The Dark Side of Leadership: An Experiment on Religious Heterogeneity and Cooperation in India.

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Abstract

We investigate voluntary contribution to public goods in culturally heterogeneous groups with a laboratory experiment conducted among 432 Hindu and Muslim subjects in India. With our specification of 'Leading by example' we test for an interaction effect between leadership and religious heterogeneity in a high stake environment. While cultural diversity does not affect contributions in the standard linear Public Goods Game, it reduces cooperation in the presence of a leader. Furthermore, we show that preferences for conditional cooperation are only prevalent in pure groups. In mixed groups, poor leadership and uncertainty about followers' reciprocity hinders the functionality of leadership as an institutional device to resolve social dilemmas.

Keywords

leading by example; conditional cooperation; reciprocity; religious diversity; public goods game

JEL Classification Numbers: C92, H41, O12, Z12

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1 Introduction

Ethnic, linguistic, and religious fractionalization has been found to have a negative effect on various outcome variables such as economic growth and political stability (e.g. Alesina and La Ferrara 2005; Collier 2000; Easterly and Levine 1997). Field experiments in low-income communities show that social heterogeneity is associated, for example, with poorly maintained infrastructure (Bardhan and Dayton-Johnson 2002), environmental degradation (Baland and Platteau 1996), and more frequent defaults in microcredit-schemes (Karlan 2007). While negative diversity effects are mostly absent in high income countries (e.g. Ottaviano and Peri 2006; Putnam 2007), heterogeneity seems to harm development in poor countries (e.g. Miguel and Gugerty 2005). The connection is often explained by a lack of cooperation across diverse groups, which causes an inefficient use of productive assets in general and a suboptimal provision of public goods in particular (e.g. Alesina et al. 1999; Habyarimana et al. 2007).

Although there seems to be a dependency between fractionalization and cooperation, a causal relationship cannot be explained within the standard framework of economic theory nor found in cross-country, regional, or illustrative quasi-experimental data. In order to fill this explanatory gap, the behavior of individual decision-makers has to be studied in a controlled context. A common way to study voluntary contribution in the laboratory is by using the Public Goods Game (PGG). Prior studies using versions of the PGG compare cooperation levels across countries, yet they mostly consider groups consisting of members of similar cultural background (Brandts et al. 2004; Henrich et al. 2005; Kocher et al. 2008). Hence, these studies do not offer the opportunity to draw conclusions about the interaction between cultural heterogeneity within groups and the observed level of cooperation. There are exceptions such as Carpenter and Cardenas (2011) who implement an 'intercultural experiment' among Colombian and US American students. However, their experiment uses a Common Pool Resource Game which conceptually differs from the PGG in terms of the existence of multiple (asymmetric) Nash equilibria.

In our specification of the PGG we vary the structure of observed groups with respect to their cultural characteristics. We use religious affiliation as the varying cultural characteristic, as it is a dimension of heterogeneity that operates strongly separating (e.g. Basu 2005). Social science emphasizes the role of leadership as a natural candidate in facilitating coordination and cooperation within collectives. Hence, leadership may alleviate social dilemma problems caused or strengthened by cultural heterogeneity. Although a considerable body of literature examines the functionality of leadership (for an overview see Ahlquist and Levi 2011), the conditions under which leadership meets these expectations are yet to be fully understood. So far, laboratory experiments have focused on the effects of leadership in culturally homogeneous groups (e.g. Güth et al. 2007; Levati et al. 2007; Moxnes and van der Heijden 2003). In our experiment we test the efficacy of 'Leading by example' to foster voluntary cooperation in religiously heterogeneous groups. In this basic form of leadership within the PGG, a first-mover can induce cooperation by taking a costly effort and revealing his contribution to the remaining group members. Our specification of 'Leading by example' allows conclusive interpretations about the interaction between leadership and cultural heterogeneity.

The experiment was conducted in India, where recruited subjects were either Hindu or Muslim. The implementation in India offers three major advantages for experimental testing: First, India is a place to study at low cost, allowing for laboratory experiments with high stakes. Second, polarized stereo-typing as well as frequent tensions between religious groups show that religious affiliation in India is a relevant category for social behavior. Both aspects strengthen internal validity. Third, following the demands made by Henrich, Heine, and Norenzayan (2010), not to study exclusively WEIRD (i.e. Western, Educated, Industrialized, Rich, Democratic) people in behavioral experiments, we use a culturally and economically diverse subject pool of Indian students.

Focusing on within-group heterogeneity in a setting where cultural prejudice has to be expected, we contribute to the understanding of the impact of religious diversity on coop-

eration and the functionality of leadership in a heterogeneous environment. The remainder of the paper is structured as follows: In Section 2 we outline the theoretical background, hypotheses, and prior findings. In Section 3 we describe our experimental design. Section 4 summarizes descriptive results and provides an explanation for the observed effects. Section 5 concludes.

2 Hypotheses

First, we describe the notion of the Public Goods Game. Second, we formulate hypotheses on the effect of heterogeneity on cooperation behavior. Third, we elaborate the effectiveness of 'Leading by example' in pure and mixed groups.

2.1 Linear Public Goods Game

The standard PGG represents a dilemma situation where individual incentives and social interest diverge. Cooperation in the PGG can be modeled through the linear voluntary contribution mechanism (Isaac and Walker 1988). The payoff Π of individual i is given by

$$\Pi_i = e_i - c_i + \beta \sum_{j=1}^{n} c_j$$

where e_i is participant i's endowment, c_i his contribution, and n the total number of group members. Assuming rationality, common knowledge of rationality, and selfish preferences, subjects would choose $c_i = 0$, whereas $c_i = e_i$ is the social optimum as it maximizes the sum of payoffs for all group members. The utility of the public good – and thus the individual incentive to contribute to its provision – is given by the efficiency factor β. As long as $1/n < \beta < 1$, the game represents a social dilemma and facilitates an experimental test of cooperative behavior between group members.

Experimental research finds cooperation rates of roughly 50% in the PGG (see Camerer

2003), which clearly rejects the theoretical expectation of rational defection. The principle of conditional cooperation offers one of the most promising ways to explain pro-social behavior in the PGG (e.g. Fischbacher et al. 2001; Keser and van Winden 2000; Sonnemans et al. 1999). One of the main results is that most participants can be categorized as conditional cooperators with a self-serving bias (always giving a little less than what they believe the others will contribute on average). Experimental findings support conditional cooperativeness not only as the prevalent individual preference, but also as the average preference of all participants. In our experiment we consider contribution behavior conditional on the others' religious affiliation (heterogeneity treatment), as well as contribution behavior reciprocal to a leader's contribution (leadership treatment).

2.2 Heterogeneity in the Public Goods Game

Experimental evidence as to the effect of heterogeneity on cooperation in the (linear) PGG is conflicting, and explanations of behavior are still inconclusive. Finocchiaro-Castro (2008) compares the behavior of English and Italian students. Using a partner design in a repeated PGG (group members interacting repeatedly with each other) he finds evidence for higher contribution levels in homogeneous than in mixed groups (under common knowledge of others' nationalities). With a relatively weak heterogeneity treatment (differences in political party preference, Christian denomination, season of birth), Koopmans and Rebers (2009) find stronger conditional cooperation within homogeneous groups in an online PGG conducted among Dutch students. In constrast, Schündeln (2013) examines ethnic heterogeneity in the context of the private provision of public goods in Uganda, using data from a household survey. He provides evidence for contribution levels that are higher in ethnically mixed groups than in pure groups. In a Common Pool Resource Game Carpenter and Cardenas (2011) find no significant difference between the extraction behavior of Colombian and US American students. However, in mixed groups Colombians (US Americans) tend to extract significantly more (less) than in pure control groups. The balancing of countervailing effects

leads to overall extraction rates similar to the ones in pure groups.

A common explanation for negative effects of heterogeneity is weak inter-group cooperation (e.g. Alesina et al. 1999; Alesina and La Ferrara 2005). Such in-group favoritism can result from preference-based or strategic discrimination within heterogeneous populations. Preference-led discriminators have a taste for interactions with their own group and a dislike of cooperative exchange with members of other groups (Becker 1971; Tajfel 1982). Strategic in-group favoritism rests on statistical discrimination (Arrow 1973; Phelps 1972), where a partner's cooperativeness is inferred from observable information (e.g. the partner's religion). Also, being unsure about the effects of heterogeneity on others' behavior may disturb cooperativeness. We test the hypothesis:

H 1 Heterogeneity reduces the level of cooperation.

In our specification of the PGG, information on the partners' religious affiliation is signaling group composition, and thus is expected to affect choices. Individuals interacting with an out-group participant (outsider) may be less cooperative in dilemma situations, where avoiding vulnerability and trying to free-ride are dominant strategies.

2.3 Leadership in the Public Goods Game

The concept of 'Leading by example' has been introduced to game theory by Hermalin (1998). In his theoretical model a leader can induce rational agents to follow in order to reach a more preferable Nash Equilibrium. However, the situation he modeled in a contract theoretical set-up differs considerably from the dilemma given in the linear PGG. The latter yields a trivial solution (contributing nothing) and has no multiple equilibria between which the leader may strategically choose.

Installing a leader, however, alters the structure of the simultaneous PGG to a two-stage

decision process. First, the leader l decides on his contribution, given the payoff function

$$\Pi_l = e_l - (1-\beta)c_l + \beta \sum_{f=1;f\neq l}^{n} (c_f|c_l).$$

After the second-moving followers have been informed about the leader's investment c_l, each follower f decides on his contribution c_f given the payoff function

$$\Pi_f = e_f - (1-\beta)c_f + \beta \sum_{j=1;j\neq f,l}^{n} ((c_j|c_l) + c_l).$$

Since the contribution of the first-mover is revealed to the remaining group members, the leader can try to encourage cooperation by setting a costly example. By choosing a high contribution leaders cannot only trigger reciprocal behavior directly but positively influence the belief formation of followers (i.e. their beliefs on other followers' contributions). However, good leadership is only rational if there is a strong propensity of second-movers to follow suit.

Hence, leadership is expected to increase cooperation in the PGG through two interrelated effects: The leader anticipates followers' behavior and strategically contributes more in order to trigger positive reciprocity. The followers update their (prior) beliefs about other followers' contributions after receiving the common signal and reciprocate the large investment of the leader. We test the hypothesis:

H 2 Leadership increases the level of cooperation.

The functionality of leadership depends on the ability of the leader to positively influence their followers' beliefs about other followers' cooperativeness. If heterogeneity increases disbelief about others' reciprocity, second-movers in heterogeneous groups should be less prone to expect other followers to reciprocate the leader's investment (first order beliefs). This disbelief may stem from the rationally assumed irrelevance of a leader's signal for followers of another religion. Moreover, it seems reasonable to expect that each follower

believes that other followers have similar thoughts about the relevance and effectivity of leader's signals (second order beliefs). In consequence, the influence of leader contributions on follower beliefs should vary between pure and mixed groups:

H 3 There is a negative interaction between leadership and heterogeneity with respect to the level of cooperation.

Moxnes and van der Heijden (2003) introduce 'Leading by example' to a Public Bad Game (an inverted PGG where group members share a common loss). They find a significant correlation between leader and follower behavior. For the PGG Komai and Grossman (2009) report higher contributions of followers after having observed a first-mover's decision. However, the effectiveness of leadership decreases in larger groups (six as opposed to four members). Güth et al. (2007) find that leaders help to increase overall contributions only if group members identify strongly with their own group and if leaders hold sanctioning power. In set-ups where it is common knowledge that only the leader is informed about the efficiency factor β, leader contributions serve as a signal for the value of the public good (e.g. Potters et al. 2007). In consequence, reciprocity of followers is relatively strong, and good leadership promotes overall cooperation.

Levy et al. (2011) investigate the conditions under which non-binding contribution statements influence follower behavior. They distinguish between commonly received signals by random and elected leaders as well as signals provided by a computer. They show that only human leaders can implement 'norms of cooperation or reciprocity' (Levy et al. 2011: 41). To effectively function, signals must not only be perceived commonly, but require followers' trust in its relevance to others. In another interpretation, it takes signals from a leader who is considered 'in-group' to effectively guide behavior in a group of followers.

Levati et al. (2007) concentrate on endowment uncertainty and show that leadership in a repeated PGG increases overall contributions only under the salience of endowment differences. Under uncertainty the positive effect of leadership disappears. Moreover, heterogeneity in initial endowments lowers the leaders' capability of inducing cooperative behavior.

Eckel et al. (2010) report higher rates of imitation for followers if respective leaders have 'high status' according to their results in a prior quizz. Both findings indicate heterogeneity effects on the efficacy of leadership. However, the interaction of cultural heterogeneity and leadership has not been studied so far.

3 Design

The experiment was conducted in December 2010 at the main campus of St.Aloysius College in the center of Mangalore, a municipal town of 420,000 inhabitants in the South Indian state of Karnataka. In Mangalore (mostly Sunni) Muslims represent a substantial religious minority of approximately 22% of the predominantly Hindu population. St.Aloysius College has about 10,000 students of whom roughly 45% are Hindu, 30% are Muslim, and 25% are Christian. 432 participants, first to fourth year students, took part in 17 sessions. The recruited participants were either Hindu (261) or Muslim (171) males.[1] On average participants earned 300 Indian Rupees – subsequently Rs – (about 7 US$), with a minimum of 100 Rs and a maximum of 475 Rs. The entire experiment took approximately 90 minutes. The average payoff exceeds a day's minimum wage for laborers of different skills by the factor of 2.5 to 4.5, and therefore provides substantial monetary incentives.[2]

Group size in the PGG was set to four, and we chose a standard efficiency factor of $\beta = 0.5$. Thus, the sum of the four group members' contributions was doubled by the experimenters. Each participant was endowed with a private budget of 200 Rs (about 4.5 US$). We allowed individual contributions only to be multiples of 50 Rs (including 0 Rs).

At the beginning of the experiment participants were asked to fill in a registration form that included a question about their religious affiliation. In addition, participants had to choose an anonymous 'game name' from a list of six alternative names showing typical male

[1] In order to shut off potential cross-gender effects, we excluded women from the experiment.

[2] For minimum wages in the respective state of Karnataka see http://www.paycheck.in.

Hindu names (Mantra, Thulasi, Trishul) in one column and typical male Muslim names (Haj, Namaz, Zakkat) in another column. The game names were used to signal religious affiliation in the experiment. Apart from their indication of religious affiliation these names carry no social meaning, such as class, caste, or physical attributes. Without being instructed to do so all participants chose their game name according to their religious affiliation. During registration accuracy was checked according to the students' ID cards that contained information on religious affiliation. Within a questionnaire filled in at the end of the experiment students were asked to charaterize their degree of religious piety on a 10 point scale ranging from 'very religious' [1] to 'not religious' [10]. The median subject reported a personal religiousness of 4. Given the perfect match of game names with religious affiliation and the strong religious identification of subjects, we assume that information on the chosen game name allowed participants to correctly infer their group partners' religion. The registration process ended with participants drawing a random number, assigning them to an individual desk in the laboratory room. The rest of the experiment was structured in three parts.

In the first part of the experiment subjects received a short introduction and written instructions (see Appendix) that explained the main mechanism of the linear PGG. Participants were given enough time (on average 30 minutes) to read and understand the main task presented in the form of a detailed description as well as several examples illustrated by simple cartoons. The language, in which the set-up was explained, was kept as abstract as possible. At the end of these instructions all participants had to answer several control questions that showed whether the basic set-up had been understood completely. Subjects had the opportunity to ask the experimenters questions in private. The actual experiment, conducted with pencil and paper, started only after everybody had answered the test questions correctly and there were no further questions. In the second part of the experiment we randomized subjects into two treatments (*control* and *leadership*), and assigned them to either a homogeneous (*pure*) or a heterogeneous (*mixed*) group of four (see Table 1). Subjects received information on the game names of the participants who would be their group

partners which we handed out on an extra sheet. When stating their beliefs and contribution participants had to write down these names on their decision sheet (see Appendix). We chose this method to increase the saliency of partners' religious affiliation.

[Table 1 about here]

In the control treatment we consider pure groups, consisting entirely of Hindu (hhhh) or Muslim (mmmm) participants, as well as mixed groups. Mixed groups are composed of both Hindu and Muslim subjects. In three cases a symmetric composition (hhmm) was violated due to student availability. As a first step participants had to state their beliefs on the actual individual contributions of their group partners. Belief statements were strongly incentivized: Correct expectations yielded 100 Rs, expectations deviating not more than 50 Rs from the actual contribution rendered 50 Rs. Then participants stated their own actual contribution to the public good.[3]

In the leadership treatment we distinguish between leaders and followers in each group of four. Applying a conservative specification of leadership we randomly chose an exogeneous leader for each group. This form of weak leadership often arises whenever the allocation of status positions is intransparent. This may be particularly relevant for spontaneous interaction in newly assembled working groups of public administration and private corporations. Each leader stated his beliefs and actual contribution (in the same manner as in the control treatment), before the three remaining group members (followers) took on their actions. Then the information on his contribution was revealed to the three followers who stated their beliefs and contributions afterwards. In this treatment we distinguish between pure groups (Hhhh, Mmmm) and mixed groups with either a Hindu or a Muslim leader. Again, the composition of some mixed groups was asymmetric.

This leads to a total number of 4 treatments, each resembling a specific group structure and the absence or existence of a particular leader (Table 1). To check within each treatment

[3]To maximize comparability between the control and the leadership treatments we paid out only two out of three payoffs for stated beliefs. This was common knowledge.

whether a pooled analysis of various group compositions (e.g. hhhh and mmmm in pure and hhmm, hhhm and hmmm in mixed control groups) is appropriate, we tested for differences in the distribution of contributions. Pairwise χ^2-tests indicate no significant differences within treatments, except for mixed groups in the control treatment ($p = 0.023$). Omitting asymmetrically mixed groups, however, has no effect on the direction and size of our findings.

In the third part of the experiment participants answered a questionnaire on their demographic profile and received their payment individually by a person who did not appear as an experimenter in the process of the experiment.

4 Results

First, we describe differences in cooperation between the control and the leadership treatment. Then, we provide an explanation for the observed interaction effect of leadership and heterogeneity. Finally, we discuss the consequences of leadership for individual payoffs.

4.1 Cooperation across Treatments

Figure 1 shows the average contribution (as a percentage of the individual endowment) across experimental treatments. To identify significant differences we throughout report α-errors of two-sided Wilcoxon rank-sum tests.

[Figure 1 about here]

The contribution rates we find in our one-shot PGG are comparable to previous findings. For example, Walker and Halloran (2004) find cooperation levels averaging at 53.3% using the same group size (4) and efficiency factor (0.5). Our results are also in line with first round behavior in repeated public goods settings of similar structure (see Zelmer 2003).

With average contributions at around 58.9% of the endowment there are no differences in cooperative behavior between groups of different structure within the control treatment

($p = 0.637$). Hence, hypothesis 1 is rejected. In simultaneous decision-making religious heterogeneity does not seem to hinder cooperation. However, expected cooperativeness by others varies significantly across treatments. Members of homogeneous groups expect their fellow group members to contribute 67.3% on average, while their counterparts from heterogeneous groups believe their group members will only contribute at a rate of 57.5% on average.[4] However, differences in beliefs do not translate into lower contributions in mixed groups.

It becomes evident that leadership does not foster cooperation, as contributions in groups with sequential decision-making (45.4%) do not excel but even undercut the average contribution in the control treatments (58.9%); this difference is highly significant ($p < 0.001$). Our rejection of hypothesis 2 contradicts theoretical expectations and prior evidence regarding leadership in culturally homogeneous groups (e.g. Komai and Grossman 2009; Moxnes and van der Heijden 2003). Moreover, while in pure groups (Hhhh, Mmmm) leaders induce cooperation levels of roughly the size of the control treatment (hhhh, mmmm), cooperation in mixed groups deteriorates with leadership and is significantly lower than the average contribution in mixed control groups ($p = 0.001$). The interaction of heterogeneity and leadership reduces average contribution by 42 Rs (21% of endowment), which is consistent with hypothesis 3. It is important to note that the negative interaction is found despite our weak operationalization of leadership (i.e. random assignment and no sanctioning power of leaders).

Why does 'Leading by example' – introduced as a remedy for free-riding – reduce cooperation rates in heterogeneous groups? In the following we further explore the observed negative interaction and substantiate our explanation concerning hypothesis 3.

[4]This difference is significant ($p = 0.006$) and indicates the validity of our game names to signal group composition.

4.2 Leader Behavior

A straigthforward explanation for weak cooperation in the leadership treatments in general and under heterogeneity in particular is offered by 'bad' leadership. In both treatments leaders contribute significantly less than subjects do in the control treatments (48.0% vs. 58.9%; $p = 0.012$). While leaders in heterogeneous groups invest significantly less (43.9%) than subjects in the respective control treatment without a leader (60.0%; $p = 0.017$), their contributions do not differ significantly from those of leaders in pure groups (52.7%; $p = 0.312$). Although the difference in leader behavior between homogeneous and heterogeneous groups is insignificant, it can be well explained by the leaders' expectations. Leaders in pure groups expect followers to contribute 69.6% on average. Their counterparts in mixed groups expect only 53.5%. The difference between the two values is highly significant ($p = 0.008$). The overall interaction effect between leadership and heterogeneity stems both from 'bad' leadership in mixed groups and – as to be seen below – its amplification through reciprocal follower behavior.

4.3 Belief Formation

Using a linear regression analysis we test for differences in the ability of leaders in pure and mixed groups to influence followers' belief formation (Table 2).

[Table 2 about here]

While a positive signal of a first-mover raises beliefs in homogeneous groups significantly (model 1), leader contributions do not affect the formation of beliefs in heterogeneous groups (model 2). Instead, as reflected by the larger intercept in model 2, followers in mixed groups stick to a focal expectation of followers contributing 100 Rs (50% of the initial endowment).

[Figure 2 about here]

Figure 2 reproduces our finding without the assumption of linearity; vertical lines indicate 90% confidence intervals. It shows that fully cooperative leaders strongly affect belief formation in homogeneous groups. Hence, inducing cooperation in pure groups is particularly effective if leaders choose the maximum investment. In contrast, providing such a strong signal to followers to update their beliefs remains ineffective in mixed groups. A natural explanation for the limited capability of a leader's signal to influence followers' beliefs under heterogeneity is the lack of followers' trust in the relevance of the signal to participants who do not share the religion of the leader.

4.4 Conditional Cooperation and Reciprocity

The following regressions test for potential differences in conditional cooperation (control) as well as reciprocity (leadership) between treatments and explore the finding of particularly low cooperation levels in mixed leadership groups (Table 3). Models 1 and 2 show the effect of the expected cooperativeness of others (measured by average belief) on a subject's own contribution within pure and mixed control groups without a leader. Models 3 to 6 report followers' reactions to their leader's contribution.

It is apparent that conditional cooperation and reciprocity are absent in heterogeneous groups (see models 2, 4). In contrast, conditional cooperation is strong in homogeneous control groups and reciprocity is apparent in pure groups in the leadership treatment (see models 1, 3). In pure groups without a leader contributions rise by 7.46 Rs for any increase of 10 Rs in beliefs. The resulting self-serving bias is consistent with the arguments on imperfect conditional cooperation in Fischbacher and Gächter (2010). In the pure leadership treatment, self-serving is more substantial. A 10 Rs increase in a leader's contribution is reciprocated with 3 Rs.

[Table 3 about here]

In the last two models we split mixed group followers into second-movers following a

leader who – in model 5 – belongs to the same religion, e.g. a Muslim follower in a group with a Muslim leader (m|M), or who – in model 6 – belongs to the other religion, e.g. a Muslim follower with a Hindu leader (m|H). Both regressions reproduce the effects found in the models 3 and 4: While follower reciprocity is significantly positive in homogeneous dyads, there is no reciprocal behavior in heterogeneous dyads. Thus, in our experiment, the cooperativeness of followers who do not share their leader's religious affiliation cannot be influenced by good leadership.

[Figure 3 about here]

Average effects indicate the absence of conditional cooperation or reciprocity in mixed groups regardless of leadership. We need to take a closer look at the pattern of contributions to explain why the level of cooperation is low only in mixed leadership groups. Figure 3 shows how beliefs translate into contributions in the control treatments (left panel) and how followers react to a leader's contribution (right panel).

In homogeneous control groups, average beliefs determine contributions over the whole range. Subjects in mixed control groups, however, over-contribute low beliefs and under-contribute if they expect full cooperation by others. Members of heterogeneous groups do not follow their beliefs about others' cooperativeness. This lack of conditional cooperation results in a roughly horizontal reaction function, which we interpret as a consequence of increased uncertainty stemming from subjects being unsure about others' reaction to heterogeneity. Instead, subjects in mixed groups heavily rely on a simple coordination rule in choosing their contribution, i.e. contributing 100 Rs (50% of their endowment). This finding is consistent with psychological concepts suggesting that insecurity about others' behavior promotes the use of generally accepted coordination rules. To cope with increased uncertainty individuals tend to rely on focal choices to coordinate their behavior (e.g. Kerr 1995; van Dijk et al. 1999; van Lange and Messick 1996). Consistently, in the simultaneous game 45% (27 of 60) of the subjects in heterogeneous groups resort to contributions of 100 Rs

(see Figure 4). Obviously, the rule of contributing half of the endowment offers the only point in the decision space, where beliefs and actual contributions match (see Figure 3). In effect, average cooperation in heterogeneous groups reaches the level of homogeneous control groups, where focal contributions of 100 Rs are considerably less frequent. A binomial test indicates a significantly lower rate of 100 Rs contributions in pure than in mixed control groups ($p < 0.01$).

[Figure 4 about here]

In contrast to the simultaneous decision scenario in the control treatments the sequential scenario allows followers to react to a leader's decision (e.g. his deviation from the coordination rule). Within the leadership treatments (Figure 3, right panel) reciprocity is prevalent in homogeneous groups facing a good leader ($c_l \geq 100$ Rs). Yet, reciprocity is absent in cases of bad leadership ($c_l < 100$ Rs). If leaders contribute less than 100 Rs, homogeneous followers over-contribute on average, sticking to a focal contribution of 50% of the endowment.

In mixed groups, followers reciprocate bad leadership. However, second-movers do not respond with high contributions in cases of good leadership. This can be explained by followers' low expectations on the relevance of a leader's signal to other participants in mixed groups. In effect, leadership does not increase overall contribution under heterogeneity. Differences in follower behavior across treatments particularly arise if leaders give more than 50% of their endowment, as heterogeneous followers do not reciprocate a benevolent leader's high contribution. Here, treatment differences are significant at the 10% level.

4.5 Payoffs across Treatments

Table 4 describes individual payoffs resulting from the treatments of our experiment. It shows average payoffs in monetary units as well as the net profit relative to the individual endowment for each role of participants in the experiment.

[Table 4 about here]

In the control treatments, payoffs average 318 Rs. Gaining from the public good provided by their group, subjects increased their initial budget of 200 Rs by 59%. As there are no differences in contributions with regard to group composition in the control, average payoffs are equal in pure and in mixed groups. In the leadership treatments, payoffs in mixed groups are significantly lower than in pure groups ($p = 0.004$). However, individual profits depend on the role of the subject, the quality of leadership, and the composition of the group.

Followers, on the one hand, clearly benefit from good leaders ($c_l \geq 100$ Rs), increasing their initial budget by 66% in pure groups. Returns from the common pool are smaller in heterogeneous groups (54%), where good leadership fails to improve overall cooperation compared to the control treatments. Followers facing a bad leader ($c_l < 100$ Rs) earn less than subjects in all the other treatments, increasing their budget by only 26%.

Leaders, on the other hand, do not gain from giving a good example. Instead, good leaders increase their budget only by 49% in pure and 30% in mixed groups. The fact that good leaders fare worse than their followers is in line with prior evidence (see Levati et al. 2007) and is consistent with imperfect conditional cooperation preferences (conditional cooperation with a self-serving bias). The foregone gains due to followers' lack of reciprocal behavior is particularly strong in mixed groups. Finally, bad leadership pays off: First-movers in homogeneous groups who contribute less than 50% of their endowment generate profits in the size of subjects in the control groups. The gain is smaller in mixed groups, as heterogeneous followers reciprocate bad leadership.

5 Conclusion

Studying conditional cooperation preferences with respect to the partners' religion using a linear Public Goods Game, we examine the effect of religious heterogeneity within groups on their contribution behavior. Furthermore, we investigate the effects of introducing a sequential order in the choices on contributions in order to measure the effect of leadership

in homogeneous and heterogeneous groups.

Conducting an experimental study in the town of Mangalore, India we find that religious heterogeneity does not have a significant impact on contribution behavior. Despite significant differences in first order beliefs, mixed groups do not suffer from lower actual contributions. However, conditional cooperation preferences seem to be prevalent only in religiously pure groups. Surprisingly, we find that introducing a weak form of leadership does not increase cooperation levels. Within the analysis of group behavior under leadership we find that group members follow their randomly designated leaders only in religiously pure groups, which is consistent with conditional cooperation behavior found in groups without a leader. In mixed groups, however, followers do not reciprocate their leader's investment, so that giving little is ex post rational for leaders who expect significantly less than their counterparts in pure groups, pursue personal profit and therefore contribute for strategic reasons only.

Consequently, for mixed leadership groups this leads to levels of cooperation lower than those observed in leader-less groups of the same structure. In mixed control groups subjects strongly resort to the focal choice of contributing 100 Rs (50% of their endowment). In contrast to the simultaneous decision scenario in the control the sequential structure of the leadership treatment allows followers to react to their leader's contribution. In effect, leadership reduces cooperation in heterogeneous groups, since the first-mover's contribution does not result in stabilizing followers' beliefs. This result strengthens the findings of Levy et al. (2011) with respect to conditions of leader effectiveness and promotes their explanatory power in the context of cultural heterogeneity. In particular, our results indicate that a leader can only be efficient if he shares relevant characteristics with his followers.

While heterogeneity in groups without a leader does not harm contributions in our public goods setting, the lack of reciprocity towards leaders can pose serious threats to cooperativeness. Especially in developing countries, where legal institutions are yet to be put in place, 'Leading by example' in combination with strong and positive reciprocity could alleviate social dilemmas in both the private and the public sector. However, heterogeneous groups

lack the ability to take advantage of reciprocity and hence the efficiency enhancing effects of strategic 'over-contribution' by good leaders. Thus, within mixed groups the establishment of a hierarchical structure may be for the detriment of cooperative behavior. Our random role assignment reflects the intransparent foundation of a spontaneous social order. Under heterogeneity the absence of this weak form of leadership seems to produce more favorable outcomes, as self organization encourages decision-makers to resort to obvious coordination rules and prevents the occurrence of highly probable bad leadership.

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Table 1: Experimental Treatments

	control		leadership	
pure	hhhh	(24)	Hhhh	(17)
	mmmm	(8)	Mmmm	(11)
mixed	hhmm	(12)	Hhmm	(13)
	hhhm	(1)	Mhhm	(12)
	hmmm	(2)	Hhhm	(4)
			Mhmm	(4)

Numbers of independent cases (i.e. observed groups) in parentheses. Capital letters represent leaders. The number of participants varied because of student availability.

Figure 1: Cooperation across Treatments

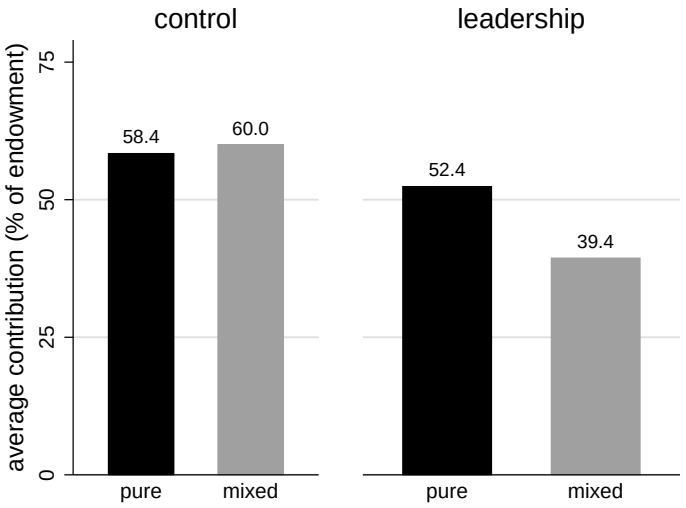
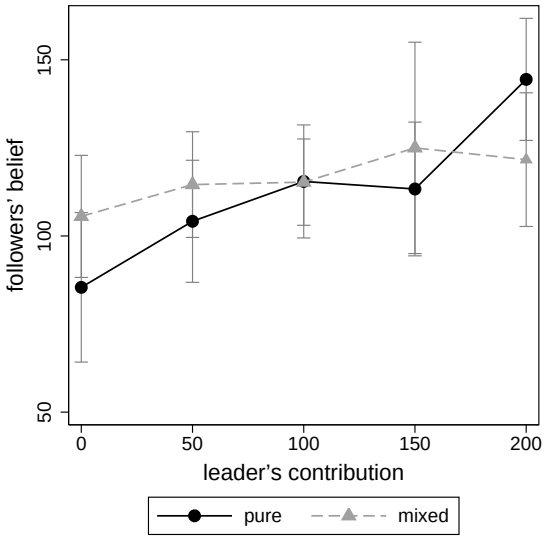


Table 2: Belief Formation

	leadership	
	1 pure	2 mixed
leader's contribution	.256***	.078
	(3.47)	(1.03)
constant	87.644***	108.062***
	(9.17)	(13.49)
n	84	99
R^2	.141	.012

OLS regressions, robust t-values in parentheses. Dependent variable: follower's average belief. *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Figure 2: Belief Formation



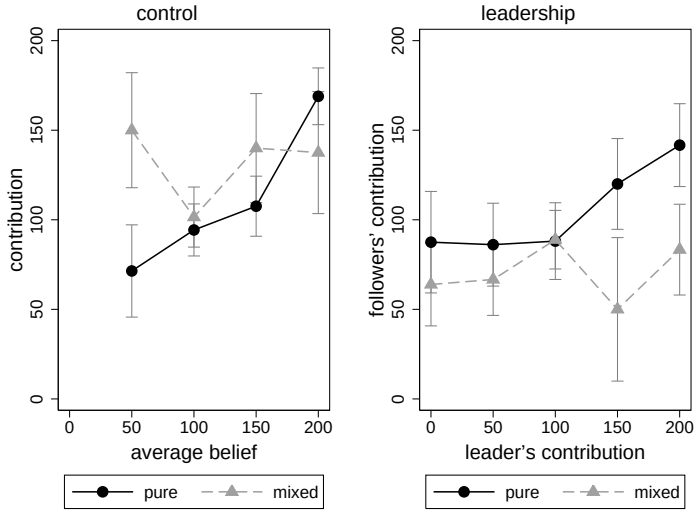
Mean values and 90% confidence intervals.

Table 3: Conditional Cooperation and Reciprocity

	control		leadership			
	1 pure	2 mixed	3 pure	4 mixed	5 mixed (h|H, m|M)	6 mixed (h|M, m|H)
average belief	.746***	.112				
	(7.37)	(.43)				
leader's contribution			.304***	.092	.317*	–.055
			(3.47)	(.93)	(2.32)	(–.43)
constant	16.331	107.065***	72.786**	67.676***	46.626**	80.589***
	(1.18)	(3.70)	(6.82)	(6.04)	(3.45)	(5.24)
n	128	60	84	99	41	58
R^2	.277	.005	.116	.009	.114	.003

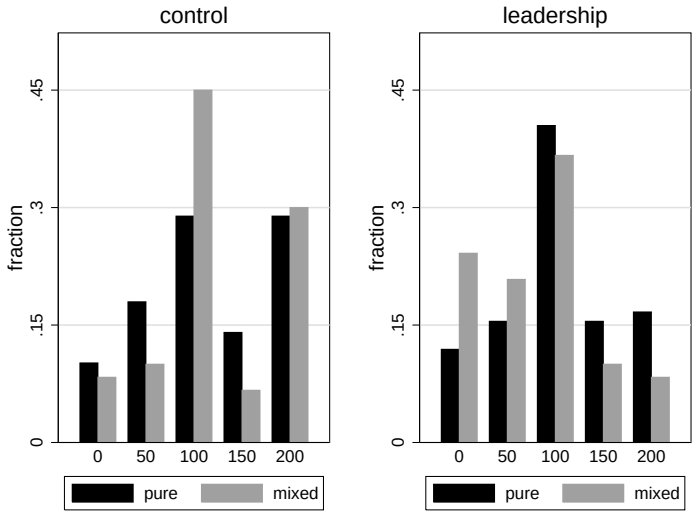
OLS regressions, robust t-values in parentheses. Dependent variable: subject's contribution (models 1, 2), follower's contribution (models 3–6). *** $p<0.001$, ** $p<0.01$, * $p<0.05$.

Figure 3: Conditional Cooperation and Reciprocity



Mean values and 90% confidence intervals.

Figure 4: Contributions



The chart for the leadership treatments considers only followers.

Table 4: Payoffs across Treatments

				Rupee	net profit
control			pure	316.8	58.4%
			mixed	320.0	60.0%
leadership		all	pure	304.9	52.5%
			mixed	278.8	39.4%
		followers	pure	305.1	52.5%
			mixed	281.8	40.9%
		leaders	pure	304.5	52.2%
			mixed	269.7	34.9%
	good leader	followers	pure	331.0	65.5%
			mixed	307.5	53.7%
		leaders	pure	298.6	49.3%
			mixed	259.2	29.6%
	bad leader	followers	pure	258.3	29.2%
			mixed	247.0	23.5%
		leaders	pure	315.0	57.5%
			mixed	283.9	42.0%

Net profit $= ((\Pi_i/e_i) \times 100) - 100$.

Appendix

The Appendix gives information on the practical set-up of the experiment. For reasons of simplicity we only include the instructions for the baseline treatment. The original instructions for 'leaders' as well as 'followers' can be obtained on request.

General Instructions

If you read the following instructions carefully, you can (depending on your decisions) earn money. The money earned during the experiment will be paid out in cash at the end of the session.

During the experiment you are not allowed to communicate with the other participants or use your mobile phone. In case of a violation of these rules we have to exclude you from the experiment including all payments. If you have any questions please raise your arm, and one of the experimenters will come to your desk to answer your questions.

All participants are randomly distributed into groups of four people. To make sure that none of the participants knows who his group partners are, we only use the **names** the participants have individually **chosen**.

First, we want you to become familiar with the decision problem. Note that these instructions only serve to make you understand the situation. The control questions are also designed for your understanding. Your answers will not affect your income from the experiment in any way.

The Situation

You are in a group together with three other participants (four group members in all). Every group member receives a private budget of 200 Rupees and is free to choose how much of this budget he is willing to contribute to a common pool. The amount of each contribution may be 0, 50, 100, 150, or 200 Rupees. Every Rupiah that is not transferred to the common pool is kept automatically by the respective participant.
In the following we describe how your total income is calculated.

Income from Private Budget

Every Rupiah of the initial budget that has not been transferred to the project is kept in private property. If you decide, for example, to transfer 150 Rupees to the common pool, 50 Rupees are kept as your private property. If you decide to transfer 100 Rupees to the common pool, your private property is 100 Rupees.

Income from Common Pool

The money contributed to the common pool by all four group members is doubled by the experimenters. Each group member receives an equal share of the money from the common pool. This means that all group members equally benefit from all contributions to the common pool.
The total amount of money in the common pool is calculated as follows:
Total amount in the common pool = Sum of all four contributions $\times$ 2
Your share (and those of the others) is calculated as follows:
Individual share from common pool = (Sum of all four contributions $\times$ 2*)* / 4

Example:
If you contribute 150 Rupees to the project and the other group members contribute 50, 100 and 200 Rupees, the sum of contributions is 500 Rupees (150+50+100+200 = 500). Then all group members receive (500 $\times$ 2)/4 = 250 Rupees as their income from the common pool.

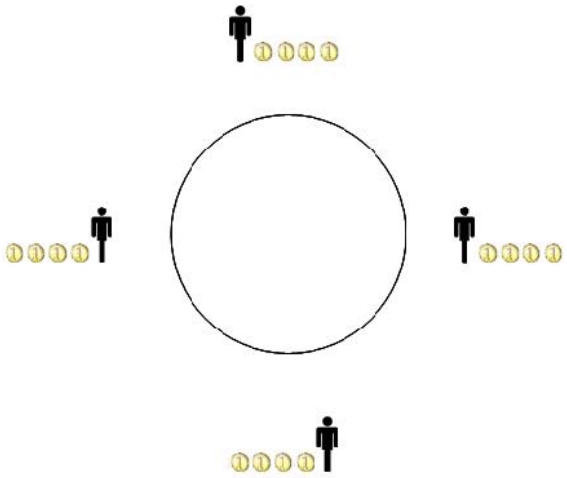
Total Income

Your total income is calculated as the sum of the income from private budget and the income from the common pool: Your private income + Your income from the common pool = Your total income
Therefore, your total income amounts to:

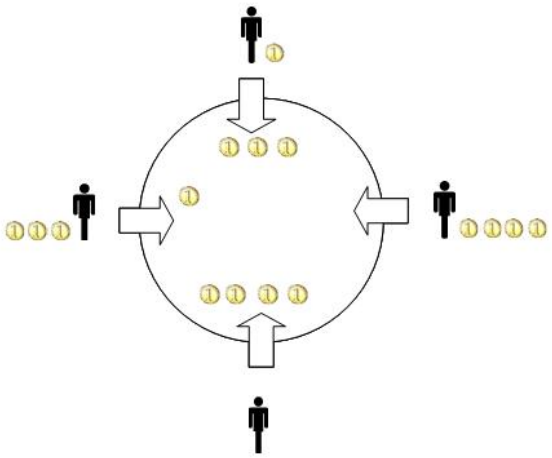
Private income	(= 200 Rs. minus your contribution to the project)
+ Income from the common pool	(= Sum of all contributions $\times$ 2, divided by 4)
= Your total income	

Illustration

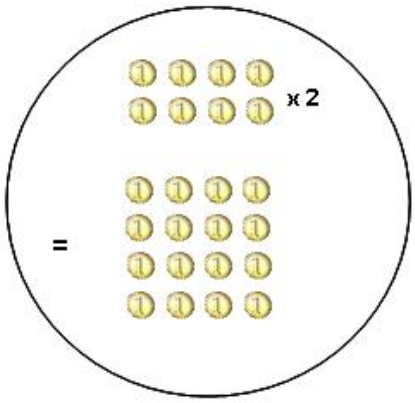
1. A group consists of 4 people, each having a game **name** and a **budget** of 200 Rs (4 units of 50 Rs):



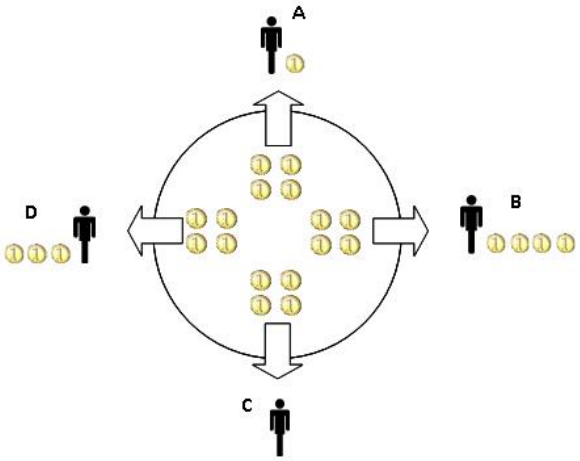
2. Each group member can decide on how much to contribute to the common pool, for example:



3. The sum of contributions to the common pool is doubled by the experimenters:



4. Finally, the doubled sum of all contributions is distributed in equal shares back to the 4 group members:



Recall that in the pictures above 1 unit amounts to 50 Rs. In this example, group members are left with the following total incomes:

- Player A receives 250 Rs (50 from private income + 200 from common pool),
- Player B receives 400 Rs (200 from private income + 200 from common pool),
- Player C receives 200 Rs (0 from private income + 200 from common pool),
- Player D receives 350 Rs (150 from private income + 200 from common pool).

Control Questions

Please answer the following questions. They will help you to better understand the calculation of your income. Please enter the solutions of all questions and raise your arm when you have finished. One of the experimenters will come to your place and check your answers. Please make sure that you fully understand the decision situation. If you have any questions please raise your arm. Note that answering these questions is completely irrelevant for your actual monetary income.

1. Assume that neither you nor any of the other group members has contributed anything to the project.

   What will your total income be? _____

   What will the total income of each of the other three group members be? _____

2. Assume that you have contributed 200 Rs and the three other group members have also contributed 200 Rs.

   What will your total income be? _____

   What will the total income of each of the other three group members be? _____

3. Assume that the three other group members contribute 100 Rs each. What will your total income be if you contribute nothing (0 Rs)?

   What will your total income be if you contribute 100 Rs? _____

   What will your total income be if you contribute 200 Rs? _____

4. Assume that you contribute 100 Rs.

   What will your total income be if the three other group members contribute the sum of 400 Rs? _____

   What will your total income be if the three other group members contribute the sum of 500 Rs? _____

After you have answered all the control questions or have any other questions, please raise your arm, and one of the experimenters will check your answers above or answer your questions. In the next step you will play the actual decision game.

Decision Sheet

This sheet will be collected by one of the experimenters. After you have filled in the requested information, please put this sheet **face down** on your table.

This way we make sure that your information given below stays **completely anonymous** and neither the experimenter nor other participants will know your personal expectations or your actual contribution.

Please fill in your **participant number** here | | 2 | 6 |

EXPECTATIONS

Please fill in each of your group partners' game names (see hand written names on the front page) and your guess on each of their contributions:

Your **expectation** on the contribution of TRISHUL: | 1 | 0 | 0 | Rs.

Your **expectation** on the contribution of THULASI: | 1 | 0 | 0 | Rs.

Your **expectation** on the contribution of HAS: | 1 | 0 | 0 | Rs.

DECISION

Please fill in your own contribution:

Your **own contribution**: | 1 | 0 | 0 | Rs.

Laboratory

Registration/Payment Area and Laboratory