Organizational Performance with In-group and Out-group leaders: An Experiment

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Abstract

In this paper, we compare the performance of a homogeneous organization in which group members and the leader belong to the same group, with a heterogeneous organization in which the leader is an outsider. Using a modified public goods game in which leaders' performance in a real effort task determines the marginal return to the public good we focus on the effect of shared group membership on: i) the effort of the leader in the real effort task, ii) cooperation of group members and iii) group members' payoffs. When the leaders are selected randomly, we find that homogeneous groups tend to out-perform heterogeneous groups. This is due to lower performance of the out-group leader and not to differences in cooperation. This effect disappears when high-performance leaders are selected. High performance out-group leaders tend to over perform relative to in-group leaders, yet, there are no differences in cooperation once we control for the marginal incentives to invest in the public good. The results of our study have important implications for how organizations can deal with the arrival of out-group leaders.

Keywords: Group Membership, Leadership, Public Goods Game, Laboratory experiment.

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1. Introduction

Leaders play an important role in the performance of the organizations (Hermalin, 1998, 2013, Van der Heijden, Potters and Sefton, 2006). At the same time, leaders are quite mobile and often move to a different organization, retire or are dismissed. The replacement of leaders can bring advantages to an organization by rejuvenating it, bringing in new ideas or by disciplining leaders and decreasing the abuse of power (Datta and Rajagopalan 1998; Ocasio 1994). However, leader succession can also be damaging for the organization: the arrival of a leader who does not belong to the same group can decrease organizational performance.

This paper focuses on the role of group membership of the leader on the performance of the organization. We ask: Do out-group leaders, exhibit a weaker motivation to work and are less productive than in-group leaders? Do group members anticipate this and cooperate less in groups led by an out-group leader compared with groups led by an in-group leader? Do these differences result in lower payout for group members with an out-group leader? Does the effect of group membership depend on the level of competence of the leader?

To explore these questions, we used a modified public goods game in which the marginal per capita return from contributions to the public good (or MPCR) depends on the productivity of the leader in a real-effort task. We allowed the leader to be either part of the organization (in-group) or to be an outsider (out-group). In the first case, group members had interacted with the leader before. Out-group leaders, by contrast, do not share membership with members of the organization. They belong to a different group, so participants had had no direct or indirect interaction with them before. The second variation that we introduced relates to the leader-selection mechanism. We either selected a leader randomly (random leader) or selected a leader among the pool of the highest-performing participants in the session (high-performance leader). In the analysis, we consider the effect of those manipulations on leaders' performance in a real-effort task, group members' contributions to a public goods game and participants' payoffs.

We find that the group membership of the leader influences the performance of the organization. However, this depends on the leader-selection mechanism. When the leader is randomly selected, members of a group with an out-group leader received a lower payment than groups with an in-group leader. This was mainly due to lower performance from out-group leaders compared with in-group leaders and not to differences in contributions to the public goods game. However, when the highest performing participant was selected as a leader, we find no significant differences in the pay-off of group members. While out-group leaders performed relatively better than in-group leaders, this did not affect cooperation. These results suggest that group heterogeneity does not compromise performance when leaders are highly qualified.

This paper contributes to two branches of research. First, we contribute to the research on the effect of group membership on cooperation. Generally, it is well established that individuals ascribe emotional value and feel attachment towards individuals they consider belong to their group. This feeling of attachment is refer to as identity (Tajfel, 1974 and Turner, 1982). The empirical literature has shown that group membership or identity plays an important role on economic decisions. In particular, a large body of research has shown that individuals display favoritism towards individuals who belong to their group and discriminate against individuals who are from a different group (i.e. Akerlof and Kranton, 2000; Bernhard et al., 2006; Eckel and Grossman, 2005; Goette et al., 2006; Li et al., 2011; McLeish and Oxoby, 2011; Tremewan, 2010). In addition, it has been shown that there is higher cooperation with in-group than with out-group members, particularly in situations where there is interdependence of payments (see meta-analysis by Balliet et al., 2014). There is also evidence that in-group leaders receive more support and are perceived to be fairer than out-group leaders (Platow et al., 1997; Haslam and Platow, 2001 and Platow and van Knippenberg, 2001). However, the effect of the group membership of the leader on organizational performance has seldom been considered.

The second branch of research to which we contribute focuses on the effect of leaders on organizational performance. Ample evidence from experimental studies shows that the decision of the first player (referred to as “leader”) affects the decisions of the followers, inducing higher levels of cooperation (Clark and Sefton, 2001; Meidinger and Villeval, 2003; Moxnes and Van der Heijden, 2003; Potters et al., 2005 and 2007; De Cremer and van Knippenberg, 2005 and Gächter et al., 2010). It has also been shown that leaders can discipline group members by imposing sanctions or by offering rewards (Glöckner et al., 2011; Gürerk et al., 2009; Güth et al., 2007; Levati et al., 2007; Rivas and Sutter, 2011; Van der Heijden, et al., 2009), can help to overcome coordination traps by setting an example (Brandts and Cooper, 2007 and Brandts, et al., 2007) or can help to motivate group members (Kuang et al., 2007). We contribute to this research by analyzing the impact of a new type of leader. In our setup, we consider that leaders are a productive asset for the organization and that they can affect the performance of the organization through their dedication, efforts and skills (Rosen 1982; Smith, et al. 1984; Connelly et al. 2000).

To the best of our knowledge, only three papers consider the effect of group membership which is also interpreted as identity on group performance: De Cremer and Van Vugt, (1999, 2002) and Drouvelis and Nosenzo, (2013). However, these papers address a different aspect of group membership. The first two studies consider how heterogeneity of the group members affects cooperation. In our experiment, we varied the group membership of the leader and considered homogeneous group of contributors. Unlike De Cremer and Van Vugt (1999, 2002), where the leader was fictitious, in our experiment the leader was an actual person. Consequently, we can track two potential effects of a shared (vs. not shared) group membership of the leader on group performance: cooperation of group members and leader performance. Drouvelis and Nosenzo (2013) considered a public goods game where they varied the group membership of the first mover (leader). In our experiment, we isolated the effect of altruism from strategic bias in cooperation by making the leader's payoff independent from group members' contributions to the public good. Hence, a leader's performance in a demanding real-effort task can be associated with self-sacrifice. This is consistent with many working environments, where the head of the organization receives a fixed payment independent of the performance of the group. We focus on leading by self-sacrifice as most leaders engage in uncompensated work without explicit incentives to do so.

A few studies have used observational data to study the effect of the arrival of an out-group leader on firm performance (e.g., Huson et al., 2004; Lauterbach et al., 1999; Shen and Canella, 2002; Zhang and Rajagopalan, 2004). However, these studies suffer from selection bias as the replacement of leaders is not random. Laboratory experiments can overcome this limitation by exogenously varying the composition of the group and the leader-selection mechanism.

The remainder of the paper is organized as follows: Section 2 presents a simple conceptual framework and outlines the main hypothesis of the study. The experimental design and procedures are presented in Section 3, and Section 4 presents the results, followed by a discussion in Section 5.

2. Conceptual Framework

We consider a simple conceptual framework that represents a stylized organization with n group members (*G*) and one leader (*L*). Consider for example a research group with researchers and the head of the research group (or leader). Researchers receive an endowment of resources, *E*, and have to decide how much of these resources they want to use for the research group, *c*, and how much they want to use for their private research (*E-c*). Researchers can support each other's work by sharing information, commenting on each others' work, exchanging ideas, etc., or can work on independent consultancy work. We assume that the marginal cost of effort for the worker is the same in the private and the joint task. Replicating a social dilemma situation, we assume that the return from working in the research group, *m*, is lower than the return from working individually, $m<1$. However, working for the research group benefits all members of the group, so $nM>1$. The Nash equilibrium is therefore to invest zero in the research group, while the Pareto optimal outcome is to invest all the endowment in the research group.

We extend this standard public goods game to consider that the return from investments in the group account, *m*, increases with the effort that the leader puts into working for the group, *e* or $m'>0$. As the head of the research group works harder and puts more effort in searching for funding and promoting the results of the group, the research group benefits more from allocating resources to the joint task. We assume decreasing marginal returns to effort ($m''<0$ *and* $m(0)=0$). The leader (*L*), receives a fixed wage (*w*) and has to decide how much effort she devotes to a real-effort task that increases the marginal per capita return from investing in the public good, *m*. At the same time, the leader does not benefit from returns to the public good. In the context of our example, this would for instance be represented by a successful funding application that leads to group member publications of which the head of the research group is not co-author. This would be consistent with the incentive structure in many organizations, whereby the head of the organization (in that case, the CEO) does not receive a share of the profits. Effort is assumed to be costly and depends on the leader's level of competence or ability to do the task. Denoting the cost function of effort by *c(e,a)*, we assume a positive and increasing marginal cost of effort ($c'_e > 0$ $c''_e > 0$). The parameter a is a shift parameter that changes the cost of effort. This represents an inverse parameter of skills or competence of the leader. We set $a>0$ and assume that $c'_a>0$.

As effort is costly and the leader does not benefit directly from it, the leader has no incentive to work for the group. Yet, multiple experiments have shown that individuals are willing to make personal sacrifices even when they do not derive direct utility from them (Fehr and Gächter, 2004). One way to explain this finding is to consider that individuals have other-regarding preferences. We therefore consider that the leader is altruistic (Andreoni, 1990) and derives utility from the utility of group members.[1] Consequently, the leader's utility can be written as:

$$U_L(w, e, U_G) = w - c(e, a) + \lambda \sum_{i=1}^{n} U_{iG}\big(c, m(e)\big) \quad (2)$$

The parameter λ represents a parameter of altruism or the weight that the leader gives to the utility of the other members of the group. For a paternalistic leader who fully internalizes the utility of workers, $l = 1$, whereas an egoistic leader gives zero weight ($l = 0$) to the utility of group members $U_{iG}(.)$. An envious leader could experience negative utility from the welfare of others ($l < 0$).

The first order condition for the above optimization problem implies that the optimal level of effort is given by the point at which the marginal cost of effort is equal to the marginal benefit of effort:

$$\frac{\mathrm{dU_L}}{de} = -\frac{dc^{\bullet\bullet}(e,a)}{de} + \lambda\left(\frac{dU_G}{dm} * \frac{dm^{\bullet\bullet}(e)}{de}\right) = 0 \quad (3)$$

Consistent with evidence on in-group favoritism (Tajfel, 1974 and Turner, 1982), we expect that weight λ would depend on the group membership of the leader. The marginal benefit of

[1] An alternative explanation could be related to inequality aversion (Fehr and Schmidt, 1999), in which case the Leader would experience disutility if the final outcomes are not equal, inducing leaders to exert effort when they are in an advantageous position or decrease effort when they are in a disadvantaged position. The model could easily be extended to account for this motivation which would lead to similar predictions.

effort would be higher for an in-group (*I*) than an out-group (O) leader ($\lambda_I > \lambda_O$). The first hypothesis is:

Hypothesis 1: *Leaders are less productive when paired with out-group members than when paired with in-group members.*

The performance of leader depends on her level of ability. A random leader is expected to be on average less productive than the high performance leader which leads to the following hypothesis:

Hypothesis 2:* *High performance *leaders will exert more effort than random leaders. Therefore, group membership would be more important for explaining the performance of random leaders than high performance leaders.*

The utility of leaders depends on group members' contributions, dU_G/dm. The more group members contribute, the higher the utility of the leader. Note that in this setup, the leader's utility is highest when group members contribute all the endowment to the public good.

Evidence from multiple public goods games shows that cooperation is different from the predicted Nash equilibrium and that average contributions are positive (Ledyard, 1995; Zelmer, 2001; Chaudhuri, 2011). To account for this irregularity, behavioral models have been extended to consider that individuals are inequality-averse (Fehr and Schmidt, 1999). One way to model this is to assume that individuals derive disutility for having an income above or below the group average. Denoting the weight that individuals give to deviations from the equalitarian outcome by g, the utility function of a worker with other preferences can be written as:

$$U_G(c, m, \gamma) = (E - c) + m(e)\sum_{i=1}^{N} c_i - \gamma(\bar{c} - c)^2 \qquad (6)$$

Where $\bar{c}$ is the average contribution of other group members. The first order condition for maximizing the above utility function implies that the optimal allocation of endowment, $c*$, to the joint tasks would be:[2]

$$c^* = \frac{m(e(\lambda, a) + 2\gamma\bar{c} - 1}{2\gamma} \qquad (7)$$

This condition implies that workers increase the fraction of time that they put into the joint task as they expect that the return from the joint task to be larger ($m(e)$). To the extent that workers anticipate that out-group leaders would put less effort into the task than in-group leaders, $e_O < e_I$, the optimal amount of time allocated to the joint task would be lower for an out-group leader compared with an in-group leader as $m(e_O) < m(e_I)$. However, this difference is expected to decrease once group members are confronted with leaders with exceptional competence or ability as high performance leaders invest more effort than average leaders. The allocation of time to the joint task increases as the average contribution from other group members, $\bar{c}$, increases.

Our conceptual framework predicts that differences in contributions are mainly driven by differences in expectations of a leader's effort (expected m) and expectations of leaders' competence (a), which leads to the next two hypotheses:

Hypothesis 3: *Group members expect higher effort from the in-group than the out-group leader and expect higher effort from high performance than from random leaders.*

Hypothesis 4: *Contributions to the group are lower when group members are matched with an out-group leader than when matched with an in-group leader. Contributions are also lower when contributors are confronted with a random leader rather than a high performance leader.*

[2] First order condition for a maximum is:

$$\frac{dU_g}{dt} = -1 + m(e_K) + 2\gamma_K(\bar{c} - c_i) = 0$$

3. Experimental Design

The experiment is based on a three-stage procedure (instructions are presented in Appendix A). The first stage was the group formation stage where individuals are randomly assigned to a group. The second stage was an unpaid real effort game and the last stage is a modified public goods game. We refer to these stages as GF, RE and PGG respectively. In order to avoid strategic behavior across stages, relevant instructions were presented by stage – i.e, so that participants did not know the procedures to be used in later stages of the game. Participants solved each activity without knowing that the information on the performance of this activity would be used to allocate roles.

As participants entered the laboratory, they were assigned a color: either green or blue. Like Buchan et al. (2006) and Hargreaves and Zizzo (2009), we used the color to make agents' group membership salient during the experiment while keeping anonymity. Each participant's color remained constant throughout the experiment. During the experiment we made the group membership of the participants apparent: e.g., "You are a blue player participant playing with a green leader". Four participants with the same color were randomly and anonymously matched to make up one group.

Below we explain with detail the objective of each stage and the procedures used in the experiment.

Stage 1: Group Formation Stage*: GF Stage*

The objective of this stage was to induce feeling of belonging to a group by allowing participants to solve a group task, to communicate with each other and to compete against other groups (Eckel and Grossman, 2005; Chen and Li, 2009, Chen et al., 2014). This replicates situations in which there is high degree of familiarity among group members.

The group task was to locate hidden objects within a picture and to type the location of the object, entering the number of the row and column where each object was located. The list of the 10 hidden objects was presented at the side of the figure. This task was selected for is gender-neutrality in terms of task performance (Lindner, 2014, Gerhards and Siemer, 2014);

hence, the gender composition of the group would not affect the manipulation of group membership by having few or many objects found by the group.

Participants were given 10 minutes to solve the task. This was intended to allow members to have enough opportunities to interact, which is expected to generate a feeling of shared group membership. The long communication window is expected to make participants more familiar with each other. Therefore our induced groups in the lab are akin to acquaintances to other participants.[3]

Group members could communicate using a chat box located on the side of the screen that automatically displayed all messages sent by any group member. By allowing members to exchange information in an anonymous way, we intended to prevent the effects that would stem from using actual identities in the group. The communication window was meant to allow participants to help each other in solving the task. To make this motive more salient and incentivize participants to actively exchange information, participants competed against groups with the same color. Answers were valid only if all four members of the group typed the correct answer. Winning groups received a congratulatory message at the very end of experiment just before knowing the total payment in the experiment. As groups of the same color competed against each other, task performance was not affected by affiliation to the assigned color. In addition, feelings of superiority/inferiority among winning/losing groups were absent when participants of different colors interacted in later stages of the experiment.

Motivated by the observation that social relations are not always mediated by monetary incentives (i.e. family relations, relations to coworkers, etc.) and considering that monetary rewards could evoke feelings of rivalry against winning or losing groups (Buser and Dreber, 2013; Chen, 2010), participants did not receive monetary incentives in this task. Also, the use of monetary incentives during this task would have generated income effects by creating groups with highly-endowed and less highly-endowed participants.

Stage 2: Real Effort Stage*: RE Stage.*

[3] Although real interactions are usually constructed over (much) longer periods of time, 10 minutes enables participants to get a basic representation of those relationships.

In the RE stage we measured the performance of all participants in a real-effort task. In this stage we used the real-effort task designed by Gill and Prowse (2012). For this task, participants had 60 seconds to bring up to 48 sliders into a middle position. Sliders were positioned at zero and could be moved as far as 100. The task was to position the slider at exactly 50. While solving the task, participants knew the exact location of each slider, how many sliders they had positioned correctly, and how many seconds were left. Participants had one practice round of 60 seconds to familiarize themselves with the task. Thereafter, they had 60 seconds to solve the task individually. The code implementing the slider task is based on the code developed by Gill and Prowse (2012). As discussed in Gill and Prowse (2011), solving this task is a demanding and quite frustrating exercise that demands concentration and precision. The time limit also brings additional stress to the task. Therefore, solving the task required commitment. We selected this task so that participants had a disincentive to perform it. Moreover, no gender differences in performance have been found in this task (Lindner, 2014, Gerhards and Siener, 2016).

This stage serves as an intermediary stage and its objective is to i) familiarize subjects with the decision, so that they can form expectations on the potential performance of other players in the activity, and ii) determine the productivity of participants. As explained in the experimental design section, in further treatments, we used this information to allocate roles. However (as also mentioned), participants only got to know that in the next stage of the game. This task uses the same pecuniary incentive structure as the one used in the next stage. Therefore, participants did not receive any payment for solving the task. Another important feature of not using piece-payments in this stage is that we did not generate any type of income effect that would bias performance by generating heterogeneity in the groups.

Stage 3: Modified Public Goods Game Stage*: PGG stage*

In this stage we created an environment in which the leader is a productive asset for the organization. Participants were randomly assigned one of two roles that were framed as: “Leader” and “Group member”. The term “Leader” was selected to evoke responsibility for the other group members, while the term “Group members” is rather neutral (i.e. it evokes the idea of group participation). Since the wording used was constant across treatments it was expected that this would not affect the results. Each group comprised one leader and three group members. The roles remained constant for the rest of the experiment.

Leader's Role

Participants allocated the role of Leader received a fixed payment of 25 points every round. In each round, leaders had to decide how much effort they wanted to devote to solving Gill and Prowse's (2012) real effort task. Performance in the real effort task did not generate any additional income for the leader but was associated with a positive externality towards group members. As the leader positioned more sliders correctly, the marginal per capita return to the public good game (MPCR) was higher, yet returns from the public good benefited only group members. Table 1 shows the distribution of the correctly-positioned sliders by the leader and the corresponding MPCR. The cut-off points for the different MPCR were determined according to the distribution of number of sliders correctly positioned in the second stage in the pilot session. We selected cut-off points at 10%, 20%, 70%, and 90% of the distribution. By allowing various levels in the multiplier we aimed at capturing subtle differences in the expectations of group members regarding the leader's effort across treatments.

In order to avoid leaders ending up solving the task merely out of not having anything better to do, confounding the inner motivation to be nice to others (Knutsson et al., 2011) which we wanted to capture in the experiment, we provided them with an alternative option. They received a picture similar to the one they received in the first task and if interested could look for hidden objects. Unlike the slider task, the hidden object game is very popular with many internet sites offering free images. Participants find the task entertaining and during the sessions we observed many participants glancing at the pictures. Performance in the picture task did not generate any payment for the leader, nor for group members and could be considered a leisure activity. Leaders could choose between exerting effort in the slider task to help their peers or playing a hidden object game for fun without generating positive externalities for group members. Solving the slider task was a demanding exercise in terms of the concentration required and the stress created by the time constraint. As leaders did not benefit personally from working hard, performing this task implied some form of self-sacrifice to help others. Since we cannot directly capture effort in the real effort task, we use instead a proxy measure and consider the number of sliders correctly positioned. This measure hence reflects productivity differences across in-group and out-group leaders.

<<<TABLE 1 <<<<

Group Member's Role

Participants allocated the role of Group Member participated in a modified public goods game. Each period, group members received an endowment of 20 experimental points and their task was to distribute this endowment between a private and a group account. Points invested in the private account gave one point in return, while points invested in the group account gave *m* points in return to all group members, independent of their contribution to the group account.[4] Participants were informed of how the performance by the leader in the real effort task would translate into different returns, *m*. However, group members did not know the exact value of the MPCR –this was done to capture the effect of expectations on contributions. If the participants lack trust in the out-group leader, they would expect that she would be less productive (have a lower m) than the in-group leader. For a very low level of effort by the group leader (less than six correctly-positioned sliders), the social optimum and the Nash equilibrium is not to invest in the public goods game. We included this option to allow us to capture a very low expectation of leader performance, since such a low level of performance cannot be associated with bad luck, but only with deliberately low levels of effort.

We considered that the uncertainty of the leader's effort in the real effort task and the uncertainty of group members' contributions could drive behavior in the organization (Fischbacher et al., 2001). Consequently, in our experiment, the leader and the group members decided simultaneously and without feedback on MPCR or group members' contributions. Had participants been informed about the return to the public good – MPCR –

[4] The expected earnings of leaders and group members would be the same if on average each participant in the group contributed 40 percent of the endowment to the public good and the MPCR was 0.6.

we would have only captured the effect of incentives to contribute to the public good and not the effect of expectations on the efforts made by the leader, which is the factor we were interested in.

To capture one potential channel that affects contributions and performance in the real effort task, we elicited the expectations of group members of the performance of the leader in the real effort task measured as the number of sliders correctly positioned. Since group members were familiar with the task, which they had played in the second stage, before roles had been assigned, they could form expectations regarding the performance of the leader. Moreover, as we measured group members' performance, this design enabled us to measure how optimistic or pessimistic group members were about their leader's performance relative to their own performance. To capture how expectations regarding group members' contributions affect effort, we also elicited leaders' expectations on the average contribution by group members. Answers to questions on expectations were incentivized using a non-linear payoff function to elicit true beliefs (Gächter and Renner, 2006 and Sonnemans et al., 2001).[5]

At the end of each period, group members received individual information on average contributions by group members and on the return that each group participant received from the group account. Although they did not know the exact number of sliders positioned by the leader during the decision, they could ex-post infer the value of the MPCR in that period. Leaders received information on total contributions, the value of MPCR, and the points that each member in the group received from contributions in the group account.

To capture repeated social dilemmas like the ones normally faced by organizations, we explained to participants that the game would be played for 10 to 15 periods and that the exact number of periods would be randomly determined. Participants were paid according to the points earned over all periods in the third stage. Experimental points were transformed into Euros at an exchange rate of 100 points to 4 Euros.

[5] Correct guesses were awarded 4 points. One unit difference from a correct answer was awarded 3 points. Two unit differences were awarded 1 point and larger differences were awarded no payment.

To ensure that the tasks were fully understood, we provided examples. Also, in the case of the second stage real effort task, we allowed participants to play a practice round. The payoff of the public goods game was explained using examples. In addition, we implemented control questions, and the experiment was only allowed to continue if all questions were answered correctly.

Experimental treatments

Our experiment varied group membership and the leader-selection mechanism. Table 2 shows the experimental design and the number of participants per treatment.

<<<TABLE 2 <<<<

In the in-group treatments, leaders and group members belonged to the same group. Hence, they interacted in the GF and PPG stage. In the out-group treatment, group members were paired with leaders from a different color group, someone with whom they had not interacted in the first two stages of the game. Green group members were assigned a blue leader and vice versa, and the color code of the participants was made salient using colored text. Hence, the only difference between in-group and out-group leaders was that out-group leaders were strangers to the organization and were from a different-color group.

The second feature in the experiment was that we varied the leader-selection mechanism. The aim of this manipulation was to create differences in the expected level of competence of the leader. In the control treatment, a random participant was selected as leader. As the selection was random, all participants in a given group had an equal chance of becoming a leader, irrespective of their performance during the previous stages. In treatments with high performance leaders, the group participant who performed best during the RE stage was assigned the role of leader.

To explain the selection mechanisms used to allocate roles during the third stage, the following statements were used:

> **Random In-group Treatment***: (RI Treatment): "A participant in your group is randomly selected to be the leader of the group."*

Random Out-group Treatment*: (RO Treatment): "A participant from a group with a different color is randomly selected to be the leader of your group".*

High performing In-group Treatment: *(HPI Treatment): "The participant in your group who positioned the most sliders correctly is selected to be the leader of your group".*

High performing Out-group Treatment: *(HPO Treatment): "The participant from one of the groups with a different color who performed best in the slider task is selected to be the leader of your group".*

In the design, we also included a treatment that excluded the group formation stage (No-Group). However, as we were interested in the impact of the composition of the group, rather than the effect of group induction, we do not present results of treatment with no group induction. Also, we have a relatively low number of participants in the treatment for this comparison to be meaningful. Future research could consider this question explicitly.

4. Data and Results

We implemented the experiment using a mobile lab at the University of Göttingen. Recruitment was conducted by email through the Online Recruitment System for Economic Experiments - ORSEE (Greiner, 2004). The experiment was programmed and conducted with the *z-Tree* software (Fischbacher, 2007). Participants were separated by removable wooden panels. We used laptop computers when running the *z-Tree* program, and instructions were provided in German. We conducted two pilots, which helped us to make relevant adjustments to the instructions and program. Since the design was modified, data from the pilot is not included in the analysis. We conducted 29 experimental sessions between November 2010 and October 2011. Sessions were conducted with 16 (four groups of four), 12 or 8 participants, according to the availability of participants. Treatments were randomized over the sessions, which lasted about 90 minutes. Participants received a show-up fee of 2.5 EUR plus any earnings from the third stage of the experiment. Participants earned an average of 17.86 EUR.

In total, 428 students participated in the experimental sessions. On average, participants were 23 years old, and 52 percent were female. Participants were from various different areas of study: 35 percent from economics, 19 percent from social sciences, nine percent from biology, eight percent from agricultural economics and the rest from other areas.

4.1. Descriptive Statistics

Group Formation Stage: *GF Stage*

The kernel densities of the number of objects found in the GF task is presented in Figure 1. The distribution of the number of objects found was similar across treatments, with the exception of the HPO treatment, where we found significant differences in the distribution of objects found (Wilcoxon rank-sum test, p-value <0.004). Since performance in this task could have affected the bonds created with other group members, our analysis controls for the mean number of objects found in this task by each group.

<<<FIGURE 1>>>>

Real Effort Stage: *RE stage*

Figure 2 presents the kernel distributions of sliders correctly positioned in the second stage (before participants knew the selection mechanisms) by participants who in the third stage were selected as leaders. The terms “Panel A” and “Panel B” refer to random and performance-based selection procedures, respectively. As expected, we found that leaders who were selected according to performance positioned on average significantly more sliders correctly than leaders who were selected at random. However, we also found that randomization was not quite effective and out-group leaders performed better than in-group leaders under both random and high performance selection conditions (Wilcoxon rank-sum test p-values: 0.007 and 0.003, respectively). Similar differences in performance were observed for all participants in the in-group and out-group treatments (Wilcoxon rank-sum test p-values: 0.104 for random and 0.002 for high performance treatments). Therefore, in the analysis we considered initial differences in leaders’ performance. We did not find significant differences in performance in the real effort task for group members (Wilcoxon rank-sum test p-values: 0.722 for random and 0.922 for high performance treatments).

<<<FIGURE 2 >>>>

4.2. Regression analysis

The analysis of the first two stages of the experiment shows that there are significant differences in the number of objects found in the GF task and in the performance of the leader in the RE stage across treatments. Hence, a simple descriptive figure would be misleading. To account for these differences, we estimated the following model to explain leaders' performance in the PPG stage:

$$E_{it} = \beta_0 + \beta_1 O_{it} + \beta_2 G_{it-1} + \beta_3 EC_{it-1} + \beta_4 t_{it} + \beta_5 X_i + u_i + \varepsilon_{it} \qquad (8)$$

where *E* is the number of sliders correctly positioned in the third stage, *O* is a dummy variable that assumes a value equal to one for groups with an out-group leader and zero for in-group leaders, *G* is the lagged level of group contributions, *EC* is the expected contributions of group members, *t* is the period and *X* is a vector of time-invariant group characteristics (number of objects found in the first stage, number of sliders positioned by the leader in the RE stage and session dummies), that aim at controlling for initial differences across treatments, *u* is individual dummy and e is the error term assumed to be normally distributed and with zero mean.

To explain contributions to the public goods game, we estimated the following model:

$$Y_{it} = \beta_0 + \beta_1 O_{it} + \beta_2 C_{jt-1} + \beta_3 m_{i,t-1} + \beta_4 Em_{i,t} + \beta_4 t + \beta_5 X_i + u_i + \varepsilon_{it,} \qquad (9)$$

where *Y* is the number of points contributed to the public account or the payoff by group member, by contributor *i*, in period *t*; C_{jt-1} is the lagged level of contributions by other group members; *m* is the MPCR to the public good, E_m is the expected number of sliders positioned by the leader. *O*, *t* and *X* are defined as before.

In the analysis we considered separately the effect of group membership of the leader on the first round of the game and on the first ten periods of the PPG.[6] The aim was to capture the short-term and long-term effects of group composition on cooperation in the public goods game. To account for the panel structure of the data we estimated a random effects model when considering the decisions over 10 periods. The estimated coefficients for the first period are presented in Table 3 while Table 4 presents the results for the 10 periods.

<<< TABLE 3<<<

Panel A in Tables 3 and 4 presents the results of an OLS model on the number of sliders correctly positioned (Equation 8).[7] Standard errors are clustered at session level. The results partly confirm Hypothesis 1. Random out-group leaders are less productive than in-group leaders both in the first round and over the ten periods. However, for high performance leaders this difference was only observed in the first period. Over the 10 periods, out-group leaders are more productive than in-group leaders. Comparing the differences in performance in the slider task between out-group and in-group leaders, we found that under random assignment to the leadership position, there is a larger difference than under the assignment based on performance (z-score: 6.781 and 11.84 for first and 10 periods). These two results indicate that differences in-group membership between the leader and group members might be less pronounced when selection is based on the qualifications of the leader.

Although we expected that leaders' performance in the real effort task would depend on lagged cooperation and expected contributions of group members – as leaders could feel that their efforts paid off only when participants contributed to the public good – we found no significant effects on either of these variables. This suggests that the leaders had an inner motivation to perform the task. We found that positive learning effects and leaders' performance increased across periods.

[6] Considering that allocation across treatments was constant over the first ten decisions, we restricted the analysis to the period where cooperation was comparable across treatments.
[7] These models refer only to t=1 and do not take into account lagged variables.

Result 1: *In the first period, in-group leaders performed better in the real effort task than out-group leaders. Over time the gap shrank and even reversed for high performance leaders, with out-group leaders being more productive than in-group leaders under this assignment condition.*

Panel B in Tables 3 and 4 presents the results on contributions to the group account and payoff of group members (Equation 9). Standard errors are clustered at the group level. All models control for performance in the *ID* task, performance in the *RE* task and includes Session fixed effects. In addition, Models 2 and 4 include controls on the leader's expectations of the group members' contributions and group members' expectations of the leader's performance in the real effort task. Contrary to Hypothesis 4, we find that there is no systematic difference in contributions between groups with an out-group leader and groups with an in-group leader. Only in the first period did participants with a random out-group leader contribute more than participants with an in-group leader. However, this difference disappears over the 10 periods. No difference in contributions is found for high performance leader between the in-group and out-group conditions. A possible explanation of why contributions were higher to an out-group leader in the first period is that group members might have been using that as a way to signal their cooperation to the leader, so as to increase the leader's effort. As expected, contributions increased with the expected number of sliders done by the leader and with the lag value of MPCR.[8] In addition, our results confirmed results from previous studies (Keser and Van Winden, 2000 and Fischbacher et. al, 2001) and showed that participants behave as conditional cooperators.

Result 2: *Contributions to the public goods game did not differ significantly between groups led by an in-group leader and an out-group leader.*

[8] As an additional robustness check, we compared groups with the same multiplier. We ran the same regression analysis considering groups that have the same multiplier (0.5) in 8 or more periods and in 9 or more periods. We found that the results are robust and although we found the level of significance to be lower, this is expected due to the fewer number of observations.

Panel C in Tables 3 and 4 shows group members' payoff. We find that participants exogenously allocated to the treatment with random out-group leader received a significantly lower payoff than participants in the comparable treatment with an in-group leader. No such effect is found for high performance leaders.

Result 3: *The payoff for groups with an out-group leader was lower than that for groups with an in-group leader. Yet this effect was only found in groups with random leaders.*

<<< TABLE 4<<<

Why do leaders discriminate in favor of in-group members? In this case, in-group leaders could possibly have performed better in the real effort task because they expected higher levels of cooperation than did the out-group leaders. To investigate if that was the case, we compared leaders' expected contributions across treatments (Equation 8). The estimated coefficients for out-group leader are presented in Panel A in Table 5. The estimations confirm Hypothesis 2 and we found that over the 10 periods, out-group leaders (both random and high performing) expected lower contributions from group members than the in-group leaders did.

Did group members anticipate that their out-group leader would be less productive? Panel B in Table 5 presents the estimated coefficient for the out-group dummy on group members' expectations on the number of sliders positioned by the leaders. The results only partially support Hypothesis 3. Participants with a random out-group leader expected significantly lower effort to be made by their leader compared with an in-group leader, however, the effect was reversed for high performance leaders. This result suggests that out-group "experts" or leaders are considered even more valuable than in-group leaders. Yet, as discussed earlier, this is not reflected in higher cooperation once we control for expectations.

<<< TABLE 5<<<

5. Discussion

In this paper, we compare the performance of organizations with an in-group and an out-group leader in terms of performance of the leader, cooperation by group members and payoffs. We found mixed evidence regarding the effect of the leader's group membership on organizational performance.

Our results indicate that random out-group leaders were less willing to work for the group they represented, than random in-group leaders. This difference was also observed for high performance leaders in the first round but shrank and eventually reversed over 10 periods. One possible explanation for this effect could be related to the lower marginal cost that high performance leaders have compared with random leaders, which is expected to induce higher effort. However, it is also possible that high performance leaders could be inherently different from random leaders and have a higher motivation for the task, and therefore be less affected by group membership. It is also possible that the selection mechanisms changed the motivation of the leaders. High performance leaders could have perceived that they had a more legitimate claim to the position of leader, which could have fostered their motivation to work for the group members. Surprisingly, our results indicate that heterogeneous groups with an out-group leader do not necessarily produce lower contributions to the public good than homogenous groups. Despite productivity differences between in-group and out-group leaders (for random leaders), whether a group had an in-group or an out-group leader did not significantly affect the level of contributions made by the group members. This effect could be partly due to the uncertainty that group members feel regarding the effort of the leader. More research to explore this question is needed.

In our experimental design we aimed to induce a strong form of group membership, and we expected that this manipulation would lead to increased social cohesion. However, one weakness of our analysis is that we did not measure the degree of attachment to the group. Moreover, by inducing a strong form of shared group membership, the impacts might be magnified. It would be interesting for future research to vary the degree of attachment to the group, with future work explicitly investigating the channels by which out-group leaders affect the performance of the organization.

Another potential limitation of our analysis was that in the GF and RE stages we did not use monetary incentives to reward performance, which could have somehow reduced the degree of identification that we created in the lab and possibly induced lower incentive to perform in the real effort task. On the other hand, as this stage was implemented in the same way across treatments, this would not bias the results.

Our experimental design varied the group composition and compared homogeneous vs. heterogeneous groups. While this design allowed a clear identification of the effect of group membership of the leader on organizational performance, it could be that familiarity induced in the group formation task played a particular role. Therefore, an extension of the design could consider the effect of leader succession. Further extensions of the design could explore the role of familiarity with the new leader on organizational performance. As participants get to know each other, trust can develop so that uncertainty would decrease over time. Depending on experience gained in previous rounds, this could lead either to higher or lower contribution levels. This aspect requires further investigation.

In the experimental design, we tried to isolate the effects of other-regarding preferences and strategic motivation to work on the real effort task by giving the leader a fixed payment. This manipulation could have led to an overestimation of the impact of the group membership of the leader on performance. Future research should consider if this effect is partly reduced when leaders' payoff depends on their performance.

The results of our study have important implications for how organizations can deal with the arrival of out-group leaders. First, the promotion of motivated internal candidates could reduce the undesirable effects for the organization of having a leader who is perceived as belonging to an out-group. Second, organizations could benefit by displaying information on the performance of the new (out-group) leader. This is expected to reduce biases in perceptions of their performance. In addition, this mechanism could generate additional incentives for the leaders to perform. Future research could test this recommendation empirically. Integration of new leaders in visible roles where motivation is easy to observe could facilitate the transition process. Third, organizations would profit from selecting leaders from within the organization by training members to assume potential leadership roles. This is, however, a long term endeavor. Therefore, hiring a qualified (high performance) out-group leader represents an attractive alternative.

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Figure 1. Kernel density on the number of objects found in the identity task

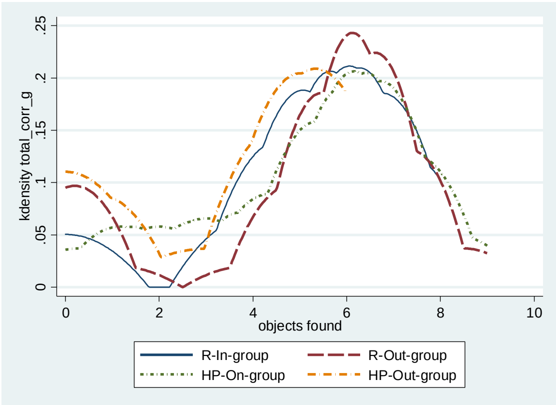

Figure 2. Number of sliders correctly positioned by leader and by treatment in the second stage.

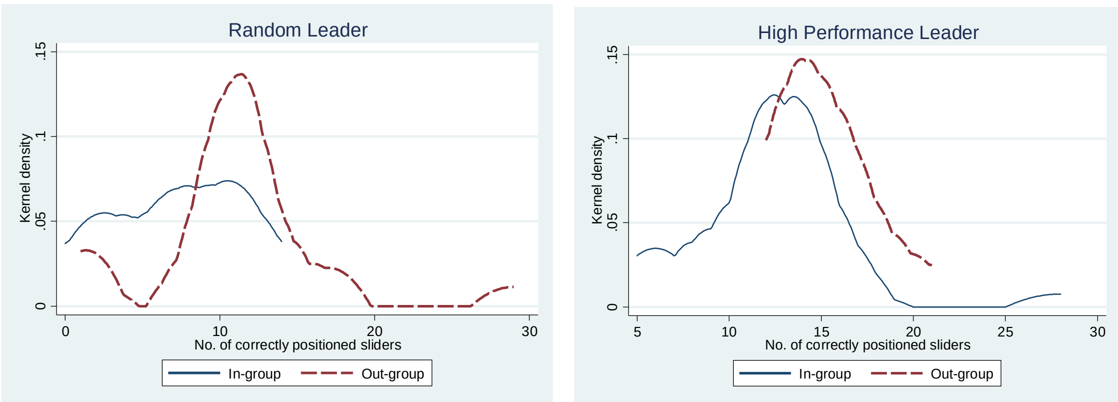

Table 1. Marginal Per Capita Return to Public Good (MPCR)

Number of sliders correctly positioned by the leader	Marginal Per Capita return (MPCR) to public good
Less than 6	0.3
Between 6 and 8	0.4
Between 9 and 16	0.5
Between 17 and 20	0.6
More than 20	0.8

Table 2. Treatments

Selection	Leader's Identity		
	In-group	**Out-group**	**No-Group**
Random	RI (100)	RO (92)	NO-I (24)
High Performance RE	HPI (132)	HPO (80)	

*Notes: Numbers in parentheses refer to the number of observations per treatment

Table 3. Effect of out-group leaders on performance in the slider task, contributions and payoff for group members. Linear Regression Model. First Period

Panel A: Slide Bars	Random Leader				High-Performance Leader			
	(1)		(2)		(3)		(4)	
Outgroup	-9.020	***	-9.212	***	-2.230	**	-2.431	***
	(0.417)		(0.420)		(0.939)		(0.806)	
Expected Contribution			-0.040				-0.035	
			(0.035)				(0.029)	
Constant	8.246	***	8.810	***	5.867	***	7.214	***
	(1.617)		(1.824)		(1.698)		(2.399)	
Obs	49		49		53		53	
R2	0.740		0.75		0.603		0.622	
R2 Adj	0.598		0.6		0.411		0.422	
Panel B: Contribution	Random Leader				High-Performance Leader			
	(1)		(2)		(3)		(4)	
Outgroup	2.763		4.432	*	0.676		-0.302	
	(2.863)		(2.418)		(2.737)		(2.624)	
Expected Sliders Leader			0.575	***			0.130	
			(0.138)				(0.083)	
Constant	10.298	***	5.736	**	12.311	***	11.946	***
	(1.913)		(2.415)		(2.483)		(2.373)	
Obs	147		147		159		159	
R2	0.114		0.206		0.184		0.199	
R2 Adj	-0.002		0.094		0.086		0.096	
Panel C: Pay-off Group Members	Random Leader				High-Performance Leader			
	(1)		(2)		(3)		(4)	
Outgroup	-6.065	**	-6.575	**	-3.015		-3.399	
	(2.462)		(2.804)		(2.654)		(2.743)	
Expected Sliders Leaders			-0.176				0.051	
			(0.143)				(0.092)	
Constant	24.480	***	25.875	***	21.249	***	21.106	***
	(1.262)		(1.592)		(1.735)		(1.702)	
Obs	147		147		159		159	
R2	0.152		0.162		0.262		0.264	
R2 Adj	0.040		0.044		0.173		0.170	

Notes: The models include controls on group performance in group formation stage, leaders' performance in the real effort stage and session fixed effects. Standard errors, as presented in parenthesis, are clustered at the session level for regression on sliders and at the group level for regressions on contributions and payoff. *, ** and *** are significance levels at 0.1, 0.05 and 0.01 percent, respectively.

Table 4. Effect of out-group leaders on performance in the slider task, contributions and payoff for group members. Random Effects Model. Periods 1 to 10.

Panel A: Slide Bars	Random Leader				High-Performance Leader			
	(1)		(2)		(3)		(4)	
Outgroup	-12.002	***	-6.748	***	2.582	**	5.092	*
	(1.576)		(0.241)		(1.234)		(2.616)	
Lagged Contributions			0.005				-0.023	
			(0.020)				(0.025)	
Expected Contribution			0.008				0.124	
			(0.015)				(0.078)	
Period			0.187	***			0.055	
			(0.033)				(0.089)	
Constant	16.341	***	9.902	***	7.446	***	4.189	***
	(0.040)		(1.662)		(0.892)		(1.562)	
Obs	490		441		494		441	
Groups	49		49		53		49	
R2	0.560		0.567		0.313		0.299	
Rho	0.634		0.694		0.472		0.498	
Panel B: Contribution	Random Leader				High-Performance Leader			
	(1)		(2)		(3)		(4)	
Outgroup	-0.756		1.264		0.508		-3.059	
	(5.762)		(4.193)		(4.408)		(1.945)	
Lagged MPCR			5.444	***			4.873	***
			(1.642)				(1.640)	
Expected Sliders Leader			0.083	***			0.135	***
			(0.032)				(0.033)	
Lagged Contribution others			0.126	***			0.137	***
			(0.026)				(0.025)	
Period			-0.311	***			-0.151	***
			(0.054)				(0.055)	
Constant	11.829	***	6.436	***	13.340	***	8.110	***
	(2.250)		(1.461)		(2.246)		(1.940)	
Obs	1470		1323		1482		1323	
Groups	147		147		159		147	
R2	0.143		0.282		0.214		0.327	
Rho	0.589		0.553		0.524		0.521	
Panel C: Pay-off Group Members	Random Leader				High-Performance Leader			
	(1)		(2)		(3)		(4)	
Outgroup	-4.179		-2.533	**	-1.977		-0.352	
	(3.546)		(1.053)		(3.241)		(1.441)	
Lagged MPCR			11.982	***			15.844	***
			(2.951)				(3.171)	
Expected Sliders Leaders			0.008				0.014	
			(0.034)				(0.032)	
Lagged Contributions Others			0.224	***			0.24	***
			(0.027)				(0.026)	
Period			0.078				-0.063	
			(0.055)				(0.059)	
Constant	25.863	***	15.187	***	21.324	***	9.847	***
	(1.709)		(1.889)		(1.439)		(1.634)	
Obs	1470		1323		1482		1323	
Groups	147		147		159		147	
R2	0.224		0.495		0.211		0.466	
Rho	0.515		0.206		0.422		0.158	

Notes: The models include controls on group performance in group formation stage, leaders' performance in the real effort stage and session fixed effects. Standard errors, as presented in parenthesis, are clustered at the session level for regression on sliders and at the group level for regressions on contributions and payoff. *, ** and *** are significance levels at 0.1, 0.05 and 0.01 percent, respectively.

Table 5. Estimated coefficient on the effect of out-group leaders on Expectations

Panel A. Expected Contribution

	Random Leader				High-Performance Leader			
	(1)		(2)		(1)		(2)	
1 Period	-4.816		-4.816		-5.747		-5.747	
	(3.247)		(3.247)		(8.872)		(8.872)	
10 Periods	-1.288		-8.742	***	-16.610	***	-18.394	***
	(2.582)		(0.285)		(2.441)		(1.459)	

Panel B. Expected Sliders Leader

	Random Leader				High-Performance Leader			
	(1)		(2)		(1)		(2)	
1 Period	-2.904	*	-3.399	**	7.507	***	7.41	***
	(1.503)		(1.277)		(2.591)		(2.337)	
10 Periods	-6.612	***	-2.401	*	3.582	**	6.027	***
	(2.103)		(1.372)		(1.703)		(1.702)	

Notes: The models include controls on group performance in group formation stage, leaders' performance in the real effort stage and session fixed effects. Model 2 includes additional controls as displayed in Table 3 and Table 4. Standard errors, as presented in parenthesis, are clustered at the session level for regression on sliders and at the group level for regressions on contributions and payoff. *, ** and *** are significance levels at 0.1, 0.05 and 0.01 percent, respectively.