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 rewards (e.g. reputation building) 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 financial and social rewards 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 in exchange for social and financial rewards. Crucial manipulation involved explicitly separating the choices that people made from the cooperative actions they exerted. Our findings suggest, in line with effort-based decision-making models, that social incentives have a stronger effect on cooperative effort when they are made salient during choice than during execution. 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

Need to maintain social reputation – serves evolutionary purpose (Tamir and Hughes 2018) People are highly attuned to social stimuli, and highly prepared to perceive them (take refs from Tamir and Hughes 2018, p.704). Receiving social approval, even in a minimalistic form of a number on a computer screen, can elicit reward activity (take refs from Tamir and Hughes, p. 705).”Though the goals of social connection can seem abstract, simple proxies for social connection – the cues that might arise en route to that goal – can be sufficient for driving reward activity”. In our task the reward was an opportunity for positive-self presentation. “Even when people are precluded from experiencing the usual consequences of informing, they retain their long-standing association of informing with its positive consequences” treating information sharing opportunities as rewarding in itself (as the building blocks for social connectedness). “Both prosocial outcomes and prosocial behaviors reliably elicit reward activity (Braams, Peters, Peper, Gürogˇlu, & Crone, 2014; Harbaugh et al., 2007; Mobbs et al., 2009; Morelli, Sacchet, & Zaki, 2015; Tricomi et al., 2010; Varnum, Shi, Chen, Qiu, & Han, 2014; Zaki & Mitchell, 2011)”. “Moreover, prosociality serves ultimate social goals (Hare, 2017) by facilitating social connection and improving one’s reputation (Axelrod & Hamilton, 1981; Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007; West et al., 2007). Reputation for reciprocity engages the brain reward center (Phan et al., 2010.

Exchanging socially relevant information (e.g. gossiping, self-disclosure), cooperation, and reputation building have all been found to activate the reward centres of the brain (e.g. vSTR and OFC – from Phan 2010) (REF) and produce behaviours that suggest these activities can be rewarding (e.g. forgoing money to get an opportunity for self-disclosure). Available evidence suggests that on opportunity to exchange social information should be seen as something that increases the value of a given option in a decision-making process.

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 rewards and/or performance monitoring (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 cooperation, 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 are there? 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). Prior work shows that people will increase the amount of effort they exert simply 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). This phenomenon typically occurs when individuals believe that they are being (or could be) evaluated (Harkins & Jackson, 1985; Innes & Young, 1975; Szymanski et al., 2000; Williams et al., 1981), which leads to improved performance when personal outputs are publicly communicated (Dobrescu et al., 2019; Ličen et al., 2019; Stefan et al., 2020). In line with these findings, social incentives have been shown to increase cooperation in social dilemma games, most notably Public Goods Games (PGG) (Andersson et al., 2020; Grimalda et al., 2016; Wu et al., 2020; Wu et al., 2016). 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.

Existing literature suggests that availability of social comparison information should have a motivating effect on performance. Recent studies exploring effort-based decision making indicate, however, that this might not always be the case when cooperative effort is required. 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), showed recently that high monetary rewards have a strong effect on the willingness to choose effortful options, but do not affect the amount of effort that is exerted during a task. In Ludwiczak et al. (2020) study, participants demonstrated strong preference for high reward tasks, regardless of the amount of effort associated with them. Yet, the level of reward 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, rewards 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 to the choices that people make about cooperative effort (e.g. publicly announcing the intentions to cooperate) should be more effective at increasing effortful contributions than linking the incentives to actual effortful actions (e.g. publicly announcing the effort exerted for a common good). In other words, when cooperative effort is required, intentions should speak louder than actions.

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 intentions, rather than actions, were available for public evaluation. This was achieved by investigating the role of social incentives during a cooperative task inspired by the PGG paradigm, in which effort contributions to a common good were required.

In the standard version of 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 (squeezing a handgrip device) instead of tokens. Depending on participants' choices, this effort could lead to individual or group gain. Participants played the game twice, to allow for social comparisons via sharing of information about the choices or actions of other group members. Given that there is good reason to make a distinction between choice and execution of effort, we investigated whether there were differences in how the social incentives affected the effort people intended to contribute to a common good (i.e. the choices that people made about effort) and how much effort the actually contributed (i.e. the execution of effort).

Our experimental set up provided an opportunity to test the following hypotheses: if social rewards play an important role when choosing to exert cooperative effort, but not when actually executing effort, communicating intentions would lead to higher intended contributions compared to baseline, whereas communicating actions would have little effect on actual effort contributions. Otherwise, if social rewards affect intentions and actions in the same way, we expected to see increased cooperative contributions when opportunity for social comparisons was present, regardless of the type of information presented to group members.

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_{age}=24.5, SD_{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.

Sample size was based on previous studies exploring financial contributions in PGG in which the 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 (see Figure 1). 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.

Figure 1 here

Effort Task

In the Effort Task participants were told they would have to perform 40 grip squeezes (trials), each associated with a 40 pence (approx. 50 cents) reward. They were also informed that there was an option for them to keep the proceeds from each trial, but that they could

also choose to contribute some or all trials to the group pot. The trials in the group pot 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) grip squeezes they intended to contribute to the group pot (Choice phase). Once participants made their choice, the grip squeezes (Execution phase) begun.

Participants either started by executing the 'individual pot' or 'group pot' trials, which was counterbalanced. After each trial participants were informed that they could continue contributing to their starting pot by pressing 'p' button on the keyboard, or switch to the other pot by pressing the 's' button. Once participants made a 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 trials 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 their individual effort sessions, they were invited to take part in an online chat. Participants accessed the chat 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 the performance of their group (i.e. how much money in total was in their group pot). Some participants also received information about the contributions of individual members of their group. The specific information provided depended on the condition the 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 (pledged) to the public pot.

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.

3) Baseline: no information allowing for social comparisons was provided in this condition. Participants received information about the total amount of money in the group pot, but no information about individual contributions (intended/actual)

Procedure

Round 1: Each participant was first invited for an individual session to complete the Effort Task. Experimenter informed the participant about their group membership, explained the Effort Task and demonstrated how to use the hand grip device. Participants had a chance to familiarize themselves with the device by squeezing it 10 times. Subsequently, they had to indicate how many trials out of 40 they wanted to devote to the group pot. Depending on the condition participants were in, they were either told that a) this decision would be communicated to other group members (Communicated Intentions condition), or b) this decision would remain private (Communicated Actions and Baseline conditions). Participants then proceeded to squeeze the hand grip device 40 times.

The Effort Task was followed by an online group chat, which took place within two weeks from the individual session (M_{hours}=115.8, SD_{hours}=57.5). In the chat, experimenter provided feedback information which depended on the condition participants were in. Experimenter encouraged participants to provide at least one comment each to discuss this feedback.

Round 2: Participants completed the Effort Task again, as in Round 1, 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

Difference in pro-social contributions (i.e. number of trials intended and devoted to the group pot) between Baseline, Communicated Intentions, and Communicated Actions conditions was examined using a mixed ANOVA in the statistical package SPSS (CITATION), When analysing Intended Contributions, 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 Contributions to the group, an additional 'between-subjects' factor, Starting Pot, was added, to account for the differences in the pot participants initially made their contributions to (Individual vs. Group).

Results

Intended 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$, 95% CI [23.3, 29.5]) than Round 1 ($M=17.1$, $SE=1.0$, 95% CI [15.1, 19.0]), 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 between Baseline and Communicated Actions condition was observed ($M=18.9$, $SE=1.9$), $p=.694$.

Figure 2 here

Actual Contributions

Mixed ANOVA revealed a significant main effect of Round on the Actual Contributions (i.e. number of trials participants actually executed for the group benefit),

$F(1,84)=37.98$, $p<.001$, $\eta^2_p=.31$with participants contributing higher number of trials to the group in Round 2 (M=26.1, SE=1.5, 95% CI [23.1, 29.1]) than Round 1 (M=16.7, SE=1.1, 95% CI [14.5, 18.8]), 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 from baseline was observed in the Communicated Actions condition (M=18.5, SE=1.86; $p=.597$)

Similarly, no significant effect of the Starting Pot was found ($p=.613$)

Figure 3 here

Discussion

While showing that social incentives can be associated with increased cooperative effort in certain circumstances, our findings provide a rather nuanced view of the relationship between these incentives and cooperative effort, supporting the predictions made by the recent models of effort-based decision-making (Ludwiczak et al., 2020). In this exploratory study, providing opportunities for social comparisons led to increased cooperation only when the intentions of group members were publicly available. When information about actions was presented, cooperative effort did not increase, despite opportunities for social comparisons being present. In the remainder of this discussion, we focus on explaining this behavioural pattern in the context of the recent evidence relating to the role of rewards in effort-based decision making. We then end with a consideration of the implications of our findings with respect to the role social comparison information in cooperation tasks.

On the whole, in our study cooperation increased in Round 2, after participants had a chance to engage in an online discussion. This 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, cooperation was found to be higher among participants that knew their intentions would be communicated to others (Communicated Intentions condition). When intentions were to be made public, people declared higher willingness to exert cooperative effort for the common good, and actually performed more trials that benefited the group. No such increase in cooperative contributions was seen in groups that received information about actions (Communicated Actions condition), despite opportunities for social comparisons 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 rewards when **choosing** how to distribute their effort, so precisely when rewards matter the most (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 an opportunity to reap social rewards in addition to financial rewards. These additional social incentives seem to have had a strong impact on the cost/benefit analysis guiding participants' choice of contributions, which led to higher intentions to donate to the group pot in the Communicated Intentions condition. In contrast, in the Communicated Actions condition participants did not have to take social rewards into account until the Execution stage. At this stage, however, these rewards had less of an effect, due to effort being the main consideration (Brehm & Self, 1989). Such pattern of findings suggests that for social rewards to increase cooperative effort, they need to be communicated and emphasised at the right moment, namely when people decide how much effort to commit to a common good.

Conclusions

The aim of this project was to explore the direction of change and the magnitude of change in social cooperative behaviours in response to feedback which enables social comparisons. Our results indicate that social rewards can be used to increase effort exerted

for a public good, providing that these rewards are emphasised when choosing how much effort to contribute and that they are directly linked to the choice to act cooperatively. More specifically, an intervention aimed at increasing cooperative effort should link social rewards with choices that people make, rather than actions they exert.

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

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TABLES

Outcome variable	Fixed factors			
	Condition	**Round**	**Condition:Round**	**Overall model significance***
Cooperative Choice	$\chi2(4)=13.14$ p=.01	$\chi2(3)=36.02$, p<.001	p=.09	$\chi2(5)=43.84$, p<.001
Cooperative Execution	$\chi2(2)=6.99$, p=.03	$\chi2(1)=27.69$, p<.001	NA	$\chi2(3)=34.43$, p<.001

*in comparison to a baseline model with just an intercept

Note. NA = not applicable

Table 1. Results of the Likelihood Ratio Test of fixed effects for models of cooperative effort choice and cooperative effort execution

	Null Model	Best model
Fixed effects	*b*[95% CI]	*b*[95% CI]
Intercept	.71 [.18, 1.24]	-.58 [-1.63, .47]
$Condition_{(Baseline)}$	-	-.24 [-1.74, 1.27]
$Condition_{(Communicated\ Intentions)}$	-	.86 [-.62, 2.34]
$Round_{(2)}$	-	1.25 [.03, 2.47]
$Condition_{(Baseline)}$:$Round_{(2)}$	-	1.14 [-.64, 2.91]
$Condition_{(Communicated\ Intentions)}$:$Round_{(2)}$	-	2.04 [.22, 3.87]
Random effects	VC	
Participant Nr $_{(Intercept)}$	2.30	3.04
Observations	7.83	5.22
Other model characteristics		
$R^2_{(m)}$	0	.15
$R^2_{(c)}$	.72	.72
AIC	2425.2	2316

Note. CI = Confidence Intervals (Wald method), VC = Variance Components

$N_{participants}$=90, $N_{observations}$=180

Table 2. Comparison of model parameters, R^2 and Akaike Information Criterion (AIC) between the null model and the most parsimonious model describing Cooperative Choice data

	Null Model	Best model
Fixed effects	*b*[95% CI]	*b*[95% CI]
Intercept	.62 [.09, 1.15]	-1.12 [-2.07, -.17]
$Condition_{(Baseline)}$	-	.49 [-.77, 1.75]
$Condition_{(Communicated\ Intentions)}$	-	1.69 [.42, 2.96]
$Round_{(2)}$	-	2.12 [1.36, 2.88]
Random effects	VC	
Participant Nr $_{(Intercept)}$	2.49	3.02
Observations	7.62	5.44
Other model characteristics		
$R^2_{(m)}$	0	.12
$R^2_{(c)}$	.72	.72
AIC	1278.8	1250.3

Note. CI = Confidence Intervals (Wald method), VC = Variance Components

Table 3. Comparison of model parameters, R^2 and Akaike Information Criterion (AIC) between the null model and the most parsimonious model describing Cooperative Execution data

FIGURES

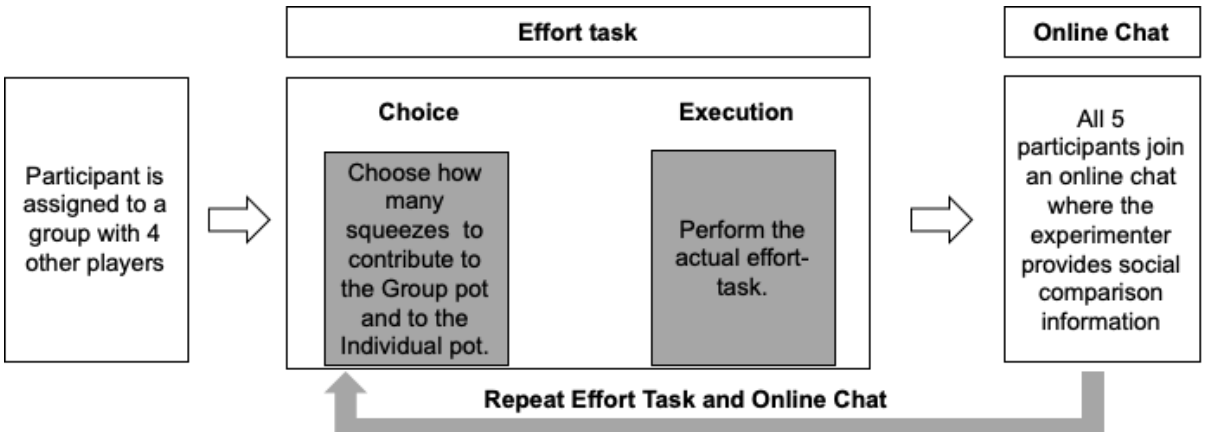

Fig. 1 Stages of the modified PGG task

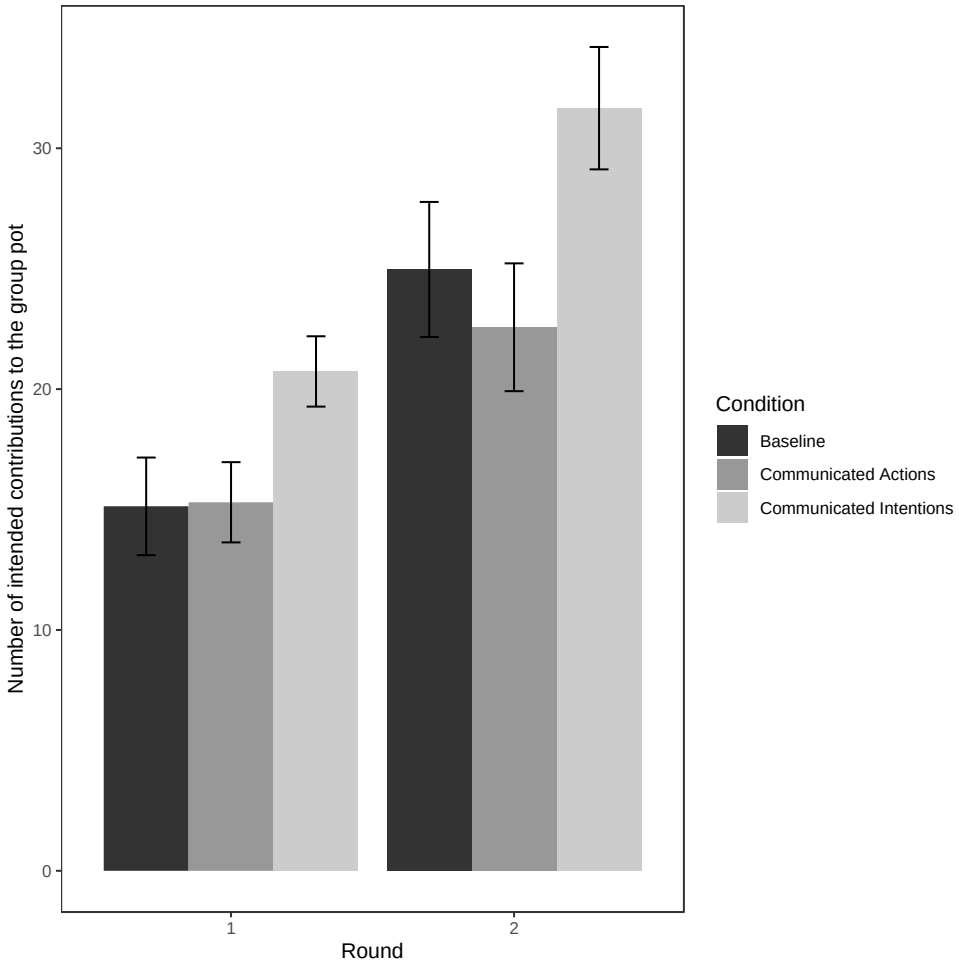

Fig. 2 Number of intended contributions to the group pot per Round and Condition (Error bars represent SE)

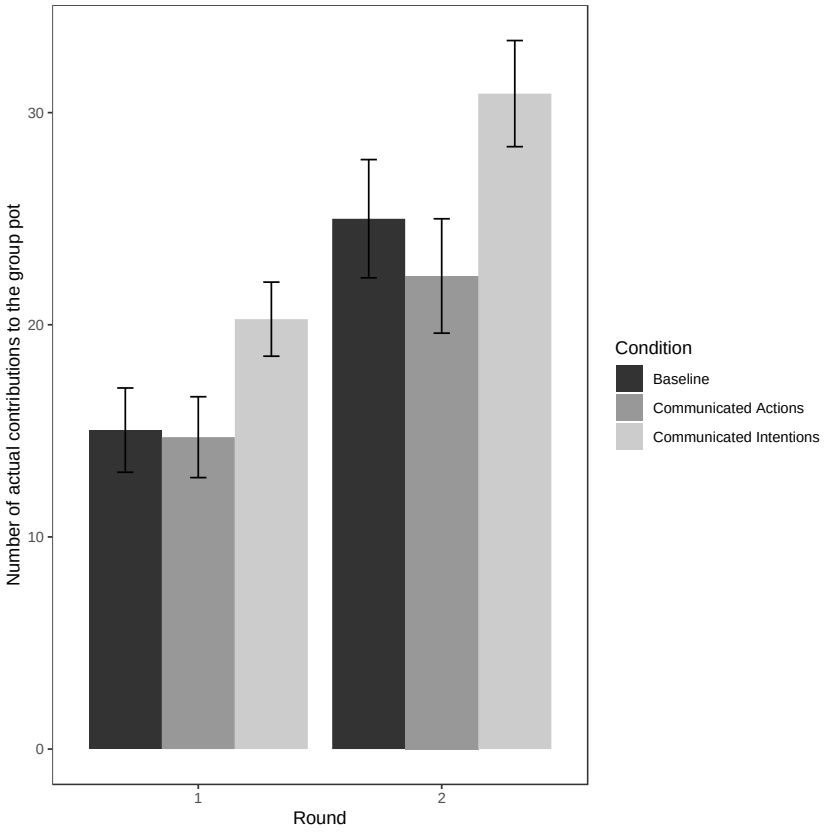

Fig. 3 Number of actual contributions to the group pot per Round and Condition (Error bars represent SE)