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Between-group conflict and other-regarding preferences in nested social dilemmas[a]

Robert Böhm[b] Gary Bornstein[c] Hannes Koppel[d]

Abstract

We investigate experimentally the underlying motivations and individual differences with regard to the participation in between-group conflict in nested social dilemmas. In our nested social dilemmas, the collective is divided into two groups, and individuals allocate tokens between a private, a group-specific, and a collective good. We vary the marginal per capita return of the group-specific and collective good in order to manipulate the motivational within- and between group conflicts. A first experiment shows that a between-group conflict leads to within-group cooperation and particularly individuals with positive other-regarding preferences (prosocials) react to a between-group conflict by contributing to the group-specific good. Hence, paradoxically, individuals with positive other-regarding preferences may foster between-group conflicts. A second experiment reveals that prosocials' contributions to the group-specific or collective good vary as a function of the personal costs of within-group versus collective cooperation, supporting the weighted average social preference theory by Charness and Rabin (2002).

Key words: between-group conflict; nested social dilemma; other-regarding preferences; local and global public goods

JEL Classification: C72, C92, D07, H41

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1 Introduction

Understanding the structural and motivational forces of within- and between-group conflict is an important challenge for social sciences. In various real world encounters, the conflict between groups is subtle and does not always involve actions that actively harm the other group. Consider a public goods setting in which individuals may choose — besides not contributing — to contribute to a group-specific local good or to a global good benefitting the collective. Here individuals can only passively harm another group by discriminating between contributions to the local or global good, constituting a two-level social dilemma. For instance, researchers at an university may decide to write a grant proposal alone, together with other researchers from the same department, or together with researchers from the own and other departments. Although a successful interdisciplinary grant proposal may give the highest reputation to the university, it is more effortful from the individual's and the department's perspective, and less suitable to positively distinguish the own department from other departments. Similar structures can be found in various real-world situations, such as group work in organizations, environmental protection or local versus national politics. This is not only a realistic situation of nested within- and between-group conflicts but also appealing theoretically, because embedding the between-group conflict in a single-level social dilemma in which individuals choose between non-cooperation and cooperation (e.g., Abbink et al. 2010, 2012, Bornstein and Ben-Yossef 1994, Goette et al. 2012, Gunnthorsdottir and Rapoport 2006) naturally confounds at least two of the three motivations involved in intergroup competition, i.e., the individual, group, and collective interest. Avoiding this problem, we experimentally study a public goods setting as described above and independently manipulate the motivational within- and between-group conflict. We are specifically concerned with the following questions: Do individuals engage in between-group conflict by contributing to the local good? If so, *what* explains this behavior and *who* engages in it?

First, what may explain individuals' willingness to engage in between-group conflict by contributing to the local good? When individuals are faced with a choice between contributing to local and/or global goods (e.g., save the local public park or save the rainforest), i.e., a nested social dilemma (NSD) (cf. Blackwell and McKee 2003, Buchan et al. 2009, 2011, Chakravarty and Fonseca 2013, Wit and Kerr 2002), the situation may simultaneously contain a motivational intrapersonal conflict (individual vs. collective interest), a motivational *within-group conflict* (individual vs. group interest), and a motivational *between-group conflict* (group vs. collective interest). On the one hand, as in single-level social dilemmas, individuals would

maximize their individual payoff by not contributing to any good, whereas they would maximize both efficiency and equality of payoffs by contributing to the global good. Hence, contributions to the local good are dominated by one of the other two options in terms of both, individual payoff-maximization and social welfare. On the other hand, research in economics and social psychology suggests that group membership matters (e.g., Akerlof and Kranton 2000, Böhm and Rockenbach 2013, Chen and Li 2009, Gunnthorsdottir and Rapoport 2006). Individuals engage, for instance, in individually costly between-group conflict even at the expense of social welfare (e.g., Abbink et al. 2010, 2012, Bornstein and Ben-Yossef 1994). Group members may perceive a sense of group identity, resulting in behavior as a function of group norms (Akerlof and Kranton 2000), or simply care more about members of their own group than members of another group, i.e., they exhibit an in-group bias (e.g., Chen and Li 2009, Tajfel et al. 1971). Therefore, contributions to the local good in the presence of a motivational between-group conflict may be seen as an act of increasing the own group's absolute or relative welfare, i.e., parochial altruism (e.g., Abbink et al. 2012, Bernhard et al. 2006, Choi and Bowles 2007). In addition, however, supporting the own group is often less costly for an individual than supporting the larger collective, particularly in the presence of a motivational between-group conflict. According to Charness and Rabin (2002), the individual utility is a weighted average of one's own and others' payoffs. With positive weights on one's own and others' payoffs, individuals may opt for contributions to the local good when these are ceteris paribus less costly. Hence, regarding the question *why* individuals engage in between-group conflict by contributing to the individually costly and collectively inefficient local good, both the group interest and the individuals' self-interest could be the motivation that matters.

Second, are individuals equally likely to engage in between-group conflict? It has been shown that individuals' behavior in situations of payoff interdependence is heterogenous. These insights have led to the emergence of other-regarding preference theories, which try to capture the observed heterogeneity in individual behavior (e.g., Bolton and Ockenfels 2000, Charness and Rabin 2002, Engelmann and Strobel 2004, Fehr and Schmidt 1999). A prominent distinction across social sciences between individual types according to other-regarding preferences is the classification of people into *prosocials* and *proselfs*. This classification is in line with research in social psychology on social value orientation (SVO) (e.g., Murphy and Ackermann 2014, Van Lange et al. 1997), according to which *prosocials* are concerned with maximizing joint payoffs (i.e., efficiency) and besides that seeking equality of payoffs. *Proselfs* are concerned with maximizing their own payoffs with no regard to

others' payoffs or even at the expense of others' payoffs. In single-level social dilemmas, the theoretical prediction that *prosocials* cooperate while *proselfs* do not has received large empirical support (see, for a meta-analysis, Balliet et al. 2009). However, how individuals' other-regarding preferences relate to contributions in an NSD is less clear. In contrast to single-level social dilemmas, individuals in an NSD may choose between two social actions that serve positive other-regarding preferences. Thus, regarding the question *who* engages in between-group conflict by contributing to the local good, one may expect that *prosocials* are more sensible to the motivational structure of conflict, especially the between-group conflict, when deciding whether to contribute to the local or global good, and therefore, "with whom" to cooperate.

We analyze who is participating in the between-group conflict by contributing to the local good and why individuals are doing so in two experiments. In the first experiment, the motivational *within-* and *between-group conflicts* are systematically and independently varied by changes in the marginal per capita return (MPCR) from contributions to the local and to the global good. This allows us to analyze the interactive dynamics of the motivational conflict structure and its effect on contributions to the local good and to the global good. We measure subjects other-regarding preferences (SVO) apart and independently from the behavior in the NSD experiment. Our results show that in nested social dilemmas particularly *prosocials* react to the motivational between-group conflict. Whereas they serve the collective interest by contributing to the global good in the absence of a between-group conflict, they serve the group interest by contributing to the local good in the presence of such a motivational conflict. Hence, paradoxically, individuals with positive other-regarding preferences may foster between-group conflicts. One the one hand, the finding may be explained by individual preferences due to differing individual costs of contributions, which is in line with the social preference theory of Charness and Rabin (2002). On the other hand, it may be explained by group-based preferences due to the salience of an in-group-favoring norm (e.g., Wildschut et al. 2002) in the presence of a between-group conflict. The results of the second experiment suggest that *prosocials* are reacting to the cost of contributions and thereby in line with Charness and Rabin (2002), also serving their individual interest.

In spite of the many public goods experiments (see Chaudhuri 2011, Ledyard 1995, for surveys), only a few focus on the implementation of group-specific (local or club) goods. Blackwell and McKee (2003) randomly assign subjects into three groups of four. While the MPCR of the local good is constant, the MPCR of the global good is gradually increased between treatments. The authors find that

contributions to the global good increase as the MPCR of it increases and conclude that the financial return from contributions, i.e., the MPCR times the number of beneficiaries, drives the decision on which good to contribute to. The study closest to ours is Chakravarty and Fonseca (2013). In contrast to Blackwell and McKee (2003), the group membership is more salient, with individuals self-selecting into two groups of three subjects according to preferences over paintings, i.e., following the minimal group paradigm (Tajfel et al. 1971). In one treatment, the MPCRs of the local and the global good are equal, whereas in the other treatment, the MPCR of the local good is doubled. In a last treatment, individuals also self-select into two groups, but only the global good is present. The authors find that introducing a group-specific (local) good significantly increases total contributions. Moreover, contributions to the local good exceed those to the global good when the MPCR of it is doubled (i.e., the financial return for both goods is the same), and individuals seem to use contributions to the local good to punish members of the other group. Both studies focus on the financial return from contributions to the two goods, thereby disregarding the effects of the motivational conflict structure inherent in the game and, moreover, do not differentiate between the behavior of *prosocials* and *proselfs*.[1] Our results, however, show that both aspects are important for contribution decisions and provide a better explanation for the observed behavior than the financial return from contributions does.

The remainder of the paper is organized as follows. Section 2 provides the theoretical background and hypotheses. In sections 3 and 4 we describe and analyze the two experiments. The paper ends with a discussion and concluding remarks in section 5.

2 Theoretical Background and Hypotheses

The nested social dilemma (NSD), a public goods game variant introduced by Wit and Kerr (2002), is played by N players assigned to a group m. All groups are of equal size and have n members. Each player i is endowed with e_i tokens and can either keep or contribute any number of these tokens to the local good (l_i) and/or

[1] Also related but very different in focus is Buchan et al. (2009). Using a general population sample from various local areas in different countries, the collective consisting of 12 individuals is divided into three groups of 4 individuals from the same local area. The authors analyze the correlation between country-level and individual-level globalization indices on individual contributions to local and to global goods. The authors find a significant correlation between these indices and contributions to the global good, and show in a companion paper that this is independent of individuals' expectations about others' contributions (Buchan et al. 2011).

the global good (g_i). Individual contributions must satisfy $0 \leq l_i \leq e_i$, $0 \leq g_i \leq e_i$ and $l_i + g_i \leq e_i$. Assuming constant MPCRs α for individual contributions l_i and β for individual contributions g_i, the payoff for player i is:

$$\pi_i = e_i - l_i - g_i + \alpha L + \beta G,$$

where $L = \sum_{i \in m} l_i$ denotes the sum of tokens contributed to the local good by members of the own group and $G = \sum_{i=1}^{N} g_i$ the sum of tokens contributed to the global good by all players, irrespective of group membership.

Under the condition that $N\beta > n\alpha > 1 \geq \alpha \geq \beta > 0$, opportunism in the sense of own monetary payoff concerns, i.e., serving the individual interest, suggests $l_i = 0$ as well as $g_i = 0$, whereas efficiency in the sense of joint payoff maximization, i.e., serving the collective interest, yields $g_i = e_i$. Moreover, joint payoff maximization of group members, i.e., serving the group interest, requires $l_i = e_i$. Therefore, the game provides clear behavioral distinctions among individual, group, and collective interests.

Note that manipulating α and β, and thereby the individual cost of contributions to the local good $(1 - \alpha)$ and the global good $(1 - \beta)$, will also change the structure of the motivational conflicts of interests. If $(1 - \alpha) > 0$, the individual interest clashes with the group interest, which we label as an individual motivational *within-group conflict*. Increasing α, and thereby decreasing $(1 - \alpha)$, decreases the intensity of the motivational *within-group conflict* and in the limit, when $(1-\alpha) = 0$, contributions to the local good (l_i) involve no personal costs, i.e., no motivational *within-group conflict* is present. Similarly, the disparity between α and β is labeled as an individual motivational *between-group conflict*, because when $(\alpha - \beta) > 0$, contributions to the local good (l_i) are more profitable for the own group but less efficient than contributions to the global good (g_i), which also benefit members from other groups.[2] Decreasing $(\alpha - \beta)$ corresponds to a decrease in the intensity of the motivational *between-group conflict*. At the extreme, when $(\alpha - \beta) = 0$, contributions to the global good (g_i) are as profitable for the own group as contributions to the local good (l_i), i.e., no motivational *between-group conflict* is present.

[2]Between-group conflict is defined here in its basic and general form as a negative payoff-interdependence between members of opposing groups. One might argue that the between-group conflict in a nested social dilemma is less salient than when it is conceptualized as a competition over an external prize, i.e., a zero-sum game (e.g., Abbink et al. 2010, 2012, Bornstein and Ben-Yossef 1994), as contributions to the global good positively affect both, members of the own group and the collective. However, the between-group conflict in the nested social dilemma is quite severe, since contributing to the local good and not to the global good results in a gain of $\alpha - \beta$ for members of the own group and a loss of $\beta > \alpha - \beta$ for members of opposing groups.

Players concerned with maximizing their own monetary payoff are unaffected by changes in the motivational *between-group conflict*. Likewise, according to the outcome-based social preference theories of Fehr and Schmidt (1999) and Bolton and Ockenfels (2000), which do not incorporate a preference for members of one group over members of another group, the disparity between contributions l_i and g_i is unaltered by the difference between α and β. Because the reduction of payoff inequalities and the maximization of joint payoffs are best achieved by contributions g_i to the global good, the theories predict no variations in contributions l_i to the local good by changes in the motivational *between-group conflict*. This also holds in the absence of the motivational *between-group conflict*.

Hypothesis 1a: Contributions $l_i = 0$ and are unaltered by variations in the motivational *between-group conflict* $(\alpha - \beta)$.

However, according to the intergroup conflict–intragroup cooperation hypothesis (e.g., Campbell 1972, Tajfel 1982), within-group cooperation increases in the presence of a between-group conflict (e.g., Bornstein and Ben-Yossef 1994, Gunnthorsdottir and Rapoport 2006). Moreover, in the presence of a motivational *between-group conflict* $\alpha > \beta$, hence, contributions to the global good are more costly than contributions to the local good. Andreoni and Miller (2002) show that cooperation is sensitive to its cost, i.e., contributions increase when the cost of contributions declines. Furthermore, in Charness and Rabin (2002), players' utility is described as a weighted average of their own and others' payoff. If the weights on own payoffs and others' payoffs are both positive, players' may opt for contributions to the local good when these are ceteris paribus less costly. Following these two arguments, contributions l_i may be greater in the presence of a motivational *between-group conflict* $(\alpha - \beta > 0)$, moreover, increasing with its intensity.

Hypothesis 1b: Contributions to the local good (l_i) are higher in the presence than in the absence of a motivational *between-group conflict*, and increase with its intensity.

The argumentation above has revealed that positive contributions to the two goods might be driven by a concern for others' payoffs. Suppose a classification of players into two types, i.e., *proselfs* and *prosocials*, based on their other-regarding preferences. *Proselfs* are mainly interested in the maximization of own payoffs, i.e., their individual interest. Hence, keeping tokens is the dominant strategy for

proselfs. *Prosocials*, in contrast, generally care about the payoff of others, i.e., they seek efficiency and equality in payoffs. Note that in the NSD, individuals may choose between one merely selfish option (i.e., keeping tokens) and two social options (i.e., contributions to the local and to the global good). This constitutes a motivational conflict between the two social actions more likely for *prosocials* than *proselfs*.

On the one hand, the structure of the motivational *within-* and *between-group conflict* might give *prosocials* an advice on how to solve the possible motivational conflict, by making either a collective fairness norm or an in-group-favoring norm more salient. Contributions to the global good maximize collective efficiency and overall equality in payoffs, and are therefore in line with a *norm of collective fairness* (e.g., Bicchieri 2006). Group membership, however, might involve normative pressure to act in favor of one's own group, i.e., to contribute to the local good, as dictated by the *in-group-favoring norm* (e.g., Wildschut et al. 2002). Even subtle situational differences may exert an important effect on the salience of social norms (e.g., Biel and Thøgersen 2007).

On the other hand, following Charness and Rabin (2002) again, in the presence of a motivational *between-group conflict* the individual cost of contributions to the global good $(1-\beta)$ is higher than that of contributions to the local good $(1-\alpha)$, albeit generating more equality and efficiency. Although *prosocials* generally care about others' payoffs, they may also have a positive and significant weight on their own payoff, which may make contributions to the local good in the presence of a motivational *between-group conflict* more attractive.[3] In sum, the presence or intensity of a motivational *between-group conflict* might influence both the salience of behavioral norms as well as the individual cost of contributions to the local or the global good. Particularly *prosocials* should be sensitive to the level of between-group conflict helping them to decide where to contribute.

Hypothesis 2: *Prosocials* but not *proselfs* contribute more to the local good if $\alpha > \beta$ and contribute more to the global good if $\alpha \leq \beta$.

[3] A similar argument has been made in psychology, claiming that "people differ in the *probability* with which one or more of the interpersonal orientations will be activated" (Van Lange et al. 2007, p. 553, italics in the original). According to this probabilistic model of social value orientations (see also *slot-machine metaphor*, Van Lange et al. 2007), *prosocials* may also have individualistic and competitive preferences, but these are less likely to become behaviorally activated than their prosocial preferences (and vice versa for *proselfs*). This indicates that behavior may vary as a function of internal (e.g., mood differences) and external circumstances (e.g., structure of conflict or opponent's behavior).

3 Experiment 1

To test our hypotheses, we independently manipulate the presence or absence of the motivational within- and between-group conflict.

3.1 Experimental Design and Procedure

We employ a one-shot NSD, as described above, in which $N = 6$ players – or participants – are randomly assigned to a group m (either "Blue" or "Green") with $n = 3$ members. Each participant i receives an endowment of $e_i = 10$ tokens and can either keep or contribute tokens to a local good (l_i) and/or a global good (g_i). Our treatments differ in the parameter values for α and β. Remember that $1 - \alpha > 0$ is an indicator for the presence of a motivational within-group conflict, while $\alpha - \beta > 0$ is an indicator for the presence of a motivational between-group conflict. In our first treatment (PP), $\alpha = .7$ and $\beta = .4$, hence, both conflicts are present. The second treatment (PA) eliminates the between-group conflict by setting $\alpha = \beta = .7$, while keeping the within-group conflict constant. Eliminating the within-group conflict but restoring the between-group conflict from treatment PP, $\alpha = 1$ and $\beta = .7$ in the third treatment (AP). Finally, the fourth treatment (AA) eliminates both motivational conflicts by setting $\alpha = \beta = 1$. Table 1 provides a summary and description of the 4 treatments. Participants' social value orientation

Table 1: Experimental treatments (Exp. 1)

	Within-group conflict	Between-group conflict	α	β	Index of within-group conflict $(1-\alpha)$	Index of between-group conflict $(\alpha-\beta)$
PP:	Present	Present	0.7	0.4	0.3	0.3
PA:	Present	Absent	0.7	0.7	0.3	0
AP:	Absent	Present	1	0.7	0	0.3
AA:	Absent	Absent	1	1	0	0

(SVO) is assessed with the 9-item triple dominance measure, in which participants imagine an interaction with an unknown other and choose 9 times (i.e., for 9 items) between three options that allocate points between the participant and the other person. From these choices we classified participants as being prosocial or proself (for details, see Van Lange et al. 1997). Altogether, we employed a 2 (within-group conflict: present vs. absent) $\times$ 2 (between-group conflict: present vs. absent) between

subjects design, with participants' SVO (prosocial vs. proself) as an additional quasi-experimental factor.

We ran one session per treatment, with 114 participants (54 male, 60 female) recruited from various disciplines at the local university via ORSEE (Greiner 2004).[4] The experiment was programmed and conducted with z-Tree (Fischbacher 2007).

After entering the computer laboratory of the Max Planck Institute of Economics in Jena, participants received written instructions, including some examples (see Appendix C for translated material). We used neutral framing such that the experimental instructions only differed with respect to parameter values. Participants' questions concerning the experiment were answered privately and they had to correctly answer a few control questions before the experiment started. In each session the game was played twice with random rematching into new groups (i.e., "Yellow" or "Red"): once between subjects with the parameter values of the respective treatment and afterwards within subjects for all possible parameter combinations, i.e., scenarios, of $\alpha = \{.5, .7, .9, 1.1\}$ and $\beta = \{.4, .6, .8, 1, 1.1\}$ on one screen employing the strategy method (Selten 1967). One scenario was randomly drawn to calculate payoffs. The second run was implemented to gain insight into how the intensity of the within- and between-group conflict, i.e., moving away from parameters at the boundary (conflicts being either present or absent), affects behavior and was announced as a surprise only after subjects had finished the first run. Feedback about the behavior and outcome in both experiments was given only after subjects completed the whole experiment. The experiment ended with a short post-experimental questionnaire, assessing the participants' demographics and social value orientation. Finally, participants got feedback on the results of the two runs, their payoff and were paid privately.[5] The whole experiment took about 45 minutes, including reading instructions, answering control questions, and receiving payment. Average earnings were €8.30, including a €2.5 show-up fee.

3.2 Results

Among all participants, 48 were classified as prosocial, 51 were classified as individualistic, and 3 were classified as competitive.[6] Individualistic and competitive

[4] Due to some no-shows, the respective sample sizes were 24 in treatment *AP*, and 30 in each other treatment.

[5] One might argue that, although feedback about the games was given after the questionnaire, the behavior in the experimental games could influence responses to the SVO items. This clearly is a limitation in the design of the first experiment, which is, however, addressed in our second experiment.

[6] 12 participants with a mixed orientation were not included in the subsequent data analysis.

participants were combined into the group of proselfs. The proportion of prosocials and proselfs was roughly equal across treatments.[7] The mean values and standard deviations of tokens kept, contributed to the local good, and contributed to the global good, by treatment and social value orientation, are displayed in figure 1. It shows that average contributions to the local and global good are, even for proselfs, positive across all treatments and in sum always above half of the endowment.[8]

As previous studies in the economic literature on the NSD have shown that contributions to the local and the global good are positively affected by their financial return from contributions (FRs), i.e., the MPCR from contributions to a good multiplied by the number of beneficiaries (cf. Blackwell and McKee 2003, Chakravarty and Fonseca 2013), we first try to replicate these findings. By design, the sum of token allocations equals the endowment, and the three decisions are linearly related but not perfectly correlated. Therefore, we will analyze each decision separately. Table 2 reports the results of ordinary least squares (OLS) regressions, in which either the tokens kept, contributed to the local good, or contributed to the global good, serve as the dependent variable. In columns III and V the coefficients for the FRs to the local and the global good have an opposite sign and are both significant. An increase in the FRs to the respective good (either local or global) leads to higher contributions to the good, thereby replicating previous results. Moreover, the coefficients are greater for the global good (column V), suggesting that at least some of the additional tokens contributed to the global good are tokens otherwise kept.

The novel feature of our design is the measurement of subjects' SVO, i.e., classifying subjects as being either proself or prosocial. As outlined above, prosocials might be more sensitive to the motivational structure of conflict in the NSD than proselfs are. Hence, how are token allocations affected by subjects' SVO?

Result 1: Prosocials and not proselfs react to the financial return from contributions to the local and the global good.

[7] There was a roughly equal ratio of individuals who were classified as prosocial or proself, which did not significantly differ from a $50:50$ split in all treatments (PP: 12 prosocials/14 proselfs, PA: 12/16, AP: 10/11, AA: 14/13).

[8] This might be surprising, as proselfs usually keep most of their endowment in standard public goods games (e.g., De Cremer and Van Dijk 2002, De Cremer and Van Vugt 1999). But the NSD contains an allocation decision between three options (i.e., individual, group, and collective) instead of two options (i.e., individual and collective). Including the option to contribute to the local good seems to lead proselfs to keep less tokens. A possible explanation might be that the introduction of two (smaller) groups besides the (larger) collective, makes the group more salient, which has been shown to increase contributions from proselfs (cf., De Cremer and Van Dijk 2002, De Cremer and Van Vugt 1999).

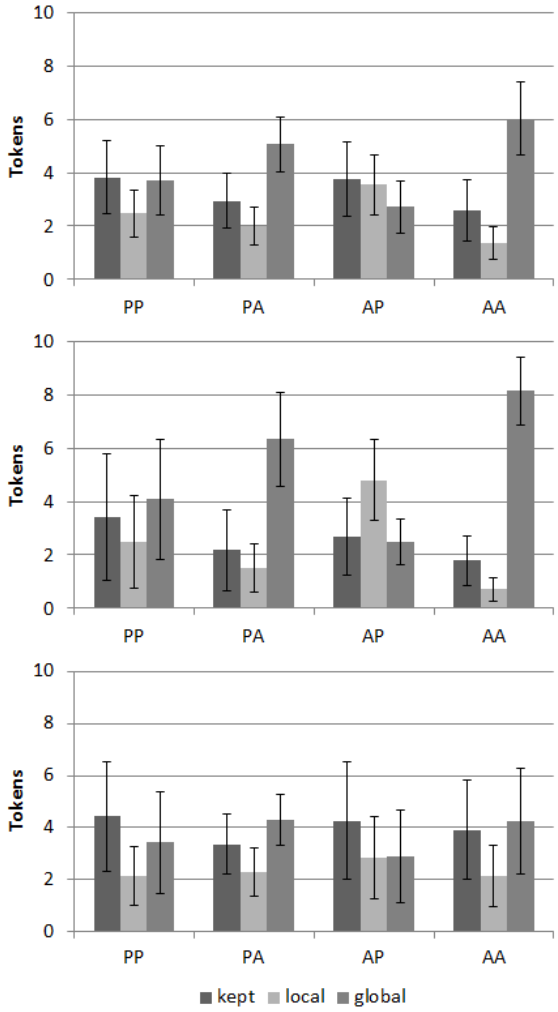

Figure 1: Mean values of tokens kept, contributed to the local or global good (with 95% confidence intervals) by treatment overall participants (top), for prosocials (middle), and proselfs (bottom)

Columns II, IV, and VI of table 2 report results of OLS regressions that additionally include a dummy for SVO (0: proself, 1: prosocial) and its interaction with the FRs to the local and the global good. While the coefficient of the interaction between SVO and the FRs to the global good is negative (positive) and significant in column IV (VI), the main effect of the FRs to the global good is not significant. Therefore, prosocials but not proselfs substitute between contributions to the local and the global good on the basis of the FRs to the global good. Also the coefficient of the interaction between SVO and the FRs to the local good is positive and significant in column IV, which suggests that, again, prosocials but not proselfs are positively affected by the FRs. In sum, the main effects of the FRs are qualified by mainly prosocials reacting to them.

Table 2: OLS regressions for tokens kept, tokens contributed to the local good, and tokens contributed to the global good

	Kept		Contributed to local good		Contributed to global good	
	(I)	(II)	(III)	(IV)	(V)	(VI)
FR local	0.734	1.039	1.830**	0.475	-2.563**	-1.514
	(1.06)	(1.40)	(0.75)	(0.99)	(1.07)	(1.38)
FR global	-0.636*	-0.488	-0.713***	-0.111	1.348***	0.599
	(0.37)	(0.49)	(0.26)	(0.35)	(0.37)	(0.48)
SVO		0.828		-2.334		1.505
		(3.78)		(2.66)		(3.71)
FR local×SVO		-0.463		3.023**		-2.560
		(2.09)		(1.47)		(2.05)
FR global×SVO		-0.291		-1.289**		1.580**
		(0.72)		(0.51)		(0.71)
Constant	3.968**	3.323	0.662	1.611	5.370***	5.066**
	(1.91)	(2.55)	(1.35)	(1.80)	(1.88)	(2.51)
N	102	102	102	102	102	102
$R^2_{adjusted}$	0.0163	0.0509	0.0567	0.0900	0.1016	0.1804

Standard errors in parentheses

Significance levels: *** < 1%,** < 5%,* < 10%

Another finding from previous NSD experiments is that contributions to the local good exceed those to the global good when the FRs are equal (Blackwell and McKee 2003, Chakravarty and Fonseca 2013). This has been explained by a general preference for the in-group (Chakravarty and Fonseca 2013), i.e., an in-group bias. Chakravarty and Fonseca (2013) also argue that if the FRs to the global good exceed the FRs to the local good, contributions to the global good increase, but to which extent depends on the degree of the in-group bias. Following this line of reasoning, increasing the disparity between the FRs to the global and the local good should increase contributions to the global good. In contrast, we observe the opposite in our data. In all treatments the FRs to the global good are above the FRs to the local good, yet the difference between the FRs is greater in AP than in PP. However, contributions to the local good are greater, while contributions to the global good are smaller in AP (see figure 1).[9] Note that both treatments contain a motivational

[9]The quantitative difference is, however, not significant when analyzing contributions to the

between-group conflict, while a motivational within-group conflict is absent in AP, i.e., making contributions to the local good individually costless. Hence, how does the structure of the motivational conflicts affect contributions?

Result 2: Contributions to the local (global) good are greater in the presence (absence) of a motivational between-group conflict.

Table 3 reports results of OLS regressions, which include dummies for a motivational within- and between-group conflict (1: present, 0: absent) and the respective interaction term. The coefficient of the motivational between-group conflict is positive and highly significant in column III, while it is negative and highly significant in column V. Therefore, supporting our hypothesis 1b, contributions to the local good are greater in the presence than in the absence of a motivational between-group conflict, while the opposite effect appears for contributions to the global good. It seems that subjects' decisions as to where to contribute depend on the motivational between-group conflict being present or absent.

Result 3: Contributions to the local good are particularly pronounced when, in addition to the presence of a motivational between-group conflict, the motivational within-group conflict is absent.

In column III of table 3 the coefficient for the interaction term is negative and significant. Therefore, the positive main effect for the presence of a motivational between-group conflict on contributions to the local good is strengthened in the absence of a motivational within-group conflict. Subjects seem to contribute even more to the local good when in the presence of a motivational between-group conflict, contributions to the local good are individually costless. Having shown main effects for the structure of motivational conflicts on token allocations, we now examine how subjects' SVO affects and potentially moderates the allocation of tokens.

Result 4: Proselfs keep more tokens than prosocials keep, while prosocials contribute more tokens to the global good than proselfs contribute.

Columns II, IV, and VI report regression results for specifications that add subjects' SVO and the interactions with the variables for the motivational conflict struc-

local and the global good, irrespective of individuals' SVO (Kruskal-Wallis, $N = 54$, $p = .192$, for local good, and, $N = 54$, $p = .577$), but marginally significant for prosocials' contributions to the local good (Kruskal-Wallis, $N = 22$, $p = .052$).

Table 3: OLS regressions for tokens kept, tokens contributed to the local good, and tokens contributed to the global good

	Kept		Contributed to local good		Contributed to global good	
	(I)	(II)	(III)	(IV)	(V)	(VI)
Within	0.524	-0.240	0.557	0.159	-1.081	0.0817
	(0.90)	(1.23)	(0.62)	(0.84)	(0.90)	(1.18)
Between	1.190	0.657	2.354***	0.664	-3.545***	-1.322
	(0.97)	(1.35)	(0.67)	(0.92)	(0.97)	(1.30)
Within×Between	-0.086	0.396	-2.011**	-0.834	2.097	0.438
	(1.33)	(1.81)	(0.91)	(1.23)	(1.32)	(1.74)
SVO		-2.473*		-1.440		3.912***
		(1.27)		(0.87)		(1.22)
Within×SVO		1.264		0.627		-1.891
		(1.78)		(1.22)		(1.72)
Between×SVO		0.900		3.421***		-4.321**
		(1.92)		(1.31)		(1.85)
Within×Between×SVO		-0.703		-2.252		2.955
		(2.63)		(1.80)		(2.54)
Constant	2.333***	3.615***	1.407***	2.154***	6.259***	4.231***
	(0.64)	(0.91)	(0.44)	(0.62)	(0.64)	(0.88)
N	102	102	102	102	102	102
$R^2_{adjusted}$	0.0063	0.0315	0.0919	0.127	0.1151	0.193

Standard errors in parentheses

Significance levels: *** $< 1\%$,** $< 5\%$,* $< 10\%$

ture as explanatory variables. The coefficient of SVO is negative and marginally significant in column II, while it is positive and highly significant in column VI. Therefore, as one would expect, proselfs keep more tokens than prosocials keep, and prosocials contribute more tokens to the global good than proselfs contribute. It suggests that subjects focus on contributions that serve their interest, i.e., individual interest for proselfs and collective interest for prosocials.

Result 5: Prosocials but not proselfs react to the motivational between-group conflict.

Although the coefficients for the motivational conflict variables have the same and expected sign as before, they are not significant. However, the coefficient for the interaction between SVO and the motivational between-group conflict dummy

is highly significant and positive in column IV, but negative in column VI. It appears that, in support of our hypothesis 2, prosocials but not proselfs react to the motivational between-group conflict: They contribute more to the local good in the presence of an between-group conflict, while they contribute more to the global good in the absence of a motivational between-group conflict.

In sum, we find that the structure of conflict, especially the motivational between-group conflict, affects token allocations in the NSD. Yet mainly prosocials react to it. Moreover, explaining contributions to the two goods, i.e., our main interest, with the structure of motivational conflicts provides a better fit than explaining contributions through the FRs, as depicted by the adjusted R^2 (see tables 2 and 3). We therefore conclude that analyzing the behavior in an NSD with respect to the conflict structure is worthwhile. However, one may regard treating the motivational within- and between-group conflict as dichotomous, i.e., as being either present or absent, as a weakness. Addressing this weakness, we will now analyze the data obtained from the second run of the experiment, which allows us to examine whether our hypotheses are also supported with variations in the intensity of the motivational conflicts. Although all our results from above hold, we will in the main text focus on analyzing our hypotheses and provide additional material in the appendix B.

For this purpose we set up a panel data structure that contains token allocations for all 102 subjects and each scenario, i.e., each possible combination of $\alpha \in \{0.5, 0.7, 0.9, 1.1\}$ and $\beta \in \{0.4, 0.6, 0.8, 1.0, 1.1\}$, from the second run using the strategy method. In our panel the timing of choices follows the natural way of reading, i.e., column-wise from top to bottom (see figure A.1 in appendix A).[10] By construction, the panel is strongly balanced with 20 observations per subject for tokens kept, contributed to the local good, and contributed to the global good, respectively.

Result 6: Our hypotheses also find support when analyzing the intensity of the motivational conflicts.

Table 4 reports the results of OLS panel regressions with individual fixed effects, in which the specifications are similar to those above. In columns I, III, and V, token allocations are explained by the intensity of the motivational within- and between-group conflict (i.e., $1 - \alpha$ and $\alpha - \beta$, respectively), a dummy variable capturing

[10] Although each scenario was equally likely to be payoff-relevant and choices can be regarded as independent, we use a panel structure. The qualitative results do not change when disregarding the timing of choices. Results of the alternative analysis are available from the authors upon request.

the presence of a motivational between-group conflict, as well as its interaction with the intensity of the within-group conflict. The coefficient for the presence of a motivational between-group conflict is again positive and highly significant in column III, moreover, negative and also highly significant in column V. Similarly to the results above, subjects contribute more to the local good in the presence of the between-group conflict, while they also contribute more to the global good in its absence. This suggests that subjects, depending on a motivational between-group conflict being present or absent, substitute between the local and global good. Furthermore, the coefficients for the intensity of the motivational between-group conflict in columns III and V are also highly significant and have the same sign as those for the dummy variable. It indicates that subjects also react to the intensity of a motivational between-group conflict, with higher contributions to the local good and lower contributions to the global good when the intensity of the motivational conflict increases. Note, however, that the effect is greater for the global good. Yet the coefficient for the motivational between-group conflict is also positive and highly significant in column I, suggesting that increased contributions to the global good are taken both from those kept and those contributed to the local good.[11]

In a second set of specifications, SVO as well as its interaction with the intensity of the motivational between-group conflict is added to the explanatory variables.[12] Columns II, IV, and VI report the results of OLS panel regressions using individual random effects estimators.[13] First note that the results described in the previous paragraph are unaltered when including SVO. The positive and highly significant coefficient of the interaction between SVO and the intensity of the motivational between-group conflict in column IV shows that mainly prosocials react to the intensity with increased contributions to the local good. Those additional tokens

[11] Also in line with our results above is that the effect of higher contributions to the local good in the presence of a motivational between-group conflict is increasing when the intensity of the within-group conflict decreases, i.e., the costs of contributions to the local good (see coefficient of the interaction in column III of table 4). Similarly, holding the intensity of the between-group conflict constant, contributions to the local good increase with lowering the intensity of the within-group conflict (see regression results of a specification testing this in table B.1 in appendix B).

[12] We add only one interaction, as our hypothesis is about prosocials' reaction to the intensity of the motivational between-group conflict.

[13] The use of random effects specifications is justified, because fixed effects panel regressions using the same explanatory variables omitted the individuals' SVO, being an important variable for the analysis of our hypotheses, due to collinearity. This shows that the SVO already captures very much the individual heterogeneity otherwise collected in the fixed effects error term. Moreover, the results from the Lagrange multiplier test support the use of random effects over standard OLS panel regressions.

Table 4: OLS panel regressions for tokens kept, tokens contributed to the local good, and tokens contributed to the global good (strategy method data)

	Kept		Contributed to local good		Contributed to global good	
	(I)	(II)	(III)	(IV)	(V)	(VI)
Between intensity	3.041***	3.288***	3.767***	3.125***	-6.808***	-6.413***
	(0.263)	(0.287)	(0.300)	(0.325)	(0.305)	(0.332)
Between	-0.207	-0.207	1.555***	1.555***	-1.348***	-1.348***
	(0.169)	(0.168)	(0.192)	(0.191)	(0.195)	(0.195)
Within intensity	4.869***	4.869***	0.457	0.457	-5.325***	-5.325***
	(0.334)	(0.334)	(0.380)	(0.378)	(0.387)	(0.386)
Between×Within intensity	2.098***	2.098***	-4.539***	-4.539***	2.441***	2.441***
	(0.417)	(0.417)	(0.475)	(0.472)	(0.483)	(0.482)
SVO		-1.184**		0.360		0.824*
		(0.544)		(0.298)		(0.433)
Between intensity×SVO		-0.525**		1.366***		-0.840***
		(0.245)		(0.277)		(0.283)
Constant	1.841***	2.398***	2.146***	1.977***	6.013***	5.625***
	(0.294)	(0.386)	(0.188)	(0.234)	(0.248)	(0.319)
N	2040	2040	2040	2040	2040	2040
$N_{subject}$	102	102	102	102	102	102
R^2_{within}	0.254	0.256	0.451	0.458	0.522	0.524

Standard errors in parentheses;

Significance levels: *** < 1%,** < 5%,* < 10%;

Individual fixed effects estimators in columns I, III, and V;

Individual random effects estimators in columns II, IV, and VI

contributed to the local good seem to be tokens that prosocials would otherwise keep or contribute to the global good, as depicted by the negative and significant coefficient for the interaction term in columns II and VI.[14] In sum, the analysis from the strategy method data reveals that the support of our hypotheses is not limited to the dichotomous setting, but holds when capturing the intensity of motivational within- and between-group conflicts. Moreover, a comparison with OLS panel regressions using the FRs as explanatory variables (see table B.2 in Appendix B) reveals that the specifications with the intensity of motivational within- and between-group conflicts result again in a better fit (see R^2 in table 4 and table B.2).

A key finding of our first experiment is that prosocials appear to be more sensitive than proselfs to the nested game's structure of motivational conflicts. In fact, the presence versus absence as well as the intensity of a motivational between-group conflict serves as a decision making aid in order to decide where to contribute. This

[14]Furthermore, the coefficient for SVO is negative and significant in column II, whereas it is positive and marginally significant in column VI. Hence, as found above, proselfs keep more tokens than prosocials keep, and prosocials contribute more tokens to the global good than proselfs contribute.

finding cannot be explained by outcome-based social preference theories, such as those of Fehr and Schmidt (1999) or Bolton and Ockenfels (2000), without incorporating a greater concern for the payoffs of in-group members compared to out-group members. However, the social preference theory of Charness and Rabin (2002) can organize the data. In the presence compared to the absence (or with increased intensity) of an between-group conflict, actors' individual costs are higher for collective cooperation than for in-group cooperation. Thus, in line with Charness and Rabin (2002), prosocials might balance their preference for greater efficiency and equality with a preference for higher personal outcomes (or smaller costs of prosocial behavior). In other words, they might follow a strategy of being prosocial as "cheaply" as possible, i.e., a *cost explanation*. On the other hand, the presence (or higher intensity) of a motivational between-group conflict might act as a situational cue to activate the salience of an in-group-favoring norm (e.g., Wildschut et al. 2002), whereas the absence (or lower intensity) of such a conflict might activate a collective fairness norm (e.g., Bicchieri 2006), i.e., a *norm-salience explanation*. As the underlying motivation of prosocials' behavior remains unclear, we set up a second follow-up experiment to disentangle the two possible explanations.

4 Experiment 2

In this experiment we independently investigate the behavioral effects of the motivational between-group conflict and the personal cost of contributions.

4.1 Experimental design

In contrast to the first experiment, we distinguish between the MPCR for contributors to the local and the global good (α_c and β_c, respectively), and those MPCR for receivers (α_r and β_r, respectively). In order to test the robustness and generality of the underlying behavioral motivation, we set up two treatments (see table 5) in which contributions to the two public goods are either personally costly ($1 - \alpha_c = 1 - \beta_c = 0.3$) or costless ($1 - \alpha_c = 1 - \beta_c = 0$). Although individual contribution costs do not differ between goods (i.e., $\alpha_c = \beta_c$ in both treatments), there is always a motivational between-group conflict present ($\alpha_r > \beta_r$).

What are the motivational consequences of these structural changes? In the NSD of the first experiment, inducing a motivational between-group conflict (i.e., $\alpha - \beta > 0$) corresponds to greater contribution costs to the global than to the local good, although contributing to the global good remains collectively efficient ($N \times \beta > n \times \alpha$). In the present adaptation, the motivational between-group

Table 5: Game parameters of experimental conditions (Exp. 2)

Treatment	α_c	β_c	α_r	β_r
Costless contribution	1	1	0.7	0.4
Costly contribution	0.7	0.7	0.7	0.4

α_c, β_c: MPCR for contributors;

α_r, β_r: MPCR for receivers

conflict is independent of the contribution costs to the local or the global good (i.e., $\alpha_r - \beta_r > 0$ but $\alpha_c - \beta_c = 0$). As a result, group interest and collective interest dictate different behaviors, but personal costs of contributions to the local and the global good are the same (either $1 - \alpha_c = 1 - \beta_c = 0$ or 0.3). Thus, one cannot attribute differences between contributions to the local and the global good to a selfish motivation.[15]

Regarding prosocials' contribution behavior, the two explanations about the underlying motivational process imply divergent predictions. According to the *norm-salience explanation*, the game parameters may act as cues about "with whom" to cooperate and one would expect, as an between-group conflict is present, that prosocials contribute more to the local good than proselfs contribute. However, according to the *cost explanation*, prosocials might also opt for the prosocial action that maximizes efficiency and equality, since the personal contribution costs are the same. Following this explanation, one would expect that prosocials contribute more to the global good than proselfs contribute. Importantly, the predictions should be independent of the treatments and therefore robust across different (absolute) incentives for cooperation.

We assessed participants' SVO, in contrast to experiment 1, with the recently developed 6-item slider measure (for details, see Murphy et al. 2011), which provides a high-resolution measure of SVO that is more sensitive than the nominal scale of the triple dominance measure. Murphy et al. (2011) show that the slider measure has a very good test-retest reliability (89% consistency of classification) and good predictive validity.

[15]Such a structure is common in real-life situations when individuals are subsidized for costly contributions (e.g., tax deductions for charity donations). With this, the marginal returns for contributors and receivers are the same (0.7 from the local good and 0.4 from the global good), however, contributors are subsidized either for contributions to the global good only (+0.3; costly contribution treatment) or for contributions to both the local and the global good (+0.3 and +0.6, respectively; costless contribution treatment).

4.2 Experimental protocol

We ran one session for each treatment, with 29 (30) participants[16] in the costly (costless) contribution treatment.[17] As in the previous experiment, participants subscribed one week prior to the experimental sessions online, but were redirected to an online questionnaire assessing participants' SVO, i.e., participants' SVO was measured before the experiment took place. The online questionnaire took 5-10 minutes to complete and ended with the request to enter a personal code. The post-experimental questionnaire of the second experiment omitted the SVO assessment, but additionally asked for a participant's personal code from the SVO questionnaire to match the data and their identification with the group using three items adapted from Doosje et al. (1995). Participants responded on a 7-point scale, with 1 = strongly disagree to 7 = strongly agree, to the statements: "I feel attached to other members of the Blue/Green group", "I identify as a member of the Blue/Green group", "I am happy to be a member of the Blue/Green group" (Cronbach's α = .84).

The whole experiment took about 45 minutes. On average, participants earned €6.80 including a €2.50 show up fee.

4.3 Results

Participants' SVO angle ranged from $-11.31°$ to $48.87°$, $M = 19.52$, $SD = 14.21$, and they showed a medium level of identification with the group they were assigned to, $M = 3.26$, $SD = 1.58$. Importantly, OLS regression results revealed that group identification did not differ between the personal contribution cost treatments, and was also not affected by SVO (see table B.3 in appendix B). Therefore, group identification was not included in the following analysis.[18]

Overall, $M = 3.08$ ($SD = 3.55$) tokens were kept, $M = 3.39$ ($SD = 2.70$) tokens were contributed to the local good, and $M = 3.53$ ($SD = 3.45$) tokens were contributed to the global good. Since we are particularly interested in the relative contributions of prosocials versus proselfs to the local and the global good, we conducted two independent OLS regressions on these decisions. We used the continuous

[16] The participants were 59 students (28 male, 31 female) from various disciplines at the University of Jena, Germany. The age of the participants ranged from 19 to 52 years ($MD = 23$, $M = 23.61$, $SD = 4.58$).

[17] Due to one no-show, the experimental session in the no-personal-contribution-cost treatment was filled up with a student assistant. The data is not included in the following analyses.

[18] Including group identification as a covariate to the analyses did not qualitatively change the reported results. However, group identification itself became a significant predictor of contributions to the local good (see table B.3 in appendix B).

SVO angle and the presence (1) versus absence (0) of personal contribution costs dummy as explanatory variables. Table 6 displays the results of the OLS regressions. Focusing on the tokens contributed to the local good, there was no significant

Table 6: OLS for tokens kept, tokens contributed to the local good and tokens contributed to the global good (Exp.2)

	Kept	Contributed to	
		local good	global good
Contribution cost	1.952**	-0.428	-1.523*
	(0.85)	(0.72)	(0.84)
SVO	-0.085***	0.01	0.084***
	(0.03)	(0.03)	(0.03)
Constant	3.781***	3.585***	2.634***
	(0.827)	(0.70)	(0.82)
N	59	59	59
R^2	0.186	0.006	0.164

Standard errors in parentheses

Significance levels: $^{***} < 1\%, ^{**} < 5\%, ^{*} < 10\%$

difference between prosocial and proself decision makers. For contributions to the global good, however, a significant main effect of SVO indicated that prosocials contributed more (M = 4.43, SD = 3.62) than proselfs (M = 2.59, SD = 3.05). This clearly supports the cost explanation, indicating that, if contribution costs are equal, prosocials are prone to select the behavioral option that maximizes overall efficiency and equality even in the presence of a motivational between-group conflict. This effect is robust even when controlling for the personal contribution cost manipulation with differing absolute incentives for cooperative behavior.

5 Discussion and concluding remarks

This paper investigates in two experiments the effects of structural changes in the motivational within- and between-group conflicts on behavior in nested social dilemmas. In the nested social dilemma experiments, the collective is divided into two (sub-)groups. Participants allocate tokens between a private good, a local good benefitting members of the own group only, and a global good benefitting all participants. Such a decision structure is common in various organizational settings with different (working-)groups. Depending on the payoffs from contributions to

the local and global good, respectively, this may result in a between-group conflict, defined as a negative payoff-interdependence between members of opposing groups. Our treatments vary the marginal productivity of contributions to the local and the global good and at the same time the structure of the motivational within- and between-group conflict. A special focus lies on answering the question: *Why* individuals engage in between-group conflict and *who* is engaging in it?

We find considerable effects for the structure of motivational within- and between-group conflicts. In our first experiment, depending on the structure of the motivational between-group conflict, more tokens are allocated to the local or global good, but mainly by prosocials. In the presence or higher intensity of a motivational between-group conflict, prosocials but not proselfs contribute more to the local good, whereas prosocials contribute more to the global good when the intensity of the conflict is low or absent. This suggests that depending on the structure of conflict, prosocials either foster between-group competition or between-group cooperation. Hence, our paper shows an interesting case, where individuals with positive other-regarding preferences may be responsible for inefficient outcome distributions, providing evidence for a potentially dark side of prosocials. The results of our second experiment reveal that prosocials' contribution decisions are mainly affected by the costs of contributions, supporting the social preference theory of Charness and Rabin (2002) instead of the salience of an in-group-favoring or a collective fairness norm (e.g., Wildschut et al. 2002, Bicchieri 2006, respectively).

Our data is not exceptional and we can replicate previous findings on nested social dilemma experiments (Blackwell and McKee 2003, Chakravarty and Fonseca 2013), i.e., that the financial return from contributions to the local and the global good (the marginal productivity of contributions multiplied by the number of beneficiaries) matters for the decision to contribute to the local or to the global good. However, not all of the observed token allocations in our experiment are consistent with this explanation, but our focus on the motivational conflict structure provides a better explanation for the observed behavior. Moreover, in contrast to Blackwell and McKee (2003) and Chakravarty and Fonseca (2013), the classification of individuals into proselfs and prosocials additionally reveals that mainly prosocials react to changes in the financial returns.

The classification of individuals into types and their respective behavior in our game delivers interesting insight into the nature of prosocial preferences. It seems that the maximization of personal outcomes may become behaviorally relevant even for individuals with other-regarding preferences, if they have to decide between more than one prosocial action. Because the nested social dilemma games involve a be-

havioral conflict between two prosocial actions, prosocials' individualistic motives are likely to become activated and therefore determine their contribution decision. Following the argument of Charness and Rabin (2002), proselfs assign the highest weight to the maximization of personal outcomes, and since keeping tokens is always consistent with this motivation, changes in the structure of conflict may only lead to slight variations in contribution decisions for proselfs. In contrast, prosocials attribute a significant and positive weight to the maximization of joint outcomes/minimization of payoff differences. In our game, contributing tokens to both the local and the global good is consistent with these motivations (although with different degrees of fulfillment) and a positive weight on the maximization of personal outcomes may decisively discriminate between the two prosocial options. Therefore, our paper also relates to the literature on framing. For instance, framing a situation in individualistic terms (e.g., a business transaction) has been shown to increase selfish behavior (e.g., Ellingsen et al. 2012). Similarly, the choice between two prosocial actions that differ in their costs may make the cheaper, but less socially desirable, option more attractive.

The obtained pattern of results has also implications for the underlying motivations of parochial altruism, that is, the tendency to prefer and to benefit in-group over outgroup members even at own costs (e.g., Abbink et al. 2012, Bernhard et al. 2006, Choi and Bowles 2007).[19] Our results indicate that particularly prosocials show parochial altruistic behavior and therefore, somewhat paradoxically, foster between-group conflict (see also, Aaldering et al. 2013). The underlying motivation for this behavior may be selfishness, since cooperating with the in-group, and thus engaging in between-group conflict at the same time, is often less costly from the individual perspective than cooperating with the collective.

References

Aaldering, H., Greer, L. L., Van Kleef, G. A. and De Dreu, C. K.: 2013, Interest (mis) alignments in representative negotiations: Do pro-social agents fuel or reduce inter-group conflict?, *Organizational Behavior and Human Decision Processes* **120**(2), 240–250.

Abbink, K., Brandts, J., Herrmann, B. and Orzen, H.: 2010, Intergroup conflict and

[19]Note that almost 70% of the participants in Experiment 1 (77 out of 114) and almost 78% of the participants in Experiment 2 (46 out of 59) contributed at least one token to the local good. Indeed, contributing even one token to the local good might be sufficient to make the own group better off compared to the other group.

intra-group punishment in an experimental contest game, *American Economic Review* pp. 420–447.

Abbink, K., Brandts, J., Herrmann, B. and Orzen, H.: 2012, Parochial altruism in inter-group conflicts, *Economics Letters* **117**(1), 45–48.

Akerlof, G. A. and Kranton, R. E.: 2000, Economics and identity, *Quarterly Journal of Economics* **115**(3), 715–753.

Andreoni, J. and Miller, J.: 2002, Giving according to GARP: an experimental test of the consistency of preferences for altruism, *Econometrica* **70**(2), 737–753.

Balliet, D., Parks, C. and Joireman, J.: 2009, Social value orientation and cooperation in social dilemmas: A meta-analysis, *Group Processes & Intergroup Relations* **12**(4), 533–547.

Bernhard, H., Fischbacher, U. and Fehr, E.: 2006, Parochial altruism in humans, *Nature* **442**(7105), 912–915.

Bicchieri, C.: 2006, *The Grammar of Society: The Nature and Dynamics of Social Norms*, Cambridge University Press, Cambridge.

Biel, A. and Thøgersen, J.: 2007, Activation of social norms in social dilemmas: A review of the evidence and reflections on the implications for environmental behaviour, *Journal of Economic Psychology* **28**(1), 93–112.

Blackwell, C. and McKee, M.: 2003, Only for my own neighborhood? Preferences and voluntary provision of local and global public goods, *Journal of Economic Behavior & Organization* **52**(1), 115–131.

Böhm, R. and Rockenbach, B.: 2013, The inter-group comparison–intra-group cooperation hypothesis: comparisons between groups increase efficiency in public goods provision, *PLoS ONE* **8**(2), e56152.

Bolton, G. E. and Ockenfels, A.: 2000, A theory of equity, reciprocity, and competition, *American Economic Review* **90**(1), 166–193.

Bornstein, G. and Ben-Yossef, M.: 1994, Cooperation in inter-group and single-group social dilemmas, *Journal of Experimental Social Psychology* **30**, 52–52.

Buchan, N. R., Brewer, M. B., Grimalda, G., Wilson, R. K., Fatas, E. and Foddy, M.: 2011, Global social identity and global cooperation, *Psychological Science* **22**(6), 821–828.

Buchan, N. R., Grimalda, G., Wilson, R. K., Brewer, M. B., Fatas, E. and Foddy, M.: 2009, Globalization and human cooperation, *Proceedings of the National Academy of Sciences* **106**(11), 4138–4142.

Campbell, D. T.: 1972, On the genetics of altruism and the counter-hedonic components in human culture, *Journal of Social Issues* **28**(3), 21–37.

Chakravarty, S. and Fonseca, M.: 2013, Discrimination via exclusion: An experiment on group identity and club goods, *Working paper*, University of Exeter.

Charness, G. and Rabin, M.: 2002, Understanding social preferences with simple tests, *Quarterly Journal of Economics* **117**(3), 817–869.

Chaudhuri, A.: 2011, Sustaining cooperation in laboratory public goods experiments: A selective survey of the literature, *Experimental Economics* **14**(1), 1–37.

Chen, Y. and Li, S. X.: 2009, Group identity and social preferences, *American Economic Review* **99**(1), 431–57.

Choi, J.-K. and Bowles, S.: 2007, The coevolution of parochial altruism and war, *Science* **318**(5850), 636–640.

De Cremer, D. and Van Dijk, E.: 2002, Reactions to group success and failure as a function of identification level: A test of the goal-transformation hypothesis in social dilemmas, *Journal of Experimental Social Psychology* **38**(5), 435–442.

De Cremer, D. and Van Vugt, M.: 1999, Social identification effects in social dilemmas: A transformation of motives, *European Journal of Social Psychology* **29**, 871–893.

Doosje, B., Ellemers, N. and Spears, R.: 1995, Perceived intragroup variability as a function of group status and identification, *Journal of Experimental Social Psychology* **31**(5), 410–436.

Ellingsen, T., Johannesson, M., Mollerstrom, J. and Munkhammar, S.: 2012, Social framing effects: Preferences or beliefs?, *Games and Economic Behavior* **76**(1), 117–130.

Engelmann, D. and Strobel, M.: 2004, Inequality aversion, efficiency, and maximin preferences in simple distribution experiments, *American Economic Review* **94**(4), 857–869.

Fehr, E. and Schmidt, K. M.: 1999, A theory of fairness, competition, and cooperation, *Quarterly Journal of Economics* **114**(3), 817–868.

Fischbacher, U.: 2007, z-Tree: Zurich toolbox for ready-made economic experiments, *Experimental Economics* **10**(2), 171–178.

Goette, L., Huffman, D., Meier, S. and Sutter, M.: 2012, Competition between organizational groups: Its impact on altruistic and antisocial motivations, *Management science* **58**(5), 948–960.

Greiner, B.: 2004, The online recruitment system orsee 2.0 - a guide for the organization of experiments in economics, *mimeo*, Department of Economics, University of Cologne.

Gunnthorsdottir, A. and Rapoport, A.: 2006, Embedding social dilemmas in intergroup competition reduces free-riding, *Organizational Behavior and Human Decision Processes* **101**(2), 184–199.

Ledyard, J. O.: 1995, Public Goods: A Survey of Experimental Research, *in* J. H. Kagel and A. E. Roth (eds), *The Handbook of Experimental Economics*, Princeton University Press, Princeton, New York, pp. 111–194.

Murphy, R. O. and Ackermann, K. A.: 2014, Social value orientation theoretical and measurement issues in the study of social preferences, *Personality and Social Psychology Review* **18**(1), 13–41.

Murphy, R. O., Ackermann, K. A. and Handgraaf, M. J. J.: 2011, Measuring social value orientation, *Judgment and Decision Making* **6**(8), 771–781.

Selten, R.: 1967, Die Strategiemethode zur Erforschung des eingeschränkt rationalen Verhaltens im Rahmen eines Oligopolexperiments, *Beiträge zur experimentellen Wirtschftsforschung* **1**, 136–168.

Tajfel, H.: 1982, Social psychology of intergroup relations, *Annual Review of Psychology* **33**(1), 1–39.

Tajfel, H., Billig, M. G., Bundy, R. P. and Flament, C.: 1971, Social categorization and intergroup behaviour, *European Journal of Social Psychology* **1**(2), 149–178.

Van Lange, P. A. M., De Bruin, E., Otten, W. and Joireman, J. A.: 1997, Development of prosocial, individualistic, and competitive orientations: Theory and preliminary evidence, *Journal of Personality and Social Psychology* **73**(4), 733–746.

Van Lange, P. A. M., De Cremer, D., Van Dijk, E. and Van Vugt, M.: 2007, Self-interest and beyond: Basic principles of social interaction, *in* E. T. Higgins and

A. W. Kruglanski (eds), *Social psychology: Handbook of basic principles*, 2nd edn, Guilford Press, New York, NY, pp. 540–561.

Wildschut, T., Insko, C. A. and Gaertner, L.: 2002, Intragroup social influence and intergroup competition., *Journal of Personality and Social Psychology* **82**(6), 975–992.

Wit, A. P. and Kerr, N. L.: 2002, "me versus just us versus us all" categorization and cooperation in nested social dilemmas., *Journal of Personality and Social Psychology* **83**(3), 616–637.

A Implementation of the strategy method

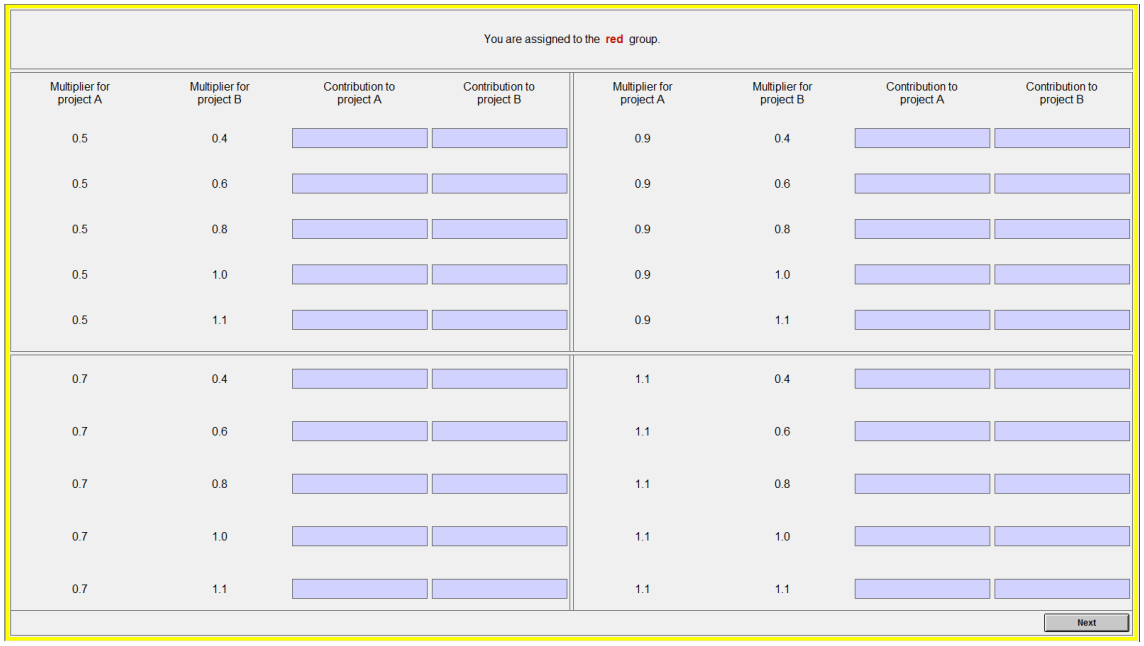

Figure A.1: Screen shot of the strategy method

B Additional regressions

Table B.1 reports the results of OLS panel regressions with individual fixed effects, which include the intensity of the motivational between- and within-group conflicts as well as dummies for a particular level of the motivational between-group conflict $(0.5, 0.3, 0.1)$ and its respective interaction terms with the intensity of the motivational within-group conflict.[20] It shows negative and highly significant coefficients of the interactions between the between-group conflict dummies and the intensity of the within-group conflict when analyzing contributions to the local good (column II). Therefore, given a constant between-group conflict, subjects contribute more to the local good when the intensity of the within-group conflict is lowered. This finding is similar to our result 3 from the analysis of the dichotomous setting.

[20] The dummy for a between-group conflict of 0.7 is not included as it only happened in one scenario and does not offer any variation in the within-group conflict when analyzing the interaction with the intensity of a within-group conflict, for which the specification is set up.

Table B.1: OLS panel regressions for tokens kept, tokens contributed to the local good, and tokens contributed to the global good

	Kept	Contributed to local good	Contributed to global good
	(I)	(II)	(III)
Between intensity	2.835***	5.111***	-7.946***
	(0.252)	(0.289)	(0.290)
$\text{Between}_{0.5}$	0.0386	0.700***	-0.739***
	(0.186)	(0.213)	(0.214)
$\text{Between}_{0.3}$	0.419***	0.946***	-1.366***
	(0.160)	(0.184)	(0.185)
$\text{Between}_{0.1}$	0.466***	0.496***	-0.961***
	(0.152)	(0.174)	(0.175)
Within intensity	5.458***	0.478	-5.936***
	(0.371)	(0.425)	(0.427)
$\text{Between}_{0.5}\times$Within intensity	3.121**	-6.164***	3.044*
	(1.367)	(1.567)	(1.574)
$\text{Between}_{0.3}\times$Within intensity	1.160	-6.311***	5.151***
	(0.755)	(0.866)	(0.870)
$\text{Between}_{0.1}\times$Within intensity	0.307	-2.958***	2.651***
	(0.557)	(0.639)	(0.642)
Constant	1.539***	2.568***	5.893***
	(0.0914)	(0.105)	(0.105)
N	2040	2040	2040
$N_{subject}$	102	102	102
R^2_{within}	0.257	0.445	0.528

Standard errors in parentheses;
Significance levels: *** $< 1\%$,** $< 5\%$,* $< 10\%$;
Panel regressions with dummies

Table B.2: OLS panel regressions for tokens kept, tokens contributed to the local good, and tokens contributed to the global good

	Kept		Contributed to local good		Contributed to global good	
	(I)	(II)	(III)	(IV)	(V)	(VI)
FR local	-0.888***	-0.998***	2.076***	2.077***	-1.188***	-1.079***
	(0.06)	(0.08)	(0.07)	(0.10)	(0.07)	(0.10)
FR global	-0.561***	-0.675***	-0.764***	-0.575***	1.325***	1.251***
	(0.03)	(0.04)	(0.03)	(0.04)	(0.03)	(0.04)
SVO		-2.891***		2.271***		0.620
		(0.67)		(0.54)		(0.63)
FR local × SVO		0.233*		-0.002		-0.231
		(0.12)		(0.14)		(0.15)
FR global × SVO		0.243***		-0.402***		0.159**
		(0.05)		(0.06)		(0.06)
Constant	7.633***	8.993***	1.459***	0.390	0.908***	0.617
	(0.34)	(0.46)	(0.27)	(0.37)	(0.32)	(0.43)
N	2040	2040	2040	2040	2040	2040
$N_{subject}$	102	102	102	102	102	102
R^2_{within}	0.244	0.253	0.420	0.432	0.509	0.511

Standard errors in parentheses;
Significance levels: *** $< 1\%$,** $< 5\%$,* $< 10\%$;
Individual fixed effects estimators in columns I, III, and V;
Individual random effects estimators in columns II, IV, and VI

Table B.3: OLS regressions for group identification, tokens contributed to the local good and tokens contributed to the global good (Exp.2)

	Group identification	Kept	Contributed to local good	Contributed to global good
Contribution cost	- 0.425	1.796**	-0.224	-1.572*
	(0.41)	(0.85)	(0.70)	(0.85)
SVO	-0.018	-0.091***	0.01	0.082***
	(0.02)	(0.03)	(0.03)	(0.03)
Group identification		-0.366	-0.481**	-0.115
		(0.28)	(0.23)	(0.28)
Constant	3.825***	5.182***	1.746	3.072**
	(0.40)	(1.334)	(1.10)	(1.33)
N	59	59	59	59
R^2	0.047	0.211	0.08	0.166

Standard errors in parentheses
Significance levels: *** $< 1\%$,** $< 5\%$,* $< 10\%$

C Instructions

Welcome and thank you for your participation in this experiment!

Please read these instructions carefully. Instructions are identical for all participants. You will receive a show-up fee of €2.50 for punctual arrival. In the following experiment you can earn additional money, depending on your decisions and the decisions of other participants. During the course of the experiment all amounts of money will be stated in ECU (experimental currency units). At the end of the experiment, all earned ECU will be converted and paid out in cash using the following exchange rate:

1 ECU = €0.20

From now on, please do not talk to your neighbors, switch off your cell phone, and remove unnecessary objects from your desk. It is important that you follow these rules – otherwise we may have to exclude you from the experiment and from any compensation. In case you have a question, please raise your hand and we will attend to you personally.

In the following experiment you will be randomly assigned to either a Green or a Blue group, each consisting of 3 members (you and two other participants). You and all other participants will not know which participants belong to your group or to the other group. Each Green group will be randomly matched with one Blue

group. You will make a decision, independent from other participants, which will influence your personal earnings. Depending on your decision, earnings of other participants in your group and in the other group will be affected. Each participant will be endowed with 10 ECU and has to take a decision on how to use the 10 ECU.

The decision problem

You will be a member of a Green or a Blue 3-person group in which each member is endowed with 10 ECU. You will have the possibility to invest an integral number of ECU, between 0 ECU and 10 ECU, of your endowment into two projects: project A and/or project B. ECUs that you will not invest in any project are for you personally.

Earnings from project A

Each ECU invested by the members of your own group (Green or Blue) in project A will be aggregated and multiplied by 0.7. The earnings from project A for each member of your own group are:

Earnings from project A =
(sum of investments from all members of your group in project A) $\times$ 0.7

Example:

If the sum of investments from all members of your own group in project A is, for example, 15 ECU (i.e., each member invests on average $15 : 3 = 5$ ECU), each group member receives $15 \times 0.7 = 10.5$ ECU as earnings from project A, irrespective of personal investments in project A.

Earnings from project B

Each ECU invested from the members of your own group and of the other group (Green and Blue) in project B will be aggregated and multiplied by 0.4. The earnings from project B for each member of the Green group and the Blue group are:

Earnings from project B =
(sum of investments from all members of both groups in project B) $\times$ 0.4

Example:

If the sum of investments from all members of both groups in project B is, for example, 30 ECU (i.e., each member invests on average $30 : 6 = 5$ ECU), each member of either group receives $30 \times 0.4 = 12$ ECU from project B, irrespective of personal investments in project B.

Earnings from not invested ECU

Each ECU not invested (in project A or in project B) will be kept for yourself. No other participant will gain from the ECU that you have not invested in either of the two projects.

Overall earnings

Your final payoff is the sum of earnings from not-invested ECU, earnings from project A, and earnings from project B. The final payoff is:

Overall earnings = not-invested ECU + (sum of investments from all members of your group in project A) × 0.7 + (sum of investments from all members of both groups in project B) × 0.4

Example:

In the following table you find an example for investment decisions of all members of the Green and the Blue group.

Group	Green			Blue		
Member	G1	G2	G3	B1	B2	B3
Not-invested	5	10	1	4	3	8
Invested in project A	5	0	4	0	2	1
Invested in project B	0	0	5	6	5	1

The final payoff for participant G1 in this example is calculated as follows:
Not-invested ECU:
5 ECU
+
(sum of investments from all members of the same group (Green) in project A) ×0.7:
$(5 + 0 + 4) \times 0.7 = 6.3$ ECU
+
(sum of investments from all members of both groups in project B) ×0.4:
$(0 + 0 + 5 + 6 + 5 + 1) \times 0.4 = 6.8$ ECU

= 18.1 ECU

Before all participants independently make their decisions, we will ask you to answer a few questions about the experimental set-up. After you have made your decision, we additionally will ask you to answer a short questionnaire. When all participants have finished the questionnaire, we will call you out individually to give your payment.
The understanding questions will start when every participant has finished reading the instructions!

Surprise second run

We will repeat this experiment once. You will be randomly rematched, independent of your previous group membership, to a Yellow or Red 3-person group. Each Yellow group will be randomly matched with one Red group. Each participant is again endowed with 10 ECU.

You will decide in 20 different situations how to use the 10 ECU, i.e., how much of the 10 ECU you want to invest into two projects (A and/or B). At the end one situation will be randomly drawn and your earnings from this situation will be paid out. Therefore, each of the 20 situations is equally likely to be payoff relevant such that you ahould decide in each of the situations as it would be the only relevant.

The 20 situations vary in the factor with which the sum of contributions to the projects is multiplied. In the previous experiment the multiplier for project A was 0.7 and will in the following 20 situations be $0.5, 0.7, 0.9$, or 1.1. The multiplier for project B was previously 0.4 and will in the following 20 situations be $0.4, 0.6, 0.8, 1.0$, or 1.1.

Upon making your choices in the 20 situations we will ask you to fill-in a short questionnaire. Afterwards you will see a screen which shows the results of the first round as well as the results from the randomly drawn situation of the second round and your payoff.