthiness within groups build on generalized social preferences, norms of reciprocity, trustworthiness, and trust. Finally, we also showed that another of the ten deeper-level variables, leadership (satisfaction with group leader) was positively correlated with ingroup trust.

Our study has demonstrated the importance of social preferences and norms for trustworthiness and trust. We may regard group members with selfish preferences as those most closely resembling *Homo economicus* and a substantial share of the respondents fall in this category although a part of this group becomes less selfish in the ingroup setting than in the outgroup setting. Our study revealed that other-regarding preferences play an important role in the formation of norms of reciprocity, trustworthiness, and trust. Many members (25%) behaved altruistically in the ingroup setting while only 10% did so in the outgroup setting. We also found that the group composition of social preferences mattered as trust and trustworthiness were enhanced more in groups with a higher share of altruists and that this group composition effect materialized through formation of stronger norms for reciprocity both in the outgroup and ingroup contexts. Thus, generalized norms of reciprocity and trust were less exogenous than we had hypothesized.

Several authors have argued that certain social-environmental systems may require a stronger element of other-regarding preferences to get more stable equilibria with sustained collective action (Agrawal 2014; Lejano and de Castro 2014). We find in our study that very few of the group members have spiteful preferences compared to what Fehr et al. (2013) and Bauer et al. (2014) found in Austria and the Czech Republic for kids and adolescents. Bauer et al. (2014) found that children from families with low education were more spiteful, more selfish and less altruistic. If we were to extrapolate from their study, we should expect to find more spiteful and more selfish members in our study because the level of education is lower than that in the study by Bauer et al. (2014). However, they studied children only up to the age of 12 and showed that the share of spiteful members declined with age (5% were spiteful at the age of 10-12) while the share with altruistic preferences increased with age. The share of altruistic members was as high as 31% for 10-12 years old, much higher in their study in the Czech Republic than that found by Fehr et al. (2013) in a study of adolescents in Austria.

We do not have the basis to claim that our sample contains more altruistic members than is likely to be found elsewhere. What we can say, however, is that the average level of generalized trust in our sample is low, even in the African context where the meta-study by Johnson and Mislin (2011) found the average levels of trust and trustworthiness to be significantly lower than in other parts of the world. The average share sent in the trust game in studies in Africa that were reviewed by Johnson and Mislin (2011) was 0.46, compared to 0.41 in the ingroup context and 0.23 in the

outgroup context in our study. The average share returned (trustworthiness) in the African studies covered by Johnson and Mislin was 0.32 compared to 0.32 in the ingroup context and 0.23 in the outgroup context in our study. One reason we find low shares sent and returned may be that our sample is particularly poor. Johnson and Mislin (2011) also indicated that when respondents are both trustors and trustees, when it is random whether games will be real, and when the strategy method is used, the shares sent and returned are likely to be lower. This may therefore also be reasons for lower rates sent and returned in our study. Anyway, we think we can rule out that collective action only works in our study groups because group members are particularly trustworthy and trusting. The institutional rules established from the beginning are likely to be of importance (Holden and Tilahun 2018).

The system estimation results have been assessed in relation to theory and can be compared with the results from the single equation linear models with step-wise introduction of additional controls. Actually, we find that the results with both approaches provide remarkably consistent results in terms of signs and significance levels of key variables. As a robustness check, we assessed how the results were affected when we used net trust gain (= individual ingroup trust – individual outgroup trust) instead of ingroup trust. Almost all of the results remained identical, with one exception. The net trust gain was negatively correlated with outgroup trust. Therefore, in groups with members with high levels of generalized trust there may be less hope to further increase ingroup trust.

We have chosen a cautious approach to assessing the relationship between ingroup trust and other group performance indicators. Based on the theory we expect positive correlations in terms of ingroup trust being positively correlated with other group performance indicators. We recognize that trust is highly endogenous like other performance indicators and these may be jointly determined by other observable and unobservable variables (Fehr 2009). Fehr (2009) stated that he has not seen any convincing studies of how trust affects other variables given the endogeneity issue and the difficulty of finding valid instruments for trust that would enable identifying its causal impacts.

Nevertheless, there are studies that have attempted to assess the impacts of trust on the group or team performance. De Jong et al. (2016) state that trust in team (group) members has long remained a relatively neglected issue in research on trust in teams and has received less attention than trust in leadership (Kiffin-Petersen 2004; Dirks and Ferrin 2002; Fulmer and Gelfand 2012). In their meta-study of trust in teams, De Jong et al. (2016) find that the effect of trust in team members is stronger than e.g. the effect of trust in team leadership. In our study we do not aim to identify the causal effect of ingroup trust on group performance as we have not been able to think of any valid instruments. De Jong et al. (2016) and Fulmer and Gelfand 2012) recommended more research on trust in team members as a fruitful direction of future research. Our experimental approach to measuring trust in groups is essentially a contribution in this direction. We have used individual group members' measures of trust and also used these to generate group-level measures of trust. We have run an additional set of models for the aggregate group-level variables (included in Appendix 3). The results from these models are consistent with the findings from the individual-level models.

9. Conclusions

Our study of social preferences, the norm of reciprocity and trust in youth business groups in northern Ethiopia has demonstrated that substantial shares of poor and young rural youth exhibit other-regarding preferences and norms both in the generalized (outgroup) and particularized (ingroup) contexts. However, the average levels of ingroup and outgroup trust and trustworthiness revealed through the experimental trust games were low even in the African context but we found substantial heterogeneity in these characteristics across groups. Altruistic preferences were associated with stronger norms to reciprocate, higher outgroup and ingroup trustworthiness and trust. On average 10% of the members exhibited altruistic preferences in the outgroup context against 25% in the ingroup context, while the share with selfish preferences was 33% in the outgroup context and 28% in the ingroup context. However, altruistic members had a stronger influence on average outgroup and ingroup trust than egalitarian and selfish members. We found that the social preferences had both direct and indirect effects on trustworthiness and trust and that there was a particularly strong indirect effect of altruism through the norm to reciprocate. This indirect effect was stronger in groups with a higher share with altruistic preferences.

An overall important conclusion from this study is that the youth group model seems robust to substantial variation in social preferences, norms of reciprocity and trust within groups as all the groups included in this study have survived and members of most groups are satisfied with how the groups perform. Still, this does not mean that social preferences, norms, and trust do not matter. We found that ingroup trust was correlated with a number of group performance indicators. We may conclude that the apparent success and stability of this youth business group model is not due to the unique social preferences and particularly high levels of trustworthiness and trust in these youth groups. This may indicate that the model is transferable to other places in Africa with similar levels of trust and norms of reciprocity. What may be more important is the compliance with Ostrom's Design Principles as found by Holden and Tilahun (2018) for these youth business groups. Still, social preferences and norms are important to enhance group performance and could in specific marginal situations be the factors that cause groups to collapse or survive under strong pressures. However, a more longitudinal study will be needed to learn more about this.

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Appendix 1. Experimental protocols

	Game set 1. To elicit social preferences		
a. We will introduce to you **eight** sharing games where you will decide what you prefer. b. You will have a chance to earn money by participating in these games and your **answers** will affect how much you and some others will get. c. Only one game will result in payout but you do not know which one when you make your **answers**. d. A lottery will determine which ones will be for real after all the games are played. e. By making careful **answers** in each game, you have a greater chance of getting your preferred payout.		
S1	**Sharing game 1**: You can choose between two sharing options **between yourself and another unknown member of your own youth group:** **Option 1: 20 ETB** for yourself AND **20 ETB** for another **unknown** member of your own youth group **Option 2: 20 ETB** for yourself AND **0 ETB** for another **unknown** member of your own youth group	Choice of sharing option: 1 or 2	
S2	**Sharing game 2**: You can choose between two sharing options **between yourself and an unknown member of another youth group in your woreda:** **Option 1: 20 ETB** for yourself AND **20 ETB** for another **unknown** member of another youth group in the woreda **Option 2**: **20 ETB** for yourself AND **0 ETB** for another **unknown** member of another youth group in the woreda	Choice of sharing option: 1 or 2	
S3	**Sharing game 3**: You can choose between two sharing options **between yourself and another unknown member of your own youth group:** **Option 1: 20 ETB** for yourself AND **20 ETB** for another **unknown** member of your own youth group **Option 2: 20 ETB** for yourself AND **40 ETB** for another **unknown** member of your own youth group	Choice of sharing option: 1 or 2	
S4	**Sharing game 4**: You can choose between two sharing options **between yourself and an unknown member of another youth group in your woreda:** **Option 1: 20 ETB** for yourself AND **20 ETB** for another **unknown** member of another youth group in the woreda **Option 2: 20 ETB** for yourself AND **40 ETB** for another **unknown** member of another youth group in the woreda	Choice of sharing option: 1 or 2	
S5	**Sharing game 5**: You can choose between two sharing options **between yourself and another unknown member of your own youth group:** **Option 1**: **20 ETB** for yourself AND **20 ETB** for another **unknown** member of your own youth group **Option 2: 40 ETB** for yourself AND **0 ETB** for another **unknown** member of your own youth group	Choice of sharing option: 1 or 2	
S6	**Sharing game 6:** You can choose between two sharing options **between yourself and an unknown member of another youth group in your woreda**: **Option 1: 20 ETB** for yourself AND **20 ETB** for another **unknown** member of another youth group in the woreda	Choice of sharing option: 1 or 2	

	Option 2: 40 ETB for yourself AND **0 ETB** for another **unknown** member of another youth group in the woreda		
S7	**Sharing game 7**: You can choose between two sharing options **between yourself and another unknown member of your own youth group:** **Option 1**: **20 ETB** for yourself AND **20 ETB** for another **unknown** member of another youth group in the woreda **Option 2: 30 ETB** for yourself AND **40 ETB** for another **unknown** member of another youth group in the woreda	Choice of sharing option: 1 or 2	
S8	**Sharing game 8**: You can choose between two sharing options **between yourself and another unknown member of another youth group in your woreda**: **Option 1**: **20 ETB** for yourself AND **20 ETB** for another **unknown** member of another youth group in the woreda **Option 2: 30 ETB** for yourself AND **40 ETB** for another **unknown** member of another youth group in the woreda	Choice of sharing option: 1 or 2	
G1(S1-S8)	**Lottery to determine which of the games is real will take place at the end of the survey interview**		

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8. Trust Game. General Instructions

You will now play two games related to trust, one will be with another anonymous member of your own group and one with another anonymous group member of another youth group in your own woreda. You will never find out who these members are and they will not find out who you are. One of these games will afterward be randomly selected /by throwing the die) as a real game that will be implemented. We are responsible for the transfer of the money between you and that other person by use of envelopes.

8.a.: Trust Game Within Own Youth Group (same format for 8.b.: With Youth Member in another Youth Group in the Woreda).

This is an experiment where you will decide how much you trust other persons within your own youth group (by giving them money they are free to return some of to you). The anonymous person in your group that you are free to decide to invest in is free to return some, all or nothing to you of the amount you invest and we triple. Like you, that other person only knows that you are an anonymous member of your own youth group. The maximum tripled amount that can be invested by you in that other anonymous person is 90 ETB. Alternatively, you may keep 30 ETB for yourself if you do not trust that other person to return any of the amount given to that anonymous person in your own group. We ask you a sequence of questions in the form of tow alternatives that you have to choose between in each case. This is to identify how much you are willing to invest in that anonymous person in your own group and that indicates how much you trust that person based on how much you expect that person voluntarily will return to you. You will respond to a number of paired alternatives where you are free to choose the one you prefer for each of the two alternatives.

After you have completed this game for a member of your own group you will do the same for an anonymous group member of another youth group in your own woreda.			
8a.1	Do you agree to play the game? 1=Yes, 2=No	Code	
8a.2	What do you prefer of these two alternatives? 1. Invest 30 ETB in the trust game with another anonymous person in your own youth group. This amount will be tripled such that that person gets 90 ETB and is free to return some, all or nothing of that amount to you, or 2. Keep the whole 30 ETB for yourself and invest nothing in the anonymous member in your own group as you do not trust this person. If choice 1, go to **8a.3**. If choice 2, go **8a.4.**	Code	
8a.3	What do you prefer? 1. Invest 30 ETB in the trust game with another anonymous person in your own youth group. This amount will be tripled such that that person gets 90 ETB and is free to return some, all or nothing of that amount to you, or 2. Keep 15 ETB for yourself AND invest 15 ETB in the trust of the anonymous member in your own group, which will be tripled to 45 ETB and who is free to return some, all or nothing to you. If choice 1, go to **8a.4**. If choice 2, go **8.a.6**	Code	
8.a.4	What do you prefer? 1. Keep the whole 30 ETB for yourself AND invest nothing in the anonymous member in your own group as you do not trust this person, or 2. Keep 25 ETB for yourself AND invest 5 ETB in the trust of the anonymous member of your own group, which we triple to 15 ETB and the anonymous person is free to return some, nothing or all of that 15 ETB to you. If choice 1, go to **Next experiment**. If choice 2, go to **8.a.9**	Code	
8.a.5	What do you prefer? 1. Invest 30 ETB in the trust game with another anonymous person in your own youth group. This amount will be tripled such that that person gets 90 ETB and is free to return some, all or nothing of that amount to you, or 2. Keep 5 ETB for yourself AND invest 25 ETB in the anonymous person in your own group who receives the tripled amount, 75 ETB and who is free to return some, all or nothing of this amount to you. If choice 1, go to the **Next experiment**. If choice 2, go **8.a.6**	Code	
8.a.6	What do you prefer?	Code	

	1. Keep 5 ETB for yourself AND invest 25 ETB in the anonymous person in your own group who receives the tripled amount, 75 ETB and who is free to return some, all or nothing of this amount to you, or 2. Keep 10 ETB for yourself AND invest 20 ETB in the anonymous person in your own group who receives the tripled amount, 60 ETB and who is free to return some, all or nothing of this amount to you. If choice 1, go to the **Next experiment**. If choice 2, go **8.a.7**		
8.a.7	What do you prefer? 1. Keep 10 ETB for yourself AND invest 20 ETB in the anonymous person in your own group who receives the tripled amount, 60 ETB and who is free to return some, all or nothing of this amount to you, or 2. Keep 15 ETB for yourself AND invest 15 ETB in the anonymous person in your own group who receives the tripled amount, 45 ETB and who is free to return some, all or nothing of this amount to you. If choice 1, go to the **Next experiment**. If choice 2, go to **8.a.8**	Code	
8.a.8	What do you prefer? 1. Keep 15 ETB for yourself AND invest 15 ETB in the anonymous person in your own group who receives the tripled amount, 45 ETB and who is free to return some, all or nothing of this amount to you. 2. Keep 20 ETB for yourself AND invest 10 ETB in the anonymous person in your own group who receives the tripled amount, 30 ETB and who is free to return some, all or nothing of this amount to you. If choice 1, go to the **Next experiment**. If choice 2, go to **8.a.9**	Code	
8.a.9	What do you prefer? 3. Keep 25 ETB for yourself AND invest 5 ETB in the trust of the anonymous member of your own group, which we triple to 15 ETB and the anonymous person is free to return some, nothing or all of that 15 ETB to you. 4. Keep 20 ETB for yourself AND invest 10 ETB in the anonymous person in your own group who receives the tripled amount, 30 ETB and who is free to return some, all or nothing of this amount to you. If choice 1, go to the **Next experiment**. If choice 2, go to **Next experiment**.	Code	
We will now ask you how you would respond as a receiver of a random envelope from another member in your youth group (amount sent back) and youth group member from another youth group of the same woreda, depending on how big the amount in the envelope you receive is.			

You know that we have tripled the amount that the other member from your youth group and/or youth group member from another youth group of the same woreda put in the envelope. **The amounts you decide to return now will be binding for what you have to return when you get the real envelope – but the amount you find there is unknown till you open it as it depends on the decision of the sender (trustor) of that envelope. You will never know who the sender is.**	
How much will you leave in the envelope (return to the sender who is a random **anonymous person in own youth group**) if the amount in the envelope is 90 ETB?	ETB
How much will you leave in the envelope (return to the sender who is a random **anonymous member of another youth group** in the same district (woreda)) if the amount in the envelope is 90 ETB?	ETB
How much will you leave in the envelope (return to the sender who is a random **anonymous person in own youth group**) if the amount in the envelope is 75 ETB?	ETB
How much will you leave in the envelope (return to the sender who is a random **anonymous member of another youth group** in the same district (woreda)) if the amount in the envelope is 75 ETB? **Etc. for smaller amounts 60, 45, 30 and 15 ETB**	ETB

Appendix A2. Additional individual-level models

Table A1. Ingroup trust, individual member linear models with group random effects and additional controls

	(1)	(2)	(3)	(4)	(5)
	trustsharein	trustsharein	trustsharein	trustsharein	trustsharein
Ingroup Altruist, dummy	0.147***	0.117***	0.0968***	0.0341**	0.0307**
	(0.014)	(0.013)	(0.013)	(0.012)	(0.011)
Ingroup Egalitarian, dummy	0.070***	0.0478***	0.0384**	0.018	0.013
	(0.015)	(0.015)	(0.014)	(0.012)	(0.012)
Ingroup Spiteful, dummy	-0.059	-0.023	-0.032	-0.027	-0.054
	(0.099)	(0.094)	(0.091)	(0.081)	(0.079)
Ingroup Selfish, dummy	-0.053***	-0.0375**	-0.0271*	-0.0267*	-0.0270*
	(0.013)	(0.013)	(0.012)	(0.011)	(0.011)
Strong Ingroup obligation to reciprocate Base					
Somewhat obliged, dummy		-0.142***	-0.0978***	-0.0753***	-0.071***
		(0.011)	(0.011)	(0.010)	(0.010)
Not obliged at all, dummy		-0.241***	-0.178***	-0.134***	-0.085***
		(0.019)	(0.019)	(0.017)	(0.018)
Outgroup trustworthiness, share			0.322***	0.116***	0.103***
			(0.023)	(0.022)	(0.022)
Outgroup trust, share				0.579***	0.550***
				(0.023)	(0.022)
Ingroup expected return: <1/3, base					
One third, dummy					-0.018
					(0.025)
Half, dummy					0.033
					(0.025)
More than half, dummy					0.058*
					(0.026)
Nothing as I sent nothing, dummy					-0.156***
					(0.030)
Nothing, although I sent some, dummy					
					(0.029)
Risk tolerance					0.0297*
					(0.012)
Constant	0.487***	0.534***	0.437***	0.349***	0.328***
	(0.023)	(0.021)	(0.022)	(0.019)	(0.031)
N	2427	2427	2427	2427	2427
R-sq., within	0.114	0.182	0.230	0.389	0.417
R-sq., between	0.340	0.518	0.603	0.706	0.727
R-sq., overall	0.157	0.247	0.304	0.455	0.483
Wald chi2	395.3	722.4	988.3	1931.5	2156.8
P-value	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Dependent variable: Ingroup trust measured as the share of 30 ETB sent in the trust game when the game is played with an anonymous member of their own youth group. The table presents marginal effects from linear panel data models with youth group random effects, district fixed effects and enumerator fixed effects (left out of the table to save space). Cluster-robust standard errors in parentheses, clustering at youth group level. Significance levels: * p<0.05, ** p<0.01, *** p<0.001.

Table A2. Ingroup trustworthiness models: Linear random effects models with additional controls

	(1) sharere~30in	(2) sharere~30in	(3) sharere~30in	(4) sharere~30in
Altruist, Outgroup, dummy	0.096***	0.062***	0.021**	0.016*
	(0.011)	(0.010)	(0.008)	(0.008)
Egalitarian, Outgroup, dummy	0.054***	0.030*	0.011	0.010
	(0.013)	(0.012)	(0.008)	(0.008)
Spiteful, Outgroup, dummy	-0.071	-0.026	-0.040	-0.039
	(0.082)	(0.075)	(0.054)	(0.054)
Selfish, Outgroup, dummy	-0.050***	-0.032**	-0.009	-0.009
	(0.011)	(0.010)	(0.007)	(0.007)
Strong Ingroup obligation to reciprocate Base				
Somewhat obliged, dummy		-0.156***	-0.0658***	-0.064***
		(0.009)	(0.007)	(0.007)
Not obliged at all, dummy		-0.268***	-0.136***	-0.133***
		(0.015)	(0.011)	(0.011)
Outgroup trustworthiness, share			0.652***	0.637***
			(0.014)	(0.015)
Outgroup trust, share				0.0434**
				(0.015)
Constant	0.355***	0.407***	0.210***	0.203***
	(0.019)	(0.017)	(0.013)	(0.013)
N	2427	2427	2427	2427
R-sq., within	0.102	0.243	0.591	0.592
R-sq., between	0.424	0.598	0.824	0.826
R-sq., overall	0.190	0.339	0.654	0.655
Wald chi2	441.0	1077.0	4338.3	4359.6
P-value	0.0000	0.0000	0.0000	0.0000

Note: Dependent variable: Share returned of 30 ETB if that is the amount received as trustee from an anonymous ingroup member, based on the strategy method. The table presents marginal effects from linear panel data models with youth group random effects, district fixed effects and enumerator fixed effects (left out of the table to save space). Cluster-robust standard errors in parentheses, clustering at youth group level. Significance levels: * p<0.05, ** p<0.01, *** p<0.001.

Table A3. Panel poisson models: Expected return in ingroup and outgroup trust games

	(1) Ingroup expect	(2) Ingroup expect	(3) Ingroup expect	(4) Outgroup expect	(5) Outgroup expect
Altruist, Outgroup, dummy	0.052**	0.032	0.019	0.060*	0.037
	(0.018)	(0.018)	(0.018)	(0.026)	(0.026)
Egalitarian, Outgroup, dummy	0.014	0.005	-0.007	0.017	-0.004
	(0.015)	(0.015)	(0.015)	(0.024)	(0.024)
Spiteful, Outgroup, dummy	0.032	0.039	0.039	-0.035	-0.044
	(0.042)	(0.043)	(0.043)	(0.057)	(0.057)
Selfish, Outgroup, dummy	-0.022	-0.019	-0.015	-0.012	-0.004
	(0.014)	(0.014)	(0.014)	(0.023)	(0.023)
Strong Outgroup obligation to reciprocate Base					
Somewhat obliged, dummy		-0.043***	-0.001	-0.169***	-0.105***
		(0.013)	(0.013)	(0.017)	(0.019)
Not obliged at all, dummy		-0.065***	0.004	-0.197***	-0.106**
		(0.016)	(0.018)	(0.033)	(0.036)
Outgroup trustworthiness, share			0.224***		0.363***
			(0.030)		(0.046)
Constant	1.022***	1.052***	0.962***	0.892***	0.754***
	(0.024)	(0.024)	(0.027)	(0.034)	(0.039)
lnalpha	-19.47***	-19.72**	-18.89***	-18.63***	-18.66***
	(1.445)	(6.217)	(0.863)	(0.554)	(2.046)
N	2150	2150	2150	1703	1703

Note: Dependent variable: Expected return categories 1-4. Robust standard errors in parentheses. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table A4. Linear random effects probability model: Individual models for group being fractioned/polarized

	(1)	(2)	(3)	(4)
	Polarized	Polarized	Polarized	Polarized
Altruist, Outgroup, dummy	-0.011	0.003	0.004	0.003
	(0.019)	(0.019)	(0.019)	(0.020)
Egalitarian, Outgroup, dummy	-0.007	0.000	0.001	0.000
	(0.016)	(0.016)	(0.016)	(0.016)
Spiteful, Outgroup, dummy	0.184***	0.179***	0.179***	0.179***
	(0.051)	(0.051)	(0.051)	(0.051)
Selfish, Outgroup, dummy	-0.0268*	-0.0283*	-0.0286*	-0.0285*
	(0.013)	(0.013)	(0.013)	(0.013)
Strong Ingroup obligation to reciprocate Base				
Somewhat obliged, dummy		0.031*	0.028*	0.029*
		(0.013)	(0.014)	(0.014)
Not obliged at all, dummy		0.045**	0.040*	0.042*
		(0.016)	(0.018)	(0.019)
Outgroup trustworthiness, share			-0.016	-0.018
			(0.030)	(0.031)
Outgroup trust, share				0.009
				(0.030)
Constant	0.0600*	0.039	0.045	0.043
	(0.024)	(0.025)	(0.027)	(0.028)
N	2427	2427	2427	2427
R-sq., within	0.034	0.037	0.037	0.037
R-sq., between	0.055	0.060	0.060	0.060
R-sq., overall	0.041	0.045	0.045	0.045
Wald chi2	94.1	104	104.2	104.2
P-value	0.0000	0.0000	0.0000	0.0000

Note: Dependent variable: Expected return categories 1-4. Robust standard errors in parentheses. * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Appendix 3. Group level models: Social preferences, trust and group performance

For group-level trust we assess the following hypotheses:

HG1) Groups with more selfish and spiteful members have lower levels of trust and trustworthiness

HG2) Groups with more altruistic and egalitarian preferences have higher levels of average (outgroup and ingroup) trust and trustworthiness

HG3) The effects of social preferences on trust and trustworthiness go through the reciprocity norm/obligation

Table A5. Group average variables used in group-level analysis

Average group variables	N	Mean	Std.	Min	Max
Average ingroup trust share	246	0.42	0.13	0.08	0.82
Average outgroup trust share	246	0.23	0.10	0.00	0.53
Average net ingroup trust markup	246	0.19	0.08	0.02	0.58
Average ingroup trustworthiness, share returned	246	0.32	0.12	0.04	0.60
Average outgroup trustworthiness, share returned	246	0.23	0.11	0.02	0.60
Ingroup average Altruist share	246	0.25	0.18	0.00	0.80
Outgroup average Altruist share	246	0.10	0.11	0.00	0.42
Ingroup average Egalitarian share	246	0.18	0.14	0.00	0.63
Outgroup average Egalitarian share	246	0.17	0.15	0.00	0.67
Ingroup average Spiteful share	246	0.00	0.01	0.00	0.13
Outgroup average Spiteful share	246	0.01	0.03	0.00	0.20
Ingroup average Selfish share	246	0.27	0.19	0.00	0.86
Outgroup average Selfish share	246	0.32	0.18	0.00	0.92
Limited obligation to reciprocate, outgroup	246	1.92	0.36	1.14	2.82
Limited obligation to reciprocate, ingroup	246	1.48	0.29	1.00	2.50
Average social relations in group score	246	1.99	0.29	1.33	3.50
Polarized group likelihood score	246	0.08	0.11	0.00	0.75
Average youth group performance score	246	2.41	0.46	1.44	4.20
Average youth group member performance	246	2.39	0.39	1.56	3.88

Source: 2019 Baseline survey data.

Table A6. Average outgroup trust and trustworthiness, social preferences and obligations to reciprocate

	(1)	(2)	(3)	(4)
	Average outgroup trust share	Average outgroup trust share	Average outgroup trustworthiness	Average outgroup trustworthiness
Outgroup average Altruist share	0.470****	0.252****	0.403****	0.0878*
	(0.045)	(0.051)	(0.059)	(0.048)
Outgroup average Egalitarian share	0.174****	0.038	0.240****	0.042
	(0.033)	(0.038)	(0.040)	(0.036)
Outgroup average Spiteful share	0.164	0.019	0.437**	0.226
	(0.149)	(0.143)	(0.169)	(0.148)
Outgroup average Selfish share	-0.0822**	-0.024	-0.121***	-0.037
	(0.039)	(0.034)	(0.040)	(0.028)
Average obligation to reciprocate		-0.159****		-0.231****
		(0.018)		(0.015)
Constant	0.177****	0.511****	0.180****	0.664****
	(0.019)	(0.045)	(0.023)	(0.037)
N	246	246	246	246
R-sq.	0.417	0.613	0.386	0.713

Note: Dependent variables: Average outgroup trust share and average outgroup shares returned in trust game (trustworthiness). Standard errors in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$, **** $p<0.001$
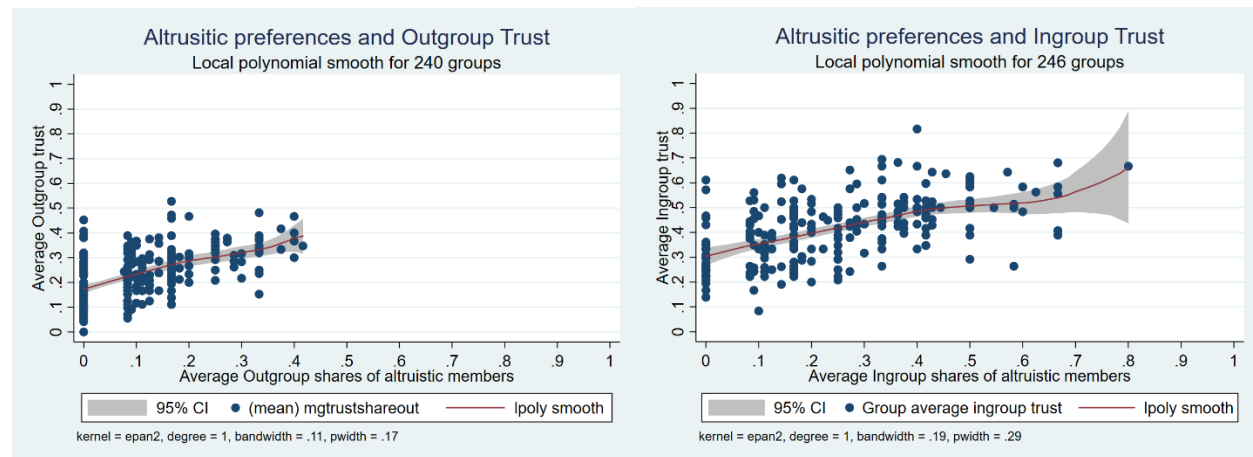

Figure A1a and A1b. Group level Altruistic preference distributions and Outgroup and Ingroup Trust
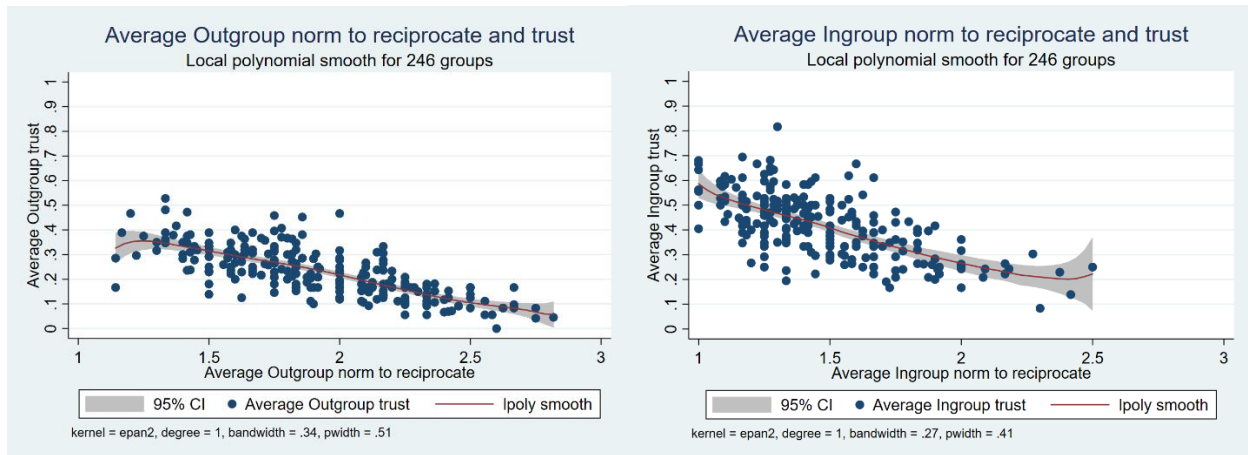
Figure A2a and A2b. Average group level Norms to Reciprocate and Outgroup and Ingroup Trust

Table A7. Average ingroup trust models

	(1)	(2)	(3)	(4)	(5)	(6)
	avtrustsharein	avtrustsharein	avtrustsharein	avtrustsharein	avtrustsharein	avtrustsharein
Ingroup average Altruist share	0.487****	0.217****	0.046	0.040	0.061	0.061
	(0.063)	(0.058)	(0.053)	(0.053)	(0.051)	(0.052)
Ingroup average Egalitarian share	0.170****	0.001	-0.025	-0.032	-0.030	-0.027
	(0.049)	(0.044)	(0.038)	(0.038)	(0.038)	(0.037)
Outgroup average Spiteful share	-0.098	-0.278*	-0.291**	-0.335**	-0.344***	-0.287**
	(0.192)	(0.160)	(0.138)	(0.137)	(0.116)	(0.124)
Outgroup average Selfish share	-0.176****	-0.104***	-0.0874***	-0.0814***	-0.0813***	-0.0771***
	(0.042)	(0.036)	(0.031)	(0.031)	(0.029)	(0.030)
Average obligation to reciprocate		-0.198****	-0.0901****	-0.0522**	-0.0514**	-0.0475**
		(0.019)	(0.020)	(0.025)	(0.023)	(0.023)
Average outgroup trust share			0.679****	0.634****	0.627****	0.635****
			(0.073)	(0.074)	(0.071)	(0.071)
Average outgroup trustworthiness				0.195**	0.178**	0.183**
				(0.077)	(0.076)	(0.076)
Average group social relations score					0.0395***	
					(0.015)	
Average group polarization score						-0.100**
						(0.040)
Constant	0.394****	0.810****	0.463****	0.357****	0.437****	0.353****
	(0.023)	(0.044)	(0.053)	(0.067)	(0.074)	(0.062)
N	246	246	246	246	246	246
R-sq.	0.382	0.574	0.687	0.696	0.703	0.702

Note: Dependent variable: Average ingroup trust share by group. Robust standard errors in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$, **** $p<0.001$

Table A8. Net average ingroup-outgroup trust

	(1)	(2)	(3)	(4)	(5)	(6)
	netingrtrust	netingrtrust	netingrtrust	netingrtrust	netingrtrust	netingrtrust
Ingroup average Altruist share	0.047	0.010	0.0805**	0.0764*	0.0753**	0.0775**
	(0.037)	(0.037)	(0.039)	(0.039)	(0.038)	(0.039)
Ingroup average Egalitarian share	0.049	0.007	0.021	0.010	0.011	0.012
	(0.036)	(0.041)	(0.039)	(0.039)	(0.039)	(0.039)
Ingroup average Selfish share	-0.044	-0.027	-0.026	-0.016	-0.014	-0.015
	(0.033)	(0.033)	(0.033)	(0.032)	(0.031)	(0.031)
Average obligation to reciprocate		-0.0633****	-0.106****	-0.0848****	-0.0813****	-0.0799****
		(0.018)	(0.020)	(0.021)	(0.021)	(0.021)
Average outgroup trust share			-0.296****	-0.381****	-0.375****	-0.374****
			(0.064)	(0.074)	(0.072)	(0.071)
Average outgroup trustworthiness				0.170**	0.166**	0.159**
				(0.068)	(0.067)	(0.067)
Average group social relations score					0.0244*	
					(0.014)	
Average group polarization score						-0.0974**
						(0.038)
Constant	0.177****	0.283****	0.394****	0.343****	0.386****	0.343****
	(0.021)	(0.037)	(0.045)	(0.047)	(0.052)	(0.046)
N	246	246	246	246	246	246
R-sq	0.049	0.087	0.163	0.186	0.194	0.204

Note: Dependent variable: Average ingroup versus outgroup trust gain by group. Robust standard errors in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$, **** $p<0.001$

Table A9. Aggregate group models: Social preferences, obligations to reciprocate and social relations in groups

	Average obligation to reciprocate	Average Fractioned group perception share	Average Social relation score
Outgroup average Altruist share	-1.365****	0.204**	-0.443*
	(0.167)	(0.090)	(0.235)
Outgroup average Egalitarian share	-0.855****	0.040	-0.030
	(0.126)	(0.060)	(0.174)
Outgroup average Spiteful share	-0.912*	0.444***	0.336
	(0.513)	(0.156)	(0.419)
Outgroup average Selfish share	0.363***	0.047	-0.021
	(0.122)	(0.050)	(0.131)
Average obligation to reciprocate		0.0734***	-0.147**
		(0.024)	(0.062)
Constant	2.095****	-0.113**	1.656****
	(0.065)	(0.055)	(0.147)
N	246	246	246
R-sq.	0.411	0.067	0.036

Note: Group average variables aggregated from group member data. Robust standard errors in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$, **** $p<0.001$.