

**Actions do not always speak louder than words: the role of social incentives when
choosing and executing cooperative effort**

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Abstract

Financial (dis)incentives (e.g. bonuses, taxes) as well as social incentives (e.g. public praise) have typically been proposed as methods to encourage greater cooperation for the benefit of all. But, when cooperation requires exertion of effort, such interventions might not always be effective. While incentives tend to be highly motivating when choosing to exert effort, evidence suggests that they have less of an effect on behavior during effort execution. The aim of this exploratory study was to incorporate these insights into empirical investigation of the effects of social incentives on cooperative effort. To this end, we modified a Public Goods Game task to require effort contributions to a common good. Crucial manipulation involved incorporating social incentives into this task and linking them to a) choices that people made, or b) effortful actions they exerted. Our findings suggest, in line with recent effort-based decision-making models, that social incentives have a stronger effect on cooperative effort when they are linked to choices that people make, rather than the actual effort they exert. This study demonstrates potential benefits of eliciting a priori declarations of cooperative effort tied to social incentives to encourage greater effort for the benefit of all.

Keywords: effort-based decision-making; social incentives; choice; effort exertion; Public Goods Game

Introduction

Economic cooperation to tackle fundamental problems, such as inequality and climate change, requires social cooperation, which goes beyond fulfilling individual needs of the members of society and sees everyone contribute to the common good. The complex nature of modern problems means that this cooperation cannot be limited to financial contributions but needs to extend to people donating their time and effort. But how can people and organizations be encouraged to put in more effort for a common good?

Traditional approaches attempting to boost effort exertion in business environments use financial incentives and/or performance monitoring, such as regularly tracking how good and consistent workers' output is (Brewer et al., 1994; Larson & Callahan, 1990). While commonly employed, such methods have clear disadvantages when it comes to promoting workplace effort, as they do not reliably increase performance (Bonner et al., 2000; Bonner & Sprinkle, 2002; Brewer & Ridgway, 1998; Klor et al., 2014) and may lead to elevated stress levels in employees (Aiello & Kolb, 1995; Carayon, 1993, 1994).

So, what other methods can be used to increase effort in cooperative contexts? Social psychology and behavioural economics propose that social forces can have extremely motivating influence on performance (Ashraf & Bandiera, 2018; Babcock et al., 2015; Bandiera et al., 2010). Exchanging socially relevant information (e.g. gossiping, self-disclosure), engaging in cooperation, or having opportunities for positive self-presentation have all been found to activate the reward centres of the brain, such as ventral striatum and orbitofrontal cortex (Bhanji & Delgado, 2014; Braams et al., 2014; Harbaugh et al., 2007; Mobbs et al., 2009; Morelli et al., 2015; Peng et al., 2015; Tamir & Mitchell, 2012; Zaki et al., 2011) and produce behaviours that suggest these activities can be rewarding, such as forgoing money to get an opportunity for self-disclosure (Tamir & Mitchell, 2012).

An opportunity to present oneself in a positive light (e.g., as hard-working, pro-social, and cooperative) can potentially act as an incentive during the effort-based decision-making

process, increasing the willingness to exert effort. Prior research has provided evidence that people tend to work harder in the presence of others, as compared to when they are on their own, referred to as social facilitation (Falk & Ichino, 2006; Markus, 1978; Platania & Moran, 2001; Zajonc, 1965). Importantly, this phenomenon typically occurs when individual outcomes are being, or could be, evaluated (Harkins & Jackson, 1985; Innes & Young, 1975; Szymanski et al., 2000; Williams et al., 1981), so when there is an opportunity for presenting oneself in a positive light (Dobrescu et al., 2019; Ličen et al., 2019; Stefan et al., 2020).

Considering that financial incentives are often costly and not always effective, the use of social incentives seems to be an attractive alternative in situations where encouraging greater cooperative effort is needed. Recent studies exploring effort-based decision making indicate, however, that these incentives need to be employed in a very specific way to be truly effective. This is because of the difference in how incentives and effort are processed during the different stages of the effort-based decision-making. Ludwiczak et al. (2020), in their experiment requiring mental effort (solving simple mathematical equations) and physical effort (squeezing a hand-grip device), indicated recently that high monetary incentives (both gains and losses) affect the willingness to choose effortful options, but not the amount of effort that is exerted during a task. In Ludwiczak et al.'s (2020) study, participants demonstrated strong preference for high incentive tasks, regardless of the amount of effort associated with them. Yet, the level of incentive had no effect on the actual amount of effort exerted in the task. This finding was in line with earlier behavioral economic and psychological studies, which revealed that when choosing between options people tend to concentrate on rewards, underestimating the amount of effort required (Akerlof, 1991; Soman, 1998, 2004). At the same time, during execution behavior seems to be driven primarily by effort requirements, with rewards only used as a benchmark to assess if effort is worth incurring (Brehm & Self, 1989).

If, as the literature suggests, incentives matter more during effort-based choice than during execution, social incentives should have a greater impact on behavior when choosing to engage in an effortful cooperation, than when executing cooperative effort. This implies, somewhat paradoxically, that linking social incentives (e.g., opportunities for positive self-presentation) to the choices that people make about cooperative effort (e.g. publicly announcing their intentions to cooperate) should be more effective at increasing effortful cooperation than linking the incentives to actual effortful actions (e.g. publicly announcing the effort exerted for a common good).

The aim of this exploratory study was to examine this hypothesis and see if individuals would be more willing to exert cooperative effort when their choices, rather than actions, were available for public evaluation. To this end, we developed a novel cooperative task inspired by the PGG paradigm, in which effort contributions to a common good were required.

In the standard version of the PGG, each player is given a number of tokens representing money and is asked to choose how many of these tokens to keep for themselves and how many to put into a public pot (Zelmer, 2003). The tokens in the public pot are then multiplied by a factor (greater than one and less than the number of players) and this 'public good' is divided evenly between participants. In our modification of this game, people were asked to contribute physical effort (squeeze a handgrip device) instead of tokens. As in the standard version of the PGG, they could choose how much of this effort should lead to individual or group monetary gain. Some participants were also provided with social incentives, as their contributions were communicated to others, offering an opportunity for positive self-presentation. In one experimental condition, social incentives were linked to cooperative choices ("you will be given information about how many squeezes each group member *decided to contribute* to the public pot"), making them salient and relevant when choosing how much effort to exert for a common good. In another condition, these incentives

were linked to actual cooperative effort exerted by participants (“you will be given information about how many squeezes each group member *actually contributed* to the public pot”), making them salient and relevant during effort execution.

Our experimental set up provided an opportunity to test the following hypotheses: if social incentives play an important role when choosing, but not executing, cooperative effort, linking incentives to choices would lead to higher cooperation compared to baseline, whereas linking incentives to actions would have little effect. Otherwise, if social incentives affect cooperative effort in the same way during choice and execution, we expected to see increased cooperative contributions when social incentives were available, regardless of the point at which they were made salient.

Methods

Participants

For the purpose of this study, a novel cooperative effort task was created. In this task, participants exerted physical effort (squeezed a hand grip device) for their own benefit or for the benefit of their group. Ninety participants (12 males, $M_{\text{age}}=24.5$, $SD_{\text{age}}=6.5$) were recruited for the study and divided into groups of five. Each group was randomly assigned to one of three conditions: Baseline, Communicated Intentions, and Communicated Actions, with 30 participants in each. These conditions differed in terms of when the social incentives were made salient (No social incentives vs. incentives linked to choices vs. incentives linked to actions).

Sample size was based on previous studies exploring financial contributions in PGG in which complexity of acquiring data was comparable (Chung et al., 2011; McIntosh et al., 2013; Palfrey & Rosenthal, 1991). The experiment was performed in accordance with Queen Mary, University of London guidelines and policies referring to human participation studies and received ethics approval from Queen Mary, University of London Research Ethics

Committee (ref: QMREC2193). Informed consent was obtained from all subjects.

Participants were also informed that they could withdraw from the study at any point, including after the experiments have finished.

Materials

The experiment consisted of two rounds. In both rounds participants first completed an Effort Task, which involved squeezing a joystick for monetary rewards. and then took part in a group online chat (see Figure 1).

Figure 1 here

Effort Task

In the Effort Task, participants were told they would have to perform 40 grip squeezes, each associated with a reward of 40 pence (approx. 50 cents). They were informed that there was an option for them to keep the proceeds from each grip squeeze, but that they could also choose to contribute some or all squeezes to the public pot. These would be multiplied by 1.5 and the corresponding monetary rewards would be divided evenly between all group members. At this point, participants had to decide how many (if any) squeezes they intended to contribute to the public pot (Choice phase). Once participants made their choice, squeezing (Execution phase) begun.

Participants either started by squeezing for the ‘individual pot’ or ‘public pot’, which was counterbalanced. After each squeeze, they were told that they could continue contributing to their starting pot by pressing the ‘p’ button on the keyboard, or switch to the other pot by pressing the ‘s’ button. Once participants made the switch, they could not switch back. Information about the current pot and the trial number appeared at the bottom of the screen. The task finished when all 40 squeezes were completed.

The Effort task was programmed using Matlab 2012a with Psychtoolbox 3 extension and presented to participants on a 19'' monitor using an IBM computer. Participants' responses were recorded using a standard keyboard and a grip force transducer forming a part of fORP 932 Subject Response Package, developed by Cambridge Research Systems. The maximum grip strength measured by the transducer was 100 Newtons.

Online Chat

Once all members of a group completed the Effort Task, they were invited to take part in an online chat. The chat was accessed via an online link, using a unique, anonymous ID provided by the Experimenter. In this E-chat, participants were able to view and discuss information about performance of their group (i.e. how much money in total was in their public pot). Some participants also received information about the contributions of individual members of their group. The specific information provided depended on the condition a group was in:

- 1) Communicated Intentions: participants in this condition were informed that all group members would be able to view the number of trials each participant intended to devote (declared) to the public pot in the Choice phase. They were later provided with this information in the online chat.
- 2) Communicated Actions: participants were informed that all group members would be able to view the number of trials each participant actually contributed to the public pot in the Execution phase. They were later provided with this information in the online chat.
- 3) Baseline: no social incentives were provided in this condition. Participants received information about the total amount of money in the public pot, but no information about individual contributions (intended/actual) was given in the online chat.

Procedure

Each participant completed the Effort Task and participated in the online chat twice (in Round 1 and Round 2).

Round 1: Participants were first invited for an individual session to complete the Effort Task. Experimenter informed them about their group membership, the nature of the Effort Task, and about the specific information from the task that would be shared with other group members (intentions + overall group performance vs. actions + overall group performance vs. overall group performance only). Participants then had a chance to familiarize themselves with the hand-grip device by squeezing it 10 times. Subsequently, they had to indicate how many squeezes out of 40 they intended to devote to the public pot (Choice phase). Participants then proceeded to squeeze the hand grip device 40 times (Execution phase).

The Effort Task was followed by an online group chat, which took place within two weeks from the individual session ($M_{\text{hours}}=115.8$, $SD_{\text{hours}}=57.5$). In the chat, experimenter provided feedback information which depended on the condition participants were in. Participants were informed what sort of information would be made available to them in the chat prior to engaging in the Effort Task.

Round 2: Participants completed the Effort Task again, followed by another chatroom discussion.

Participants were debriefed and received the money they won in the experiment at a follow-up meeting. The total amount could range between £40 (approx. \$52) and £70 (approx. \$91), depending on participants' behavior in the task.

Data Analysis

Differences in pro-social contributions (i.e. number of trials devoted to the public pot) between Baseline, Communicated Intentions, and Communicated Actions conditions were examined using a mixed ANOVA design.

When analysing Intended Pro-social Contributions (i.e. number of trials declared for the public pot in the Choice phase), Condition (Communicated Intentions vs. Communicated

Actions vs. Baseline) was entered as a between-subjects factor, and Round (1 vs. 2) as a within-subjects factor.

When analysing Actual Pro-social Contributions (i.e. number of trials performed for the public pot in the Execution phase), an additional ‘between-subjects’ factor, Starting Pot (Individual vs. Public), was added, to account for the differences in the pot to which participants initially made their contributions.

Results

Intended Pro-social Contributions

Analysis of participants intended contributions to the group, as declared during the Choice phase, revealed a significant main effect of Round, $F(1,87)=41.16$, $p<.001$, $\eta^2_p=.32$, with participants pledging higher number of trials to the group in Round 2 ($M=26.4$, $SE=1.5$) than Round 1 ($M=17.1$, $SE=1.0$), as indicated in Figure 2. Effect of Condition was also found to be significant $F(2,87)=4.42$, $p=.015$, $\eta^2_p=.09$. Planned comparisons revealed that participants made higher contributions to the group in the Communicated Intentions condition ($M=26.2$, $SE=1.9$) than the Baseline ($M=20.1$, $SE=1.9$), $t(58)=-2.32$, $p=.024$. No significant difference in intended prosocial contributions between Baseline and Communicated Actions ($M=18.9$, $SE=1.9$) condition was found ($p=.694$).

Figure 2 here

Actual Pro-social Contributions

Analysis of participants’ actual contributions to the group, as performed during the Execution phase, revealed a significant main effect of Round, $F(1,84)=37.98$, $p<.001$, $\eta^2_p=.31$, with participants contributing higher number of trials to the group in Round 2

($M=26.1$, $SE=1.5$) than Round 1 ($M=16.7$, $SE=1.1$), as indicated in Figure 3. Effect of Condition was also found to be significant $F(2,84)=4.03$, $p=.021$, $\eta^2_p=.09$. Planned contrasts revealed that participants made higher contributions to the group in the Communicated Intentions condition ($M=25.6$, $SE=1.9$) than the Baseline ($M=20.0$, $SE=1.9$), $t(58)=-2.10$, $p=.040$. No significant difference in actual contributions between Baseline and Communicated Actions condition ($M=18.5$, $SE=1.9$) was observed ($p=.597$). Similarly, no significant effect of the Starting Pot was found ($p=.613$)

Figure 3 here

Discussion

While showing that social incentives can lead to increased cooperative effort in certain circumstances, our findings provide a rather nuanced view of the relationship between social incentives and cooperative effort, supporting the predictions made by the recent models of effort-based decision-making (Ludwiczak et al., 2020). These models suggest that incentives increase willingness to exert effort primarily when choosing between effortful actions and play a much lesser role during effort execution. In line with this notion, in our study social incentives led to increased cooperative effort only when they were linked to choices made prior to the exertion of effort. Social incentives linked to actual execution of effort did not have the same effect. In the remainder of this discussion, we focus on explaining this behavioural pattern in the context of the recent evidence and describing the implications of our findings with respect to the role of incentives in effortful cooperative tasks.

On the whole, in our study cooperation increased in Round 2, after participants had a chance to engage in an online discussion. This finding is in line with previous PGG studies, showing that an opportunity to communicate between group members rises cooperation (Brosig et al., 2003; Dawes et al., 1977; Sally, 1995). At the same time, in both rounds,

cooperation was found to be higher when participants' intentions were communicated to others (i.e., in the Communicated Intentions condition). In such circumstances, people declared higher willingness to exert cooperative effort for the common good in the Choice phase, and actually performed more trials that benefited the group compared to baseline in the Execution phase. No such increase in cooperative contributions was seen in groups that received information about actions (i.e., in the Communicated Actions condition), despite social incentives being present.

We propose that increase in cooperation observed in the Communicated Intentions condition in our study was due to participants being encouraged to think about the social incentives when **choosing** how to distribute their effort, so precisely when incentives matter the most in the effort-based decision-making process (Ludwiczak et al., 2020). From the onset, participants in the Communicated Intentions condition knew that their choice would be communicated to other group members and that this provided social incentives in addition to financial rewards. These additional social incentives were incorporated into the cost/benefit analysis guiding participants' choice of contributions, which led to higher intentions to donate to the public pot in the Communicated Intentions condition. In contrast, in the Communicated Actions condition participants did not have to take social incentives into account until the Execution stage. At this stage, however, these incentives had less of an effect, due to effort being the main consideration (Brehm & Self, 1989). Such pattern of findings suggests that social incentives can be used to change the allocation of effort towards more cooperative actions. The important caveat is that for social incentives to increase cooperative effort, they need to be made salient and relevant at the right moment, namely when people decide how much effort to commit to a common good.

In broader terms, our findings highlight the need to go beyond the traditional assumption that effort exerted in a task is proportional to the incentives at stake (e.g. that we try harder when rewards are higher). Such assumption implies that if we want to encourage

greater effort exertion, we should provide stronger incentives. But, previous studies on the impact of rewards on performance indicate that this approach produces mixed results, at best (Bonner et al., 2000; Bonner & Sprinkle, 2002). We believe that our research offers a simple way to understand the relationship between effort and incentives, providing a framework for predicting when incentives could be expected to increase effort. In a previous study, which involved exerting mental and physical effort for monetary incentives (Ludwiczak, et al. 2020), we have demonstrated that financial incentives do increase the willingness to exert effort, but only when choosing between effortful options, not when executing effort. In this study we've extended these findings to social incentives and cooperative effort. Taken together, our results suggest that incentives are important for deciding if an action is worth performing, but they do not necessarily serve to energize that action. In the cooperative effort context, incentives should primarily be used to encourage the choice of an effortful action that serves a common good; in certain circumstances this might act as a commitment device, increasing the effort that is exerted, but this is by no means guaranteed. We believe that acknowledging this is the first step to designing more effective interventions aimed at encouraging people and organizations to put in more effort for a common good.

Conclusions

Whereas most non-monetary real-life interventions aimed at increasing effort in group settings typically focus on performance monitoring (evaluating the outcomes of effortful actions), our findings suggest that 'monitoring of intentions' (or rather publicly announcing the choice to act cooperatively) could be considered as an alternative, if not a more effective, tool. Knowledge that cooperative effort intentions will be made public is likely to lead to increased willingness to exert cooperative effort. Importantly, our findings suggest that this is not because of the mere presence of potential social incentives – in this study social incentives could also be obtained when cooperative actions were communicated, and yet no increase in cooperation was observed in that condition. Instead, we propose that increased

willingness to exert cooperative effort was a product of social incentives being processed as a choice was being made, before actual effort was exerted. According to the effort-based decision-making models, all incentives play a more important role when choosing between effortful actions than when executing them. Our study presents evidence that this insight extends to social incentives, and so it is worth incorporating when designing interventions aimed at increasing effort people put in for a common good.

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FIGURES

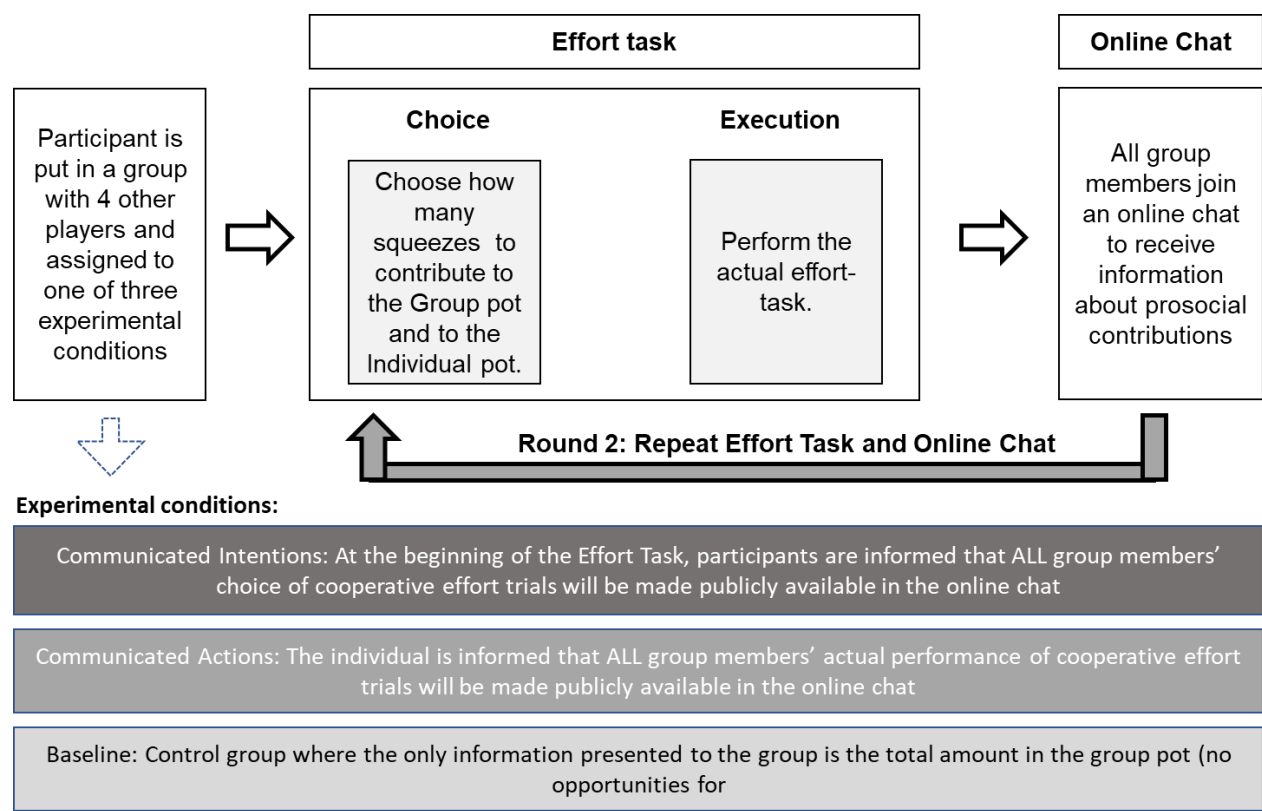


Fig. 1 Stages of the modified PGG task

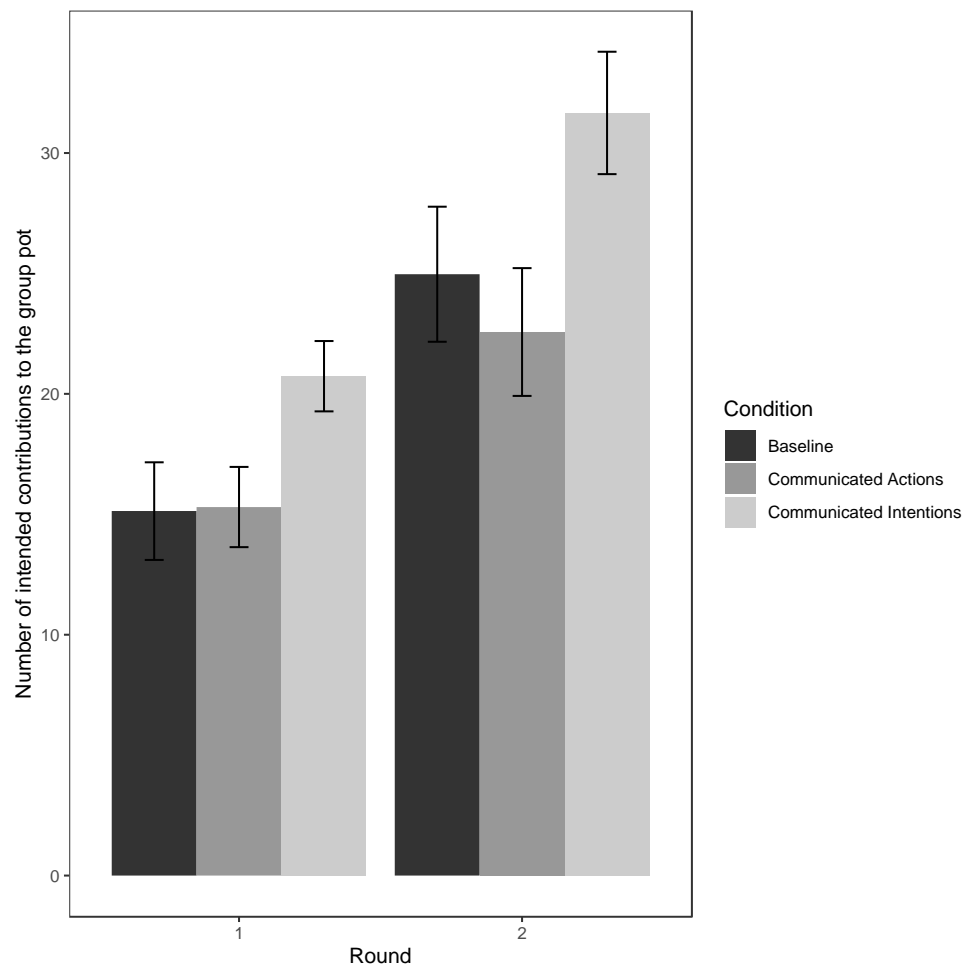


Fig. 2 Number of intended contributions to the public pot per Round and Condition (error bars represent SE)

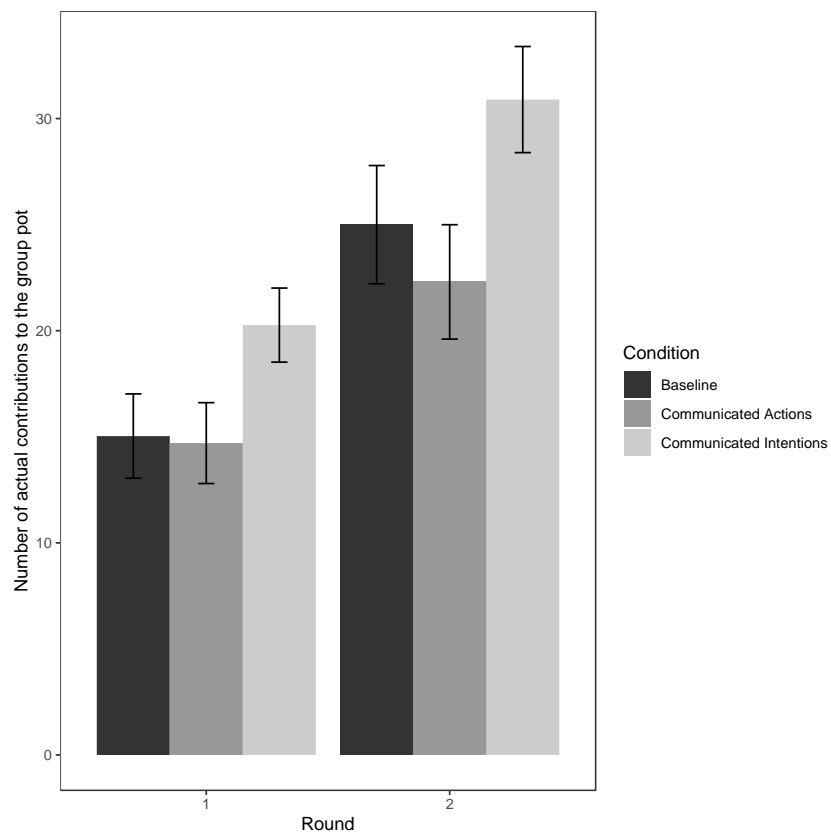


Fig. 3 Number of actual contributions to the public pot per Round and Condition (error bars represent SE)

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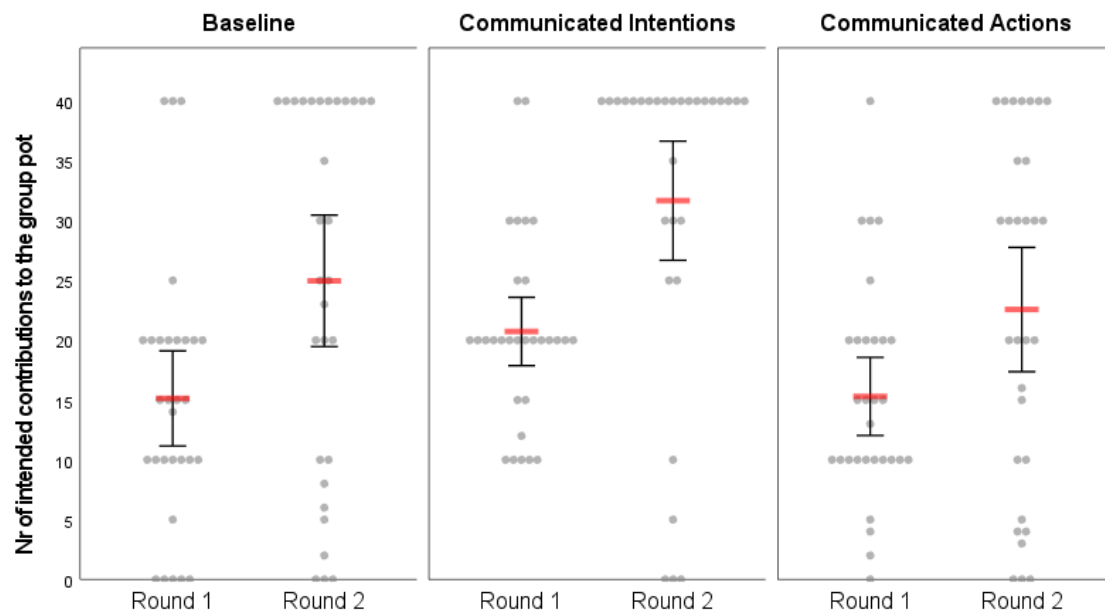
ELECTRONIC SUPPLEMENTARY MATERIALS

Figure 1. Number of intended pro-social contributions from individual participants in the Baseline, Communicated Intentions, and Communicated Actions condition in Rounds 1 and 2. Red lines represent mean intended pro-social contributions in each round (error bars represent SE).

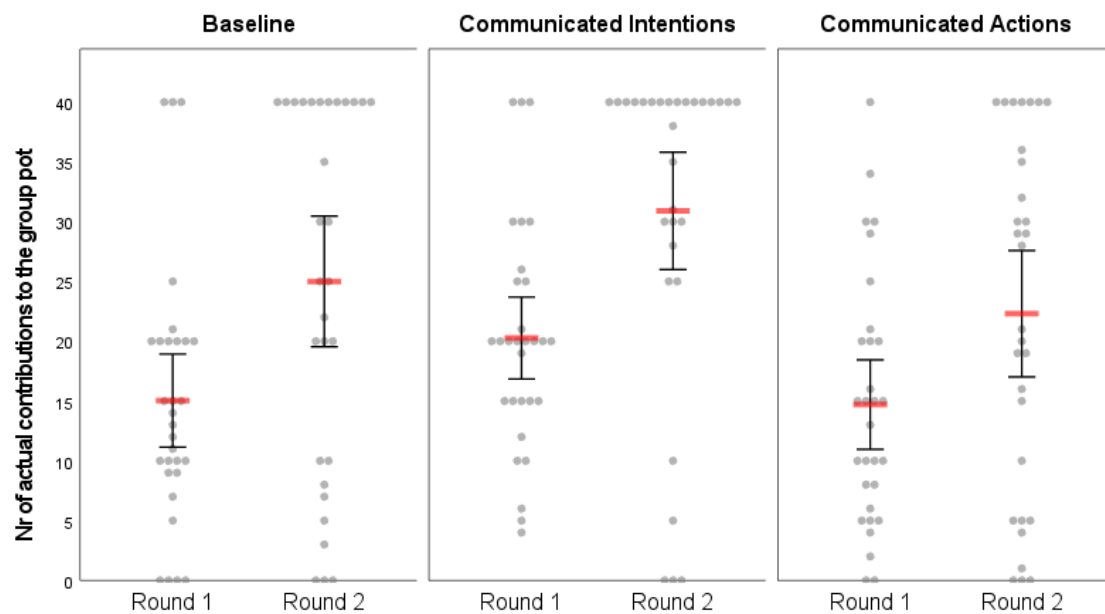


Figure 2. Number of actual pro-social contributions from individual participants in the Baseline, Communicated Intentions, and Communicated Actions condition in Rounds 1 and 2. Red lines represent mean intended pro-social contributions in each round (error bars represent SE).