Third-Party Cooperation: How Reducing Material Involvement Enhances Contributions to the Public Good

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Abstract

Decisions to cooperate are often delegated to a third party. We examined whether cooperation differs when decisions are made for a third party compared with ourselves and specified which motives are important for third-party cooperation. Participants played multiple rounds of a public goods game (PGG). In Study 1, we varied personal involvement from high to low; participants played for themselves (*Self*), for themselves and a third party (*Shared*), and solely for a third party (*Third Party*). Participants contributed most when personal involvement was lowest (i.e., *Third Party*) and least when personal involvement was high (i.e., *Self*). Study 2 explored if social motives underlie third-party cooperation by comparing cooperation with *social* (human) and *non-social* (computer) group members. Reducing personal involvement in the PGG (i.e., *Third Party*) increased cooperation in social contexts compared with non-social contexts, indicating enhanced collective interest. Increased cooperation for a third party may result from taking the other's perspective, thereby increasing social norm preferences.

Keywords

social decision making, cooperation, third party, self–other, perspective-taking

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Introduction

In 1997, representatives of multiple nations gathered together in Kyoto to negotiate a plan to combat global warming by reducing greenhouse gas emissions (i.e., the so-called public good). The Kyoto protocol produced by this meeting essentially enlisted all citizens of the participating countries to cooperate in reducing their CO_2 levels, in turn incurring financial costs to those citizens. However, at the same time, countries that did not sign this agreement could still enjoy the benefits of reduced global emissions without having to cooperate, which neatly outlines the risk of cooperation, namely that of being exposed to free riders. This is just one of many examples that illustrates cooperative behavior on a global scale and demonstrates that these decisions generally involve evaluating different and conflicting motives, typically our self-interest versus the collective interest.

Interestingly, many of these types of decisions are not made by individuals themselves but instead are delegated to an authority that decides on the group's behalf whether they should or should not cooperate. However, despite the importance of these decisions for society and the often considerable impact that they have on each individual, the majority of research on cooperation has typically studied how individuals make cooperative decisions for themselves.

Therefore, we are interested, first, in potential differences in cooperative decisions when the decision maker is making choices for a third party with no material self-involvement, that is, on behalf of another person, as compared with making choices directly for themselves in their own direct interest. Second, we will explore in which direction these differences lie, assuming they exist—are third-party decisions more pro-social or more for the interest of the beneficiary? Finally, we attempt to specify which motives are important for third-party decision making and how these might affect preferences to cooperate.

As illustrated in the example above, decisions to either cooperate or not can entail different levels of material interest for the decision maker, which we define here as the level of personal involvement. This can be full involvement, when deciding for oneself whether to cooperate to a public good

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and personally reaping the benefits (which we refer to as the *Self*). Examples from real-life public goods and a great deal of research on cooperation have demonstrated that people do not simply maximize their own material gain (Camerer, 2003) but rather care about others' payoffs. Studies have shown that people frequently cooperate (Fehr & Gächter, 2000; Fischbacher, Gächter, & Fehr, 2001) and behave fairly toward others in bargaining decisions (Rilling & Sanfey, 2011; Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003). These findings show that both the interest of others and social values (e.g., cooperation, fairness) are important in these types of social decisions.

A more moderate level of involvement is the example of representatives of nations deciding to participate in the Kyoto protocol. These situations entail joint involvement in the decision and the outcome of the public good, a situation that probably reflects many large-scale cooperative decisions. In other words, a decision to cooperate, where the decision maker shares the cost and benefits of the good, is referred to here as a *Shared* decision. There is evidence that people make different decisions in these joint situations as compared with deciding solely for themselves. For instance, in comparison with deciding for themselves, for decisions in which they had joint involvement, individuals chose less impulsively for delayed rewards on behalf of a group (Charlton et al., 2013) and were more risk averse for uncertain financial outcomes (i.e., monetary gambles). This was both for a partner and themselves (Charness & Jackson, 2009) and for a group that they were part of (Reynolds, Joseph, & Sherwood, 2009). This suggests that additionally being responsible for others' outcomes can change our choice preferences for cooperation.

Finally, there is the situation in which a person as an outsider decides solely on behalf of another person or group whether they should cooperate, while having no material involvement in the public good. One example is a judge deciding how a divorced couple should cooperate in a fair division of property. These decisions, entailing no direct material involvement in the part of the decision maker, are defined here as a *Third-Party* decision. A growing body of research on risk-taking and social decision making has highlighted differences between decisions for a third party and decisions for ourselves (i.e., first person). Studies have shown increased risk-taking for third-party decisions concerning uncertain financial outcomes (i.e., gambles; Agranov & Bisin, 2011; Chakravarty, Harrison, Haruvy, & Rutström, 2011) and uncertain outcomes for other people (Beisswanger, Stone, Hupp, & Allgaier, 2003), as well as for hypothetical outcomes (Leonhardt, Keller, & Pechmann, 2011). However, increased risk aversion on behalf of a third party has also been observed for monetary (Eriksen & Kvaloy, 2010; Reynolds et al., 2009) and medical decisions (Garcia-Retamero & Galesic, 2012).

Studies focusing on social preferences in decision making have also reported differences in behavior for third parties (Pronin, Olivola, & Kennedy, 2008; Trautmann & Vieider, 2012). For example, decisions made for other people showed a stronger preference for choice options with highly desirable but low feasible outcomes (e.g., a better restaurant that is further away) as opposed to options with less desirable but highly feasible outcomes (e.g., a close-by, lower quality restaurant; Lu, Xie, & Xu, 2013). A similar result has also been observed for intertemporal choice, with greater preferences for the later-larger rewards over sooner-smaller rewards for others than for oneself (Albrecht, Volz, Sutter, Laibson, & von Cramon, 2011; Kim, Schnall, & White, 2013; Ziegler & Tunney, 2012). These findings are interesting when considering cooperative choice, where people have to pay a cost now for the benefit later. Studies on cooperation have shown that the ability of people to focus on long-term benefits by overriding short-term self-interest induced higher levels of contributions (Rilling & Sanfey, 2011). Deciding for a third party might therefore make people better able to forego immediate self-interest and choose the optimal, long-term, outcome for the group, resulting in higher cooperation.

Furthermore, some research has indicated that choosing for third parties increases behavior in line with social norms (Civai, Corradi-Dell'Acqua, Gamer, & Rumiati, 2010; Corradi-Dell'Acqua, Civai, Rumiati, & Fink, 2013; Fehr & Fischbacher, 2004a, 2004b). For instance, bystanders in a social dilemma game were highly motivated to pay a cost to punish players who did not behave in line with the social norm (i.e., did not cooperate; Fehr & Fischbacher, 2004b). In bargaining decisions, third-party responses demonstrated an equal preference for fairness as compared with when the offer was directed toward the individual himself or herself (Civai et al., 2010; Corradi-Dell'Acqua et al., 2013). Interestingly, these latter studies showed a difference in the underlying neural processes, suggesting that the decision maker's role does indeed have some impact and may possess different motives. In particular, the strong negative affective response that occurs when receiving unfair offers for oneself was absent when receiving these offers on behalf of a third party (Civai et al., 2010), and activity in reward- and affect-related brain regions for third-party decisions was diminished relative to self choices (Albrecht et al., 2011; Corradi-Dell'Acqua et al., 2013).

Taken together, the research literature regarding third-party decision making has shown that choices for others can differ compared with choices made for the self and, additionally, has an impact on underlying brain processes. Specifically, the extent of the personal involvement of the decision maker appears to play an important role in how we value different choice outcomes and decisions, in terms of both preferences for risk as well as preferences for social outcomes.

Examining how personal involvement may influence cooperation can provide a better understanding of what processes may be important for third-party cooperation. The aim of this study therefore is twofold. The *first aim* is to assess if

cooperative decisions change as a function of whether the decision maker is materially involved in the outcome or not. The *second aim* is to identify motives relevant for third-party cooperation by examining whether peoples' willingness to cooperate on behalf of a third party is altered when varying the social context of the group (i.e., with whom the public good is shared).

To study third-party cooperation, we used the public goods game (PGG; Andreoni, 1988; Samuelson, 1954). This is an experimental task adopted from classical Game Theory, which models strategic behavior in social contexts via simple economic paradigms (von Neumann & Morgenstern, 1944). In the standard PGG (our *Self* condition), a group of players each receive a monetary endowment, and then, each has to decide, simultaneously and anonymously, how much, if any, of this amount they are willing to contribute to a public pot, keeping the remainder for themselves. The total pot is then multiplied by a reward factor (usually 1.6) and this "public good" is then redistributed equally across all players, irrespective of how much each player has contributed. In the condition in which the decision maker is jointly involved in the public good (*Shared*), the decision maker decides how much to contribute on behalf of a selected, anonymous player (their "partner") and shares both the initial endowment as well as the outcome of the public good with their partner. In the *Third-Party* condition, the decision maker also decides on behalf of a selected, anonymous player; however, in this case, the decision maker explicitly shares neither the cost nor the outcome of the public good. Thus, in this case, the decision maker has no material involvement in the public good, nor does the decision maker indirectly partake of the public good in case another person decides for them.

A player who seeks to maximize their own, or the third-party, profit should contribute less than the average, or even nothing at all ("free riding"). This behavior typically results in receiving the highest payoff and is, at least according to Game Theory, the optimal approach. Conversely, a cooperator accepts a higher personal cost for the benefit of the group, by contributing the average amount or higher, and this is often labeled as the "social" decision. Previous work described earlier has shown that people often behave cooperatively and prefer the interest of the group. However, in situations where these decisions are made on behalf of a third party it is unclear if, and how, social motives influence cooperation.

One behavioral model is that cooperative decisions for a third party are the same as for the first person, in line with some previous research (Civai et al., 2010; Stone, Yates, & Caruthers, 2002). Third-party decisions might be taken with a "self" perspective, that is, deciding for others as we would decide for ourselves. Alternatively, third-party decisions could show higher preferences for cooperation as compared with the self. By one account, these higher preferences for cooperation could result from a change in the individuals' perspective when choosing on behalf of another. Taking the perspective of another person, as one might when deciding for someone else, can lead to more benevolent choices (Tunney & Ziegler, 2015). This change might alter decision rules and enhance the valuation of social norms, that is, cooperating with the group. Alternatively, third-party cooperation may affect non-social preferences in the form of risk-taking. Because material involvement in this condition is low, players may be relatively more risk-seeking, which in the PGG usually translates to decisions to cooperate.

To examine these hypotheses, participants played multiple trials of the PGG, under various different conditions. In Study 1, we varied personal involvement in the PGG, within subjects: Participants played a block of trials for themselves with maximum personal involvement (*Self*), a block of trials for both themselves and a third party containing joint involvement (*Shared*), and a block of trials solely for a third party containing no personal involvement in the public good (*Third Party*). In Study 2, we aimed to identify motives underlying third-party cooperation by examining peoples' willingness to cooperate when varying the social context of the group (i.e., with whom the public good is shared). Participants randomly played the PGG in a *social* context (e.g., sharing the public good with human group players) and in a *non-social* context (e.g., with purported computer players), again across a block of trials playing for themselves (*Self*) and a block playing solely on behalf of a third party with no personal involvement in the public good (*Third Party*). Cooperative decisions involve a social element, as they influence payoffs of other people. In addition, deciding on behalf of a third party automatically induces a social situation. By varying the group context and comparing cooperation in a social versus non-social group context, we can test if third-party cooperation is driven more by enhanced social preferences (e.g., social norms to cooperate) or rather other non-social preferences.

Study 1

Materials and Method

Participants. Sixty volunteers participated in the study. All gave written informed consent and received research credits for participation. Participants could earn a monetary bonus (between €0.00 and €7.50) depending on their performance in a selection of rounds that they played on their own behalf, as well as rounds that another player played on their behalf. Experimental exclusion criteria were self-reported history of psychiatric disorders, regular use of marijuana, or use of psychotropic drugs. One participant (male) was excluded because of reported daily drug use. Data are therefore reported from 59 participants (male = 17, *M* age = 22.67, *SD* = 2.82). The study was approved by the local ethics committee.

Design. We employed a modified version of the PGG (Fehr & Gächter, 2000) to study cooperative decisions for different

beneficiaries. Three PGG conditions were used: (a) participants played a PGG on behalf of themselves, similar to a standard PGG, where they received an equal share of the total earnings from the public pot and thus have full material involvement (*Self*); (b) participants played the task on behalf of both themselves and a randomly selected, anonymous person ("partner"), where the public pot share was split between the participant and their partner, thus both were jointly involved (*Shared*); and (c) participants played the task solely on behalf of a randomly selected, anonymous person, in which case, this other person would receive the total earnings from the pot, and the participant would not take part in the division of the public pot and therefore was not materially involved (*Third Party*). Participants were told that when they would play the *Shared* or *Third-Party* condition, someone else participating in the experiment, in turn, would be playing for him or her. However, this person would never be included as one of the group players in rounds the participant was playing for *Shared* or *Third-Party* condition. Thus, the participant's decisions to contribute to the public pot could not additionally influence his or her own earnings, as the person deciding for the participant would never take part in the same group composition.

At the beginning of the task, participants were shown the beneficiary for whom they would play. Importantly, they did not know about the other conditions in advance, to avoid inducing the use of a fixed strategy. Participants played all three conditions. In total, participants played 60 experimental trials, 20 trials per condition (*Self*, *Shared*, and *Third Party*). Order of conditions was counterbalanced across participants, resulting in a total of six possible orders, distributed equally across participants. A total of 19 participants started in the *Self* condition, 20 participants started in *Shared* condition, and 20 participants in the *Third-Party* condition. One participant performed nine additional experimental trials in the *Self* condition (i.e., 29 trials in the first block, the *Self* condition) due to technical problems.

Procedure. After viewing instructions of the modified PGG, participants first completed a questionnaire to ensure that they understood the task completely. At the beginning of the experiment, participants were told that their bonus would be paid out at the end of the entire study (i.e., when all participants had played the game). Therefore, no feedback was given about the contributions of the other players in the group, the total income of the pot, or the outcome of each round. Participants were told that they would play three blocks of the game, with an extra instruction given before the start of a new block. Because participants were not informed in advance that they would also be playing for different beneficiaries, all participants were told that in each block, one round would be selected randomly, and the total earned tokens in those rounds (i.e., tokens kept plus the equal share of the pot) would be converted to euros and paid out at the end of the study. The conversion rate of a token was not announced in advance.

At the start of the experiment, participants saw the beneficiary they would be playing for. In the *Self* condition, a silhouette with the text "You" was highlighted. For both the *Shared* and *Third-Party* condition, one player with a random ID number was selected from a pool of 24 players at the start of the block and was highlighted as either the partner or third party.

At the start of each trial (i.e., a PGG round), participants saw a fixation cross (1,000 ms), followed by a screen where a yellow box selected three other players randomly from the pool of the remaining 23 players. The selected players were the group players for that round with whom the participant would share the public pot. After the selection of the group players, a contribution screen was presented, and participants had 8 s to indicate how much of the endowment, if any, they wanted to contribute to the public pot. The endowment amount per round was either 10 or 20 tokens, randomly determined. If the endowment was 10 tokens, participants could indicate an amount between zero and 10 (in steps of one) to contribute to the pot by selecting the desired amount via moving the contribution box, which started at a random position on each trial. If they received 20 tokens as an endowment, they could choose any amount between zero and 20 (in steps of two; Figure 1). After confirming their choice, a screen was displayed with their contribution, and a new round began. If participants did not confirm their choice in the provided time, then the round ended with a warning message reminding participants to respond within 8 s. For each new round, three new group players were randomly selected from the pool of 23 players.

At the beginning of each new block of the PGG, participants received extra instructions introducing the new beneficiary of that PGG, including the consequences to their earnings. Each block began with four examples of possible scenarios, followed by two practice rounds, analogous to the instruction of the first block they played.

The task was presented in Psychophysics Toolbox (Brainard, 1997; Pelli, 1997) running on MATLAB ® R2011b (The MathWorks). After completing three blocks of the PGG, participants filled out an online questionnaire (Qualtrics) about the task,[1] including questions about their beliefs and demographics. All participants had to return at a later stage to receive their payments.

Analysis. To examine the level of cooperation by beneficiary, we assessed the proportion of tokens contributed on each trial as the dependent measure (as a continuous variable from 0 to 1). We included four within-subject factors: "Beneficiary" (three levels: *Self, Shared, Third Party*), "Endowment" (two levels: 10 or 20 tokens), the start position of the contribution box "Startposition" (11 levels: positions from 0 to 10), and "Block" (three levels: Block1, Block2, Block3). Reaction times were measured in seconds (continuous variable: 0 to 8 s). Responses were defined as outliers and thereby excluded from analysis, if (a) the number of button presses used in the choice phase was 3 or more standard deviations

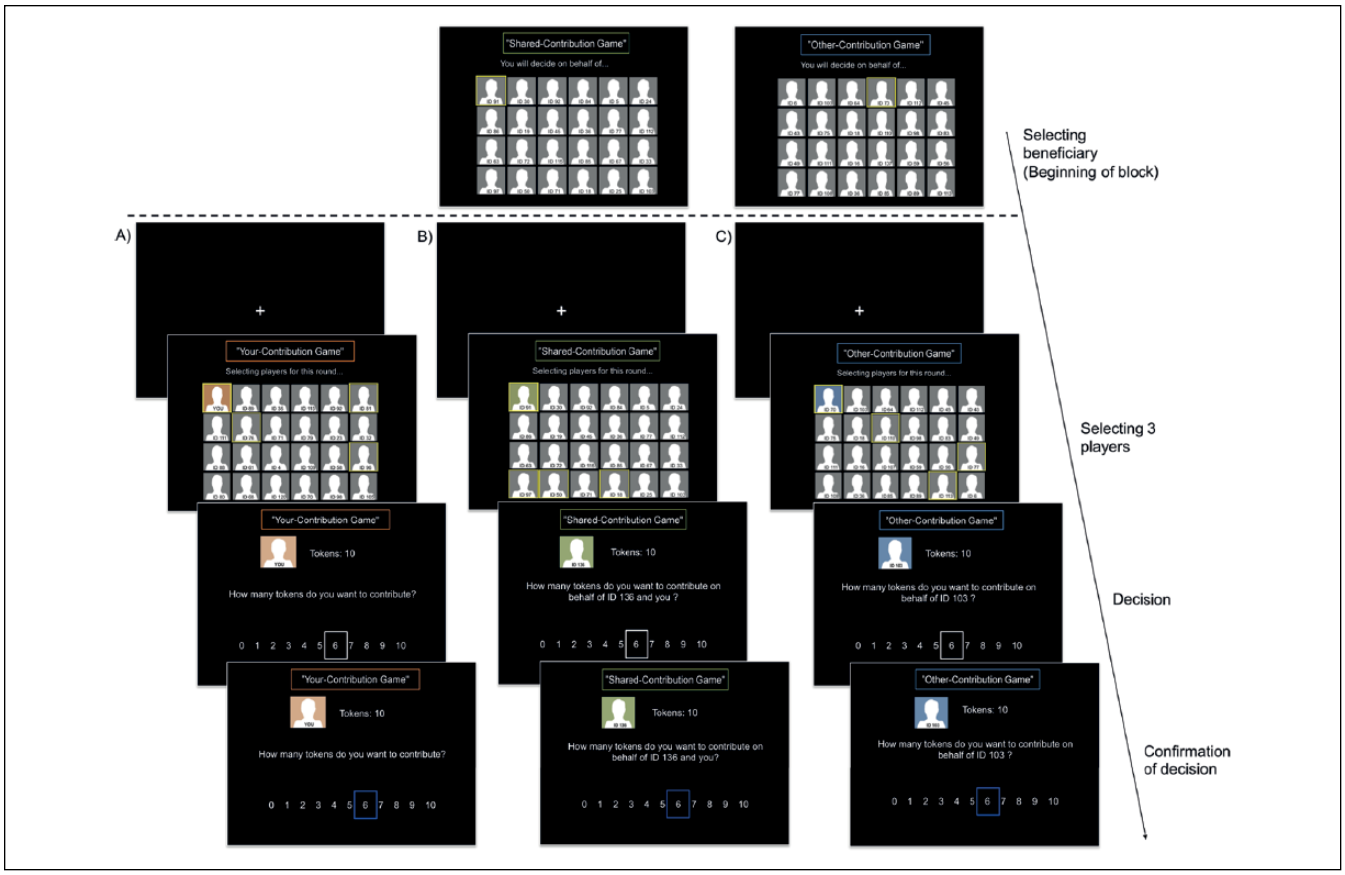

Figure 1. Modified PGG.

Note. Each round begins by randomly selecting three group players with whom the beneficiary will share the public good. Next, participants will see their endowment (tokens) and are asked to indicate how many tokens they would be willing to contribute. After confirmation of the selected amount, the game round ends, after which a new round starts. No feedback is given. (A) The *Self* PGG. An example of a round played for the *Self*. (B) The *Shared* PGG. At the beginning of the block, the partner for whom the decision maker will choose to cooperate is selected and stays the same over the entire block. (C) The *Third-Party* PGG. Participants choose on behalf of another person, who is also selected at the beginning of the block. PGG = Public Goods Game.

from the median using Hampel identifier approach (i.e., 14 button presses or more) resulting in excluding 14 trials in total, and (b) responses had reaction times smaller than 300 ms, which excluded three trials in total. Rejected trials thus comprised 0.5% of all trials across the entire participant pool (i.e., 17 of the total 3,487 trials). The reaction time data of two participants were excluded from the reaction time analysis because of the program erring in recording the timing of each event during the experiment for these participants, resulting in saving invalid reaction times that fell outside the possible 8-s time window. Their behavioral data were included in the behavioral analysis. Response outliers of these two participants were only based on the number of button presses.

All behavioral statistics were computed using R statistical package (R Core Team, v. 3.1.2, 2014). A linear mixed-effect model was performed using the *mixed* function of the package for Analysis of Factorial Experiments (afex, v. 0.13-145; Singmann, Bolker, & Westfall, 2015), running on lme4 (v.1.1-7; Bates, Maechler, Bolker, & Walker, 2014). The model contained the four within-subject factors to predict participant's willingness to cooperate. To account for repeated measures, a random intercept for participants was included (e.g., Baayen, Davidson, & Bates, 2008). Random slopes for "Beneficiary" and "Endowment" varying over participant with correlated intercept were included. For reaction times, uncorrelated random slopes varying over participant were included to allow model convergence. Significance levels were calculated with the Kenward-Roger (KR) correction implemented in the *mixed* function (Singmann et al., 2015). All descriptives and pairwise comparisons (i.e., least-squares means, 95% confidence intervals [CI]) were performed using *lsmeans* function from the lsmeans package (v.2.17; Lenth & Herve, 2015).

Results

Cooperation by levels of personal involvement: Self, Shared, *and* Third Party. Participants on average transferred 49.7% of their endowment to the public pot. Of most interest to this

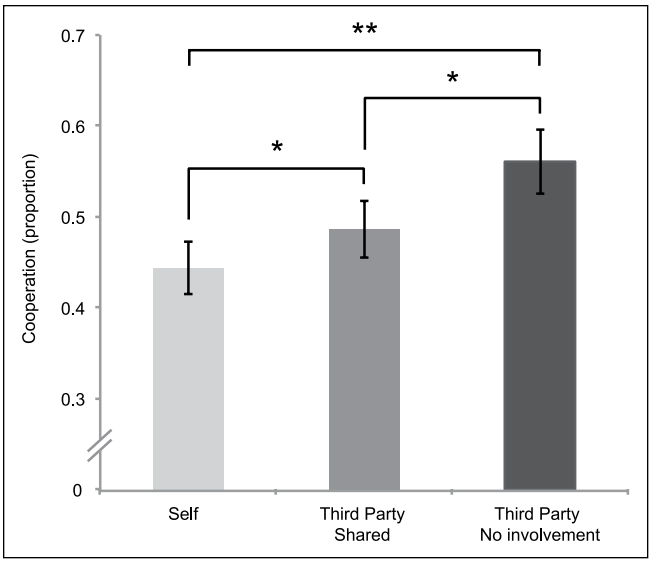

Figure 2. Cooperation level across conditions of personal involvement.
Note. Error bars are 1 ± standard error of the mean.
*$p < .05$. **$p < .01$.

study was whether level of personal involvement in the outcome of the public pot (*Self, Shared*, and *Third Party*) influences how much individuals would be willing to cooperate with other players, defined by their contribution amounts in each condition. Indeed, personal involvement significantly affected cooperation levels, $F(2, 53.96) = 5.35$, $p = .008$. That is, the amount of cooperation was greater when there was no personal involvement in the outcome (i.e., *Third Party;* $M_{\text{Third Party}} = 0.561$, CI = [0.489, 0.633]) as compared with when personal involvement was highest (i.e., Self; $M_{\text{Self}} = 0.444$, CI = [0.385, 0.503]), $b_{\text{Third Party–Self}} = 0.117$, $SE = 0.035$, $t(55.60) = 3.09$, $p = .003$. Deciding on behalf of both the self and an anonymous partner (i.e., *Shared*) resulted in lower cooperation amounts relative to the *Third-Party* condition ($M_{\text{Shared}} = 0.486$, CI = [0.423, 0.549]), $b_{\text{Third Party–Shared}} = 0.075$, $SE = 0.035$ $t(55.39) = 2.15$, $p = .036$, but higher cooperation amounts relative to the *Self,* $b_{\text{Shared–Self}} = 0.042$, $t(54.5) = 2.28$, $p = .026$ (Figure 2).

Participants contributed relatively less when endowed with 20 tokens ($M_{20\text{ tokens}} = 0.485$, CI = [0.430, 0.539]) as compared with 10 tokens ($M_{10\text{ tokens}} = 0.509$, CI = [0.454, 0.564]), $b_{20-10} = 0.025$, $SE = 0.011$, $F(1, 58.66) = 4.63$, $p = .036$, across all conditions $F(2, 3226.67) = 1.69$, $p = .184$. Across blocks, there was no significant difference in cooperation, $F(2, 85.90) = 0.62$, $p = .535$, and also there was no interaction of block with beneficiary, $F(4, 89.97) = 0.28$, $p = .889$. Furthermore, when examining cooperation in only the first block, that is, between subjects, cooperation amounts did not differ by beneficiary, $F(2, 35.04) = 2.04$, $p = .146$ ($M_{\text{Self}} = 0.401$, CI = [0.272, 0.529]; $M_{\text{Shared}} = 0.449$, CI = [0.371, 0.527]; $M_{\text{Third Party}} = 0.549$, CI = [0.446, 0.652]), demonstrating no significant difference in cooperation between different levels of personal involvement.

Reaction times of cooperation: Self, Shared, *and* Third Party. We tested whether different levels of personal involvement affected reaction times for decisions to cooperate, which might imply differences in processing difficulty across conditions. No differences in reaction time for *Self* ($M = 3.247$, CI = [3.014, 3.480]), *Shared* ($M = 3.299$, CI = [3.058, 3.540]), and *Third Party* ($M = 3.153$, CI = [2.895, 3.412]) were observed, $F(2, 51.63) = 1.44$, $p = .245$. Participants were faster in responding over time, $F(2, 103.90) = 28.01$, $p < .001$; $b_{\text{Block1–Block2}} = 0.295$, $SE = 0.078$, $t(104.71) = 3.790$, $p < .001$; $b_{\text{Block2–Block3}} = 0.282$, $SE = 0.077$, $t(105.68) = 3.662$, $p = .001$; $b_{\text{Block1–Block3}} = 0.577$, $SE = 0.077$, $t(101.44) = 7.485$, $p < .001$, with no differences here between beneficiaries $F(4, 111.33) = 0.34$, $p = .850$.

Conclusion

In this experiment, we examined if cooperation levels were influenced by the degree of personal involvement in the public good. We varied involvement in the public good, examining how much a participant was willing to contribute for herself (*Self*), for a third party, where the participant and third party split the endowment and payoff of the public good (*Shared*), and solely for a third party, in which the participant was not involved in the outcome of the public good (*Third Party*). First, we found that participants contributed, on average, half of their own endowment, very similar to other studies on cooperation (Fehr & Gächter, 2000). Participants were more willing to cooperate on behalf of a third party as compared with cooperating for themselves. Moreover, when participants were jointly involved in the public good (*Shared*), participants contributed less than when not materially involved in the public good (*Third Party*). However, they still cooperated more in comparison with being directly involved in the payoff of the pot, that is, when cooperating only on their own behalf. These results indicate that reducing self-related interests and enhancing focus on others, by choosing on behalf of a third party, increases cooperation levels. In other words, people potentially place more weight on social values when personal involvement is reduced. Importantly, cooperation levels across personal involvement conditions did not differ in the first block. This suggests that people may initially employ a "default" cooperation preference and then update this rate when the context changes to include more or less personal involvement.

Study 2

Third-Party Cooperation for Social and Non-Social Contexts

In the first study, we showed how reducing material involvement in the public good encourages cooperation. Decreased material involvement is hypothesized to enhance social preferences, such as the preference to abide by social norms and

rules (Fehr & Fischbacher, 2004a). In Study 1, the public good was always shared with a group of human players, introducing an additional social element when deciding for a third party. To examine whether increased cooperation on behalf of a third party is driven by "pure" social motives (e.g., the social norm for helping the collective benefit) and not other, perhaps non-social, motives (e.g., increased risk-taking preferences when deciding for others), we compared here a *non-social* group (computer players) with a *social* group (human players). In addition, we compared only cooperative decisions for a third party in which the decision maker was not materially involved (*Third Party*) with the standard PGG in which the decision maker decides for themselves and is materially involved in the outcome (*Self*). The rationale to examine only the two conditions is that these showed the largest differences in cooperation rates in the first study. In Study 2, we first aimed to replicate the findings of Study 1, that is, enhanced cooperation on behalf of third party, and additionally examine whether this behavior is primarily driven by social interests for the group. We hypothesized that if third-party cooperation is driven by social motives for the group, then participants' contributions would expect to be higher when playing for a third party in the social context than in the non-social context.

Materials and Method

Participants. Forty-seven volunteers participated in the study. All gave written informed consent, with 10 participants taking part for course credit while the remainder received €10 for participation. Participants could earn a monetary bonus (between €0.00 and €7.50) depending on their performance in a selection of rounds that they played on their own behalf and rounds that another player played on their behalf. Experimental exclusion criteria were a self-reported history of psychiatric disorders, regular use of marijuana, or use of psychotropic drugs and elaborate foreknowledge about the nature of the experiment. Data from one participant were excluded from the analysis because she had already taken part in the first study; data from one other participant were excluded due to technical problems that resulted in only one round per condition being recorded. Data are therefore reported from 45 participants (7 males, M age = 21.33, SD = 2.45). The study was approved by the local ethics committee.

Design. In this experiment, we used a similar version of the PGG as employed in Study 1. In Study 2, we investigated two levels of involvement, *Self* versus *Third Party*, as outlined in Study 1. Again, the third party was an anonymous other who was randomly selected at the beginning of the block and remained the beneficiary of the participant throughout the entire block.

The critical addition to this study is the composition of the group players (which we refer to here as Group context). Here, we directly compared cooperation decisions in social versus non-social context by including a group of computer players (i.e., *Non-social* context) in addition to the original paradigm with anonymous human players (i.e., *Social* context) with whom the public pot was shared. Participants were told that the computer players followed "pre-programmed strategies" and were presented as computer pictures (see Figure 3). In total, participants played 80 experimental trials, 40 trials per beneficiary (*Self, Third Party*). Participants shared the public pot with human players (*Social* context) and computer players (*Non-social* context), which were presented randomly across trials for both beneficiaries (20 trials per group context per beneficiary).

Procedure. The procedure of Study 2 was similar to Study 1. Instructions about the task and rules of bonus payment were similar and made clear from the beginning. Again, participants were told that the other human players were participants in the experiment who had either already participated or still had to participate in the game. No feedback was given about the outcome of each round.

Participants played two blocks of the task: one block only for the *Self* and one block only for a *Third Party*, counterbalanced. The different group contexts (*Social* and *Non-social*) were randomized within each block. Brief instructions were given before the start of a new block. Similar to Study 1, participants were not informed in advance that they would be playing for a different beneficiary.

After viewing the instructions, participants performed four practice trials, with a 10- and 20-tokens initial endowment and with a human and computer group. As in Study 1, participants first saw the beneficiary they would be playing for, either as a silhouette with the text "You" (*Self* condition) or as a silhouette with a random ID number (*Third-Party* condition), who was randomly selected from a pool of players at the start of the block. Participants had to confirm that they understood they would be playing for this person throughout the experiment.

At the start of each trial (i.e., PGG round), participants saw a fixation cross (500 ms). They were then informed about the composition of their group in the round to come. A non-social group was depicted by three computer pictures, while a social group was represented by three silhouettes with anonymous ID numbers, randomly selected from a pool of other participants' ID numbers. After a button press to advance, the contribution screen appeared. Participants could then indicate how much of the initial endowment, if any, they wanted to contribute to the public pot. Similar to Study 1, the endowment for each round was either 10 or 20 tokens, randomly presented across trials. The possible amounts that the participant could transfer were presented in the same way as in Study 1.

Upon completion of the first block, participants were informed they would continue to a second block. They were introduced to the new beneficiary of the PGG and shown the rules of the game and consequences to their earnings.

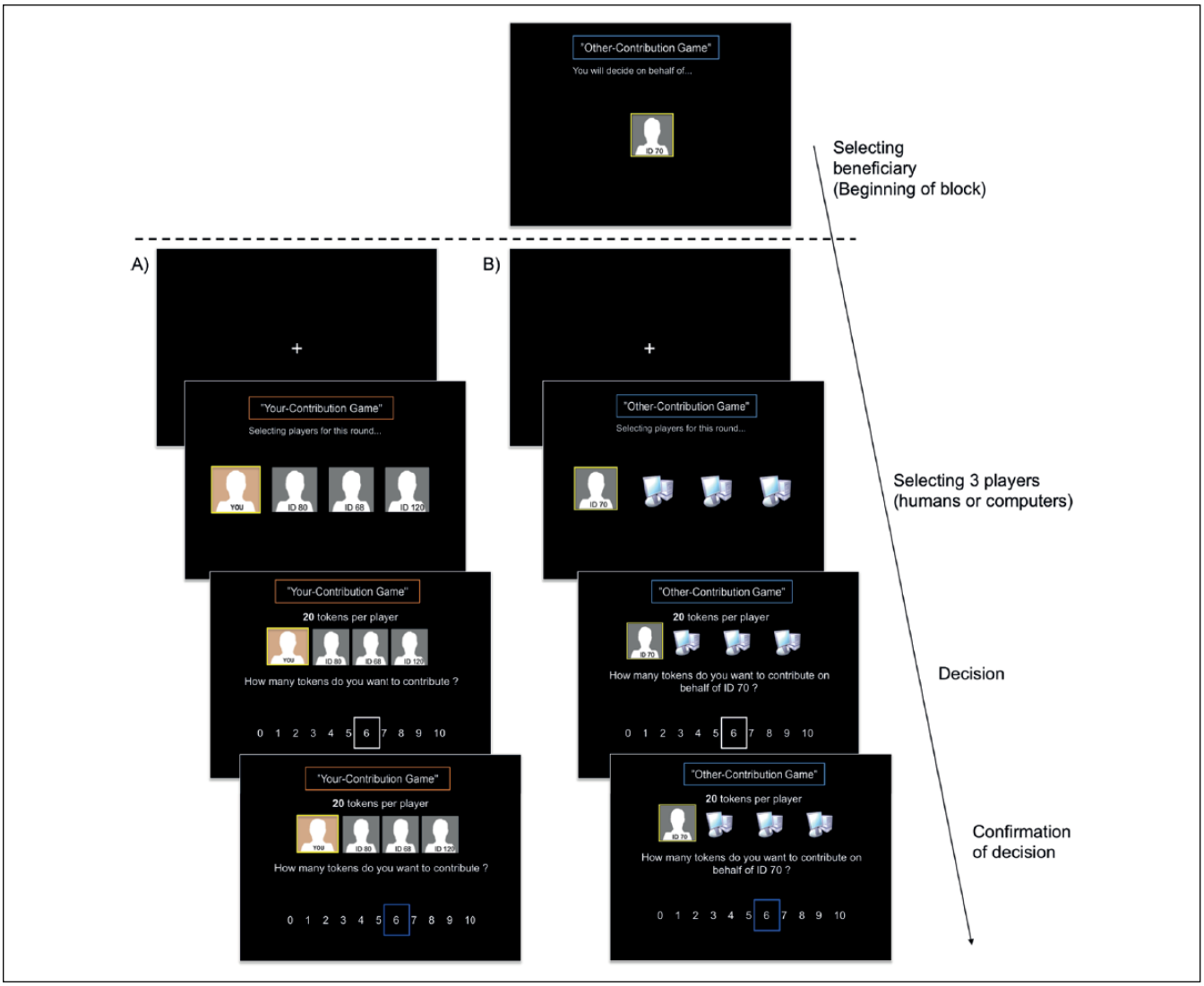

Figure 3. Modified PGG with *social* and *non-social* groups.

Note. Each round begins by randomly selecting three group players with whom the beneficiary will share the public good. Next, participants will see their endowment (tokens) and are asked to indicate how much they would be willing to contribute. After confirmation of the selected amount, the game round ends, after which a new round starts. No feedback is given. (A) The *Self* PGG. An example of a round played for the *Self* in the *Social* context (with human players). (B) The *Third-Party* PGG. At the beginning of the block, the other person is selected for whom the decision maker will choose to cooperate for multiple rounds. An example of a round played for the *Third Party* in the *Non-social* context (computer players). PGG = Public Goods Game.

Importantly, participants did not know in advance that they would be playing on behalf of someone else if they had started in the *Self* condition and vice versa.

After completing the PGG, participants were shown the ID number of the player who had played on their behalf previously. Subsequently, participants were asked to select six rounds to calculate their bonus: three rounds from the *Self* block and three rounds from the person who had played on the participant's behalf. Only rounds played with computer players were used for this purpose because not all participants in the human group had participated yet. The rounds were each selected by means of a button press while trial numbers briefly and randomly flashed on the screen. The average total balance of the six rounds determined participants' bonus, which ranged between €0.00 and €7.50. The bonus was paid out after participants completed an online questionnaire (Qualtrics) about the task,[2] similar to Study 1. In total, the experiment lasted an hour. The task was presented in Psychophysics Toolbox (Brainard, 1997; Pelli, 1997) running on MATLAB ® R2011b (The MathWorks).

Analysis. To assess the level of cooperation, the proportion of tokens contributed on each trial was used as the dependent measure (as continuous variable from 0 to 1). To predict participant's willingness to cooperate, we included five within-subject factors: "Beneficiary" (two levels: *Self, Third Party*),

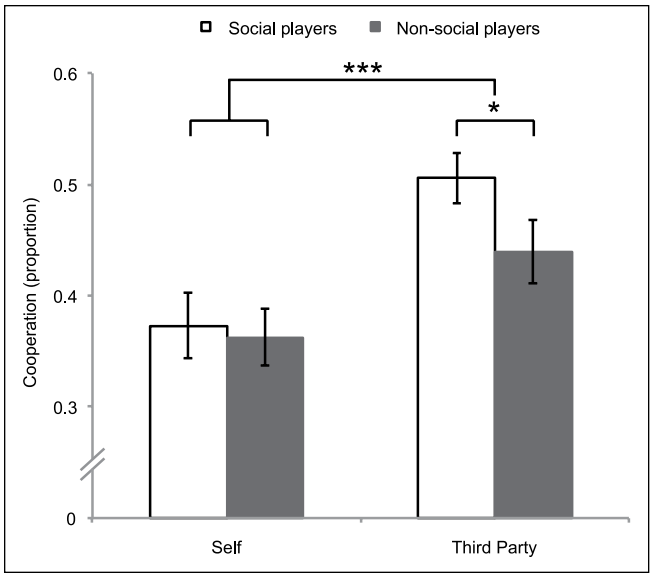

Figure 4. Cooperation levels by personal involvement (*Third Party* and *Self*) and Group context (*Social* and *Non-social*).
Note. Error bars are 1 ± standard error of the mean.
*$p < .05$. ***$p < .001$.

"Group context" (two levels: *Social, Non-social*), "Endowment" (two levels: 10 or 20 tokens), the start position of the contribution box "Startposition" (11 levels: positions 0-10), and "Block" (two levels: Block1 and Block2). Reaction times were measured in seconds (continuous variable: 0-8 s). Responses were defined as outliers and excluded from analysis by the same procedure as Study 1 (i.e., trials with 12 button presses or more, including trials with reaction times smaller than 300 ms, were excluded). In total, 55 of a total 3,567 trials (1.8%) were excluded from analysis. Random slopes for within-subject factors (i.e., "Beneficiary," "Group context," and "Endowment") varying over participant with correlated intercept were also included. Behavioral analyses were further computed identically to Study 1. For reaction time, uncorrelated random slopes varying over participant were used.

Results

Third-party cooperation with social and non-social groups. Replicating results from Study 1, participants contributed significantly more tokens on behalf of a third party than for themselves, $F(1, 43.36) = 13.52$, $p < .001$ ($M_{\text{Third Party}} = 0.472$, CI = [0.429, 0.516]; $M_{\text{Self}} = 0.368$, CI = [0.322, 0.414]). However, average cooperation amounts were not higher when playing with human players ($M_{\text{Social}} = 0.439$, CI = [0.392, 0.486]) as compared with playing with computer players ($M_{\text{Non-social}} = 0.401$, CI = [0.355, 0.447]), $F(1, 44.01) = 1.50$, $p = .23$. There was a significant interaction between Beneficiary and Group context, $F(1, 3336.23) = 17.80$, $p < .001$ (Figure 4). Planned contrasts show that participants contributed more on behalf of the *Third Party* with human players (*Social* context) as compared with computer players (*Non-social* context), $b_{\text{Social–Non-social}} = 0.065$, $SE = 0.032$, $t(47.68) = 2.04$, $p = .047$, whereas contribution levels for oneself were not influenced by the group context, $b_{\text{Social–Non-social}} = 0.011$, $SE = 0.032$, $t(47.76) = 0.34$, $p = .720$ (see Figure 4). After completing the task, participants were asked via questionnaire to rate how important they found cooperation with humans and with computers (on a slider from 0 to 100). Participants rated the importance of cooperation with humans ($M = 56.4$, $SD = 24.86$) significantly higher than cooperation with computers ($M = 35.5$, $SD = 23.19$), $b = 20.85$, $SE = 3.956$, CI = [12.89, 28.83], $t(46) = 5.27$, $p < .001$.

Within subjects there was no significant difference in cooperation across block, $F(1, 42.98) = 0.06$, $p = .809$. Similar to Study 1, participants' initial contribution amounts in the first block, a between-subjects comparison, was the same, irrespective of whether contributing on behalf of a third party or the self ($M_{\text{Third Party}} = 0.428$, CI = [0.364, 0.491]; $M_{\text{Self}} = 0.405$, CI = [0.340, 0.471]), $b = 0.022$, $SE = 0.046$, $t(83.34) = 0.49$, $p = .628$. However, in the second block, when participants changed beneficiary (from *Self* to *Third Party* and *Third Party* to *Self*) a significant change in cooperation levels was observed, Beneficiary × Block: $F(1, 43.00) = 5.43$, $p = .025$. Specifically, participants who previously played for the *Self* ($n = 23$) cooperated 11.1% *more* for a *Third Party* in the second block ($M_{\text{Self Block1}} = 0.405$, CI = [0.340, 0.471]; $M_{\text{Third Party Block2}} = 0.517$, CI = [0.455, 0.579]), $t(45.24) = 2.81$, $p = .007$. The participants who previously played for a *Third Party* ($n = 22$) cooperated 9.8% *less* when cooperating for the *Self* in the second block ($M_{\text{Third Party Block1}} = 0.428$, *CI* = [0.364, 0.491], $M_{\text{Self Block2}} = 0.330$, CI = [0.263, 0.397]), $t(45.20) = 2.41$, $p = .020$ (Figure 5).

Participants contributed fewer tokens when endowed with 20 tokens ($M_{\text{20 tokens}} = 0.402$, CI = [0.365, 0.438]) as compared with 10 tokens ($M_{\text{10 tokens}} = 0.438$, CI = [0.402, 0.474]), $F(1, 43.94) = 13.95$, $p < .001$, which was the same for both beneficiaries, $F(1, 3317.58) = 0.17$, $p = .683$.

Reaction times of cooperation: Self *and* Third Party. We tested whether the beneficiary type affected reaction times for decision to cooperate. Reaction times did not differ depending on the self–other condition, $b_{\text{Third Party–Self}} = -0.058$, $SE = 0.087$, $F(1, 42.99) = 0.44$, $p = .51$. However, participants' decisions were slower when playing with human players as compared with computer players ($M_{\text{Social}} = 3.063$, CI = [2.815, 3.312]; $M_{\text{Non-social}} = 2.938$, CI = [2.707, 3.170]), $F(1, 43.90) = 7.07$, $p = .011$. Similar to Study 1, participants were faster at making decisions in the second block as compared with the first block ($M_{\text{Block1}} = 3.267$, CI = [3.016, 3.517]; $M_{\text{Block2}} = 2.735$; CI = [2.483, 2.986]), $F(1, 42.99) = 34.18$, $p < .001$. Moreover, reaction times for each block were not influenced by who the decision was made for, Beneficiary × Block, $F(1, 43.00) = 3.59$, $p = .065$, or in which group context, Group context × Block, $F(1, 3379.10) = 0.01$, $p = .931$.

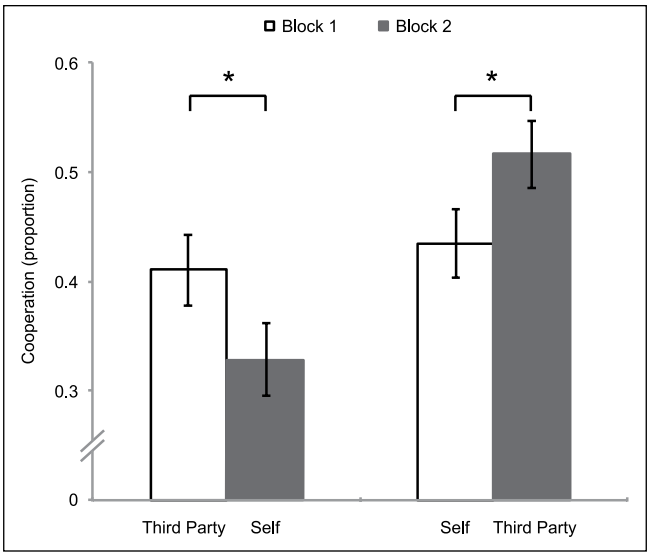

Figure 5. Effect of order of beneficiary on cooperation.
Note. Cooperation levels by personal involvement (*Third Party* and *Self*) per block are shown. Participants who began cooperating for the *Self* then cooperated on behalf of a *Third Party* in the second block and vice versa. Error bars are 1 ± standard error of the mean.
*$p < .05$.

Conclusion

We again showed that varying the involvement in the public good by means of choosing either on behalf of oneself or for a third party influenced the willingness to cooperate. Individuals contributed more on behalf of a third party than when choosing for themselves. Notably, cooperation amounts between *Self* and *Third Party* only significantly differed in the second block of the PGG. Specifically, participants who played first for the *Self* in Block 1 and then on behalf of a *Third Party* in Block 2 contributed 11% more on average when cooperating for another person. Participants who cooperated first for the *Third Party* in Block 1 contributed 10% less on average when cooperating for the *Self* in Block 2. In other words, preference to cooperate across personal involvement did not differ in Block 1, as was the case in Study 1. However, when the participants' involvement changed to either greater or lesser involvement, choice preferences were updated accordingly. The *Social* and *Non-social* group context affected cooperation amounts on behalf of third party, though not when participants played on their own behalf. That is, participants contributed more tokens on behalf of a third party when the public good was shared with other human players (i.e., *Social* context) than when it was shared with computer players (i.e., *Non-social* context).

General Discussion

The main question of interest in the current study was to examine whether the degree to which the decision maker is affected by the outcome of a cooperative interaction would influence contribution amounts in a PGG. Large-scale cooperative decisions are often made by individuals on behalf of other people (i.e., a third party), such as banning assembly of specific groups to maintain safety. At the same time, these decisions sometimes do still entail some personal involvement. Hence, it is of immediate interest to understand how these decisions are made in comparison with standard individual cooperative decisions. We examined this by comparing choosing for oneself (high personal involvement) and choosing for a third-party (no personal involvement), as well as an intermediate condition where both the decision maker and their partner benefitted equally (joint involvement). In addition, we examined whether willingness to cooperate is affected by social motives.

Results demonstrated clearly that cooperative behavior was at its maximum when deciding on behalf of a third party, as compared with when being jointly involved in the public good, as well as when only deciding for oneself. Moreover, in Study 2, participants contributed more on behalf of a third party when playing with humans than when playing with computer players (*Non-social* context). Cooperation for oneself did not show a difference in contribution amounts for human or computer players, which suggests that preferences for self-related outcomes are more valued than social preferences. In other words, when material involvement in the decision is reduced, self-related strategic interests are correspondingly reduced, and social preferences are relatively enhanced, which resulted in a greater extent of cooperative behavior. These results indicate that people place higher value on the social outcome, that is, the group interest, when personal involvement is reduced. Conversely, relative to choosing on behalf of a third party, when choosing on one's own behalf, the comparison between self-related interests and social interests may increase strategic selfish motives, thereby reducing cooperation levels. These results are in line with research demonstrating strong preferences for social norm behavior (e.g., fairness, cooperation), defined as widely shared standards that are based on beliefs about how one should behave in a given situation (Civai et al., 2010; Fehr & Fischbacher, 2004a, 2004b). One study examining bargaining decisions showed that on behalf of a third party (relative to self), receiving unfair divisions of money, correlated to neural activity in the anterior insula (AI), which has been associated with violating social norms (Corradi-Dell'Acqua et al., 2013). In addition, they showed that neural activity in the medial prefrontal cortex (mPFC), an area involved in self-related emotions, correlated with receiving unfair offers on behalf of oneself. The aforementioned studies and the current findings of the role of personal involvement on cooperation, imply that preferences to behave in line with social norms (i.e., cooperate) become more important when deciding on behalf of third party. An interesting future direction would be to examine which specific social motives underlie third-party cooperation by conducting a direct test of different group norms such as concerns about fairness, reciprocity,

or social sanctions. In our study, we did not assess these different norms. However, participant's contributions were not revealed to the group, nor did they receive any feedback about the group's contributions. Therefore, our findings seem unlikely to be explained by norms such as reciprocity or social sanctions. Nevertheless, assessing the effects of different social norms would offer additional insight into the exact social motives underlying third-party cooperation.

One possible mechanism underlying third-party cooperation is perspective-taking. Studies have found that changing perspectives can modulate choice values and choices, both behaviorally and neurally (Bhanji & Beer, 2012). Perspective-taking has been linked to the process of making inferences about other people's thoughts and feelings, commonly referred to as Theory of Mind (Frith & Frith, 2006). Processes have also been linked to empathy (Singer et al., 2006) and other related preferences in decisions for third party (Janowski, Camerer, & Rangel, 2012; Jung, Sul, & Kim, 2013). The ability to take the perspective of others has shown to indirectly increase preferences for social behavior. Studies on cooperation (Gallagher, Jack, Roepstorff, & Frith, 2003; McCabe, Houser, Ryan, Smith, & Trouard, 2001; Rilling, Sanfey, Aronson, Nystrom, & Cohen, 2004) reported Theory-of-Mind processes to be involved when choosing to cooperate, suggesting that the ability to take another's perspective plays an important role in cooperation (Stallen & Sanfey, 2013). Furthermore, imitation research has further highlighted that being imitated can change the person's orientation to the imitator, which results in more altruistic behavior not only toward the imitator but also in general to others (van Baaren, Holland, Kawakami, & van Knippenberg, 2004). Thus, third-party decisions in a cooperative context may facilitate the individual to take the perspective of the other person, which in turn can lead to increased cooperative choices. Perspective-taking in this context enhances preference for contributing to the group that may signal the preference for social norm compliance and is considered the "socially optimal" choice. Alternatively, perspective-taking in this third-party context could also have resulted in the decision maker to take a more self-interested orientation toward the third party (Tunney & Ziegler, 2015). If so, we would have expected lower or similar contributions as compared with the self; however, our data showed that choosing for a third party induces a more altruistic orientation, as shown by increased preferences to cooperate. We hypothesize therefore that perspective-taking prompts additional integration of social information (i.e., social norm and group interest) when evaluating decision rules on behalf of third party and thus leads to different preferences when comparing and evaluating choice options from one's own perspective. Thus, varying the degree of individuals' involvement in the public good shifts preferences for cooperation in favor of the collective benefit and away from personal cost-benefit strategies. Future studies could address this question more specifically by studying if perspective-taking is a key process to increased cooperation for third party, for instance, by examining if choosing for a third party elicits activity in brain regions referred to as Theory-of-Mind network and whether this activity subsequently modulates other processes and networks correlating with pro-social decisions that match social norm-related behavior (e.g., mPFC, AI, and anterior cingulate cortex; Stallen & Sanfey, 2013). In addition, inducing different perspectives could provide insight in how these influence cooperation.

A potential alternative explanation for the increased cooperation without material involvement is a willingness to engage in social risk-taking. Prior work has reported effects of risk-taking for others, such as increased risk-taking with other peoples' money in an investment game (Agranov & Bisin, 2011). However, our results in Study 2 do not support this mechanism. Here, participants contributed most on behalf of a third party when the group was comprised of humans as compared with when the group was made up of computer partners (*Non-social* context). This difference suggests a social preference underlying cooperation. In the case of risk-taking, we would expect this to affect both decisions with social and non-social groups on behalf of a third party. In addition, participants' initial level of cooperation did not differ across levels of personal involvement. Only once participants' involvement changed to either greater or lesser involvement, and cooperation preferences were updated accordingly. In both cases, cooperation was higher on behalf of the third party than for the self. Participants also decided to cooperate more (relative to the self) when being both jointly involved and choosing on behalf of a third party with whom they shared the payoff, thereby minimizing an effect of risk or lack of responsibility. The findings from this study and prior cooperation studies suggest that deciding on behalf of a third party enhances cooperation by changing one's perspective.

Several unaddressed features could be considered in future studies examining (third-party) cooperation. First, third-party decision making could induce a sense of power, as the participant decides how much another person will cooperate. Previous studies have shown that manipulating (sense of) power can have differential effects on cooperation for the self (De Dreu & Van Kleef, 2004) and perspective-taking abilities (Côté et al., 2011; Galinsky, Magee, Inesi, & Gruenfeld, 2006). Future research could assess the role of power in third-party decisions, which might also help explain differences in the literature. Second, we found an effect of stake size on cooperation, with higher endowments leading to lower cooperation rates than lower endowments, suggesting that there is a threshold up to how much people are willing to invest. Future studies could test whether these effects hold when providing endowments as proportions instead of magnitudes. Importantly, stake size did not interact with our manipulation of personal involvement. Third, group size is an interesting factor considering cooperation decisions, as public goods are often shared by large groups. Although we

did not vary group size here, sustaining cooperation could become more difficult in large groups, as monitoring behavior of other people becomes more difficult and individual involvement may reduce. Literature has reported mixed effects of group size on cooperation (Isaac, Walker, & Williams, 1994; Weimann, Brosig-Koch, Hennig-Schmidt, Keser, & Stahr, 2012). Studying these aspects can improve generalizability of findings of cooperation.

To conclude, the primary goal of the present study was to examine how varying personal involvement, such as choosing for either oneself or another, anonymous person, could alter preferences for cooperation. In general, it has been demonstrated that in these social dilemmas, people do not act out of pure self-interest but also value social interests. We showed that reducing personal involvement in the PGG, by choosing for a partner or third party, enhances social interests for the group, as shown by greater cooperation in groups involving human players as compared with groups involving computer players. We speculate that these higher cooperation amounts on behalf of a third party are a result of taking the other's perspective, leading to increased social preferences and reduced self-interested concerns for the beneficiary. Understanding which processes enhance cooperation is essential to the existence of public goods. The current study provides new insight into third-party decisions of cooperation and, moreover, how choosing on behalf of a third party encourages people to be more cooperative.

Declaration of Conflicting Interests

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Notes

1. To double-check for participants' understanding of the third-party condition, we performed a post hoc analysis based on the answers they provided in a questionnaire about the third-party condition. Five percent of participants (i.e., three out of 59 participants) reported that they might still gain from the public pot in the future and therefore could possibly be materially affected. Excluding the data of these participants from the analysis did not change the meaning of the results. Therefore, and because these participants showed full understanding of the other two conditions, their data were not excluded.
2. Again, we performed a post hoc analysis based on the answers they provided in a questionnaire to double-check for participants' understanding of the third-party condition. Here, 11% of participants (i.e., five out of 45) reported that they thought they might still gain from the public pot in the future and therefore could possibly be materially affected. Excluding the data of these participants from the analysis did not change the meaning of the results. Therefore, and because these participants showed full understanding of the other two conditions, their data were not excluded.

Supplemental Material

The online supplemental material is available at http://pspb.sagepub.com/supplemental.

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