Do Peers Increase the Voluntary Contributions of Low Contributors to Group Projects? And How? Evidence from a Field Experiment*

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Abstract

In this paper, we vary exogenously the proportion of high contributors in meetings that are designed to encourage the contributions of low contributors to a real-world community-based electrification project. We find that low contributors contribute more after they attended a "mixed" meeting, i.e., with some high contributors, rather than a "low meeting", i.e., with no high contributors. We explore four mechanisms that could explain this result: shaming, encouragement, reciprocity, learning about the benefits of the project, through a combination of detailed data collection on the behavior of meeting attendees, and additional experiments designed to test in isolation each mechanism. In fact, we find support for an additional channel that has not been explored before: the removal of uncertainty about the project by high contributors.

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Solving collective action problems, i.e., when individual incentives are at odds with collective efficiency, has been an enduring puzzle in economics. For example, when the success of a risky group project depends on having members contribute financially over a period of years, every member has a strong incentive to postpone any contributions until the end and hope that other "high contributors" contribute early instead to ensure that the project reaches its final stage, and that the investment risk declines. Low contributors thus have an incentive to freeride on high contributors, if they exist at all. However, these high contributors may also shame (Kandel and Lazear, 1992), and/or encourage low contributors into giving more. Alternatively, low contributors could be conditional cooperators, i.e., people who are willing to contribute more to a group project the more others contribute. Conditional cooperation can be a consequence of some fairness preferences like reciprocity (Rabin, 1993). Finally, in risky real-world projects with incomplete information, low contibutors may learn from high contributors about the management of the project, which would reduce the undertainty associated with the project. They may also discover the benefits associated with the project at the contact of high contributors. Theoretically, in a real-world situation, it is thus unclear whether low contributors associated with more high contributors in groups would contribute more or less. Empirically, measuring peer effects is notoriously difficult (Manski, 1993). First, it is often difficult in practice to define the reference groups. Second, there is endogenous sorting into groups based on unobservables. Third, there is simultaneity between an individual's behaviour and the behaviour of its peers (the reflection problem). Finally, it is difficult to understand the precise mechanisms through which peer effects are operating, be it shaming, encouraging, reciprocity, learning about the project, or its benefits. The ideal experiment would entail engineering well-defined groups, with an exogenously varying proportion of high and low contributors, with the difference between high and low contributors measured on an *ex-ante* dimension of contributions, so as to address the reflection problem.

This paper is the first to undertake such a real world experiment, in the context of voluntary contributions to a community-based electrification project in Kenya. Meetings are organized to increase the contributions of 1,496 contributors. Importantly, a third of these meetings randomly mixes high and low contributors ("mixed" meetings), while a third of these meetings only includes low contributors ("low" meetings), and the remaining third only high contributors ("high" meetings). We find that low contributors

contribute significantly more in mixed than in low meetings. Effects are asymmetric: high contributors do not contribute less in mixed vs high meetings. This raises the question as to how high contributors exert influence on low contributors in these mixed meetings.

Identifying the specific mechanism through which low contributors contribute more in mixed meetings, be it shaming, learning, encouragement, or reciprocity, is important for policy implications. If shaming matters, low contributors could be affected by simple tools as in Masclet et al. (2003), Carpenter et al. (2004), or Barr (2001). On the other hand, if the specific mechanism is learning, these tools will not raise contributions. Instead, information about the project, or the benefits of electricity, may be gathered from high contributors and disseminated to low contributors. If encouragement raises contributions, encouraging messages may be disseminated to low contributors. Finally, if people have a tendency to reciprocate, a description of how much high contributors are contributing may be shown to low contributors.

To uncover the mechanisms underlying peer effects, this paper collects detailed data on the behavior of meeting attendees. We collect and code all the questions and comments raised by the meeting participants. First, we find no evidence of shaming in the meetings. This does not mean that shaming is not a powerful way to raise contributions, but that high contributors do not use this particular verbal punishment when left to their own device in this situation. Second, we find that most of the participation in meetings consists in asking clarifying questions about the project. Consistent with the learning hypothesis, we find that more questions raised by high contributors in mixed meetings significantly raise contributions of low contributors. This explains the result as to why low contributors contribute more in mixed meetings: they gather precious information that reduces the uncertainty associated with the project. Interestingly, we also find that low contributors ask less questions in mixed meetings, but that these questions actually decrease contributions. Meeting attendees also voice criticisms about the project. We observe that low contributors voice significantly less criticisms in mixed meetings, and that these criticisms would have reduced contributions. This provides an additional channel through which contributions of low contributors are increased in mixed meetings. Third, high contributors encourage others to contribute, and this increases contributions. Fourth, we witness no discussion about the potential benefits of electricity, and no increased contribution after showing a video on the potential benefits

of electricity to a random sample of 271 contributors. We thus conclude that learning about electricity is unlikely to drive the results. Fifth, even controlling for all these above factors, we still find a net effect of attending a mixed meeting on the contributins of low contributors. Moreover, we find a (small) increase in contributions when we show a video describing the work done by peers on the project to another random sample of 271 contributors, and conclude to some reciprocity effects. This paper thus finds support for a variety of channels through which peer effects are operating.

Finding ways to increase contributions in public goods games experiments is one of the most studied topic in economics (see Ledyard (1995) for a survey, and Sally (1992) for a meta-analysis on 35 years of 130 distinct treatments from 37 different studies in political science, social psychology, economics and sociology). In particular, this paper is closely realted to lab experiments where group members are exogenously matched. Ockenfels and Weimann (1999), Gunnthorsdottir et al. (2001), Ones and Putterman (2004), Burlando and Guala (2005) use an initial public goods game to define high and low contributors. Then, groups of high and low contributors are formed, and contributions are compared to random groups (mixing high and low). These four papers find that low contributors contribute more in mixed than in low groups. However, Gachter and Thoni (2005) find the opposite result, i.e. low contributors contribute more in low than in mixed groups. The evidence about peer effects is thus mixed. Moreover, these papers do not explore the mechanisms that may explain the results. Other lab experiments find strong support for shaming as way to induce low contributors to contribute more. In lab experiments where high contributors may distribute disapproval points (Masclet et al., 2003), show pictures with an unhappy face (Carpenter et al., 2004), or criticize low contributors (Barr, 2001), low contributors are always found to contribute more. Encouraging low contributors has also been found to increase contributions (Chaudhuri et al., 2006). Reciprocity, where the willingness to help is contingent on the behavior of others has also been shown to be an important motivator of contributions (Fischbacher and Fehr, 2001). However, because of the simplicity of the public goods game played, these lab experiments cannot look at another channel that we explore in this paper: the uncertainty of a risky project that may be removed by high contributors. This channel may dominate in practice all other channels and generate strong peer effects.

This paper also contributes to a growing literature on cost-recovery and participatory development. Much policy attention on infrastructural finance has been paid to the

potential of cost-recovery through user contributions (Gulyani and Basset 2007; Olken and Singhal 2007). This follows the broader movements in the development field around participatory development and private sector approaches to poverty alleviation. Governments in developing countries levy fewer taxes as a percent of their gross domestic product than their counterparts in developed countries and are unable to finance much needed infrastructure projects. To finance local projects, communities have turned to informal taxation, such as voluntary contributions. Olken and Singhal (2007) find that such revenues represent a large share of local development budgets. Similarly, Community Based (and Driven) Development (CBD) projects have also become an important form of development assistance. For example, Mansuri and Rao (2004) estimate that within the World Bank's portfolio alone, lending for CBD projects increased from $325 million in 1996 to $2 billion in 2003. There is also widespread recognition that cost recovery has been very difficult to implement. Gulyani and Conners (2002) estimate that, at best, infrastructure projects typically recover only 5-10% of total project costs. In a review of the literature, Mansuri and Rao (2004) conclude that while there is some evidence that community based projects create effective community infrastructure, not a single study establishes a causal relationship between any outcome and participatory elements of a community-based development project.

This paper addresses this question. Section 1 provides some background on the setting. Section 2 describes the experimental design. Section 3 presents the basic results. Section 4 describes the panel estimates, while section 5 looks at the mechanisms explaining these peer effects. Section 6 concludes.

1 Setting of the project

In Kenya in 2000, only 2% of rural Kenyan households were connected to the national electric grid (World Bank 2000). This lack of access to reliable and affordable energy services may have severe consequences on private sector development, women empowerment, education, and health. Green Power (GP), a Kenyan NGO, is offering one promising new solution by taking advantage of the enormous hydro power potential in the Mt. Kenya region and developing off-grid micro-hydro power systems that are constructed, owned, and operated by local rural communities. Since 2006, 1,496 small farmer households have contributed financial resources to build the micro-hydro power

station, dam, turbine, and distribution network. If the project succeeds, those community members that contributed will become shareholders and will receive dividends from the sale of electricity to customers.

While the success of the project depends on having hundreds of members contribute financially and in labor over a period of years, the Nash equilibrium is one where no-one contributes in all but the last period when the project is being finalized. The reason is simple: for an individual member, a given contribution made in the final stage of the project is much more valuable than a contribution made early on and, given the project riskiness, the value of a given contribution increases with the combined history of contributions by others. To see why, a $10 contribution made in 2004 (the start of the project) will guarantee the same ownership share once the project is up and running as a $10 contribution made in 2011, even in nominal terms. Given inflation, this means that the (present value) return to a given project contribution is increasing over time. Further, the investment risk is strictly declining with the completion of each stage of the project (which depends on the contributions of everyone). With the individual return to contributions increasing over time and the risk to this return decreasing over time, every member has a strong incentive to postpone any contributions until the end and hope that others contribute early instead to ensure that the project reaches its final stage.

By 2008, GP was thus looking for ways to encourage contributions.

2 Experimental design

To motivate the 1,496 contributors, 30 meetings of 50 contributors each were organized between October 2008 and February 2009. The project presentation, themed "Together We Move Darkness," was designed by the project leadership to emphasize progress and encourage contributions. The general outline of the presentation was the same for each meeting. It included a discussion about the past work, the current situation, the administrative structure (explanation about shareholders, customers, and dividends), and other related projects. The meetings generally lasted for a day and attendees were provided with lunch. In all of these meetings, attendees were given the opportunity to ask questions and make comments.

Unknown to either the invitees or the meeting organizers, meeting invitees were randomly distributed into three different compositional types of meetings based on levels

of financial contributions from the inception of the project in 2004 up until January 2007[1] (median: 1950 Ksh[2], minimum: 50 Ksh, maximum: 24610 Ksh). The first meeting type ("low") was comprised of only below median financial contributors. The second meeting type ("high") included only above median financial contributors. Importantly in this study, the third meeting type ("mixed") was comprised of a mix of low and high contributors. The three meeting types were alternating over time. Table 1 describes the experimental design and sample size: 500 low contributors were invited to low meetings, 249 low contributors to mixed meetings. Similarly, 501 high contributors were invited to high meetings, 246 high contributors to mixed meetings.

As evidenced in Table 1, not everybody attended the meetings. For example, 19% of the low contributors decided to come to the low meetings. Importantly, the attendance rate is similar in the mixed meetings, at 18 percent. Furthermore, the characteristics of low contributors who came to low or mixed meetings are similar, in terms of sex, age, education, income, household size as evidenced in Table 1. This confirms that low contributors were not aware of the organization of these mixed meetings, and did not self-select differently into low or mixed meetings. We can thus safely compare the future contributions of low contributors in mixed versus low meetings to get the causal impact of these mixed (versus low) meetings on contributions. The latter comparison is likely to measure the causal impact of the mixed meeting, and not any other unobservable characteristic driving attendance, since both groups decided to attend the meeting, not knowing if the meeting was going to be a low or a mixed meeting. It is an average treatment on the treated (ATT). It does not estimate the impact of the mixed meetings on the general population, including those who did not attend. We argue that this ATT is in fact the relevant information to know for policy implications. In this particular case, the NGO is not interested in knowing the impact of interventions on people who do not even decide to come to these interventions.

Classifying people in high/low contributors based on the median of past levels of financial contributions is appealing for several reasons. First, the use of a discrete classification above/below median is largely insensitive to small adjustments such as inflation. Second, it is an objective measure of contributions to the project that is

[1] After October 2007, contributions were recorded daily by one of our fieldworker in a central computerized database in the GP office.

[2] 1USD=70 Kenya Shillings in October 2008

highly correlated with other forms of contributions. For example, the project also accepts contributions in labor. The correlation between financial and labor contributions is 0.82. Therefore, it is highly likely that high contributors in finance are also high contributors in labor. As it is not yet clear how labor contributions will be valued and as the NGO was placing more importance on financial versus labor contributions in 2008, we choose to focus in this paper on financial contributions. Third, income levels of high and low contributors who came to the meeting are rather similar, as evidenced in Table 1. Therefore, total financial contributions are similar to total contributions relative to total income. Fourth, the use of a discrete classification creates maximum distance between high and low contributors in the meetings. As shown in Table 1, the average past contributions of low contributors in mixed meetings is 579 Ksh, while those of high contributors in these mixed meetings is 8355 Ksh. It is thus highly likely that high contributors will know of their status due to their extensive contribution to the project. It is also likely that they will know of the status of others since an individual that has contributed only 579 Ksh between 2004 and 2007 is likely to have been absent from the many general assembly meetings organized by the NGO. In fact, we ask the NGO officials to identify meetings as being high, low or mixed. Their answers are significantly correlated with the type of meetings[3]. This indicates that NGO officials are able to identify who the high or low contributors are. It is thus likely that high contributors also know the status of others. For all these reasons, we believe that using the median of past financial contributions to stratify contributors is appropriate.

The next section compares the contributions of low contributors in mixed versus low meetings.

3 Basic results

Figure 1 shows the financial contributions of low contributors depending on whether they attended a meeting, and if their meeting was low or mixed, in three periods (before, pre, and post). Post corresponds to an interval of 0 to 9 months after the meeting. Pre corresponds to an interval of 0 to 9 months before the meeting, and Before corresponds to an interval of 9 to 18 months before the meeting. We choose intervals of

[3]Results available upon request

9 months since the first meeting was organized in October, i.e., 8 months before May, when coffee payouts are delivered. Most farmers in this community are coffee producers, and are heavily credit constrained, except in May when they receive large coffee payouts from their cooperative. We thus chose the shortest interval (to minimize the risks of coincidental shocks that may influence contributions) that allows every individual in the sample to have experienced a coffee payout[4].

Several key observations can be made from this figure. First and somewhat obviously, contributions of individuals who did not attend the low meetings did not change after the meetings. Second, the evolution of contributions of individuals who did not attend the mixed meetings is similar to those who did not attend the low meetings. This is reassuring for our randomization since this shows that people placed in low or mixed meetings are indeed comparable. Third, low contributors who attended low meetings contribute approximately 100Ksh more over the next 9 months than those who do not attend. This could be due to the meeting, or to any other unobservable characteristic linked with their higher propensity to attend a meeting. Fourth, low contributors who attend a mixed meeting contribute approximately 300Ksh more than those who do not attend, and 200Ksh more than those who attend a low meeting. As explained above, the latter comparison is likely to measure the causal impact of mixed versus low meetings, independent of any other unobservable characteristics driving attendance, since both groups decided to attend the meeting, not knowing if the meeting was going to be a low or a mixed meeting. It is an average treatment on the contributors who decided to attend the meeting, an average treatment on the treated. We make no claim on the ATU, the average treatment on the untreated, i.e., the impact of a mixed meeting on those who did not attend, which could be different if effects are heterogeneous. However, the ATT is the relevant information to know for policy implications and the NGO.

Figure 2 shows the same graph for high contributors. The evolution of contributions of individuals who choose to attend significantly differ from those who chose not to attend. Importantly, high contributors in mixed meetings do not contribute less than in high meetings. If anything, they contribute slightly more, contrary to the standard prediction of peer effects models according to which contributions decrease when peers' contributions decrease. Therefore, these mixed meetings seem to be a "win-win" for the

[4]In the empirical analysis below, we discuss results when using time intervals of 1, 4, 7, 14, 30, 60, 90, 120, and 365 days.

NGO.

To determine whether these increases in contributions are statistically significant, we now turn to regression analysis.

4 Panel estimates

4.1 Methodology

We perform the following regression on the sample of 750 low contributors observed over three intervals of 9 months:

$$\begin{aligned} Contributions_{it} &= \alpha_0 + \alpha_1 Attended_i + \alpha_2 Post_t + \alpha_3 Attended_i * Post_t \\ &+\alpha_4 Mix_i + \alpha_5 Attended_i * Mix_i + \alpha_6 Post_t * Mix_i + \alpha_7 Attended_i * Post_t * Mix_i \\ &+X_{it} + u_{it} \end{aligned} \quad (1)$$

where i corresponds to individual i, t corresponds to the three time intervals ($Post_t = 1$: from 0 to 9 months after the meeting, $Pre_t = 1$: the reference category from 0 to 9 months before the meeting, and $Before_t = 1$: from 9 to 18 months before the meeting). The dependent variable is the sum of financial contributions over these intervals. $Attended_i$ is a dichotomous variable equal to 1 if the individual ever attended a meeting, 0 otherwise. $Post_t$ is a dichotomous variable equal to 1 if the observation is taken after the meeting, 0 otherwise. $Attended_i * Post_t$ is the interaction of $Attended_i$ and $Post_t$, and is a difference-in-differences coefficient measuring the impact of attending a meeting (or of any other unobservable driving both attendance to a meeting and contributions).

The focus of this paper is on measuring the impact of mixed versus low meetings. We thus include Mix_i , a dichotomous variable equal to 1 if the individual was invited to a mixed meeting, 0 otherwise, and further interact it with all other variables: $Attended_i$, $Post_t$, and $Attended_i * Post_t$. α_7 is thus the coefficient of interest in a triple differences estimation, that measures the evolution of contributions after attending a mixed meeting, relative to those who attended a low meeting.

The control variables X_{it} include $Before_t$, a dichotomous variable equal to 1 if the observation is taken from 9 to 18 months before the meeting. $Before_t$ is interacted with

all variables of the specification ($Attended_i$, Mix_i, $Attended_i * Mix_i$). The significance of the coefficient in front of $Attended_i * Before_t * Mix_i$ represents a test of the common time effects assumption of the triple differences. Intuitively, contributors who attended a mixed versus low meetings should not contribute differently from 9 to 18 months *before* any meeting is organized. Other controls include the video controls that will be discussed later on[5].

4.2 Main result

Column (1) of Table 2 presents the results associated with specification 1. The coefficient of interest α_7 in front of $Attended_i * Post_t * Mix_i$ is significantly positive at 182.5 Ksh (or 2.6USD at the October 2008 conversion rate), similar to what was found in the graph. This means that low contributors placed in mixed meetings contribute significantly more that when placed in a low meeting. Considering their average past contribution from 2004 to 2007 was 579 Ksh, this represents a 31 percent increase in their total contribution. Relative to the average monthly income per capita of 1,353 Ksh of low contributors, or 12,177Ksh over 9 months, this represents 1.5 percent out of their total income devoted to the project, which is a sizeable amount for individuals at the poverty line.

Other important results from Table 2 are checks on the randomization. Mix_i represents the impact of being placed in a mixed meeting, while not attending the meeting, in the period pre (i.e. before the meeting). This coefficient is not significantly different from zero and indicate that the randomization into mixed meetings was indeed random. $Post_t * Mix_i$ is also not significantly different from zero and indicates, as expected, that there is no impact of the mixed meeting if one did not attend a mixed meeting. $Attended_i * Mix_i$ is the impact of attended a mixed meeting, but before any meeting takes places. This coefficient is also not significantly different from zero and indicates that individuals who chose to attend a mixed or a low meeting were not significantly different before the meetings took place. This confirms that people did not know in advance if the meeting was low or mixed, and did not self-select in these meetings. These randomization checks confirm the validity of the experiment.

[5]The full list of X_{it} is: Before, Attended*Before, Mix*Before, Attended*Before*Mix, Any Video, Work Video, Benefits Video, Masterplan Video, Any Video*Post, Work Video*Post, Benefits Video*Post, Masterplan Video*Post, Any Video*Before, Work Video*Before, Benefits Video*Before, Masterplan Video*Before

The identification assumption of this triple difference estimate is that low contributors placed in mixed meetings would have evolved similarly to those placed in low meetings, had they been placed in low meetings. This is likely for two reasons. First, being placed in a mixed meeting was a randomized experiment, not an endogenous decision. The randomization checks above confirm that people placed in mixed meetings are comparable to those placed in low meetings. Second, we test this proposition by looking at another period, from 9 to 18 months before the meetings ($Before_t = 1$), and comparing it to the period from 0 to 9 months before the meetings ($Pre_t = 1$). In column (1), the coefficient in front of $Attended_i * Before_t * Mix_i$ represents the evolution of contributions of low contributors who attended a mixed as opposed to a low meeting, but before any meeting took place. As expected, this coefficient is not significantly different from zero, and confirms that low contributors in mixed or low meetings were indeed on the same time trend.

Column (2) of Table 2 replicates the analysis for high contributors. Consistent with the graphical evidence, high contributors in mixed meetings do not contribute less, if anything slightly more, than in high meetings. High contributors are thus not discouraged by the presence of low contributors. Mixed meetings appear to be a "win-win" strategy for the NGO, by raising contributions of low contributors, while not decreasing those of high contributors.

4.3 Robustness checks

Table 3 presents robustness checks of the main result. First, when choosing the time interval over which to aggregate contributions, we face a trade-off. Choosing a small interval reduces the risk of coincidental shocks influencing contributions, but may not leave enough time for people to contribute. In fact, when we repeat the analysis for low contributors with 1, 4, 7 (shown in column (2)), 14, 30, 60, and 90 days intervals, we find no significant impact of the meetings. This is understandable if low contributors are credit-constrained and cannot supply contributions on short notice. In fact, in this community, most farmers are coffee producers, who receive large coffee payouts from their cooperative in May each year. Thus, one can expect contributions to be made after this date. As the first meeting was organized in October, i.e. 8 months before May, we choose to consider a 9 months interval so that each low contributor experienced a

coffee payout in this window. Note that as the last meeting is in February, i.e. 3 months before May, results should be positive but smaller by using a 4 months window. This is exactly what we find in column (3). The causal impact of the meetings should slowly fade over time, as past meetings become less and less important. This is exactly what we find in column (4) with a one-year window.

In fact, these findings allow us to discard a first mechanism that may explain the main result of the paper: reputation. In a real-world setting with repeated interactions, it is possible that low contributors wish to acquire a reputation among high contributors, and contribute more in mixed meetings. But to do so, they should contribute directly in the meeting in front of high contributors. However, Table 3 finds that they contribute later, when they are less credit constrained, but when high contributors are also not around o witness the contributions. We thus argue that the motives for giving are not due to reputation.

Second, we confirm that the main result of this paper, low contributors contributing more in mixed meetings, is not due to the fact that low contributors in mixed meetings are systematically different from those in mixed meetings, by including 749 individual fixed effects in column (5). The main result remains similar, confirming that it is not driven by individual unobserved heterogeneity. In column (6), control variables (sex, age, total years of schooling completed, monthly income per capita, and household size) are included. The main coefficient is similar, if anything larger, showing that the result is not driven by the fact that attendees of mixed meetings are systematically different based on sex, age, education, income, and household size.

Overall, these robustness checks confirm that low contributors contribute more after attending mixed meetings. We now turn to the mechanisms that could explain this result.

5 Mechanisms

Before investigating whether motivation, learning and conformism may explain these peer effects, we first discard a number of obvious explanations. First, Low contributors may contribute more in mixed meetings simply because there are more people in mixed than in low meetings due to the higher attendance rate of high contributors. Indeed, Table 1 shows that there are 96 attendees in the 10 low meetings, and 45 low plus 92 high,

i.e. 137 attendees in the 10 mixed meetings. More attendees may contribute to a livelier atmosphere and stimulate low contributors to contribute more. To explore the impact of the number of attendees on contributions, we thus define the number of attendees in each meeting ($Number\_attendees_i$) as the total number of attendees minus 1 for an attendee, and as the total number of attendees in the meeting that a non-attendee was assigned to for a non-attendee. We then include $Number\_attendees_i$ in specification (1), together with its interactions with $Attended_i$, $Post_t$, and $Attended_i * Post_t$. We only report in Table 3 column (7) the triple differences coefficient $Attended_i * Post_t * Number\_attendees_i$. This column shows that low contributors do not contribute more after attending meetings with more individuals. The higher number of individuals in mixed meetings is thus unlikely to drive the results.

Second, low contributors may contribute more in mixed meetings because they are surrounded with individuals of different gender, age, education, income or household size in these mixed meetings. Those peers' observable characteristics may in turn influence the contributions of low contributors. This is unlikely to be the case based on Table 1, which showed little variation in these characteristics across high and low contributors. Nonetheless, we compute the average of peers observable characteristics, such as sex, age, education, income, and household size, per meeting, interact them with $Attended_i$, $Post_t$, and $Attended_i * Post_t$, and include them in column (7) of Table 3. Younger, richer peers from bigger families seem to encourage contributions of low contributors. Interestingly, the triple differences coefficient of mixed meetings is still significantly positive even after controlling for these obvious explanations.

Having first explored these explanations, we now turn to five mechanisms that have been highlighted in the literature as potentially explaining peer effects: shaming, learning about the project, encouragement, learning about electricity, and conformism.

5.1 Shaming

The lab experiments described above (Masclet et al., 2003; Carpenter et al., 2004; Barr, 2001) focus on high contributors emotionally disapproving of the behaviour of low contributors. Distributing disapproval points, showing unhappy faces, or criticizing other are some kind of verbal punishment or shaming. To investigate whether high contributors shame low contributors in mixed meetings, we explore in greater detail the meetings

dynamics. A fieldworker systematically wrote down all the remarks made over the course of the meeting in the detailed meeting minutes. In our case, we interestingly do not see this kind of high contributor verbal punishment. First, the only negative comments said in the meetings are about the project, not about the low contributors. Second, when we do see comments about contributions, they are positive not negative; i.e. encouraging others to contribute. We conclude that the kind of shaming commonly used in lab experiments does not arrive in the meetings.

Instead, comments in meetings can be grouped in two categories: (1) "learning" consisting of questions, as well as positive and negative comments about the project; (2) "encouragement" consisting of proclamations to contribute more as an individual or encourage others to contribute more. We now describe these two categories in more details.

5.2 Learning about the project

Low contributors may learn from questions asked by high contributors in mixed meetings.

5.2.1 Questions and comments in the meetings

Attendees provide 517 questions or comments on 11 categories. These are, by decreasing frequency, 1) project management organization, 2) general positive comments about the project, 3) project management: contributions, 4) project progress (site, generation, distribution), 5) project management: days of communal work, 6) their financial personal contributions, 7) poles, 8) seminar, 9) the financial situation of the overall project, 10) the supermarket (another side project), and 11) other comments on other projects. See Table Appendix 1 for a definition of these categories, total number of questions/comments for each category, and some examples.

These clarifying questions and comments may provide valuable information to low contributors, and make them contribute more. However, the question raised in this paper is why low contributors contribute more in mixed vs low meetings. It may be that 1) there are more of these questions/comments in mixed meetings, 2) high contributors in mixed meetings ask questions of different categories compared to low contributors in low meetings, or 3) independently from the number or category of questions, the identity of the person (high vs low contributor) asking the question differs.

To investigate this, Table 4 compiles the total number of questions/comments, provided by high or low contributors, in the three types of meetings. First, 161 questions/comments were raised in the low meetings, as opposed to 164 (51 by low contributors and 113 by high contributors) in mixed meetings. There are thus approximately the same number of questions/comments raised in both types of meetings. The total number of questions/comments raised in mixed vs low meetings is thus unlikely to drive the results. Second, the number of questions/comments by for each type does not vary significantly between low and mixed meetings. The rest of Table 4 provides the number of questions broken down by category. For example, 23 questions were asked about the project management organization, while 18 (9 by low contributors, and 9 by high contributors) were asked in mixed meetings. All other categories follow the same pattern. i.e., approximately the same number of total questions raised in low or mixed meetings. Third, the identity of the persons raising questions/comments varies significantly across low/mixed meetings. Low contributors raise significantly less questions/comments in mixed versus low meetings. This is true at the extensive margin: there are less low contributors in mixed meetings (45) than in low meetings (96). This is also true at the intensive margin: low contributors raise 1.68 question/comments per capita in meetings, but only 1.13 in mixed meetings. Conversely, high contributors raise more questions/comments in mixed vs low meetings at the extensive margin (there are no high contributors in low meetings). But it is not clear whether high contributors raise more questions/comments in mixed vs high meetings, as rates per capita are very close.

To explore the statistical significance of these effects, we now turn to regression analysis. The sample is restricted to meeting attendees. We perform regressions of the following form:

$$Number\_questions_i = \beta_0 + \beta_1 Mix_i + \beta_2 High\_contributor_i + \beta_3 Mix * High\_contributor_i + + u_i \quad (2)$$

The dependent variable is the number of questions/comments asked by individual i. The independent variable Mix_i is a dichotomous variable equal to 1 if the individual attended a mixed meeting, 0 otherwise. The independent variable $High\_contributor_i$ is a dichotomous variable equal to 1 if the individual is a high contributor, 0 otherwise. $Mix * High\_contributor_i$ is an interaction term between these two explanatory variables.

Table 5 column (1) indicates that low contributors in low meetings (β_0) ask on average 1.7 questions/comments per capita. Consistent with the observation from Table 4, they voice ($\beta_1 =$) 0.5 less questions/comments per capita in mixed meetings. Moreover, the coefficient $\beta_1 + \beta_3$, not significantly different from zero, indicates that high contributors do not change their behaviour in mixed vs high meetings[6]. Table 5 thus shows that low contributors are muted in mixed meetings, while high contributors do not increase their number of questions/comments. This could affect the contributions of low contributors in mixed vs low meetings. Before looking at the impact of questins/comments on contributions, we describe the other comments made in the meetings: criticisms and encouragement.

5.2.2 Criticisms of the project

Attendees also provide negative[7] comments about the project. Two key observations can be made from Table 4. First, low contributors voice less criticisms in mixed meetings. There were 20 negative comments in mixed meetings (0.21 per capita), and zero in mixed meetings. This is confirmed in Column (2) of Table 5. Second, high contributors make slightly more negative comments in mixed meetings (0.14 negative comments per capita in mixed meetings as opposed to 0.11 in high meetings), however, this effect is not significant as shown in Column (2) Table 5 ($\beta_1 + \beta_3$). Overall, there are less criticisms in mixed meetings (13), but more by high contributors. These criticisms may affect contributions, and their effect will be explored in the next section.

[6] A high contributor in a mixed meeting says $\beta_0 + \beta_1 + \beta_2 + \beta_3$ questions/comments. A high contributor in a high meeting says $\beta_0 + \beta_2$ questions/comments. Therefore, a high contributor says $\beta_1 + \beta_3$ more questions/comments in a mixed vs low meeting.

[7] of three sorts: 1) about project delays: "will power really be generated?"; "you will die doing the same thing without any progress."; "I wish we started a coffee factory instead"; "people are challenging you that you have started asupermarket even before completing the project."; "the ideas are very great but long term and will mostly benefit the young generation but for the sake of the old people it would be better if power was provided first since it was the prime reason of starting the project."

2) about the posts for distribution network that rotted because of delays: "I had done a lot of work but what made me angry is to see the posts being abused in the manner that some were rotten and others were stollen. Have the management taken any legal measures on to compensating for those posts?"

and 3) about incorrect contributions: "my contributions are incorrect."

5.2.3 Encouragement

Aside from asking questions/comments, and critcizing the project, attendees encourage others to participate[8], or promise to contribute more themselves[9]. Two observations can be made from Table 4. First, low contributors become muted in mixed meetings. Column (3) of Table 5 confirm that this effect is significant. Second, high contributors provide more encouragement in mixed (0.15 per capita) vs high meetings (0.07). However, Column (3) of Table 5 show that this effect is not significant.

The main result of this paper (increase in contributions of low contributors in mixed vs low meetings) could thus be caused by several factors. First, there is a decrease at the intensive and extensive margin of questions/comments, criticisms, and encouragements raised by low contributors. Second, there is an increase, at the extensive margin only, of questions/comments, criticisms, and encouragements raised by high contributors. To disentangle the relative influence of all factors, we ideally would need an exogenous variation in the number of questions/comments, criticisms, and encouragements raised in meetings. In this paper, our only exogenous source of variation is the mixed vs low meetings. We thus now provide only suggestive evidence about the channels through which low contributors are influenced.

5.2.4 Impact of questions/comments, criticisms, and encouragements on contributions

To do this, we use the following methodology. First, we count the number of questions/comments, criticisms and encouragements, in mixed vs low meetings, raised by other high or low contributors. For example, we define $Number\_questions\_comments\_byHigh_i$ as the number of questions/comments asked by other high contributors in the meeting attended by individual i. Second, we interact this variable with Attended, Post, and Mix, and include all possible variations. Third, we use regression (1) and include these

[8] "I appeal members to continue supporting the project".
"Don't despair or let anyone discourage you, be strong and patient".
"We are to attain many benefits for our children, and so let's wake up and pull our socks".

[9] "I thank you for the seminar for it has restored my lost hope and am now strong to continue with the project".
"I am revived and very ready to continue".
"Even though I had defected, I am now going to continue with my contributions for me to meet my obligations as per the project".

additional variables:

$$
\begin{aligned}
Contributions_{it} \;=\; & \alpha_0 + \alpha_1 Attended_i + \alpha_2 Post_t + \alpha_3 Attended_i * Post_t \\
& + \alpha_4 Mix_i + \alpha_5 Attended_i * Mix_i + \alpha_6 Post_t * Mix_i + \alpha_7 Attended_i * Post_t * Mix_i \\
& + X_{it} + u_{it} \\
& + Number\_questions\_comments\_byHigh \\
& + Attended * Number\_questions\_comments\_byHigh \\
& + Post * Number\_questions\_comments\_byHigh \\
& + Attended * Post * Number\_questions\_comments\_byHigh \\
& + Mix * Number\_questions\_comments\_byHigh \\
& + Attended * Mix * Number\_questions\_comments\_byHigh \\
& + Post * Mix * Number\_questions\_comments\_byHigh \\
& + Attended * Post * Mix * Number\_questions\_comments\_byHigh \\
& + Number\_questions\_comments\_byLow... \qquad (3)
\end{aligned}
$$

We also include the interaction of $Number\_questions\_comments\_byHigh_i$ with the period "Before". We similarly define: $Number\_questions\_comments\_byLow_i$ as the number of questions/comments asked by other low contributors in the meeting; $Number\_negative\_byHigh_i$, the number of negative comments by other high contributors; and $Number\_encouraging\_byHigh_i$, the number of encouraging comments by other high contributors. We interact these variable with all other variables from regression (1) and include them in regression (3) above[10].

In Table 6, we only report the triple difference estimator "Attended*Post*Number_questions_comm i.e. the impact of one extra question?comment by a high contributor in a low meeting. This coefficient cannot be estimated since there are no high contributors in low meetings. More interestingly, "Attended*Post*Mixed*Number_questions_comments_byHigh" can be estimated since high contributors ask questions in mixed meetings. One extra ques-

[10]The full list of X_{it} is as before: Before, Attended*Before, Mix*Before, Attended*Before*Mix, Any Video, Work Video, Benefits Video, Masterplan Video, Any Video*Post, Work Video*Post, Benefits Video*Post, Masterplan Video*Post, Any Video*Before, Work Video*Before, Benefits Video*Before, Masterplan Video*Before

tion?comment by other high contributors in mixed meetings raise contributions by 77.3 Ksh over the next nine months. Recall from Tables 4 and 5 that high contributors asked more questions in mixed vs high meetings at the intensive and extensive margins (as visible by the "+" sign in column (2) of Table 6[11]). This suggests a mechanism through which high contributors influence low contributors: by asking questions/comments about the project whose answers provide low contributors with valuable information about the project.

Questions asked by low contributors have a lower effect in low meetings, and even a negative effect in mixed meetings. This shows that the identity of the person asking the question matters. Considering low contributors ask less questions in mixed meetings at the extensive and intensive margins, this could also explain why low contributors contribute more in mixed meetings. Overall, these results suggest that questions/comments, but more importantly, the identity of the questioner, increase contributions of low contributors in mixed meetings.

Table 6 also reports results relative to criticisms. As expected, more criticisms by high contributors decrease contributions. However, Table 4 shows that high contributors provide more, not less, negative comments in mixed meetings. More negative comments by high contributors in mixed meetings thus decrease contributions. This channel is unlikely to explain the main result of this paper. In contrast, the behaviour of low contributors may explain the result: criticisms by low contributors decrease contributors, and there are no criticisms by low contributors in mixed meetings.

Finally, Table 6 also reports the impact of encouraging comments. Column (1) shows that one extra encouragement by high contributors in mixed meetings increase contributions of low contributors by 604 Ksh. In contrast, encouragements by low contributors do not increase, if anything decrease, contributions. It would have been surprising to find that encouraging comments from those who do not themselves contribute increase contributions of others. Recall from Tables 4 and 5 that there are less encouragements by low contributors in mixed meetings. Consequently, both the increase of encouraging comments by high contributors and the decrease of those comments by low contributors explain the result

[11]In column (2), we report conclusions from Tables 4 and 5 about the behaviour of high or low contributors in mixed relative to other meetings. A + (-) indicates that contributors say more (less) of those particular comments in mixed meetings.

Table 6 thus supports several theories. High contributors influence low contributors in mixed meetings by asking questions, and providing encouragements. In parallel, low contributors increase contributions of others by asking less questions, voicing less criticisms, and providing less encouragements, that would have all had a negative impact on contributions.

5.3 Learning about electricity

Low contributors may contribute more in mixed meetings because high contributors tell them about the potential benefits of electricity. We argue that this explanation is unlikely for two reasons. First, we witness no discussion centered around the benefits of electricity in the meetings. Second, to explore this channel in further detail, we show, at approximately the same time as the meetings, to a random sample of 271 individuals a video ("Benefits Video") that demonstrates the benefits and uses of electricity by displaying various tools that may be used with electricity (e.g., cellular phone, TV, radio, electric pump...). The control group is constituted by another random sample of 271 individuals that were shown a video entitled "Contribute!", that displayed a simple message from the GPower director reminding people to contribute. This group serves as a comparison video message since the "Benefits Video" contained the same "Contribute!" message and was expanded with additional cues.

Results are displayed in Figure 3. This graph shows the evolution of contributions of low contributors before and after watching the "Benefits Video". Contributions remains essentially flat indicating that learning about the benefits of electricity is unlikely to raise contributions. Alternatively, community members may have already known about these potential benefits.

Column (1) of Table 2 shows the regression results. "Any Video" is a dichotomous variable equal to 1 if the individual has been shown any video. As dichotomous variables for the exact type of the videos (in particular the "Benefits Video") are included, the coefficient of "Any Video" represents the impact of the "Contribute Video", while the coefficients in front of "Benefits Video" represents the differential impact of seeing the "Benefits Video" compared to the "Contribute Video". "Any Video*Post" is the interaction between "Any Video" and "Post" and thus represents the impact on financial contributions of having been shown the Contribute Video. "Benefits Video*Post"

is similarly defined[12]. The coefficient is not significantly different from zero and thus confirms the graphical result.

For these two reasons (absence of discussion about the benefits of electricity and absence of effects when showing a video about the uses of electricity), we thus conclude that learning about electricity is unlikely to be an important mechanism driving the result.

5.4 Reciprocity

Independently of learning, low contributors may contribute more in mixed meetings because of reciprocity towards high contributors (Rabin, 1993). Table 6 finds support for this hypothesis. Even after controlling for all possible communication in the meetings, the coefficient $Attended_i * Post_t * Mix_i$ is still significant, if anything stronger than the baseline result of 182.5 Ksh of Column (1) Table 2. This coefficient means that in a mixed meeting with no communication (zero questions/comments, criticisms, or encouraging coments), low contributors contribute 883 Ksh more than in a comparable low meeting. This indicates that the mere presence of high contributors had a sizeable effect on low contributors.

To further explore this channel, we show to another random sample of 271 community members a video entitled "Past work", that showed images of community members building the dam. This video conveys information about the contributions of others. This in turn might increase contributions of low contributors through reciprocity, and not motivation or learning, since no motivational or informational message from high contributors is simultaneously delivered.

Figure 3 indeed shows that contributions increase somewhat after this video is shown. Regression results from column (1) of Table 2 confirm the positive impact but the coefficient is not significantly different from zero. We thus conclude that there is some suggestive evidence supporting reciprocity as a mechanism explaining the results.

[12] In all regressions, all Video level terms, and other Video interventions controls ("Masterplan Video" and "Video Shown to Spouse") not discussed in this paper are included to control for their potential influence.

6 Conclusion

This paper is the first to vary exogenously the proportion of high contributors in meetings designed to encourage the contributions of low contributors to a real-world community-based electrification project. We find that low contributors contribute 182.5 Ksh more (equivalent to 31 percent of their total past contribution) after they have attended a "mixed" meeting, i.e. with some high contributors, rather than a "low meeting", with no high contributors. To explore the mechanisms that could explain this result, we collect detailed data on the behavior of high and low contributors in these meetings. First, we see no shaming, i.e. emotional disapproval of low contributors by high contributors. Second, we find that high contributors ask more questions about the project, that in turn increase contributions of low contributors. Low contributors thus gain valuable information about the project in mixed meetings. Third, high contributors also encourage others to contribute, with important effects on contributions of low contributors. Fourth, we find no evidence of learning about electricity. Fifth, we find some evidence of reciprocity. Overall, these results shed light on the mechanisms underlying peer effects and suggest that learning from high contributors is a powerful channel.

In sum, the findings in this paper show that social multipliers driven by peers are an important means to increase contributions in a community based project. This is important for policy recommendations, in the sense that community mobilization can be more efficient than individual mobilization if organized carefully. In this setting, 45 low contributors attended the mixed meetings and contributed 182.5Ksh more as a result. One can reasonably assume that the 96 low contributors that attended low meetings would have contributed the same had they been placed in mixed meetings, since they are comparable to low contributors in mixed meetings. One cannot reasonably assume that the low contributors who did not attend the meetings would have contributed the same had they been forced to attend the meetings since attendees may be systematically different from non-attendees. Therefore, 45 and 96 low contributors would have contributed 25,732 Ksh ((45+96)*182.5), or 368USD had they all been placed in mixed meetings. While this total amount seems low, it is two times more than the costs of organizing such meetings[13]. Moreover, Figures 2 and 3 show that these meetings essen-

[13]Costs of one meeting: one cup of tea (chai) per person: 5 Ksh, two mandazi per person (brown oval fried breads): 10 Ksh, half a day of work of Local Committee member to distribute invitations: 125Ksh, 1 day of work for presenter: 250 Ksh. 92 high contributors came to the mixed meetings. One

tially turned low contributors into high ones. In this sense, peer effects represent an important way to mobilize the community.

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can assume that 184 high contributors would have come to the low meetings, if these in fact had been mixed meetings. Total attendance would have been 45+96+92+184=417. These 417 individuals in 20 meetings would have cost (417*(5+10)+20*(125+250))=13,755Ksh.

- Ashraf, Nava. 2009. “Spousal Control and Intra-Household Decision Making: An Experimental Study in the Philipines” The American Economic Review 99(4):1245-1277.
- Ashraf, Nava, Diego Aycinena, Claudia Martinez, and Dean Yang (2010) "Remittances and the Problem of Control: A Field Experiment Among Migrants from El Salvador". Working Paper
- Barr, Abigail. 2001. "Social Dilemmas and Shame-Based Sanctions: Experimental Results from Rural Zimbabwe." CSAE Working Paper Series 2001-11.
- Burlando Roberto, and Francesco Guala. 2005. Heterogeneous Agents in Public Goods Experiments. Experimental Economics, 8:35.54 (2005)
- Chaudhuri, Ananish, Grraziano, Sara, and Pushkar Maitra. 2006. Social Learning and Norms in a Public Goods Experiment with Inter-Generational Advice. Review of Economic Studies (2006) 73, 357–380.
- Cialdini, Robert B., and Goldstein, Noah J. 2004. "Social Influence: Compliance and Conformity." Annual Review of Psychology, 55(1): 591-621.
- Vollan, Bjorn and Elinor Ostrom. 2010. “Cooperation and the Commons” Science 330: 923-924.
- Brown, K.M. and L. Taylor. 2000. “Do as you say, Say as you do: Evidence on Gender Differences in Actual and Stated Contributions to Public Good” Journal of Economic Behavior & Organization 43:127-139.
- Brown-Kruse, J and D. Hummels. 1993. “Gender Effects in Laboratory Public Goods Contribution: Do Individuals put their Money Where their Mouth is?” Journal of Economic Behavior & Organization 22:255-267.
- Cadsby, C.B. and E. Maynes. “Gender and Free Riding in a Threshold Public Goods Game: Experimental Evidence. Journal of Economic Behavior & Organization 34(1998): 603-620.
- Carpenter, Jeffrey P., Amrita G. Daniere, and Lois M. Takahashi. 2004. "Cooperation, Trust, and Social Capital in Southeast Asian Urban Slums." Journal of Economic Behavior & Organization, 55(4): 533-551.
- Case, Anne. 1991. "Spatial Patterns in Household Demand." Econometrica, 59(4): 953 965.
- Charness, Gary, and Martin Dufwenberg. 2006. "Promises and Partnerships." Econometrica, 74(6): 1579-1601.

- Ellingsen, Tore, Magnus Johannesson, M., Sigve Tjøtta, and Gaute Torsvik. 2009. "Testing Guilt Aversion." Games and Economic Behavior, 68(1): 95-107.
- Falk, Armin, and Andrea Ichino. 2006. "Clean Evidence on Peer Effects." Journal of Labor Economics, 24(1): 39-57.
- Fischbacher, Urs, Gachter, Simon, and Ernst Fehr. 2001. Are people conditionally cooperative? Evidence from a public goods experiment. Economics Letters 71 (2001) 397–404
- Fehr, Ernst and Simon Gächter. 2002. "Altruistic Punishment in Humans" Nature 415, 137-140.
- Fischbacher, Urs, Simon Gachter, Ernst Fehr. "Are people conditionally cooperative? Evidence from a public goods experiment." Economic Letters 71 (2001) 397-404.
- Gachter, S., and C. Thoni (2005), "Social Learning and Voluntary Cooperation Among Like-Minded People", Journal of the European Economic Association, 3 (2–3), 303–314.
- Gaspart, Frederic, M. Jabbar, C. Melard and J.P. Platteau. 1998. "Participation in the Construction of a Local Public Good with Indivisibilities: An Application to Watershed Development in Ethiopia" Journal of African Economies 7(2): 157-184.
- Gaviria, Alejandro, and Steven Raphael. 2001. "School Based Peer Effects and Juvenile Behavior." Review of Economics and Statistics, 83(2): 257 268.
- Greig, F. and I. Bohnet. 2009. "Exploring Gendered Behavior in the Field with Experiments: Why Public Goods are Provided by Women in a Naiorbi Slum" Journal of Economic Behavior & Organization 70:1-9.

- Gulyani, S., & Bassett, E. M. 2007. "Retrieving the Baby from the Bathwater: Slum Upgrading in Sub-Saharan Africa" Environment and Planning C: Government and Policy 25(4):486-515

- Gulyani, S. & Conners, G. 2002. "Urban Upgrading in Africa: A Summary of Rapid Assessments in Ten Countries. Africa: Regional Urban Upgrading Initiative. Washington D.C.: The World Bank.

- Gunnthorsdottir, Anna, Daniel Houser, Kevin McCabe, and Holly Ameden (2001). "Dispositions, History and Contributions in Public Goods Experiments." Working paper 99-02, University of Arizona.

- Kandel, Eugene, and Edward P. Lazear. 1992. "Peer Pressure and Partnerships." The Journal of Political Economy, 100(4): 801-817.

- Karlan, Dean, Margaret McConnell, Sendhil Mullainathan, and Jonathan Zinman. 2010. "Getting to the Top of Mind: How Reminders Increase Saving." NBER Working Paper 16205.

- Khwaja, Asim Ijaz (2009). "Can Good Projects Succeed in Bad Communities?" Journal of Public Economics. 93, 899-916.

- Mansuri, Ghazala (2011). "Bottom up or Top Down; Participation and the Provision of Local Public Goods." Mimeograph

- Mansuri, Ghazala and Vijayendra Rao. 2004. "Community-Based and –Driven Development: A Critical Review" The World Bank Research Observer 19(1):1-39.

- Mansuri, Ghazala and Vijayendra Rao. 2012 (forthcoming). "Localizing Development: Does Participation Work?" World Bank Policy Research Report.

- Masclet, David, Charles Noussair, Steven Tucker, and Marie-Claire Villeval. 2003. "Monetary and Nonmonetary Punishment in the Voluntary Contributions Mechanism." The American Economic Review, 93(1): 366-380.

- Nowell, C. and S. Tinker. 1994. The Influence of Gender on the Provision of a Public Good. Journal of Economic Behavior & Organization 25:25-36.

- Ockenfels, Axel and Joachim Weimann (1999). "Types and Patterns: An Experimental East-West-German Comparison of Cooperation and Solidarity." Journal of Public Economics, 71, 275–287.

- Olken, B., and M., Singhal. 2009. "Informal Taxation." NBER Working Paper 15221.

- Onesa, Umut, and Louis Putterman. 2007. The ecology of collective action: A public goods and sanctions experiment with controlled group formation. Journal of Economic Behavior & Organization. Vol. 62 (2007) 495–521

- Rabin, Matthew. 1993. "Incorporating Fairness into Game Theory and Economics". The American Economic Review, Vol. 83, No. 5 (Dec., 1993), pp. 1281-1302.

- Rustagi, Devesh, S. Engel, and M. Kosfeld. 2010. "Conditional Cooperation and Costly Monitoring Explain Success in Forest Commons Management" Science 330: 961-965.

- World Bank. 2000. Energy Services for the World's Poor; Energy and Development Report 2000, Energy Sector Management and Assistance Programme (ESMAP), World Bank, Washington D.C., 2000.

- World Bank. 2010. Africa's Infrastructure: A Time for Transformation. Washington DC: The World Bank.

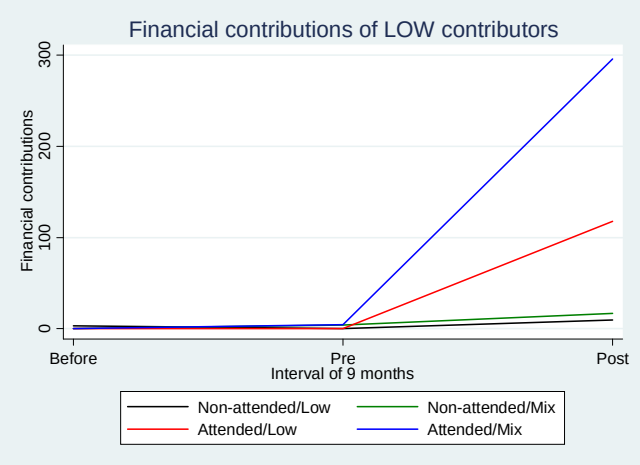

Figure 1: Financial contributions of LOW contributors

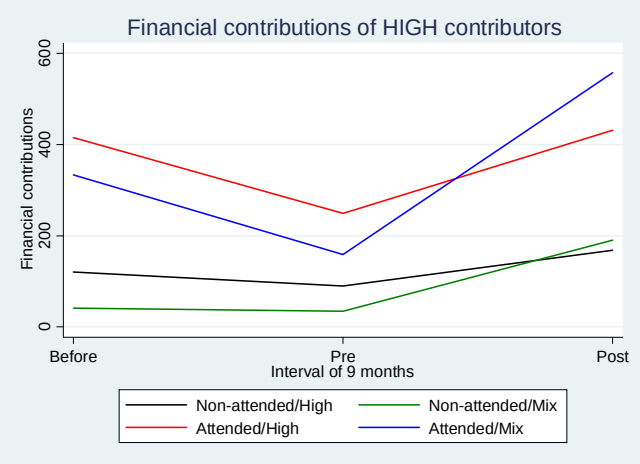

Figure 2: Financial contributions of HIGH contributors

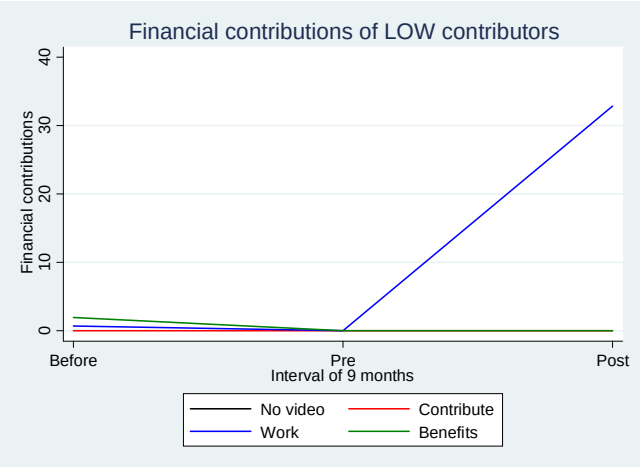

Figure 3: Impact of "Contribute", "Work" and "Benefits" video on financial contributions of LOW contributors

Table 1: descriptive statistics

Contributors	Meeting	Invited	Attended	Proportion Attended	Stat	Past financial contribution	Sex	Age	Education	Monthly Income per Capita	HH size
Low	Low	500	96	0.19	Mean	672.60	0.89	47.33	8.71	1656.68	3.75
					SD	499.44	0.32	11.59	4.26	1528.16	1.54
	Mix	249	45	0.18	Mean	579.33	0.83	50.40	7.59	1352.91	4.03
					SD	449.33	0.38	14.06	4.42	1345.51	1.43
High	Mix	246	92	0.37	Mean	8355.43	0.88	51.43	8.28	1671.32	3.96
					SD	4559.35	0.33	13.89	3.78	1523.76	2.03
	High	501	181	0.36	Mean	8688.15	0.88	53.92	7.86	1538.60	3.78
					SD	5527.53	0.33	13.92	4.23	1567.22	1.63

Table 2: Impact of mixed meetings on financial contributions

	(1)	(2)
	LOW	HIGH
Attended	-0.317	158.493
	(38.366)	(91.841)*
Post (next 9 months after the meeting)	23.383	196.089
	(37.278)	(112.655)*
Attended*Post	106.468	101.656
	(54.258)**	(129.882)
Mix	3.923	-55.513
	(29.030)	(96.681)
Attended*Mix	0.305	-28.437
	(67.739)	(159.154)
Post*Mix	-2.107	82.270
	(41.054)	(136.727)
Attended*Post*Mix	182.538	127.002
	(95.798)*	(225.078)
Attended*Before*Mix	2.653	19.005
	(95.798)	(225.078)
Before, Attended*Before, Mix*Before	Yes	Yes
Any Video*Post	-64.033	-37.543
	(73.578)	(217.883)
Work Video*Post	25.122	-33.904
	(97.390)	(270.875)
Benefits Video*Post	-5.951	-250.529
	(95.012)	(288.570)
Video level terms, and other Video interventions controls	Yes	Yes
Observations	2247	2241
R-squared	0.02	0.03

Standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. In column (1), the sample is restricted to low contributors. The dependent variable is the sum of financial contributions from 0 to 9 months after the meeting (Post=1), from 0 to 9 months before the meeting (reference category), or from 9 to 18 months before the meeting (Before=1). "Attended" is a dichotomous variable equal to 1 if the individual ever attended a meeting, 0 otherwise. "Post" is a dichotomous variable equal to 1 if the observation is taken after the meeting, 0 otherwise. "Attended*Post" is the interaction of "Attended" and "Post". "Mix" is a dichotomous variable equal to 1 if the individual was invited to a mixed meeting, 0 otherwise. "Attended*Post*Mix" is the coefficient of interest and shows the impact on financial contributions after attending a mixed meeting. "Before" is a dichotomous variable equal to 1 if the observation is taken from 9 to 18 months before the meeting. "Attended*Before*Mix" thus represents a falsification exercise of the triple differences. Level terms (Before, Attended*Before, and Mix*Before) are always included. "Any Video" is a dichotomous variable equal to 1 if the individual has been shown any video. As three dichotomous variables for the type of the videos ("Work Video", "Benefits Video", "Masterplan Video") are included, the coefficient of "Any Video" represents the impact of the "Contribute Video", while the coefficients in front of "Work Video", "Benefits Video", and "Masterplan Video" represents the differential impact of seeing one of these videos compared to the "Contribute Video". "Any Video*Post" is the interaction between "Any Video" and "Post" and thus represents the impact on financial contributions of having been shown the Contribute Video. "Work Video*Post" and "Benefits Video*Post" are similarly defined. Video level terms, and other Video interventions controls ("Masterplan Video" and "Video Shown to Spouse") are included. In column (2), the sample is restricted to high contributors.

Table 3: robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Baseline		Time interval:		Fixed effects	Individual	Meeting
		1 week	4 months	1 year		controls	controls
Attended*Post*Mix	182.538	-0.000	46.589	156.248	182.538	367.778	363.764
	(95.798)*	(1.183)	(16.946)***	(95.527)	(95.792)*	(148.164)**	(124.897)***
Other controls from baseline	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual fixed effects					Yes		
Individual controls						Yes	
Attended*Post*Number_attendees							16.353
							(17.644)
Attended*Post*Peer's sex							477.760
							(348.606)
Attended*Post*Peer's age							-35.738
							(10.117)***
Attended*Post*Peer's education							42.268
							(46.732)
Attended*Post*Peer's income							0.448
							(0.137)***
Attended*Post*Peer's hh size							309.069
							(118.389)***
Observations	2247	2247	2247	2247	2247	1449	2247
R-squared	0.02	0.02	0.01	0.02	0.35	0.04	0.05

Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. Column (1) replicates column (1) of Table 2. All specifications includes all control variables of column (1) of Table 2. Only the triple differences coefficient "Attended*Post*Mix" is reported. Instead of 9 months before and after the meetings, time intervals of 1 week, 4 months, and 1 year are used in columns (2), (3) and (4). In Column (5), 749 individual fixed effects are included. In column (6), control variables (sex, age, total years of schooling completed, monthly income per capita, and household size) are included. In column (7), Number_attendees is the total number of attendees minus 1 for an attendee, and the total number of attendees in the meeting that a non-attendee was assigned to for a non-attendee. We then include Number_ attendees, Attended*Number_ attendees, Post*Number_ attendees, and Attended*Post* Number_ attendees in the specification similarly to specification (1). We only report Attended*Post* Number_ attendees. Peer's sex is defined as the average sex of the meeting peers excluding oneself for a meeting attendee, and as the average sex of the meeting peers of the meeting that a non-attendee was assigned to for a non-attendee. We define similarly Peer's age, Peer's education, Peer's income, and Peer's household size. All these variables are interacted with Attended, Post, and Attended*Post.

Table 4: comments in meetings

		Low contributors		High contributors	
Number of		Low meetings	Mixed meetings	Mixed meetings	High meetings
Attendees		96	45	92	181
Any questions/comments	Total	161	51	113	191
	Per capita	1.68	1.13	1.23	1.06
1) Project management organization	Total	23	9	9	38
	Per capita	0.24	0.20	0.10	0.21
2) Positive comments about the project	Total	23	2	14	17
	Per capita	0.24	0.04	0.15	0.09
3) Project management: contributions	Total	10	6	9	25
	Per capita	0.10	0.13	0.10	0.14
4) Project progress (site, generation, distribution)	Total	8	2	5	14
	Per capita	0.08	0.04	0.05	0.08
5) Project management: days of communal work	Total	9	3	5	9
	Per capita	0.09	0.07	0.05	0.05
6) Their financial personal contributions	Total	12	3	2	8
	Per capita	0.13	0.07	0.02	0.04
7) Poles	Total	4	3	6	4
	Per capita	0.04	0.07	0.07	0.02
8) Seminar	Total	4	0	1	5
	Per capita	0.04	0.00	0.01	0.03
9) The financial situation of the overall project	Total	3	0	1	2
	Per capita	0.03	0.00	0.01	0.01
10) The supermarket (another side project)	Total	31	4	22	27
	Per capita	0.32	0.09	0.24	0.15
11) Other comments on other projects	Total	34	19	39	43
	Per capita	0.35	0.42	0.42	0.24
Negative comments	Total	20	0	13	20
	Per capita	0.21	0.00	0.14	0.11
Encouragement	Total	18	1	14	14
	Per capita	0.19	0.02	0.15	0.08

Table 5: comments in meetings
(Sample restricted to meeting attendees)

	(1)	(2)	(3)
	Number questions/comments	Number negative comments	Number encouraging comments
Mixed meeting	-0.544	-0.198	-0.165
	(0.335)*	(0.068)***	(0.074)**
High contributor	-0.622	-0.087	-0.110
	(0.234)***	(0.048)*	(0.052)**
Mixed meeting * High contributor	0.717	0.229	0.240
	(0.411)*	(0.083)***	(0.090)***
Constant	1.677	0.198	0.188
	(0.189)***	(0.038)***	(0.042)***
Observations	414	414	414
R-squared	0.02	0.02	0.02

Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The sample is restricted to meeting attendees. In column (1), the dependent variable is the number of questions/comments asked by an individual. The independent variable "Mixed meeting" is a dichotomous variable equal to 1 if the individual attended a mixed meeting, 0 otherwise. The independent variable "High contributor" is a dichotomous variable equal to 1 if the individual is a high contributor, 0 otherwise. "Mixed meeting * High contributor" is an interaction term between these two explanatory variables. In column (2), the dependent variable is the number of negative comments made by an individual. In column (3), the dependent variable is the number of encouraging comments made by an individual.

Table 6: Impact of number of questions or comments, criticisms, and encouragements, by high and low contributors, in mixed or low meetings, on financial contributors of low contributors
(Dependent variable: financial contributors of low contributors)

	(1)	(2)
		More (+) or less (-) in mixed vs other meetings From Tables 4 and 5
Attended*Post*Mix	882.968	
	(256.316)***	
Attended*Post*Number questions comments by High	No high contributors	
	in low meetings	
Attended*Post*Mixed*Number questions comments by High	77.338	+
	(15.255)***	
Attended*Post*Number questions comments by Low	43.934	
	(12.791)***	
Attended*Post*Mixed*Number questions comments by Low	-136.615	-
	(18.839)***	
Attended*Post*Number negative by High	No high contributors	
	in low meetings	
Attended*Post*Mixed*Number negative by High	-579.445	+
	(78.111)***	
Attended*Post*Number negative by Low	-211.722	
	(83.885)**	
Attended*Post*Mixed*Number negative by Low	Zero negative comments	
	in mixed meetings	
Attended*Post*Number encourage by High	No high contributors	
	in low meetings	
Attended*Post*Mixed*Number encourage by High	604.734	+
	(150.967)***	
Attended*Post*Number encourage by Low	146.610	
	(74.371)**	
Attended*Post*Mixed*Number encourage by Low	-1,517.589	-
	(444.176)***	
Observations	2247	
R-squared	0.16	

Standard errors in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%. In column (1), the sample is restricted to low contributors. The dependent variable is the sum of financial contributions from 0 to 9 months after the meeting (Post=1), from 0 to 9 months before the meeting (reference category), or from 9 to 18 months before the meeting (Before=1). The specification is the same as column (1) Table 2: Attended, Post, Attended*Post, Mix, Attended*Mix, Post*Mix, Attended*Post*Mix, Before, Attended*Before, Mix*Before, Attended*Before*Mix, Any Video, Work Video, Benefits Video, Masterplan Video, Any Video*Post, Work Video*Post, Benefits Video*Post, Masterplan Video*Post, Any Video*Before, Work Video*Before, Benefits Video*Before, Masterplan Video*Before. On top of these variables, we include "Number_questions_comments_byHigh", i.e. the number of questions or comments asked by other high contributors in the meeting. We interact this variable with Attended, Post, and Mix, and include all possible variations: Attended*Number_questions_comments_byHigh, Post*Number_questions_comments_byHigh, Attended*Post*Number_questions_comments_byHigh, Mix*Number_questions_comments_byHigh, Attended*Mix*Number_questions_comments_byHigh, Post*Mix*Number_questions_comments_byHigh, Attended*Post*Mix*Number_questions_comments_byHigh, Before*Number_questions_comments_byHigh, Attended*Before*Number_questions_comments_byHigh, Mix*Before*Number_questions_comments_byHigh, Attended*Before*Mix*Number_questions_comments_byHigh. We only report "Attended*Post*Number_questions_comments_byHigh", the impact of one extra question or comment by a high contributor in a low meeting (which is impossible to estimate since there are no high contributors in low meetings), and "Attended*Post*Mixed*Number_questions_comments_byHigh", the impact of one extra question or comment by high contributors in mixed meetings. Number_questions_comments_byLow is the number of questions or comments asked by other low contributors in the meeting, and interact this variable with all other variables above. Number_negative_byHigh is the number of negative comments by other high contributors, and Number_encourage_byHigh is the number of encouraging comments by other high contributors. In column (2), we report conclusions from Tables 4 and 5 about the behaviour of high or low contributors in mixed relative to other meetings. A + (-) indicates that contributors say more (less) of those particular comments in mixed meetings relative to other meetings.

Table Appendix 1: classification and examples of questions and comments

Code	Explanation	Total number	Example 1	Example 2
1) Project management organization	general management of the project (unless it is related to contributions or communal work - see code 3 and 5)	79	is it only the registered members who are eligible for membership completion or new member can be enrolled? (ID 208)	will you install metre box? (ID 1365)
2) Positive comments about the project		56	The leaders of the project have good vision. (ID 654)	he said that he bought share with Gichugu Housing and they have benefited him very much and so he rercommended the idea of starting companies and urged people to invest the little they have. (ID 1306)
3) Project management: contributions	comments specifically about what happens to their contributions, not how much or where they have to pay	50	if am unable to meet Ksh 10000 to be a shareholder and the I be installed power as a company customer will I be allowed to complete my shareholding later when I will have money (ID 612)	asked whether they allow payment of kshs.25000 at ago or it must be paid annually (ID 1209)
4) Project progress (site, generation, distribution)	comments or questions about how well things are progressing and how people expect it to progress	29	is it possible that by next year we have power (ID 1485)	will one get enough power to operate an industry after the second turbine is installed (ID 209)
5) Project management: days of communal work	comments about how many days of communal work they have to do or how many they have done and whether they have to do more	26	how many will be the communal days and when will they be stop (ID 100)	if I have not been attending communals will I start being accounted for communal days today or the day I will start going to the site. (ID 1178)
6) Their financial personal contributions	comments about how much the contribution is or when/where to give it	25	he asked whether cash should be brought to the office or at the site or anywhere else. (ID 1272)	will I be issued with a receipt for any money I pay in the office (ID 1485)
7) Poles	comments about the posts and/or their destruction and replacing them	17	what step are to be taken for posts that were stolen (ID 381)	Asked the fate of the poles since they are getting destroyed. He said that this will help them be able to handle people who are chalenging the project out there in the names of poles. (ID 691)
8) Seminar	comments relating to organization of seminar or seminar in themselves	10	which people do you invite for seminar and why (ID 886)	I request the members to ask questions regarding the seminar so that we may understand and get fully informed (ID 705)
9) The financial situation of the overall project	comments about loans or how are the finances of the project	6	were you given the loan we had applied in the early beginning of the project. (ID 1162)	let money come from other sources apart from CDF(community development fund) (ID 271)
10) The supermarket (another side project)	all comments related to the supermarkets or what is sold there	84	will one be contributing for supermarket monthly. (ID 577)	are the women to be the only supermarket shareholders (ID 586)
11) Other comments on other projects		135	how are youth being enrolled to the youth project? (ID 849)	there is one man from Kiandai who transport weter to Mwea for sale and he earns a lot of money. (ID 1628)
Total		517		