Parochial cooperation in nested intergroup dilemmas is reduced when it harms out-groups

Aaldering, H.; Ten Velden, F.S.; van Kleef, G.A.; De Dreu, C.K.W.

DOI
10.1037/pspi0000125

Publication date
2018

Document Version
Final published version

Published in
Journal of Personality and Social Psychology

Journal of Personality and Social Psychology
2018, Vol. 114, No. 6, 909–923

0022-3514/18/$12.00 http://dx.doi.org/10.1037/pspi0000125

Parochial Cooperation in Nested Intergroup Dilemmas Is Reduced When It Harms Out-Groups

Hillie Aaldering, Femke S. Ten Velden, and Gerben A. van Kleef
University of Amsterdam

Carsten K. W. De Dreu
Leiden University and University of Amsterdam

In intergroup settings, humans often contribute to their in-group at a personal cost. Such parochial cooperation benefits the in-group and creates and fuels intergroup conflict when it simultaneously hurts out-groups. Here, we introduce a new game paradigm in which individuals can display universal cooperation (which benefits both in- and out-group) as well as parochial cooperation that does, versus does not hurt the out-group. Using this set-up, we test hypotheses derived from group selection theory, social identity, and bounded generalized reciprocity theory. Across three experiments we find, first, that individuals choose parochial over universal cooperation. Second, there was no evidence for a motive to maximize differences between in- and out-group, which is central to both group selection and social identity theory. However, fitting bounded generalized reciprocity theory, we find that individuals with a prosocial value orientation display parochial cooperation, provided that this does not harm the out-group; individualists, in contrast, display parochialism whether or not nut it hurts the out-group. Our findings were insensitive to cognitive taxation (Experiments 2–3), and emerged even when universal cooperation served social welfare more than parochialism (Experiment 3).

Keywords: intergroup conflict, cooperation, social value orientation, social dilemmas

Intergroup relations are often marked by peaceful coexistence, stable alliances, and mutually beneficial exchange of people, goods, and services. Unfortunately, however, peaceful coexistence is continuously threatened by the human tendency to limit cooperation and trust to the in-group, and sometimes even harm out-groups (Balliet, Wu, & De Dreu, 2014; De Dreu et al., 2016; Rand & Nowak, 2013; also see Brewer, 1999; Dovidio & Gaertner, 2010; Greenwald & Pettigrew, 2014). Indeed, such parochial cooperation creates in-group advantages relative to out-groups, with concomitant feelings of pride and superiority among in-group members and feelings of deprivation and threat among out-group members. This not only undermines constructive intergroup relations (Dovidio & Gaertner, 2010; Hewstone, Rubin, & Willis, 2002), but also fuels conflict-intensifying responses such as preemptive and retaliatory aggression (De Dreu, Aaldering, & Saygi, 2014; Lickel, Miller, Stenstrom, Denson, & Schmader, 2006).

In spite of the widespread evidence for parochial cooperation and its destructive effects on intergroup relations, two key issues remain poorly understood. First, it is unclear whether harming another group is a necessary component of parochial cooperation. According to some theoretical accounts parochial cooperation is motivated by the desire to create maximal differentiation between the in-group and out-group and thus should emerge especially in competitive intergroup situations when parochialism would not only help the in-group but would also harm the out-group (e.g., Choi & Bowles, 2007; Rusch, 2014; Weisel & Böhm, 2015). Other accounts, in contrast, imply that parochial cooperation emerges in absence of a competitive motivation vis-à-vis the out-group, and might even be mitigated by possible negative externalities imposed on neighboring out-groups (Corr, Hargreaves Heap, Seger, & Tsutsui, 2015; De Dreu, Balliet, & Halevy, 2014; Thielmann & Böhm, 2016). Second, and despite the evidence that individuals chronically differ in their cooperative inclination, current theories about parochial cooperation remain silent about such possible individual differences in social value orientation. This is striking because individuals with a prosocial value orientation, relative to more self-oriented people, not only prefer cooperation rather than competition (Balliet, Parks, & Joireman, 2009; Van Lange, 1999), but are also more likely to identify with their in-group (De Cremer & Van Dijk, 2002) *and* are more motivated to avoid harm to others (Baron, 1993, 1995; De Dreu, Dussel, & Ten Velden, 2015; Van Beest, Van Dijk, De Dreu, & Wilke, 2005). Thus, social value orientation should shape parochial cooperation.

This article was published Online First February 1, 2018.

Hillie Aaldering, Femke S. Ten Velden, and Gerben A. van Kleef, Department of Psychology, University of Amsterdam; Carsten K. W. De Dreu, Institute of Psychology, Leiden University, and Center for Experimental Economics and Political Decision Making (CREED), University of Amsterdam.

Financial support was provided by NWO-Grant 432.08.002 to Carsten K. W. De Dreu. Hillie Aaldering, Femke S. Ten Velden, Gerben A. van Kleef, and Carsten K. W. De Dreu conceived of the project, designed the experiments and discusses analyses and results; Hillie Aaldering coordinated data collection and Hillie Aaldering and Femke S. Ten Velden performed analyses; Carsten K. W. De Dreu and Hillie Aaldering drafted the article and incorporated coauthor revisions.

Correspondence concerning this article should be addressed to Carsten K. W. De Dreu, Institute of Psychology, Leiden University, Wassenaarseweg 52, 2333 AK Leiden, the Netherlands. E-mail: c.k.w.de.dreu@fsw.leidenuniv.nl

Here we address these two issues. We model intergroup relations as a nested social dilemma, and develop two variants—one in which parochial cooperation does, and one in which it does not harm the out-group. Predictions are derived from three distinct theoretical accounts—group selection theory (GST; Bowles & Gintis, 2011), social identity theory (SIT; Tajfel & Turner, 1986), and bounded generalized reciprocity theory (BGR; Balliet et al., 2014; Yamagishi, Jin, & Kiyonari, 1999). We report three experiments in which we tested our predictions, and examined whether and how social value orientation shapes parochial cooperation that harms, or does not harm, the out-group.

Intergroup Relations as Nested Social Dilemmas

Research on intergroup cooperation has used a number of experimental games to model tensions among self-interest, parochial cooperation, and universal cooperation. In a nested social dilemma (NSD; Halevy, Chou, Cohen, & Livingston, 2012; Polzer, Stewart, & Simmons, 1999; Wit & Kerr, 2002), individuals are nested in two groups that are in turn nested in one collective (see Table 1). Individuals have personal endowments from which they can contribute to their in-group (parochial cooperation) and/or to the collective (universal cooperation). Individuals are always best off when they keep their endowments to themselves, yet in-group members are better off when all in-group members contribute their endowments to the in-group, and both in-group and out-group members are better off when all invest their resources in the collective, than when they do not.

In the standard NSD, parochial cooperation allows groups to peacefully coexist. Although group members indirectly withhold profit from the out-group by restricting cooperation to the in-group, doing so does not directly thwart out-group members' goals. This contrasts with situations in which parochial cooperation not only benefits the in-group, but also directly and simultaneously harms the out-group. This more competitive situation is modeled with the NSD-intergroup prisoner's dilemma (NSD-IPD; Table 1). The NSD-IPD is similar to the standard NSD in that the (ordinal) personal benefits derived from selfish keeping exceed both parochial and universal cooperation. It differs from the standard NSD in that parochial cooperation not only benefits the in-group (as in the NSD) but also directly and simultaneously harms the out-group (see Bornstein, 1992). In the NSD, parochial cooperation maximizes absolute outcomes for the in-group and does little to differentiate the in-group from the out-group; in the NSD-IPD, parochial cooperation serves the in-group and creates maximal differentiation between the in-group and the out-group.

Theoretical Accounts of Parochial and Universal Cooperation

The notion of parochial cooperation features in various theories that are concerned with within-group processes in the context of intergroup relations. While these various accounts share similarities, they differ in the extent to which differentiation between in-group and out-group is assumed to be critical and desirable for parochial cooperation to come about. As we will discuss below, some theoretical accounts imply that parochial cooperation evolved because of, and is motivated by, the desire to create a relative advantage for the in-group. Other accounts imply that parochial cooperation evolved because of, and is motivated by, the desire to create in-group efficiency and welfare, without any additional need to harm or derogate neighboring out-groups.

Group Selection Theory

Grounded in evolutionary theory, GST (Bowles & Gintis, 2011) proceeds from the assumption that tendencies toward parochial (rather than universal) cooperation have been shaped throughout evolutionary history in the context of oftentimes brutal intergroup competition and conflict. The basic premise is that intergroup competition and conflict forced people within groups to give up their self-interest and help their in-group by contributing to in-group efficiency as well as to aggress against rivalling out-groups (Arrow, 2007; Bowles, 2008; Bowles, 2009; Choi & Bowles, 2007; De Dreu et al., 2014; Lehmann & Feldman, 2008). Those groups who were superior in eliciting such parochial cooperation from its members were presumably more likely to win the conflict and to survive and spread (Bowles & Gintis, 2011).

Support for GST comes from laboratory experiments (e.g., De Dreu et al., 2010; De Dreu et al., 2016; Efferson, Lalive, & Fehr, 2008), ethnographic and archaeological reports (Bowles & Gintis, 2004), and agent-based simulations (Bowles & Gintis, 2011; Gunnthorsdottir & Rapoport, 2006). Each body of evidence models parochial cooperation as benefiting the in-group while simultaneously harming the out-group. This fits the core tenet of GST that the individual propensity for (parochial) cooperation co-evolved with a propensity to aggress against (rivalling) out-groups, and that parochial cooperation serves group and individual fitness

Table 1
NSD Versus NSD IPD: Return in Euros per Invested MU for Each Player

Investment	Game	Decision maker	Each in-group member	Each out-group member
Keep to self	NSD	+1	0	0
	NSD IPD	+1	0	0
Parochial cooperation	NSD	+.5	+.5	0
	NSD IPD	+.5	+.5	−.25
Universal cooperation	NSD	+.25	+.25	+.25
	NSD IPD	+.25	+.25	+.25

Note. NSD = nested social dilemma; NSD-IPD = nested social dilemma-intergroup prisoner's dilemma; MU = monetary unit; entries are return in euros.

when and because it creates a relative advantage over other groups and their members. If true, we should see that individuals are more motivated to invest in their in-group when doing so creates a relative advantage over the out-group (as in the NSD-IPD) than when it does not (as in the NSD).

Social Identity Theory

Whereas GST models the distal causes and origins of parochial cooperation as they are rooted in evolution, SIT (Tajfel & Turner, 1986) models more proximate motivations. It posits that individuals categorize themselves and others in terms of group memberships, and that they derive self-esteem and a positive social identity from the relative standing of their in-group vis-à-vis out-groups (Abrams & Hogg, 1988; Ellemers, Spears, & Doosje, 2002; Heine, Lehman, Markus, & Kitayama, 1999). To maximize the standing of the in-group relative to the out-group, individuals engage in two complementary strategies. First, individuals favor their in-group by emphasizing its positive characteristics and by downplaying its negative features. Second, individuals derogate out-groups by emphasizing their negative features and downplaying their positive characteristics (Brewer, 1999; Dovidio & Gaertner, 2010; Greenwald & Pettigrew, 2014; Hewstone et al., 2002; De Dreu, Balliet & Halevy (2014); Messick & Mackie, 1989).

Both in-group favoritism and out-group derogation strategies should drive parochial cooperation. Underlying SIT is the assumption that people seek maximal differences between their own and other groups' outcomes: Whether through in-group favoritism or out-group derogation, the goal is to increase the relative standing of the in-group compared with the out-group (Rabbie, Schot, & Visser, 1989; Tajfel & Turner, 1986; Turner, Brown, & Tajfel, 1979). Parochial cooperation enables intergroup discrimination and promotes relative standing of the in-group more in competitive (NSD-IPD) rather than noncompetitive (NSD) intergroup structures. From SIT we thus derive the prediction that parochial cooperation should be stronger in the NSD-IPD than in the NSD. This prediction is similar to the one derived from GST. The difference between GST and SIT is in terms of the underlying mechanism: From SIT we derive that parochial cooperation is driven by in-group identification (Leonardelli & Brewer, 2001).

Bounded Generalized Reciprocity

BGR describes the psychological implications of evolutionary models of cooperation. It builds on the assumption that individuals rely on their groups for survival and prosperity (Balliet et al., 2014; Brewer, 1999; Henrich & Henrich, 2007; Yamagishi & Mifune, 2016). This mutual interdependence among group members motivates parochial cooperation as well as expectations of reciprocity from other group members (Kiyonari & Yamagishi, 2004; Yamagishi & Mifune, 2008; Yamagishi et al., 1999; also see Milinski, Semmann, Bakker, & Krambeck, 2001; Nowak & Sigmund, 1998).

Within BGR, parochial cooperation evolved from the expectation that other group members reciprocate trust and cooperation. Building and maintaining a reputation of being a reliable and trustworthy group member is a requirement for such indirect reciprocity, and group membership serves as a heuristic for deciding when cooperation is desirable (Balliet et al., 2014; Mifune, Hashimoto, & Yamagishi, 2010). In contrast to GST and SIT, BGR assumes parochial cooperation to be oriented toward and motivated by a desire to maximize in-group welfare in absolute terms, and not by a competitive motivation to create or maintain a relative advantage over out-groups (Balliet et al., 2014; Mifune et al., 2010). Accordingly, there would be little difference in parochial cooperation between the NSD-IPD and the NSD, yet expectations of cooperation by fellow in-group members should predict the individual's own parochial cooperation.

Social Value Orientation and Parochial Cooperation

Consistent with all three perspectives, we predicted that individuals in intergroup settings are inclined to show parochial rather than universal cooperation (*Hypothesis 1*). Evidence for this prediction would fit earlier studies on cooperation in nested social dilemmas that found stronger contributions to the in-group rather than collective pools (Polzer, 2004; Wit & Kerr, 2002).

Second, GST and SIT give reason to predict stronger parochial cooperation when it can, versus cannot, create a relative advantage over the out-group. Thus, these theories would predict more parochial cooperation in the NSD-IPD than in the NSD (*Hypothesis 2*). From SIT it further follows that parochial cooperation associates with in-group identification (*Hypothesis 3a*). Contrary to Hypothesis 2, BGR does not predict differences in parochial cooperation in the NSD and the NSD-IPD, given that they can both serve to maximize in-groups' absolute standing. BGR does inform the prediction that parochial cooperation correlates with expectations about fellow group members' inclination toward parochialism (*Hypothesis 3b*).

Without exception, these predictions disregard the well-established notion that individuals differ in their propensity to cooperate; their social value orientation (henceforth SVO). Individuals with a prosocial orientation have greater trust in others, value others' outcomes more, and are more likely to cooperate than individuals with a proself orientation (Van Lange, 1999). How do these characteristics align with parochial cooperation? None of the three theoretical perspectives on parochial cooperation directly speak to this question, because none of these perspectives models individual differences in parochial cooperation. However, by extrapolating from the key tenets of the various perspectives, differential predictions concerning the role of SVO in shaping parochial cooperation can be derived.

GST assumes that intragroup cooperation and intergroup aggression have coevolved, and although the theory is silent about potential individual differences, the existence of such differences would be difficult to reconcile with the basic idea that parochial cooperation evolved because of its strong fitness functionality. Based on GST, one would therefore expect that the effects of the interdependence structure of a social situation on parochial versus universal cooperation are independent of SVO.

SIT provides more opportunities for incorporating individual differences. Even though SIT is mute with regard to potential effects of SVO, some prior studies revealed that prosocial individuals identify more strongly with their in-group than proselves (De Cremer & Van Dijk, 2002), and high identifiers favor their in-group more than do low identifiers (Brewer & Kramer, 1986; Wit & Wilke, 1992). Accordingly, prosocials may be more likely than proselves to display parochial cooperation. Such a pattern would fit recent findings indicating that prosocial individuals display more parochial cooperation than universal cooperation (Aaldering, Greer, Van Kleef, & De Dreu, 2013; Abbink, Brandts, Hermann, & Orzen, 2012; De Dreu, 2010; De Dreu et al., 2010, 2015; also see Polzer, 2004). Importantly, however, according to SIT we should see this tendency toward increased parochial cooperation among prosocials especially in the NSD-IPD and less in the NSD, where parochial cooperation can do little to differentiate the in-group from the out-group. Based on SIT, we therefore predict that especially prosocial individuals display more parochial cooperation in the NSD-IPD compared with the NSD (*Hypothesis 4a*).

BGR holds that an important driver of parochial cooperation is the expectation of reciprocity from other in-group members. This postulate informs predictions about the role of SVO. First, prosocials are more likely than proselves to reciprocate cooperation (Parks & Rumble, 2001; Van Lange, 1999) and, therefore, prosocials can be expected to exhibit more parochial cooperation than proselves. Second, prosocials are more averse to harm others than proselves (Van Beest et al., 2005). Third, prosocials display less parochial than universal cooperation in competitive intergroup settings (Thielmann & Böhm, 2016). Accordingly, and in contrast to Hypothesis 4a, BGR implies that prosocials should be more likely to display parochial cooperation in the NSD (where it does not harm the out-group) than in the NSD-IPD (where it does harm the out-group; *Hypothesis 4b*).

Experiment 1

Method

Participants, design, and power. One hundred seventeen undergraduate students from the University of Amsterdam participated in this experiment in exchange for 10 euro or course credit. Sixteen participants were not classifiable as either prosocials or proselves and were not included in the analyses. The 101 remaining participants (71.3% female, mean age = 21.98, SD = 4.30) were randomly assigned to the NSD or the NSD-IPD, resulting in 24 prosocials and 24 proselves playing the NSD, and 23 prosocials and 30 proselves playing the NSD-IPD. Dependent variables were investments in the in-group (parochial cooperation) and the collective (universal cooperation), in-group identification, and expectations about in-group cooperation. The experiment was approved by the Ethics Committee of the Psychology Research Institute of the University (2013-WOP-2743) and participants provided signed informed consent prior to their experimental session.

Sample size was informed by previous research with similar designs (De Dreu, 2010; Polzer, 2004; Thielmann & Böhm, 2016). A meta-analysis of in-group bias in cooperation revealed an effect size of d = .42 for social dilemma set-ups (Balliet et al., 2014), suggesting a N = 100 provides statistical power of 1-β = 0.69 with α = .05 for the 2 × 2 between-subjects design (NSD/NSD-IPD × SVO) and 1-β = 0.90 for the within-subjects contrast (parochial vs. universal cooperation; based on G*Power 3.0; Faul, Erdfelder, Lang, & Buchner, 2007).

Procedure and task. Upon arrival in the laboratory, participants were seated in individual cubicles behind a computer. The experiment was computer-based and self-paced and did not involve deception. It started with the decomposed-game measure to assess SVO (De Dreu & Van Lange, 1995; Parks, 1994; Van Lange & Kuhlman, 1994). Participants were asked to make decisions in nine decomposed games. In each game, three options of point distributions between themselves and another person were provided. Participants were asked to imagine that this person was an unknown other, someone they would never meet, and that the points were valuable. Each option represents a particular SVO. An example is the choice between Option 1 (500 points for self and 500 points for other; prosocial), Option 2 (560 points for self and 300 for other; individualistic), and Option 3 (500 points for self and 100 for other; competitive). Participants were categorized as prosocial (n = 54) or as proself (n = 47) if they made at least six choices consistent with one of the three orientations. Consistent with most research in this area, we combined individualists (n = 41) and competitors (n = 6) into one category of proselves (De Dreu & Van Lange, 1995; Van Lange, 1999).

Following the decomposed game measure, participants completed the *Need to Belong* questionnaire, which served as unrelated filler and data were not analyzed. Then, participants learned that they were randomly assigned by the computer to Team Triangle or Team Square, each consisting of four members who were not necessarily all present at the same time but would all play the same game and earnings would depend on the decisions of those four members as well as the decisions of the members of the other team.

Participants received 10 monetary units (MU, which translated to 0.5 euros per MU) which they could keep or invest in Pool X or in Pool Y. MUs kept to oneself would be multiplied by two (see also Table 1). In both the NSD and the NSD-IPD, 1 MU invested in Pool Y (the collective pool, reflecting universal cooperation) would be multiplied by four and divided by eight: All members of both the own and the other group would receive 0.5 MU. In the NSD, 1MU invested in Pool X (the in-group pool, reflecting parochial cooperation) would be multiplied by four and divided by four among all group members; thus, each in-group member would receive 1MU. In contrast, in the NSD-IPD, each MU invested in Pool X (the in-group pool) would be multiplied by four and divided by four among the group members (thus returning 1MU to each in-group member, as in the NSD), but also multiplied by −2 and divided by four among the members of the other group (thus creating a cost of 0.5 MU to each out-group member; see also Table 1). Thus, the essential difference between the NSD and the NSD-IPD was the direct consequence of parochial cooperation for the out-group (no consequence in the NSD vs. negative consequence in the NSD-IPD). Both within and across games, the personal costs of investing in Pool X and Pool Y were equal, and there was no rational economic incentive on the individual level to invest more in either pool.

Participants were told that all members of both groups would make decisions regarding their contributions, and that final outcomes would be determined by their own as well as by the other group members' decisions. MUs earned were converted at a 0.5 euros exchange rate and eligible for payout: One out of four participants would receive extra pay-off based on the investment decisions of themselves and the other group members. Before the actual investments were made, participants answered practice questions about consequences of hypothetical chip divisions to make sure they understood the task correctly. Afterward, participants made three choices on investments in Pool X (in-group pool), Pool Y (collective pool), and the amount of MU they wanted to keep to themselves. To obtain a reliable measure of participants' choices, we computed the average of the three choices (for a similar procedure, see De Dreu et al., 2010, 2015). After their investment choices, participants indicated the amount of MU they expected their fellow group members as well as the members of the other group to invest in each of the pools. Finally, a manipulation check of game structure was administered. Upon finishing the experiment, participants were thanked, paid, and debriefed. The participants who earned extra money based on their decisions were informed and paid after all data was gathered.

Dependent variables. Main dependent variables were the MUs invested in the in-group pool and the collective pool.[1] We aggregated investments across the three decisions (Cronbach's alpha = .76 for the in-group and $\alpha = .85$ for the collective pool). Total investments always summed up to 10; the program gave an error message in case of miscalculations by the participants.

The manipulation check for game structure consisted of four items. Participants indicated the consequences of their in- and out-group members' investments in Pool X and Pool Y. Answering options varied between generating profit or loss for each of the groups, either separately or combined. If they had understood the task instructions correctly, participants in the NSD-IPD should more often indicate "generates profit for own team, but loss for the other team" than participants in the NSD for investing in Pool X, and "generates profit for both as well as to avoid loss for the other team" for investing in Pool Y.

Participants' expectations about reciprocity were measured by requesting them to type in the amount of MU they expected their group members to invest in each of the pools. Additionally, they were asked to indicate how many MU they expected the members of the other group to invest in each of the pools.

In-group identification was measured with four items on a seven point scale (adapted from Doosje, Ellemers, & Spears, 1995): "Me and the other members of Team Triangle are alike," "I feel connected to Team Triangle," "I would like to meet the other members of Team Triangle again," and "I would like to do another task with the members of Team Triangle" (1 = *not at all*, 7 = *very much*; Cronbach's alpha = .87).[2]

Results

Investment decisions. A paired-sample *t* test showed that investments in the in-group pool exceeded investments in the collective pool, $M_{\text{in-group}} = 3.21$, $SD = 2.22$ versus $M_{\text{collective}} = 2.03$, $SD = 2.42$, $t(100) = 3.06$, $p = .003$, Cohen's $d = 0.61$, 95% CI [.41, 1.95]. This supports Hypothesis 1. Figure 1 shows that most participants invested more in the in-group than in the collective pool, $\chi^2(df = 2, N = 101) = 46.95$, $p < .001$, $\varphi = 0.68$.

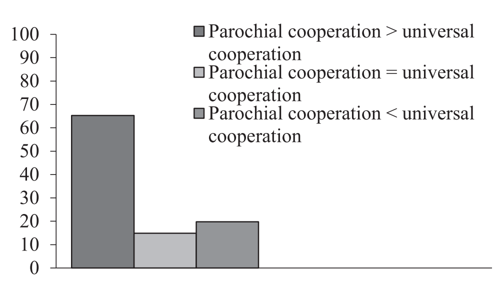

Figure 1. Percentage of individuals investing more in the parochial or in the universal pool in Experiment 1.

Specifically, 66 (65.3%) participants invested more in the in-group than in the collective, and only 20 (19.8%) participants invested more in the collective than in the in-group pool; 15 (14.9%) invested equally in both pools.

Hypothesis 2 was tested by submitting parochial cooperation to a 2 (Game Structure: NSD vs. NSD-IPD) × 2 (SVO: prosocial vs. proself) ANOVA. A main effect of game structure, $F(1, 97) = 4.47$, $p = .04$, $\eta_p^2 = .04$, 95% CI [.06, 1.75] showed that investments were higher ($M = 3.72$, $SD = 1.87$) in the NSD compared with the NSD-IPD ($M = 2.75$, $SD = 2.41$). This is inconsistent with Hypothesis 2 derived from GST and SIT, which predicted the opposite pattern: More in-group investments in the NSD-IPD compared with the NSD. Furthermore, although there was no main effect of SVO, $F(1, 97) = .02$, $p = .90$, the interaction with game structure was significant, $F(1, 97) = 6.14$, $p = .015$, $\eta_p^2 = .06$. Figure 2 shows that prosocials invested less in the NSD-IPD compared with the NSD, $F(1, 97) = 11.26$, $p = .001$, $\eta_p^2 = .10$ (95% CI [.80, 3.11]). This was not the case for proselves, $F(1, 97) = .06$, $p = .80$, $\eta_p^2 = .001$ (95% CI [−1.39, 1.08]). This pattern of results is inconsistent with Hypothesis 4a, which we derived from SIT and predicted especially prosocials to invest more in the in-group pool in the NSD-IPD compared with the NSD. The data support Hypothesis 4b which we derived from BGR and predicted more in-group investments in the NSD compared with the NSD-IPD, especially for prosocials.

Correlates of parochial cooperation. Table 2 (below the diagonal) shows the correlations between the investment decisions, expectations of in-group members' investments, and identification with the in-group. Investments in each of the pools were negatively correlated. In-group identification was not associated with parochial cooperation. This does not support Hypothesis 3a, which we derived from SIT and predicted a correlation between in-group identification and parochial investments. Consistent with Hypothesis 3b, which we derived from BGR, individuals' expectations about in-group members' investments in each of the pools were positively related to their own investment in the respective pool.

Discussion

Experiment 1 supported Hypothesis 1 that parochial cooperation prevails over universal cooperation. In contrast to Hypothesis 2, which we derived from GST and SIT, parochial cooperation was stronger in the NSD than in the NSD-IPD. In fact, parochial cooperation was stronger in the NSD compared with the NSD-IPD

[1] Additional analyses of investments in the collective pool and amount of MUs kept to self are not reported here, because they fall outside the scope of the present research. A table with means is given in the Appendix and data are available from the first author upon request.

[2] We also included, for exploratory purposes, measures of expectations about out-group members' investments and individuals' motivation to invest in the parochial and the collective pool (greed, competitiveness toward the other group, concern for fairness, concern for collective, and concern to minimize differences) in all three experiments. These measures were assessed at the end of each of the experiments. Expectations of out-group members investments correlated with own investments and with expectations of in-group members investments in each respective pool. Analyses on the motive questions revealed main effects of social value orientation but no additional insights important for the current conclusions and are further ignored. Materials and results are available from the first author upon request.

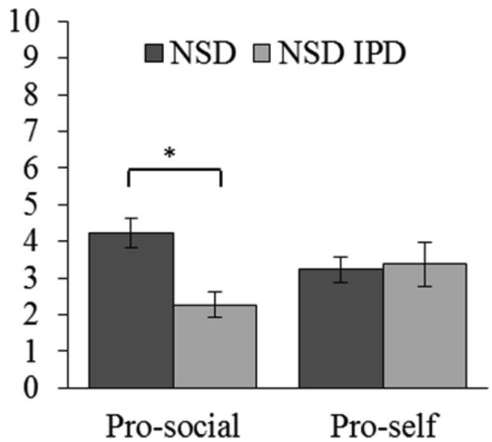

Figure 2. Investments in the (parochial) in-group pool X (Experiment 1).

especially among prosocial individuals. This fits Hypothesis 4b derived from BGR but does not support Hypothesis 4a, derived from SIT, which predicted the opposite. Finally, no support was obtained for Hypothesis 3a, derived from SIT, that in-group identification correlates with parochial cooperation. We did, however, obtain evidence that expectations of reciprocity by fellow in-group members predict parochialism (per Hypothesis 3b). Overall, findings violate predictions derived from GST and SIT, and fit predictions derived from BGR: Individuals, but especially prosocials, increase their in-group's welfare without an attempt to maximize the relative standing of the in-group over the out-group (also see Thielmann & Böhm, 2016; Van Beest et al., 2005).

Experiment 2

Experiment 2 was designed to replicate and extend these findings. In addition to game structure and SVO, we explored the effects of cognitive taxation on parochial cooperation. Recent work suggests that in competitive intergroup settings such as the NSD-IPD, parochial cooperation emerges especially when individuals are cognitively taxed and more likely to make decisions intuitively rather than based on careful deliberation (Rand, Greene, & Nowak, 2012; De Dreu et al., 2015; Ten Velden, Daughters, & De Dreu, 2016). Possibly, the finding that parochial cooperation is stronger in the NSD compared with the NSD-IPD emerges especially when individuals are not only motivated but also able to take into account that in-group cooperation harms out-group members. If true, we should see that cognitive taxation reduces the difference in parochial cooperation between the NSD and the NSD-IPD observed in Experiment 1 (*Hypothesis 5*).

Method

Sample, design, and power. Participants (N = 191), mostly undergraduate students, took part in the experiment in exchange for euros5 or course credit. Because 17 participants were not classifiable as prosocial or proself, the final sample was 174 (64.9% female, mean age = 22.33, SD = 5.40). Participants were randomly assigned to the conditions of a 2 (NSD vs. NSD-IPD) × 2 (Cognitive Taxation vs. No Taxation) factorial. Main dependent variables were investments in the in-group Pool X (parochial cooperation) and in the collective Pool Y (universal cooperation). The experiment was approved by the Ethics Committee of the Psychology Research Institute of the University (2014-WOP-3392). Participants provided signed informed consent prior to their experimental session and were debriefed afterward.

Using the effect size of the interaction between SVO and game in Experiment 1, $\eta_p^2 = .06$, we needed $N = 121$ to obtain statistical power of 0.80. Sample size for the interaction between game structure and cognitive taxation could not be determined a priori, and we therefore "oversampled" to $N = 174$. The sample was distributed as follows across conditions: In the NSD, $N_{\text{prosocials}} =$ 24 with and 25 without cognitive taxation, $N_{\text{proselves}} = 16$ with and 22 without cognitive taxation. In the NSD-IPD, $N_{\text{prosocials}} = 21$ with and 18 without cognitive taxation, $N_{\text{proselves}} = 22$ with and 26 without cognitive taxation.

Procedure and measures. The procedure and tasks were similar to those in Experiment 1. However, following the instructions and practice questions of the game (NSD or NSD-IPD, depending on condition), participants were introduced to a Stroop task (McLeod, 1991), a common procedure to induce cognitive taxation (De Dreu et al., 2015; Halali, Bereby-Meyer, & Ockenfels, 2013; Mead, Baumeister, Gino, Schweitzer, & Ariely, 2009; Ten Velden et al., 2016). The task was introduced as a visual processing task after participants had read the instructions for the decision making task. Participants were presented with color words ("blue," "green," "red," or "black") on the screen and were asked to report the color in which the word appeared, using the appropriate color-coded key on the keyboard. After a trial with 12 stimuli, the real task consisting of 24 stimuli started. In the no taxation condition,

Table 2
Correlations Between Investments, Expectations and In-Group Identification (Experiment 1 and 2)

	1	2	3	4	5	6	7
1. Investments parochial X	1	−.306*	−.538*	.603*	−.289*	−.331*	.269*
2. Investments collective Y	−.401*	1	−.638*	−.088	.531*	−.328*	−.145
3. Investments self	−.489*	−.603*	1	−.409*	−.237*	.558*	−.089
4. Expectation in-group X	.414*	−.335	−.041	1	−.309*	−.680*	.124
5. Expectation collective Y	−.263*	.648*	−.388*	−.450*	1	−.487*	−.132
6. Expectation self	−.069	−.397*	.439*	−.362*	−.670*	1	−.012
7. Identification in-group	.091	.170	−.242*	.093	.063	−.143	1

Note. Entries below (above) the diagonal pertain to Experiment 1 (Experiment 2).
* $p < .05$.

the words were congruent with the color in which they were presented. In the taxation condition, the words did not match the color, and participants had to suppress their automatic tendency to press the key for the color that the word spelled, rather than the ink color.

Following the Stroop task, participants received a summary of the instructions in the decision making task as reminder, and proceeded by making their decisions. We used two ways to check whether the manipulation of cognitive taxation was successful. One followed directly after the investment decisions, consisting of two questions: "It took effort to indicate the color of the word" and "Indicating the color of the word was tiring", with a 7-point answering scale (Pearson's $r = .50$). The second one consisted of four questions at the end of the experiment, referring to the Stroop task: "I found this task difficult/ frustrating/ tiring/fun" on a 7-point scale (last item reverse coded; $\alpha = .70$). The same questions as in Experiment 1 were used to measure expectations and identification with the own group (for the latter scale, Cronbach's alpha = .85). Parochial and universal cooperation were computed as average investments in respectively the in-group (Pool X) and collective pool (Pool Y) over five rounds (Cronbach's alpha = .85 for parochial and .93 for collective investments).

Results

Manipulation check. To check the cognitive taxation manipulation, a custom built 2 (Taxation: yes vs. no) × 2 (Game Structure: NSD vs. NSD IPD) × 2 (SVO: prosocial vs. proself) MANOVA including main effects and two-way interactions of Taxation × SVO and Taxation × Game Structure was conducted on the two scales measuring experienced taxation. Other interactions were not included because we did not have predictions nor the statistical power for further exploration. Participants found the Stroop interference task more tiring and effortful (the first manipulation check) in the taxation ($M = 3.37$, $SD = 1.38$) compared with the no-taxation condition ($M = 1.98$, $SD = 1.10$, $F(1, 168) = 52.24$, $p < .001$, $\eta_p^2 = .24$, 95% CI [1.00, 1.75]. They also indicated afterward that they found the task harder, more frustrating, and less fun (the second manipulation check) after taxation ($M = 3.38$, $SD = 1.23$) compared with no-taxation ($M = 2.67$, $SD = 1.09$, $F(1, 168) = 15.07$, $p < .001$, $\eta_p^2 = .08$, 95% CI [.34, 1.04]). No other effects were significant. We therefore conclude that the cognitive taxation manipulation was successful.

Investment decisions. Participants invested more in the in-group pool ($M = 3.02$, $SD = 2.25$) than in the collective pool ($M = 1.94$, $SD = 2.46$, $t(173) = 4.17$, $p < .001$, Cohen's $d = 0.63$, 95% CI [.63, 1.77]). This supports Hypothesis 1. Figure 3 shows that 65.5% of participants ($N = 114$) invested more in the in-group than in the collective. This is more than three times as many as the 18.4% ($N = 32$) who invested more in the collective than in the in-group ($\chi^2[df = 2, N = 174] = 81.24$, $p < .001$, $\varphi = .68$). 16.1% ($N = 28$) invested equally in both pools.

In the next step, parochial cooperation was analyzed using an ANOVA model that was custom built to include main effects for game, social value orientation, cognitive taxation, and two-way interactions involving game structure. Other interactions were not included because we did not have predictions nor the statistical power for further exploration. As in Experiment 1, we observed a main effect of game structure, indicating higher investments in the NSD ($M = 3.56$, $SD = 2.15$) compared with the NSD-IPD ($M = 2.74$, $SD = 2.29$), $F(1, 168) = 4.67$, $p = .03$, $\eta_p^2 = .03$ (95% CI [.062, 1.38]). This provides additional evidence against Hypothesis 2, derived from GST and SIT that parochial cooperation should be higher in the NSD-IPD than in the NSD.

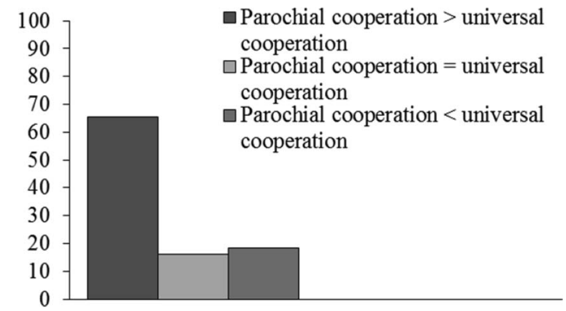

Figure 3. Percentage of individuals investing more in the parochial or in the universal pool in Experiment 2.

We also observed that prosocials displayed stronger parochial cooperation ($M = 3.56$, $SD = 2.26$) than proselves, ($M = 2.73$, $SD = 2.17$), $F(1, 168) = 4.92$, $p = .03$, $\eta_p^2 = .03$ (95% CI [.082, 1.40]). This effect was qualified by a significant interaction with game structure, $F(1, 168) = 4.91$, $p = .03$, $\eta_p^2 = .03$. Figure 4 shows that prosocials invested more in the in-group pool in the NSD than in the NSD-IPD, $F(1, 168) = 9.72$, $p = .002$, $\eta_p^2 = .06$ (95% CI [.54, 2.38]). Proselves did not differentiate their in-group investments based on game structure, $F(1, 168) = .002$, $p = .97$, $\eta_p^2 < .001$, (95% CI [−.96, .92]). This replicates Experiment 1 and supports Hypothesis 4b, derived from BGR, which predicted especially prosocials to invest more in the NSD than in the NSD-IPD. At the same time, as in Experiment 1, data do not support Hypothesis 4a, derived from SIT, which predicted the opposite pattern for prosocials.

Hypothesis 5 predicted cognitive taxation to decrease the difference in parochial investments in the NSD versus the NSD-IPD and was not supported. Neither the main effect of cognitive taxation, nor the interaction with game structure was significant, $F(1, 168) = .05$, $p = .82$, $\eta_p^2 < .001$, and $F(1, 168) = .23$, $p = .63$, $\eta_p^2 = .001$, respectively (see Table 3 for means and standard deviations).

Correlates of parochial cooperation. As shown in Table 2 (above the diagonal), and unlike in Experiment 1, in-group identification predicted parochial cooperation (per Hypothesis 3a). Table 2 also shows that expectations about in-group members' reciprocity predicted parochial cooperation (per Hypothesis 3b), which replicates Experiment 1. Thus, both in-group identification and expectations of reciprocity predicted parochial cooperation.

Discussion

Experiment 2 replicated the key findings from Experiment 1. First, we observed more parochial than universal cooperation, in line with Hypothesis 1. Again, contrary to Hypothesis 2, more parochial cooperation was observed in the NSD compared with the NSD-IPD. In line with Hypothesis 4b, and inconsistent with Hypothesis 4a, this was especially true among prosocials. Supporting both Hypothesis 3a and 3b, parochial cooperation correlated with both in-group identification and expectations of in-group mem-

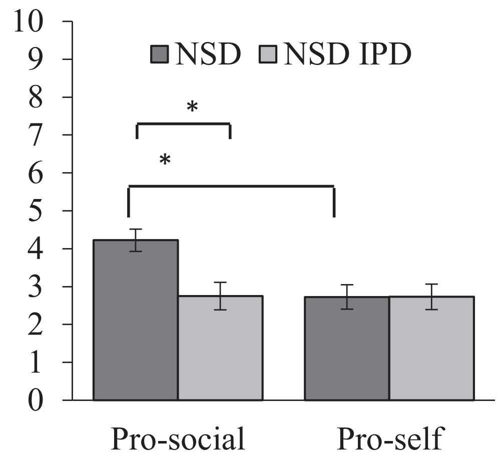

Figure 4. Investments in the (parochial) in-group Pool X (Experiment 2).

bers' cooperation. Again, we conclude that findings are largely inconsistent with predictions derived from GST and SIT, and that predictions based on BGR are supported.

Experiment 2 provided no evidence for moderation by cognitive taxation (Hypothesis 5), even though manipulation checks indicated that we successfully induced cognitive taxation and we had sufficient statistical power to observe a small to medium effect (i.e., for $f = 0.20$, $1 - \beta = 0.76$, with our $N = 176$). We should be careful not to overinterpret null findings, and we therefore tested Hypothesis 5 once again in Experiment 3. However, our most important aim with Experiment 3 was to eliminate a possible validity threat, emanating from the nested social dilemma structure used in the previous two studies. Specifically, in the NSD (see also Halevy et al., 2012) the highest maximum profit for both in- and out-group combined could be reached either by investing everything in the in-group, or by investing everything in the collective. In the NSD-IPD, however, highest collective outcomes can only be realized by investing in the collective. Accordingly, the finding that (especially prosocial) individuals show parochial cooperation mainly in the NSD (as compared with the NSD-IPD) could reflect a general concern with social welfare. When social welfare is maximized equally well through parochial cooperation, this can even be considered the less risky choice as outcomes are dependent on fewer interdependent others. Thus, parochial cooperation can be considered a way to optimize social welfare in the NSD. If social welfare can only be optimized through universal cooperation, as in the NSD-IPD, this option should be chosen more.

Experiment 3

In Experiment 3 we examined this possibility by comparing two new game paradigms: the Collective Incentive Game (CI-G) and the Equal Outcomes Game (EO-G). Similar to the Intergroup Prisoner's Dilemma-Maximizing Differences Game (IPD-MD; Halevy, Bornstein, & Sagiv, 2008), both games allow investments in two in-group pools: one with, and one without direct harm to the out-group. Similar to an NSD, both games also allow for universal cooperation as well as the selfish option to keep money to oneself. Thus, in both games, participants have four options: (a) to keep their endowment; (b) to invest in an in-group pool that does not directly harm the out-group (Pool $X_{\text{no-harm}}$); (c) to invest in an in-group pool that does directly harm the out-group (Pool X_{harm}); and (d) to invest in the collective pool (Pool Y). Options 2 and 3 both represent parochial cooperation, the first without direct out-group harm (similar to the in-group pool in the NSD) and the latter with direct out-group harm (similar to the in-group pool in the NSD-IPD). Importantly, in CI-G, highest outcomes can be reached if all individuals in both groups invest in the collective pool (Table 4 and Procedure and Measures section; see also Buchan, Grimalda, Wilson, Brewer, Fatas, & Foddy, 2009; Wit & Kerr, 2002). In EO-G, highest possible outcomes can be reached either when all group members invest in the in-group pool or when they all invest in the collective pool (see also Halevy et al., 2012).

Method

Sample, design, and power. Participants ($N = 172$; 74.1% female, mean age = 22.92, $SD = 1.71$) received either euros5 or course credit, required for the undergraduate psychology curriculum. Participants were randomly assigned to the conditions of a 2 (EO-G or CI-G) × 2 (taxation or no taxation) design; SVO was measured as a between subjects continuous factor. Main dependent variables were investments in the in-group pools (with and without out-group harm; Pool X_{harm} and Pool $X_{\text{no-harm}}$, respectively) and the collective pool. The experiment was approved by the Ethics Committee of the Psychology Research Institute of the University (2015-WOP-4034) and participants provided signed informed consent prior to their experimental session.

An a priori power analysis using G * Power 3.0 (Faul et al., 2007) and the meta-analysis effect size of $d = .42$ (Balliet et al., 2014) yielded a sample size of $N = 112$ to obtain a power of $1 - \beta = .80$. We oversampled to have a robust test of the possible influence of cognitive taxation.

Procedure and measures. The procedure and tasks in the Experiment were similar to those in Experiment 2, with three main exceptions. First, instead of the classic decomposed game measure,

Table 3
Means (and Standard Deviations) of In-Group Investments Depending on Game Structure and Cognitive Taxation (Experiment 2)

	Cognitive taxation	No taxation
NSD	3.57 (2.15)	3.55 (2.16)
NSD-IPD	2.86 (2.42)	2.62 (2.17)

Table 4
Return per Invested Monetary Unit for Each Player (Experiment 3)

Investment	Game	Decision maker	Each in-group member	Each out-group member
Keep to self	CI	+1	0	0
	EO	+1	0	0
Parochial $X_{\text{no-harm}}$	CI	+.5	+.5	0
	EO	+.5	+.5	0
Parochial X_{harm}	CI	+.5	+.5	−.25
	EO	+.5	+.5	−.25
Collective Y	CI	+.4	+.4	+.4
	EO	+.25	+.25	+.25

the more recent slider measure was used to measure social value orientation (Murphy, Ackermann, & Handgraaf, 2011). Participants were asked to make six decisions about how to divide a (fictional) amount of money between themselves and another person. They were asked to imagine that this other person was unknown and someone they would never meet. The decisions consisted of a slider with nine possibilities, with varying outcomes between oneself and the other person. For example, in the second item the options were (for self and other, respectively): 85–15; 87–19; 89–24; 91–28; 93–33; 94–37; 96–41; 98–46; 100–50). Based on the answers, a general SVO score is computed in terms of an angle of prosociality: An angle of 0° reflects perfect self-interest, while a positive angle reflects more positive concern for other's outcomes (prosociality). A negative angle indicates negative concern for the other party: Motivation to maximize differences in outcomes. The slider measure is a continuous scale and does not exclude individuals as unclassifiable.

Following this measure, participants received task instructions. They learned that they would receive 10 euros and could divide these between three different pools, or keep them to themselves. Note that the games differ from those in the previous experiments which had two rather than three investment pools next to the option to keep the money. Moreover, the instructions here referred directly to euros, and not to monetary units representing euros. In EO-G, 1 euros invested in parochial pool $X_{no\text{-}harm}$ would yield 0.5 euros return for all in-group members; 1 euro invested in parochial pool X_{harm} would yield 0.5 euros return for all in-group members, and subtract 0.5 euros from all out-group members. 1 euro invested in universal pool Y would yield 0.25 euros return for all in-group as well as for all out-group members. The CI-G was identical with one exception: 1 euro invested in pool Y would now yield a return of 0.40 euros to all members of both the in-group and the out-group. Thus, the difference between direct outcomes as consequence of investing in the in-group and the collective were now smaller (0.5 euros vs. 0.4 euros in the CI-G compared with 0.5 euros vs. 0.25 euros in the EO-G), and maximum outcomes possibly gained were now higher on the collective level compared with both the in-group level and the collective level in the equal outcomes game (10 × 0.25 euros investments by eight group members = 20 euros in EO-G, while 10 × 0.40 euros investments by eight group members = 32 euros in the CI-G; see Table 4). Parochial and universal investments were computed as average over the five rounds (see De Dreu et al., 2010 for a similar procedure). For investments in in-group pool $X_{no\text{-}harm}$, Cronbach's alpha = .92. For investments in in-group pool X_{harm}, Cronbach's alpha = .81. For investments in collective Pool Y, Cronbach's alpha = .95.

After the task instructions, we administered the same Stroop task as in Experiment 2, with half of the participants receiving congruent trials and the other half receiving incongruent trials. Subsequently, participants made investment decisions and answered questions regarding their expectations of in-group members' behavior. A final change in materials compared with the previous experiments consisted of our measure of identification. To measure identification in a more fine-grained manner than in the previous experiments, we now used 11 of the 14 items of the in-group identification scale developed by Leach et al. (2008). We excluded the three items measuring "centrality," because these items would not make sense in the minimal group setting we used. Answering was possible on a 1–7 scale (1 = *not at all*, 7 = *very much* and the total 11 item scale had a Cronbach's alpha = .94.

Results

Descriptive statistics. We excluded three participants from further data-analyses. One invested his or her whole endowment in the parochial pool X_{harm} where parochialism directly imposed harm to the out-group, which is not only highly unusual in light of previous research (De Dreu, 2010; Halevy et al., 2012) but also resulted in an outlier score Z = 5.95;[3] two others invested more than the maximum possible of 10 euros. Thus, the final $N = 169$.

Investment decisions. A paired samples *t* test comparing in-group and collective investments supported Hypothesis 1. In-group investments in Pool $X_{no\text{-}harm}$ and Pool X_{harm} combined were higher than collective investments, $t(168) = 5.37$, $p < .001$, Cohen's $d = 0.82$, (95% CI [1.10, 2.37]; also see Table 6). Figure 5 shows that 65.7% ($N = 111$) invested more in the in-group pools combined than in the collective pool, which exceeded the number of participants who invested more in the collective pool (18.9%, $N = 32$) than in the in-group pools by more than three times. 15.4% ($N = 26$) of participants invested equally in the in-group and the collective pool, $\chi^2(df = 2, N = 169) = 79.89$, $p < .001$, $\varphi = 0.69$. In sum, the data replicated Experiment 1 and 2, and support Hypothesis 1 that parochial cooperation prevails over universal cooperation.

Hypothesis 2 predicted more investments in Pool X_{harm} than in Pool $X_{no\text{-}harm}$. As in Experiment 1 and 2, the data did not support this hypothesis, which was derived from GST and SIT. In fact, and once again, we observed the opposite pattern. As shown in Table 6, more investments were made in the Pool $X_{no\text{-}harm}$ than in Pool X_{harm}, $t(168) = 9.69$, $p < .001$, Cohen's $d = 1.49$ 95% CI [1.62, 2.45]. In fact, 71% ($N = 120$ of participants invested more in the $X_{no\text{-}harm}$ than in the X_{harm} pool, which is seven times as many as those who invested more in the X_{harm} than in the $X_{no\text{-}harm}$ pool (8.3%, $N = 14$). 20.7% ($N = 35$) invested equally in both pools, $\chi^2(df = 2, N = 169) = 111.85$, $p < .001$, $\varphi = 0.81$.).

A linear mixed model analysis with investments in Pool $X_{no\text{-}harm}$ and Pool X_{harm} as within-subjects factor and SVO as between-subjects variable was conducted to test contrasting Hypotheses 4a and 4b. Hypothesis 4a, derived from SIT, predicted especially prosocials to invest more in Pool X_{harm} than in Pool $X_{no\text{-}harm.}$ Hypothesis 4b, derived from BGR, predicted the opposite: Especially prosocials should invest more in Pool $X_{no\text{-}harm}$ than in Pool $X_{harm.}$ We obtained a Pool × SVO interaction: $F(1, 180.816) = 8.408$, $p = .004$, Cohen's $d = 0.43$. Simple slopes analysis using ±1 *SD* from the mean SVO angle revealed that individuals high in prosociality invested more in Pool $X_{no\text{-}harm}$ than in Pool X_{harm}, B = 2.623, $SE = 0.288$, $t(180.816) = 9.119$, $p < .001$, Cohen's $d = 1.36$, 95% CI [2.06, 3.19]. Those low in prosociality also invested more in Pool $X_{no\text{-}harm}$ than in Pool X_{harm}, B = 1.442, $SE = 0.288$, $t(180.816) = 5.015$, $p < .001$, Cohen's $d = 0.75$, 95% CI [.87, 2.01]. However, the slope was not as steep as for those higher in prosociality, causing the interaction. Figure 6 depicts

[3] Because investing the complete endowment in the parochial pool where parochialism includes out-group harm (X_{harm}) is in fact a possibility in the current game, we also analyzed the data retaining this participant in the analyses. This did not affect the results or conclusions.

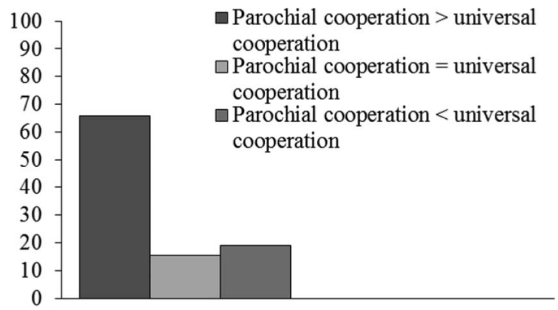

Figure 5. Percentage of individuals investing more in the combined parochial or in the universal pool in Experiment 3.

the means and standard deviations using a median split for SVO for ease of interpretation. Thus, as in Experiment 1 and 2, findings are consistent with Hypothesis 4b and in line with BGR. Hypothesis 4a, which we derived from SIT, received no support.

Hypothesis 5, that cognitive taxation would moderate investments in Pool X_{harm} and Pool $X_{no\text{-}harm}$, was tested with a mixed ANOVA using investments in Pool X_{harm} and Pool $X_{no\text{-}harm}$ as within-subjects variables and cognitive taxation as between-subjects variable. There was no main effect for cognitive taxation on either pool X_{harm}, $F(1, 167) = 3.12$, $p = .08$, $\eta_p^2 = .02$, 95% CI [−.08, .36]) or on Pool $X_{no\text{-}harm}$, $F(1, 167) = .001$, $p = .98$, $\eta_p^2 < .001$, 95% CI [−.40, .39]). Also, the interaction between cognitive taxation and pool was not significant, $F(1, 167) = 2.42$, $p = .12$, $\eta_p^2 = .014$ (see Table 5). As in Experiment 2, we did not observe support for Hypothesis 5.

Correlates of parochial cooperation. Table 6 summarizes zero-order correlations among our measures. When combining in-group investments in Pool $X_{no\text{-}harm}$ and Pool X_{harm}, identification was a significant predictor, $B = .38$, $SE = .17$, $t(167) = 2.28$, $p = .024$, $R^2 = .03$, 95% CI [.05, .71]. This supports Hypothesis 3a derived from SIT. However, identification predicted investments in Pool $X_{no\text{-}harm}$ ($B = .29$, $SE = .15$, $t(167) = 1.99$, $p = .048$, $R^2 = .02$, 95% CI [.002, .59]) but not in Pool X_{harm} ($B = .09$, $SE = .08$, $t(167) = 1.06$, $p = .29$, $R^2 = .007$, 95% CI [<23.07, .25]). This could be seen as inconsistent with the basic assumption in SIT that in-group identification engenders a motivation to maximize difference vis-à-vis out-groups.

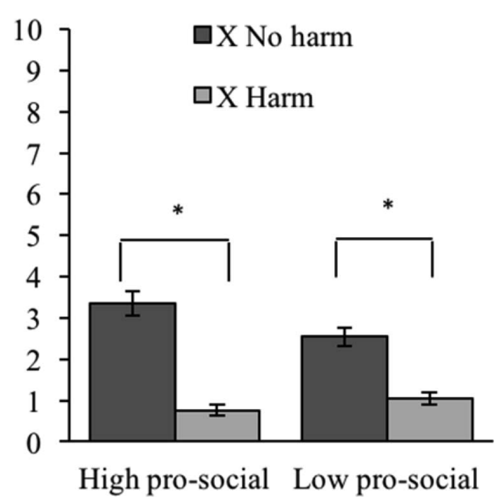

Figure 6. Investments in the parochial $X_{no\text{-}harm}$ and the parochial X_{harm} pool depicted for individuals high and low in prosocial value orientation (Experiment 3). Note: For ease of interpretation, we used a median split and categorized individuals with an SVO angle of 32.69 or higher as high in prosociality, and individuals with an SVO angle lower than 32.69 as low in prosociality.

Table 5
Means (and Standard Deviations) of In-Group Investments Depending on Game Structure and Cognitive Taxation in Experiment 3

	Cognitive taxation	No taxation
Parochial $X_{no\text{-}harm}$	2.62 (2.22)	3.26 (2.51)
Parochial X_{harm}	.91 (1.16)	.90 (1.43)

Expectations about in-group members' investments predicted actual investments in each of the in-group pools ($B = .58$, $SE = .069$, $t(167) = 8.33$, $p < .001$, $R^2 = .29$, 95% CI [.44, .71] for Pool $X_{no\text{-}harm}$, strictly in-group benefiting investments, $B = .51$, $SE = .06$, $t(167) = 8.57$, $p < .001$, $R^2 = .30$, 95% CI [.39, .62] for Pool X_{harm}, out-group harming in-group investments). This supports Hypothesis 3b derived from BGR.

Maximizing social welfare. To investigate whether investments in the in-group by prosocials are a disguised way to maximize social welfare, we conducted an ANOVA with game structure as between-subjects variable and SVO as between-subjects continuous variable on investments in Pool $X_{no\text{-}harm}$. If prosocials only invested in Pool $X_{no\text{-}harm}$ to maximize social welfare, their investments in Pool $X_{no\text{-}harm}$ should be lower in the Collective Incentive Game compared with the Equal Outcomes Game. There was a main effect of SVO, with prosocials investing more in Pool $X_{no\text{-}harm}$ as described above, $F(1, 165) = 6.38$, $p = .012$, $\eta_p^2 = .037$. There was no main effect of game structure, $F(1, 165) = .000$, $p = .99$, $\eta_p^2 < .001$. Finally, there was no interaction between game structure and SVO, $F(1, 165) = .38$, $p = .54$, $\eta_p^2 = .002$. Thus, prosocials did not invest less in their in-group when they could maximize social welfare by investing in a different (the collective) pool.

Discussion

Using a different set of experimental games, Experiment 3 largely replicated Experiments 1 and 2. Participants exhibited a preference for parochial over universal cooperation and preferred parochial cooperation that does not harm the out-group. Maximizing differences in standing between the in- and out-group appeared not to be a main motivator of parochial cooperation. These findings thus contradict our derivations from SIT and GST. Supporting our predictions derived from BGR, we found that stronger parochialism in the NSD emerged especially among prosocials, who appeared to prefer limiting their resources to the in-group, rather than (also) using them to aggress against out-groups. Proselves also showed parochial cooperation, but were less reluctant to impose out-group harm.

Experiment 3 ruled out that parochial cooperation among prosocials is a disguised way of maximizing outcomes for both parties.

Table 6
Descriptive Statistics and Zero-Order Correlations for All Measures (Experiment 3)

	M	*SD*	1	2	3	4	5	6	7	8
1. Investments $X_{no\text{-}harm}$	2.94	3.38	1							
2. Investments X_{harm}	.91	1.29	−.014							
3. Investments coll Y	2.11	2.47	−.242*	−.208*						
4. Investments self	4.04	3.03	−.582*	−.247*	−.536*					
5. Expectations $X_{no\text{-}harm}$	3.10	2.24	.542*	−.053	.081*	−.469*				
6. Expectations X_{harm}	1.40	1.42	.107	.552*	−.208*	−.151*	−.065			
7. Expectations collective Y	1.69	1.95	−.229*	−.089	.542*	−.224*	−.234*	−.170*		
8. Expectations self	3.81	2.73	−.337*	−.180*	−.347*	.624*	−.620*	−.345*	−.436*	
9. Identification in-group	3.21	1.23	.152	.082	.209*	−.325*	.112	−.005	.037	−.1

* $p < .05$.

Even when prosocials could reach higher outcomes on the collective level by displaying universal cooperation, they chose not to do so. We conclude that prosocials are primarily parochial in their cooperation as long as it does not harm the out-group.

As in Experiment 2, we did not obtain effects of cognitive taxation on parochial cooperation. This tentatively suggests that cognitive taxation does not influence parochial cooperation in the social dilemma set-up studied here. Rather, expectations of cooperation by others predict parochialism. Although identification was also associated with parochial cooperation when this was limited to benefiting the in-group, it did not predict parochial cooperation that maximizes differences between the two groups. Again, findings contradict GST and SIT, and support (derivations from) BGR.

General Discussion

Parochial cooperation can potentially harm intergroup relations and escalate conflict, when helping the own group goes at the expense of another group. Three experiments consistently showed that humans have a preference for parochial over universal cooperation. Moreover, we find that the opportunity to harm the other group is not necessary for parochial cooperation to occur. In fact, all three experiments show that individuals are parochial—proself individuals are parochial regardless the consequences to the outgroup and individuals with a prosocial orientation prefer parochial cooperation when it does *not* impose negative externalities on the other group (and if it does, they shift toward universal cooperation). These behavioral tendencies appeared robust against cognitive taxation, and were consistently correlated with expectations about in-group cooperation and, to a lesser extent, in-group identification.

Theoretical Implications and Limitations

Predictions based on the GST received no support. According to GST, the propensity to help the in-group coevolved with a propensity to aggress against out-groups, and humans should prefer parochial cooperation that directly harms the out-group (Arrow, 2007; Lehmann & Feldman, 2008). Along similar lines, but for different reasons, SIT proposes that individuals are motivated to maximize differences between their in-group and out-groups. To achieve this, they should aim for increasing the relative standing of the in-group over the out-group by both in-group favoritism and out-group derogation (see, e.g., Hewstone et al., 2002). Following SIT, we therefore expected even more parochial cooperation when favoring the in-group would *in*clude rather than *ex*clude outgroup harm; this would increase in-groups' relative standing the most. None of our findings provide evidence that this maximizing differences motive is associated with parochial cooperation. Instead, we find strong support for the prevalence of and preference for strictly in-group benefiting parochial cooperation that does not (also) harm the out-group. This primary or even exclusive focus on benefiting the in-group only is in line with BGR. According to BGR, people are motivated to benefit the absolute welfare of the in-group with little or no concern for out-groups, or the relative standing of the in-group vis-à-vis the out-group (Yamagishi & Mifune, 2008; Yamagishi & Mifune, 2016). Indeed, consistent with BGR, all studies confirmed the predictive value of expectations about in-group members' investments on own investments (Yamagishi & Mifune, 2008). Our findings also support the "do no harm" principle, stating that people are unwilling to benefit a group if this would incur damage on others (Baron, 1995). We find individuals reluctant to harm outgroup members, even when this can benefit their own group. Moreover, we advance the do-no-harm principle by showing that especially prosocial individuals are sensitive to situational factors requiring considerations about harming others (see also Van Beest et al., 2005).

We conclude, in sum, that our results resonate with the basic tenets of BGR, and not with those derived from either GST or SIT. To BGR, our findings critically add that especially prosocials are willing to show potentially self-costly parochial cooperation—provided it does no harm to the out-group. Put differently, predictions from BGR appear most valid and predictive of behavior of individuals with a prosocial value orientation. We note that, given the absence of any effects for cognitive taxation in both Experiment 2 and 3, we tentatively conclude also that there is no obvious association between cognitive taxation and parochial cooperation, and that predictions from BGR as supported here are robust against cognitive taxation.

Our analysis thus far resides at the level of individuals making decisions. BGR (and GST) implies that parochial cooperation is adaptive, in that contributing to the group makes the group more effective; this should benefit the individuals within such groups. To directly examine this possibility, we computed collective outcomes generated by both parties based on individuals' investments in Experiment 1 and 2. We aggregated individual investments of Experiment 1 and Experiment 2 to the collective of eight persons

($n = 38$, including individuals without a classifiable social value orientation. Not all participants could be included in the analyses because we analyzed collectives of eight individuals and the total N could not be divided by eight. The collectives were computed based on order of entrance, hence the data of the participants entering the lab last were not used in these analyses). We then investigated how the number of prosocials as well as game structure influenced group welfare (this includes combined investments from all in-group members, the combined investments in their in-group by the outgroup members, and investments in the collective by members of both groups according to the rules of the game). A linear regression with game structure and number of prosocials in the collective as predictors showed two main effects: Collective outcomes were higher when participants played the NSD rather than the NSD-IPD ($B = 50.43$, $SE = 10.83$, $t(36) = 4.66$, $p < .001$). This reflects the wastefulness of intergroup competition. Second, group efficiency was higher when there were more prosocials in the collective, $B = 9.58$, $SE = 3.72$, $t(36) = 2.57$, $p = .014$, $R^2 = .43$.[4] Group efficiency thus is higher with more prosocials and less intergroup competition. This is consistent with BGR and not anticipated in either GST nor SIT.

Avenues for Future Research

The current experiments provide an important next step in understanding individuals' preference for parochial cooperation in intergroup conflict, and the essential role of social value orientation. We developed a new paradigm that affords different cooperation options faced by individuals in many real-life intergroup interdependence structures. Our findings also beget new research questions. For example, we found that individuals are less likely to show parochialism when this directly harms the other party, and another cooperation option is readily available. More research is needed to identify when individuals are willing to inflict harm on another party if this can benefit their in-group. Situations such as intergroup conflicts, which do not easily allow for collectively beneficial options, are easily conceivable. The current results suggest, however, that prosocials are willing to indirectly harm the out-group by withholding benefits from them but not by actively incurring costs. This stands in contrast with previous studies showing that prosocials are willing to benefit their in-group at the expense of the other party (e.g., Abbink et al., 2012). More research is needed to provide conclusive evidence regarding the circumstances under which prosocials are willing to accept harm to the other party as "collateral damage" in their search to benefit the in-group.

Future research could also specifically test predictions of each of the theoretical viewpoints. Our data do not support our derivations from group selection theory or social identity theory. Results support better bounded generalized reciprocity theory, especially for prosocial individuals. To further investigate the mechanisms underlying parochial cooperation, future work could manipulate rather than measure concepts relating to SIT and BGR. Manipulation of interdependence between group membership (uni- or bilateral awareness of common in-group membership) for example has proven fruitful in distinguishing between mere categorization and reciprocity as motives for in-group cooperation (Balliet et al., 2014; Yamagishi & Mifune, 2008). Similarly, varying the cooperative reputation of fellow in- but also out-group members should in- or decrease prosocials' parochial and universal cooperation if bounded generalized reciprocity theory can explain their behavior (Romano, Balliet, & Wu, 2017). Identification with in-group members could also be manipulated or measured in field experiments to investigate the role of in-group identification in explaining parochial cooperation more closely.

Within intergroup interdependence structures, parochialism is not always the only possible form of cooperation. A collectively beneficial option in a conflict is often available, if only the conflicting parties are willing to explore it. Diplomacy and negotiations are constructive means toward conflict resolution and can lead to agreements accepted by both parties, with peace and prosperity as a result (Rubin, Pruitt, & Kim, 1994). Our findings thus bear implications for negotiation research as well. In representative negotiations, representatives of groups also face a cooperation dilemma where they are pressured by their constituency to defend their interests, but pressured by the other negotiation party to compromise and reach an agreement (Druckman, 1977). Research into group influences on cooperation in representative negotiations has shown that representatives are likely to follow the group norm as established by their constituency, which may guide them toward suboptimal decisions or even conflict escalation to serve the groups' interests (Aaldering & De Dreu, 2012; Aaldering & Ten Velden, 2016; Steinel, De Dreu, Ouwehand, & Ramírez-Marín, 2009; Steinel, Van Kleef, Van Knippenberg, Hogg, Homan, & Moffit, 2010). Future research could investigate multiissue negotiations with room for a unilateral (parochial) but also a bilateral (universal) cooperative agreement, thereby varying the competition between the groups, characteristics of the constituency and cognitive restraints on the representatives. Such research would be fruitful in showing the robustness of our findings in a practical negotiation context, as well as refining our conclusions regarding other boundary conditions of prosocials' parochial cooperation.

Conclusion

The in-group advantages created by parochial cooperation can undermine intergroup relations and even elicit or intensify intergroup conflict. In three experiments we tested hypotheses derived from three important theoretical perspectives on in-group cooperation, and showed that individuals are inclined to show parochial rather than universal cooperation. Crucially, we also found that whereas proself individuals are parochial regardless its consequences for the out-group, prosocials are parochial to the extent that it does not hurt out-groups: They are unwilling to impose harm on the out-group. To paraphrase Allport (1954): People live in and contribute to their own group, and especially prosocial individuals do so in ways that avoid harming out-groups.

[4] When including the amount of chips individuals decided to keep to themselves (multiplied by two according to the rules of the games), results did not differ: Higher outcomes were predicted by collective entities playing the NSD ($B = 45.80$, $SE = 6.16$, $t(36) = 7.44$, $p < .001$) and by a higher number of prosocials within the collective ($B = 5.68$, $SE = 2.12$, $t(36) = 2.68$, $p = .011$, $R^2 = .63$). Thus, even when including selfish keeping, combined outcomes for the collective were still predicted by the number of prosocials.

References

Aaldering, H., & De Dreu, C. K. W. (2012). Why hawks fly higher than doves: Intragroup conflict in representative negotiations. *Group Processes & Intergroup Relations, 15,* 713–724. http://dx.doi.org/10.1177/1368430212441638

Aaldering, H., Greer, L. L., Van Kleef, G. A., & 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,* 240–250. http://dx.doi.org/10.1016/j.obhdp.2012.06.001

Aaldering, H., & Ten Velden, F. S. (2016). How representatives with a dovish constituency reach higher individual and joint outcomes in integrative negotiations. *Group Processes & Intergroup Relations*. Advance online publication. http://dx.doi.org/10.1177/1368430216656470

Abbink, K., Brandts, J., Herrmann, B., & Orzen, H. (2012). Parochial altruism in inter-group conflicts. *Economics Letters, 117,* 45–48. http://dx.doi.org/10.1016/j.econlet.2012.04.083

Abrams, D., & Hogg, M. A. (1988). Comments on the motivational status of self-esteem in social identity and intergroup discrimination. *European Journal of Social Psychology, 18,* 317–334. http://dx.doi.org/10.1002/ejsp.2420180403

Allport, G. W. (1954). *The nature of prejudice*. Cambridge, Massachusetts: Addison-Wesley.

Arrow, H. (2007). Evolution. The sharp end of altruism. *Science, 318,* 581–582. http://dx.doi.org/10.1126/science.1150316

Balliet, D., Parks, C., & Joireman, J. (2009). Social value orientation and cooperation in social dilemmas: A meta-analysis. *Group Processes & Intergroup Relations, 12,* 533–547. http://dx.doi.org/10.1177/1368430209105040

Balliet, D., Wu, J., & De Dreu, C. K. W. (2014). Ingroup favoritism in cooperation: A meta-analysis. *Psychological Bulletin, 140,* 1556–1581. http://dx.doi.org/10.1037/a0037737

Baron, J. (1993). Heuristics and biases in equity judgments: A utilitarian approach. In B. A. Mellers & J. Baron (Eds.), *Psychological perspectives on justice: Theory and applications* (pp. 109–137). New York, NY: Cambridge University Press.

Baron, J. (1995). Blind justice: Fairness to groups and the do-no-harm principle. *Journal of Behavioral Decision Making, 8,* 71–83. http://dx.doi.org/10.1002/bdm.3960080202

Bornstein, G. (1992). The free-rider problem in intergroup conflicts over step-level and continuous public goods. *Journal of Personality and Social Psychology, 62,* 597–606. http://dx.doi.org/10.1037/0022-3514.62.4.597

Bowles, S. (2008). Being human: Conflict: Altruism's midwife. *Nature, 456,* 326–327. http://dx.doi.org/10.1038/456326a

Bowles, S. (2009). Did warfare among ancestral hunter-gatherers affect the evolution of human social behaviors? *Science, 324,* 1293–1298. http://dx.doi.org/10.1126/science.1168112

Bowles, S., & Gintis, H. (2004). The evolution of strong reciprocity: Cooperation in heterogeneous populations. *Theoretical Population Biology, 65,* 17–28. http://dx.doi.org/10.1016/j.tpb.2003.07.001

Bowles, S., & Gintis, H. (2011). *A cooperative species: Human reciprocity and its evolution*. Princeton, NJ: Princeton University Press.

Brewer, M. B. (1999). The psychology of prejudice: In-group love and out-group hate? *Journal of Social Issues, 55,* 429–444. http://dx.doi.org/10.1111/0022-4537.00126

Brewer, M. B., & Kramer, R. M. (1986). Choice behavior in social dilemmas: Effects of social identity, group size, and decision framing. *Journal of Personality and Social Psychology, 50,* 543–549. http://dx.doi.org/10.1037/0022-3514.50.3.543

Buchan, N. R., Grimalda, G., Wilson, R., Brewer, M., Fatas, E., & Foddy, M. (2009). Globalization and human cooperation. *Proceedings of the National Academy of Sciences of the United States of America, 106,* 4138–4142. http://dx.doi.org/10.1073/pnas.0809522106

Choi, J.-K., & Bowles, S. (2007). The coevolution of parochial altruism and war. *Science, 318,* 636–640. http://dx.doi.org/10.1126/science.1144237

Corr, P. J., Hargreaves Heap, S. P., Seger, C. R., & Tsutsui, K. (2015). An experiment on individual 'parochial altruism' revealing no connection between individual 'altruism' and individual 'parochialism'. *Frontiers in Psychology, 6,* 1261. http://dx.doi.org/10.3389/fpsyg.2015.01261

De Cremer, D., & Van Dijk, E. (2002). Reactions to group success and failure as a function of identification level: A test of the goaltransformation hypothesis in social dilemmas. *Journal of Experimental Social Psychology, 38,* 435–442. http://dx.doi.org/10.1016/S0022-1031(02)00009-4

De Dreu, C. K. W. (2010). Social value orientation moderates in-group love but not out-group hate in competitive intergroup conflict. *Group Processes & Intergroup Relations, 13,* 701–713. http://dx.doi.org/10.1177/1368430210377332

De Dreu, C. K. W., Aaldering, H., & Saygi, O. (2014). Conflict within and between groups. In J. Dovidio & J. Simpson (Eds.), *APA handbook of interpersonal and group relations* (Vol. 2, pp. 151–176). Washington, DC: APA Press.

De Dreu, C. K. W., Balliet, D., & Halevy, N. (2014). Parochial cooperation in humans: Forms and functions of self-sacrifice in intergroup conflict. *Advances in Motivational Science, 1,* 1–47. http://dx.doi.org/10.1016/bs.adms.2014.08.001

De Dreu, C. K., Dussel, D. B., & Ten Velden, F. S. (2015). In intergroup conflict, self-sacrifice is stronger among pro-social individuals, and parochial altruism emerges especially among cognitively taxed individuals. *Frontiers in Psychology, 6,* 572. http://dx.doi.org/10.3389/fpsyg.2015.00572

De Dreu, C. K. W., Greer, L. L., Handgraaf, M. J. J., Shalvi, S., Van Kleef, G. A., Baas, M., . . . Feith, S. W. W. (2010). The neuropeptide oxytocin regulates parochial altruism in intergroup conflict among humans. *Science, 328,* 1408–1411. http://dx.doi.org/10.1126/science.1189047

De Dreu, C. K. W., Gross, J., Méder, Z., Giffin, M., Prochazkova, E., Krikeb, J., & Columbus, S. (2016). In-group defense, out-group aggression, and coordination failures in intergroup conflict. *Proceedings of the National Academy of Sciences of the United States of America, 113,* 10524–10529.

De Dreu, C. K. W., & Van Lange, P. A. M. (1995). The impact of social value orientations on negotiator cognition and behavior. *Personality and Social Psychology Bulletin, 21,* 1178–1188. http://dx.doi.org/10.1177/01461672952111006

Doosje, B., Ellemers, N., & Spears, R. (1995). Perceived intragroup variability as a function of group status and identification. *Journal of Experimental Social Psychology, 31,* 410–436. http://dx.doi.org/10.1006/jesp.1995.1018

Dovidio, J. F., & Gaertner, S. L. (2010). Intergroup bias. In S. T. Fiske, D. Gilbert, & G. Lindzey (Eds.), *Handbook of socical psychology* (pp. 1084–1123). New York, NY: Wiley. http://dx.doi.org/10.1002/9780470561119.socpsy002029

Druckman, D. (1977). Boundary role conflict negotiation as dual responsiveness. *The Journal of Conflict Resolution, 21,* 639–662. http://dx.doi.org/10.1177/002200277702100406

Efferson, C., Lalive, R., & Fehr, E. (2008). The coevolution of cultural groups and ingroup favoritism. *Science, 321,* 1844–1849. http://dx.doi.org/10.1126/science.1155805

Ellemers, N., Spears, R., & Doosje, B. (2002). Self and social identity. *Annual Review of Psychology, 53,* 161–186. http://dx.doi.org/10.1146/annurev.psych.53.100901.135228

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39,* 175–191. http://dx.doi.org/10.3758/BF03193146

Greenwald, A. G., & Pettigrew, T. F. (2014). With malice toward none and charity for some: Ingroup favoritism enables discrimination. *American Psychologist, 69,* 669–684. http://dx.doi.org/10.1037/a0036056

Gunnthorsdottir, A., & Rapoport, A. (2006). Embedding social dilemmas in intergroup competition reduces free-riding. *Organizational Behavior and Human Decision Processes, 101,* 184–199. http://dx.doi.org/10.1016/j.obhdp.2005.08.005

Halali, E., Bereby-Meyer, Y., & Ockenfels, A. (2013). Is it all about the self? The effect of self-control depletion on ultimatum game proposers. *Frontiers in Human Neuroscience, 7,* 240. Advance online publication. http://dx.doi.org/10.3389/fnhum.2013.00240

Halevy, N., Bornstein, G., & Sagiv, L. (2008). "In-group love" and "out-group hate" as motives for individual participation in intergroup conflict: A new game paradigm. *Psychological Science, 19,* 405–411. http://dx.doi.org/10.1111/j.1467-9280.2008.02100.x

Halevy, N., Chou, E. Y., Cohen, T. R., & Livingston, R. W. (2012). Status conferral in intergroup social dilemmas: Behavioral antecedents and consequences of prestige and dominance. *Journal of Personality and Social Psychology, 102,* 351–366. http://dx.doi.org/10.1037/a0025515

Heine, S. J., Lehman, D. R., Markus, H. R., & Kitayama, S. (1999). Is there a universal need for positive self-regard? *Psychological Review, 106,* 766–794. http://dx.doi.org/10.1037/0033-295X.106.4.766

Henrich, J., & Henrich, N. (2007). *Why humans cooperate: A cultural and evolutionary explanation, evolution and cognition series*. Oxford, UK: Oxford University Press.

Hewstone, M., Rubin, M., & Willis, H. (2002). Intergroup bias. *Annual Review of Psychology, 53,* 575–604. http://dx.doi.org/10.1146/annurev.psych.53.100901.135109

Kiyonari, T., & Yamagishi, T. (2004). In-group cooperation and the social exchange heuristic. In R. Suleiman, D. V. Budescu, I. Fischer, & D. M. Messick (Eds.), *Contemporary psychological research on social dilemmas* (pp. 269–286). New York, NY: Cambridge University Press.

Leach, C. W., van Zomeren, M., Zebel, S., Vliek, M. L., Pennekamp, S. F., Doosje, B., . . . Spears, R. (2008). Group-level self-definition and self-investment: A hierarchical (multicomponent) model of in-group identification. *Journal of Personality and Social Psychology, 95,* 144–165. http://dx.doi.org/10.1037/0022-3514.95.1.144

Lehmann, L., & Feldman, M. W. (2008). War and the evolution of belligerence and bravery. *Proceedings Biological Sciences, 275,* 2877–2885. http://dx.doi.org/10.1098/rspb.2008.0842

Leonardelli, G. J., & Brewer, M. B. (2001). Minority and majority discrimination: When and why. *Journal of Experimental Social Psychology, 37,* 468–485. http://dx.doi.org/10.1006/jesp.2001.1475

Lickel, B., Miller, N., Stenstrom, D. M., Denson, T. F., & Schmader, T. (2006). Vicarious retribution: The role of collective blame in intergroup aggression. *Personality and Social Psychology Review, 10,* 372–390. http://dx.doi.org/10.1207/s15327957pspr1004_6

McLeod, C. M. (1991). Half a century of research on the Stroop effect: An integrative review. *Psychological bulletin,* 163–203. http://dx.doi.org/10.1037/0033-2909.109.2.163

Mead, N. L., Baumeister, R. F., Gino, F., Schweitzer, M. E., & Ariely, D. (2009). Too tired to tell the truth: Self-control resource depletion and dishonesty. *Journal of Experimental Social Psychology, 45,* 594–597. http://dx.doi.org/10.1016/j.jesp.2009.02.004

Messick, D. M., & Mackie, D. M. (1989). Intergroup relations. *Annual Review of Psychology, 40,* 45–81. http://dx.doi.org/10.1146/annurev.ps.40.020189.000401

Mifune, N., Hashimoto, H., & Yamagishi, T. (2010). Altruism toward in-group members as a reputation mechanism. *Evolution and Human Behavior, 31,* 109–117. http://dx.doi.org/10.1016/j.evolhumbehav.2009.09.004

Milinski, M., Semmann, D., Bakker, T. C., & Krambeck, H. J. (2001). Cooperation through indirect reciprocity: Image scoring or standing strategy? *Proceedings of the Royal Society of London, Series B: Biological Sciences, 268,* 2495–2501. http://dx.doi.org/10.1098/rspb.2001.1809

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

Nowak, M. A., & Sigmund, K. (1998). Evolution of indirect reciprocity by image scoring. *Nature, 393,* 573–577. http://dx.doi.org/10.1038/31225

Parks, C. D. (1994). The predictive ability of social values in resource dilemmas and public good games. *Personality and Social Psychology Bulletin, 20,* 431–438. http://dx.doi.org/10.1177/0146167294204010

Parks, C. D., & Rumble, A. C. (2001). Elements of reciprocity and social value orientation. *Personality and Social Psychology Bulletin, 27,* 1301–1309. http://dx.doi.org/10.1177/01461672012710006

Polzer, J. T. (2004). How subgroup interests and reputations moderate the effect of organizational identification on cooperation. *Journal of Management, 30,* 71–96. http://dx.doi.org/10.1016/j.jm.2002.12.003

Polzer, J. T., Stewart, K. J., & Simmons, J. L. (1999). A social categorization explanation for framing effects in nested social dilemmas. *Organizational Behavior and Human Decision Processes, 79,* 154–178. http://dx.doi.org/10.1006/obhd.1999.2842

Rabbie, J. M., Schot, J. C., & Visser, L. (1989). Social identity theory: A conceptual and empirical critique from the perspective of a behavioural interaction model. *European Journal of Social Psychology, 19,* 171–202. http://dx.doi.org/10.1002/ejsp.2420190302

Rand, D. G., Greene, J. D., & Nowak, M. A. (2012). Spontaneous giving and calculated greed. *Nature, 489,* 427–430. http://dx.doi.org/10.1038/nature11467

Rand, D. G., & Nowak, M. A. (2013). Human cooperation. *Trends in Cognitive Sciences, 17,* 413–425. http://dx.doi.org/10.1016/j.tics.2013.06.003

Romano, A., Balliet, D., & Wu, J. (2017). Unbounded indirect reciprocity: Is reputation-based cooperation bounded by group membership? *Journal of Experimental Social Psychology, 71,* 59–67. http://dx.doi.org/10.1016/j.jesp.2017.02.008

Rubin, J. Z., Pruitt, D. G., & Kim, S. H. (1994). *Social conflict: Escalation, stalemate, and settlement*. New York, NY: McGraw-Hill Book Company.

Rusch, H. (2014). The evolutionary interplay of intergroup conflict and altruism in humans: A review of parochial altruism theory and prospects for its extension. *Proceedings of the Royal Society of London B: Biological Sciences, 281*.

Steinel, W., De Dreu, C. K. W., Ouwehand, E., & Ramírez-Marín, J. Y. (2009). When constituencies speak in multiple tongues: The relative persuasiveness of hawkish minorities in representative negotiation. *Organizational Behavior and Human Decision Processes, 109,* 67–78. http://dx.doi.org/10.1016/j.obhdp.2008.12.002

Steinel, W., Van Kleef, G. A., Van Knippenberg, D., Hogg, M. A., Homan, A. C., & Moffit, G. (2010). How intragroup dynamics affect behavior in intergroup conflict: The role of Group norms, prototypicality, and need to belong. *Group Processes and Intergroup Relations, 13,* 1–16.

Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel & W. G. Austin (Eds.), *Psychology of intergroup relations*. Chicago, IL: Nelson Hall.

Ten Velden, F. S., Daughters, K., & De Dreu, C. K. W. (2016). Oxytocin promotes intuitive rather than deliberated cooperation with the in-group. *Hormones and Behavior*. Advance online publication.

Thielmann, I., & Böhm, R. (2016). Who does (not) participate in intergroup conflict? *Social Psychological & Personality Science, 7,* 778–787. http://dx.doi.org/10.1177/1948550616660160

Turner, J. C., Brown, R. J., & Tajfel, H. (1979). Social comparison and group interest in in-group favouritism. *European Journal of Social Psychology, 9,* 187–204. http://dx.doi.org/10.1002/ejsp.2420090207

Van Beest, I., Van Dijk, E., De Dreu, C. K. W., & Wilke, H. A. (2005). Do-no-harm in coalition formation: Why losses inhibit exclusion and promote fairness cognitions. *Journal of Experimental Social Psychology, 41,* 609–617. http://dx.doi.org/10.1016/j.jesp.2005.01.002

Van Lange, P. A. M. (1999). The pursuit of joint outcomes and equality in outcomes: An integrative model of social value orientation. *Journal of Personality and Social Psychology, 77,* 337–349. http://dx.doi.org/10.1037/0022-3514.77.2.337

Van Lange, P. A. M., & Kuhlman, D. M. (1994). Social value orientations and impressions of partner's honesty and intelligence: A test of the might versus morality effect. *Journal of Personality and Social Psychology, 67,* 126–141. http://dx.doi.org/10.1037/0022-3514.67.1.126

Weisel, O., & Böhm, R. (2015). "Ingroup love" and "outgroup hate" in intergroup conflict between natural groups. *Journal of Experimental Social Psychology, 60,* 110–120. http://dx.doi.org/10.1016/j.jesp.2015.04.008

Wit, A. P., & 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,* 616–637. http://dx.doi.org/10.1037/0022-3514.83.3.616

Wit, A. P., & Wilke, H. A. (1992). The effect of social categorization on cooperation in three types of social dilemmas. *Journal of Economic Psychology, 13,* 135–151. http://dx.doi.org/10.1016/0167-4870(92)90056-D

Yamagishi, T., Jin, N., & Kiyonari, T. (1999). Bounded generalized reciprocity: Ingroup boasting and ingroup favoritism. In E. J. Lawler, S. R. Thye, E. J. Lawler, M. W. Macy, & H. A. Walker (Eds.), *Advances in group processes* (pp. 161–197). Bingley, UK: Emerald.

Yamagishi, T., & Mifune, N. (2008). Does shared group membership promote altruism? Fear, greed, and reputation. *Rationality and Society, 20,* 5–30. http://dx.doi.org/10.1177/1043463107085442

Yamagishi, T., & Mifune, N. (2016). Parochial altruism: Does it explain modern human group psychology? *Current Opinion in Psychology, 7,* 39–43. http://dx.doi.org/10.1016/j.copsyc.2015.07.015

Appendix

Overall Means and Standard Deviations of the Investments in Experiments 1–3

Experiment 1	Pool X	Pool Y	Self	
NSD	3.72 (1.87)[a,b]	1.44 (1.97)[a]	4.84 (2.34)[b]	
NSD−IPD	2.75 (2.41)[b]	2.57 (2.68)	4.69 (2.73)[b]	
Prosocials	3.14 (2.12)	2.99 (2.79)	3.87 (2.04)	
Proselves	3.30 (2.34)[a,b]	.92 (1.19)[a]	5.78 (2.70)[b]	
Experiment 2	**Pool X**	**Pool Y**	**Self**	
NSD	3.56 (2.15)[a,b]	1.92 (2.47)[a]	4.52 (2.73)[b]	
NSD-IPD	2.74 (2.29)[a,b]	1.97 (2.47)[a]	5.30 (2.80)[b]	
Prosocials	3.56 (2.26)[a]	2.51 (2.48)[a]	3.94 (2.46)	
Proselves	2.73 (2.17)[a,b]	1.37 (2.32)[a]	5.90 (2.75)[b]	
Cognitive taxation	3.20 (2.31)[a,b]	1.74 (2.02)[a]	5.07 (2.79)[b]	
No taxation	3.10 (2.21)[a,b]	2.13 (2.81)[a]	4.77 (2.78)[b]	
Experiment 3	**Pool $X_{no\text{-}harm}$**	**Pool X_{harm}**	**Pool Y**	**Self**
CI-G	2.68 (1.96)[b]	.78 (1.22)[c,d]	2.56 (2.40)[c]	3.98 (2.87)[b,d]
EO-G	3.19 (2.72)[a]	1.03 (1.35)[d]	1.68 (2.47)[a]	4.10 (3.19)[d]
High prosocials	3.35 (1.31)[a,b]	.76 (.6)[c,d]	2.63 (2.74)[a,c]	3.27 (2.75)[b,d]
Low prosocials	2.52 (1.00)[a,b]	1.06 (.65)[d]	1.60 (2.05)[a]	4.82 (3.12)[b,d]
Cognitive taxation	2.62 (2.22)[b]	.91 (1.16)[c,d]	1.98 (2.20)[c]	4.49 (3.02)[b,d]
No taxation	3.26 (2.51)[a]	.90 (1.43)[c,d]	2.24 (2.72)[a,c]	3.60 (2.99)[d]

Note. CI-G = Collective Incentive Game; EO-G = Equal Outcomes Game; high and low prosocials are based on a median split where we categorized individuals with an SVO angle of 32.69 or higher as high in prosociality, and individuals with an SVO angle lower than 32.69 as low in prosociality.
[a] Investments in Pool $X_{no\text{-}harm}$ and Pool Y differ significantly per row. [b] Investments in Pool $X_{no\text{-}harm}$ and Pool Self differs significantly per row. [c] Investments in Pool X_{harm} and Pool Y differ significantly per row. [d] Investments in Pool X_{harm} and Pool Self differs significantly per row.

Received May 2, 2017
Revision received November 3, 2017
Accepted November 7, 2017 ■