

Intergroup Conflict: Individual, Group, and Collective Interests

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Intergroup conflicts generally involve conflicts of interests within the competing groups as well. This article outlines a taxonomy of games, called team games, which incorporates the intragroup and intergroup levels of conflict. Its aims are to provide a coherent framework for analyzing the prototypical problems of cooperation and competition that arise within and between groups, and to review an extensive research program that has used this framework to study individual and group behavior in the laboratory. Depending on the game's payoff structure, contradictions or conflicts are created among the rational choices at the individual, group, and collective levels—a generalization of the contradiction between individual and collective rationality occurring in the traditional mixed-motive games. These contradictions are studied so as to identify the theoretical and behavioral conditions that determine which level of rationality prevails.

Realistic group-conflict theory (Coser, 1956; Levine & Campbell, 1972; Sherif, 1966) maintains that intergroup conflicts are rational “in the sense that groups do have incompatible goals and are in competition for scarce resources” (Campbell, 1965, p. 287). Although this assumption of rationality pertains to the competing groups, it has been commonly extended to include the individual group members. Inferring that if it is rational for the groups to compete, it must also be rational for the individual group members to do so, researchers have often portrayed realistic conflict theory as “essentially an economic theory” that presumes “that people are selfish and will try to maximize their own rewards” (Taylor & Moghaddam, 1987, p. 34).

Other researchers, however, have realized that what is best for the group is not necessarily best for the individual group member. For example, Campbell (1965) observed that “group-level territoriality has always required that the soldier abandon for extensive periods the protecting of his own wife, children, and home” (p. 24). Similarly, Dawes (1980) noted that

soldiers who fight in a large battle can reasonably conclude that no matter what their comrades do they personally are better off taking no chances; yet if no one takes chances, the result will be a rout and slaughter worse for all the soldiers than is taking chances. (p. 170)

And, more recently, Gould (1999) stated that “all group members benefit if the group acts collectively in defense of its shared interests, but even moderately sensible members might hesitate before joining a possibly fatal fray” (p. 359).

The tension between the collective interest of the group and the interests of its individual members, referred to by these researchers, is unavoidable. It stems from the fact that the benefits associated with the outcome of intergroup conflicts (e.g., territory, political power, status, pride) are public goods that are nonexcludable to the members of a group, regardless of their contribution to their group's effort (Rapoport & Bornstein, 1987). Because contribution entails personal cost (e.g., of time, money, physical effort, and risk of injury or death), rational group members have an incentive to free ride on the contributions of others. The problem, of course, is that if everyone else in the group tries to free ride as well, the group is bound to lose the competition, and the public good will not be provided, or worse yet, a public “bad” will be provided for contributors and noncontributors alike.

This intragroup problem of public goods provision, and its effects on conflict resolution at the intergroup level, has received surprisingly little attention. As observed by Gould (1999)

The issue of interest [in studies of intergroup conflicts] is typically not how groups overcome internal obstacles to collective action but rather why members of distinct social groups see their interests as conflicting in the first place. ... The transition from group interest to group action is often treated either implicitly as unproblematic, or explicitly as a function of response to conflict. (p. 356)

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The central assertion of this article is that the inherent tension between group interest and individual interest is, in fact, the key for understanding intergroup conflicts. Most of all, the need to mobilize individual contribution in spite of the incentive to take a free ride necessitates powerful solidarity mechanisms (Campbell, 1965) within the competing groups. Collective group goals and common group identity are emphasized, norms of group-based altruism or patriotism are fortified, punishment and rejection of defectors are increased, and the shared perception of the out-group is manipulated (Campbell, 1965; Pruitt & Rubin, 1986; Sherif, 1966; Simmel, 1955; Stein, 1976). Whereas the foremost function of these structural and motivational processes is to facilitate cooperation within the groups, they inevitably contribute to the escalation of the conflict between them.

For example, Gilbert (1988) observed that nuclear arms control activists in the United States were often accused of lack of support for American interests. He argued that the main reason why individuals do not oppose nuclear arms policies is that they would have to defend their commitment to the national interest. The situation is complicated further by the fact that the motivation underlying defection in intergroup conflict is inherently ambiguous. Refusing to take part in a war may reflect one's genuine concern for the collective welfare. However, because it is also consistent with the individual's self-interest, a pacifist is likely to be labeled a coward, in addition to being called a traitor.

The problem of public goods provision in intergroup conflict is fundamentally different from that studied in the single-group case. In the case of a single group, the level of contribution needed for the public good to be provided is determined by Nature. Nature, although often uncertain (e.g., Messick, Allison, & Samuelson, 1988; Suleiman, 1997; Suleiman & Rapoport, 1988), never competes back. In contrast, the provision in intergroup conflict is determined by comparing the levels of contribution made by the competing groups. The existence of another group whose choices also affect the outcome requires each group to make complex strategic considerations in deciding whether to cooperate, compete, or strike a certain balance between cooperation and competition. The group's choice of strategy and its success in carrying it out depends to a large extent on its ability to mobilize contribution from its individual members, and its perception of the out-group's ability to do the same.

Clearly, to understand conflict between groups, the intragroup and intergroup levels of conflict must be considered simultaneously. However, the existing paradigms are too restrictive for this purpose. Two-person games (which have been widely used to model intergroup and international conflicts, e.g., Axelrod, 1984; Brams, 1975; Deutsch, 1973) treat the competing groups as unitary players, thus, overlook-

ing the free-rider problem within the groups. On the other hand, traditional n -person games (which have been used to model social dilemmas and problems of public goods provision, e.g., Dawes, 1980; Dawes & Messick, 2000) ignore the competition between the groups.

This article therefore outlines a broader type of games, called *team games*, which incorporates the intragroup and intergroup levels of conflict and shows how the two levels are interrelated. Its aims are to provide a coherent framework for analyzing prototypical problems of cooperation and competition that arise within and between groups, and to review an extensive program of research that has used this framework to study individual and group behavior in the laboratory.

Intergroup Conflicts as Team Games

A team game involves a competition between two groups of players. Each player independently chooses how much to contribute toward his or her group effort. Contribution is costly. Payoff to a player is an increasing (or at least nondecreasing) function of the total contribution made by members of his or her own group and a decreasing (or at least nonincreasing) function of the total contribution made by members of the opposing group (Palfrey & Rosenthal, 1983). In other words, a player can only benefit from contribution by another in-group member and can only lose from contribution by an out-group member.

As a starting point for a taxonomy of team games, I focus first on intergroup competition over step-level public goods (Bornstein & Horwitz, 1993). The group that wins the competition and receives the public good is the one whose members' total contribution of some relevant input (e.g., effort, money, bravery) exceeds that of the other group. Sports competitions and elections, where a margin of even one point or one vote is sufficient to provide the disputed resource in its entirety (e.g., gold medals, public office, group pride), exemplify this type of conflict in its purest form. Many other intergroup conflicts, where the benefits increase rapidly at some critical level of input, rather than increasing smoothly with contribution (Hardin, 1982; Taylor, 1987), approximate this step-level property. In an arms race, for example, if one side has greater arms strength than the other, it often gains a decisive diplomatic or military advantage and the opportunity to secure most of the contested resources.

In its simplest, symmetric form, a step-level team game is defined as an n -person game with the following characteristics:

1. The game is played by two groups, A and B, with n members in each group.

2. Each member of Groups A and B receives an endowment of size e ($e > 0$), and then must decide individually whether or not to contribute his or her endowment.

3. Denote the number of contributors in Groups A and B by m_A and m_B , respectively. If $m_A > m_B$ ($m_A < m_B$), each member of Group A (B) receives a payoff of r units. Members of the losing group receive no reward, and contributions are not refunded. If $m_A = m_B$, then each of the players in both groups receives a payoff of s ($0 \leq s \leq r$) units.

4. The game is played once.

5. The parameters n , e , r , and s are common knowledge.¹

The taxonomy of step-level team games is based on the ordinal relations between the payoff parameters: the cost of contribution (e), the utility of a win (r), and the utility of a tie (s). It is always assumed that $r > e$, but s , the payoff for a tie, can vary from 0 to r . Intergroup conflicts often end up in a stalemate, with neither side clearly winning nor losing the competition. The utility of such an outcome, however, may differ from one conflict to another. In some conflicts the reward in case of a tie is divided equally between the competing sides. In other conflicts where the competition is particularly fierce a tie may be valued more like a loss (Snidal, 1986). In yet other milder conflicts, groups may only aspire not to lose and, therefore, value a tie as if it were a win.

Because Player i in Group A has to choose between two strategies—to contribute his or her endowment (C) or to withhold contribution (D)—four contingencies obtain, depending on the effect of Player i 's decision on the game's outcome. In the first contingency, $m_A < m_B - 1$, Player i 's decision does not affect the outcome, as his or her group loses the competition whether or not he or she contributes. In the fourth contingency, $m_A > m_B$, it is again the case that Player i 's decision has no effect on the game outcome, because his or her group wins whether or not he or she contributes. In the second contingency, $m_A = m_B - 1$, Player i can change a loss into a tie by contributing his or her endowment, and in the third contingency, $m_A = m_B$, he or she can change a tie into a win.

We distinguish among three prototypical step-level team games. The first game satisfies the two inequalities $r > (s + e)$ and $s > e$. Given the first inequality, a rational player should contribute when his or her contribution is critical for winning the game, and given the second inequality, he or she should contribute when his

or her contribution is critical for tying the game. We refer to this game as the Intergroup Public Good (IPG) game (Rapoport & Bornstein, 1987). The second game satisfies the inequalities $r > (s + e)$ and $s < e$. As in the first game, a rational player should contribute when his or her contribution is critical for winning, but in contrast to the first game, he or she should not contribute when his or her contribution is critical for tying the game. This game is referred to as the Intergroup Chicken game. The third team game is one in which $r < (s + e)$ and $s > e$. For the individual player, contribution is rational only if it is needed to tie the game. This game is called the Intergroup Assurance game. Because the games' definitions are based on the ordinal relations between the payoffs, one can generate many different games that fit each category. However, the simplest and most straightforward way to satisfy the defining inequalities is to set $s = r/2$ for the IPG game, $s = 0$ for the Chicken game, and $s = r$ for the Assurance game (the experiments described in this article used these parameters to operationalize the step-level games).²

There is one more permutation of the two inequalities that has not been considered, namely $r < (s + e)$, and $s < e$. In a team game under these constraints, a rational player should not contribute under any circumstances. If we, in addition, stipulate that the player's group also never benefits from his or her contribution, the resulting game is without interest; because the value for which the groups compete is smaller than the minimal cost of competition, there is no conflict of interests between groups and no need for collective action within groups.³ If we relax this constraint, however, and maintain the requirement that each group member is always better off withholding contribution, an interesting and important team game results.

This fourth game, called the Intergroup Prisoner's Dilemma (IPD) game, involves competition for a continuous rather than a step-level public good. That is, the reward is divided between the two groups based on the margin (and not merely the direction) of victory, so that members of the group with more contributors receive a higher payoff, whereas those in the group with fewer contributors receive a lower payoff. Intergroup conflicts (e.g., labor-management negotiations, political dis-

¹For simplicity, I discuss the case where the competing groups are of equal size, all the players have identical endowments, and each has to decide between contributing the whole endowment and withholding contribution. The team game paradigm can be adapted to allow for groups of unequal size (e.g., Rapoport & Bornstein, 1989), unequal endowments (both within each group and between the groups, e.g., Rapoport, Bornstein, & Erev, 1989), and continuous contribution.

²This taxonomy by no means exhausts the universe of step-level team games. For example, Bornstein, Kugler, and Zamir (2003) studied an asymmetric team game, where, to provide the public good, one group must strictly win the game, but the other must only not lose (that is $s = r$ for one group and 0 for the other group). Other variations of intergroup games were recently formulated by Rapoport and Almadoss (1999) and Takacs (2001).

³The constraint that a noncritical contribution does not benefit the group was implicit in the previous discussion of the step-level team games. Formally, this constraint is expressed in the following inequalities: $e > 0$, for the IPG, $e > ns$ for the Chicken game, and $e > n(r - s)$ for the Assurance game.

putes, wars), as modeled by the IPD game, can end up in a compromise that reflects the relative amounts of effort expended by the competing groups. In the IPD game, as in the previous step-level games, each player receives an endowment of e and has to decide whether or not to contribute his or her endowment. The reward to Player i in Group A is given by the following function: $r/2n(m_A - m_B) + r/2$, with $r/2n < e < r/2$.

Because by contributing a group member increases his or her payoff by $r/2n$ but pays e (which is defined to be larger), a rational player should never contribute, regardless of what the other (in-group and out-group) members do. That is, defection is the dominant individual strategy in the IPD game. However, because by contributing a player produces a total benefit of $r/2$ for the in-group ($r/2 > e$), the payoff for a player when all in-group members contribute is higher than his or her payoff when none contribute, regardless of the number of out-group contributors. Table 1 illustrates the payoff for an individual group member in the IPG, Chicken, Assurance, and IPD team games with $n_A = n_B = 3$, $e = 2$, and $r = 6$. Because the games are symmetric, the table displays the payoff to a member of Team A as a function of that player's decision to contribute (C) or not contribute (D) and $m_A - m_B$, the difference between the number of in-group and out-group contributors.

Specifying Individual, Group, and Collective Rationality

For each team game we consider three cases: the *noncooperative case*, where binding and enforceable agreements among players are impossible (Colman, 1995), and each player makes his or her decision independently of the other (in-group and out-group) players; the *semicooperative case*, in which the members of each group can make a binding decision concerning a collective strategy vis-à-vis the out-group; and the *fully cooperative case*, where all members of both groups

can bind themselves to an agreement for a collective strategy.

Solving for the noncooperative, semicooperative, and fully cooperative cases allows choices that are consistent with individual, group, and collective rationality to be specified concurrently and compared to one another. *Individual rationality* is defined in terms of the optimal individual strategy in the noncooperative game against all other (in-group and out-group) players; *group rationality* refers to a group adopting an optimal strategy vis-à-vis the other group in the context of the semicooperative game; and *collective rationality* is defined in terms of the collectively optimal strategy—the one maximizing the total payoff of all members of both groups—in the fully cooperative game.

As will be shown later, the solutions for the noncooperative, semicooperative, and fully cooperative cases do not always coincide. Depending on the game's payoff structure, contradictions or conflicts can arise between the rational choices at the individual, group, and collective levels—a generalization of the contradiction between individual and collective rationality occurring in the traditional mixed-motive games. Studying these contradictions so as to identify the theoretical and behavioral conditions that determine which level of rationality predominates is the heart of our research program.

Individual and Group Rationality

This section reviews team-game experiments in which members of each group were allowed to conduct a face-to-face discussion to decide on a collective strategy vis-à-vis the other group. If group decisions were made, however, they were neither binding nor enforceable. Although this type of communication has no direct bearing on the situation's reward structure (and hence is often referred to as "cheap talk"), it does serve two important

Table 1. *The Four Prototypical Team Games*

	$m_A - m_B$						
	3	2	1	0	-1	-2	-3
The Intergroup Public Goods (IPG) game							
C	6	6	6	3	0	0	—
D	—	8	8	5	2	2	2
The Intergroup Chicken game							
C	6	6	6	0	0	0	—
D	—	8	8	2	2	2	2
The Intergroup Assurance game							
C	6	6	6	6	0	0	—
D	—	8	8	8	2	2	2
The Intergroup Prisoner's Dilemma (IPD) game							
C	6	5	4	3	2	1	—
D	—	7	6	5	4	3	2

Note: $m_A - m_B$ = difference between number of in-group and out-group contributions; C = contribute; D = not contribute.

functions. First, discussion enables group members to agree on a collective strategy. Second, discussion provides the group with an opportunity to mobilize the individual contributions necessary for carrying out its strategy of choice (e.g., Dawes, McTavish, & Shaklee, 1977; Kerr & Kaufman-Gilliland, 1994; Orbell, van de Kragt, & Dawes, 1988).

These two functions are inseparable. Having to deal simultaneously with the external conflict and the internal dilemma, the group faces the challenge of selecting a strategy that is effective in the game against the out-group and, at the same time, provides a stable solution to the group's internal dilemma. As will be shown later, the group's choice of strategy and its success in implementing it depend largely on the strategic structure of the intergroup and intragroup games and the interaction between the two levels.

The Effect of Within-Group Communication in the IPG and IPD Games

From the point of view of the competing groups, the IPD and IPG games are practically identical. In both team games the optimal strategy for each group is to compete by having all of its members contribute. This strategy maximizes the group's security level by guaranteeing at least a tie and a payoff of $r/2$ per player. It is also the best response against a rational opponent in the sense that neither group can benefit from having fewer than n contributors when the n members of the other group all contribute.⁴ But the outcome resulting from mutual competition is collectively deficient; if both groups compete by having all their members contribute, each player receives $r/2$, whereas if both groups cooperate by having none of their members contribute, each player ends up with $r/2 + e$. The intergroup conflict (i.e., the semicooperative case) in the IPG and IPD games has the properties of a 2-person Prisoner's Dilemma (PD) game—when both sides choose their optimal strategies, the outcome is collectively deficient (Dawes, 1980).

Rational choice theory prescribes that when the game is played only once, the groups in both the IPG and IPD games should use the opportunity for discussion to designate all group members as contributors. However, the consequence of such a decision on the subsequent individual choice is hypothesized to be different in the two games. In the absence of coercion

(i.e., side payments), a narrowly rational player should contribute if and only if his or her contribution is critical in affecting the outcome of the competition, and his or her personal gain from changing the game's outcome exceeds the cost of contribution. In other words, under rational choice assumptions, a group agreement is self-enforcing only if it renders the contribution of each designated contributor individually rational.

This is indeed the case in the IPG game. Designating all group members as contributors, while assuming that the out-group has done the same, makes each member's contribution critical for tying the game. And, because the reward for a tie is defined to be larger than the cost of contribution ($r/2 > e$), the incentive to free ride is removed. In the terminology of van de Kragt, Orbell, and Dawes (1983) such a decision constitutes a minimal contributing set.⁵ In contrast, the decision to designate all group members as contributors in the IPD game does not change the fact that withholding contribution is the dominant individual strategy, and therefore such a decision is vulnerable to defection by self-interested individuals. Based on this structural difference, it is hypothesized that groups will be more successful in solving the free-rider problem in the IPG than in the IPD game. Specifically, it is predicted that groups playing the IPG game will be more likely to choose the competitive strategy, and individual group members will be more likely to abide by the group's decision.

An experiment by Bornstein (1992) that compared the effects of within-group discussion in the two team games (played between two 3-player groups) clearly confirms these predictions. Although in both team games discussion increased contribution rates as compared with a no-communication control condition, it was much more effective in solving the free-rider problem in the IPG game. Of the groups playing the IPG game, 90% agreed to designate all group members as contributors, and when such an agreement was made, it was violated by fewer than 2% of the individual players. In contrast, only 60% of the groups playing the IPD game agreed to designate 3 contributors, and the defection rate was about 17%. As a result, 85% of the groups managed to carry out the optimal group strategy in the IPG game, as compared with only 45% of the groups who managed to do so in the IPD game.

Implications. The finding that groups are much more efficient in solving the internal problem of free riding in the step-level IPG game than in the continuous IPD game provides a valuable insight as to why intergroup conflicts are often portrayed in "all-or-noth-

⁴Contribution by all members of both groups is the unique Nash equilibrium (in pure strategies) in both the IPG and IPD games. In the IPD game, contribution by all group members is the dominant group strategy that maximizes the in-group's payoffs regardless of what the out-group does, whereas in the IPG game there is no dominant strategy.

⁵More formally, because no individual player can benefit from unilaterally changing his or her strategy, the outcome of all players contributing is the (unique) Nash equilibrium in the noncooperative game among the $2n$ players in addition to being the equilibrium in the 2-person game between the two groups.

ing” terms (“It’s either victory for them or victory for us”). Framing the conflict as a step-level game (Pruitt & Rubin, 1986) has clear advantages from the perspective of the group, as it makes it rational for group members to contribute when they believe this is critical for their group’s success (Kerr, 1992).

This does not mean that free riding is no longer a problem if a conflict is perceived as step-level. For example, an experiment by Bornstein, Rapoport, Kerpel, and Katz (1989) allowed participants in the IPG game to conduct both within- and between-group discussions before choosing individually whether or not to contribute. It showed that communication with the out-group interferes with the group’s ability to solve the internal free-rider problem. This can perhaps explain why groups tend to restrict contact with the out-group in times of conflict.

Another important factor is group size. When the groups become larger, the probability that a particular player’s contribution will affect the game’s outcome becomes smaller and the temptation to take a free ride increases. Groups often try to overcome the sense of dispensability that comes with large numbers by propagating narratives of a single individual or a small group of individuals who “saved the battle” by an act of heroism. Similarly, the individual’s sense of criticalness is affected by the perceived symmetry between the groups (Rapoport & Bornstein, 1987). Individual criticalness is maximized, and consequently, the incentive to free ride is minimized when the competing groups are perceived as equal in size, strength, and cohesion. This is indeed why soccer team coaches and political campaign managers are rather careful not to create a sense of overconfidence (or defeatism either, for that matter) among the members of their groups.

The Effects of Within-Group Communication in the Chicken and Assurance Team Games

Next we examine the effect of within-group discussion in the Assurance and Chicken team games. The game of Assurance models a relatively benign version of the security dilemma where the temptation to defect for defensive reasons is balanced by the strong preference of both sides for mutual cooperation (Jervis, 1978). The game of Chicken models conflicts involving bilateral threat, such as military confrontations and disputes between management and workers, where a failure of either group to yield, leads to an outcome, such as war or strike, that is disastrous to both sides.

In the Assurance game, as in the IPG and IPD games, if a group fears that the other group might compete, its best response is also to compete by designating all n group members as contributors. Designating n contributors is the safest (i.e., maximum) strategy that protects the group against the possibility of losing the

competition and guarantees a reward of r for each member. But, unlike the IPG and IPD games, if a team expects the out-group to behave cooperatively (i.e., to designate no contributors), its best response is also to cooperate. Choosing to compete in this case will not increase the team’s payoffs (because the payoffs for winning and tying the game are identical) but will reduce its endowments. The mutually cooperative outcome of designating no contributors yields a payoff of $r + e$ per player—the highest payoff possible in the game.⁶ The intergroup conflict (i.e., the semicooperative game) is, thus, a generalization of the 2-person Assurance game (Jervis, 1978), where it is rational for each side to compete if it fears that the other side will compete, and to cooperate if it expects that the other side will cooperate.

The strategic considerations in the Chicken game are virtually reversed. If a group fears that the other group will compete (i.e., designate n contributors), its best response is to cooperate or yield (i.e., designate no contributors). However, if both groups play it safe, the outcome is not stable as each group can exploit the other team’s caution to compete and win the game. Of course, if both groups are greedy and try to win the game, the resulting outcome is the worst possible. When all players in both groups contribute, everyone loses their endowment and no one gets paid. The (i.e., semicooperative) Chicken game has the defining characteristics of a 2-person game of Chicken (Schelling, 1960). If each side assumes that the other side will “chicken out,” both are exposed to the risk of a mutually disastrous outcome (i.e., a “collision”).

An experiment by Bornstein, Mingelgrin, and Rutte (1996) compared the effect of within-group communication in the Assurance and Chicken games (operationalized as a competition between two teams with 3 players in each). The experimental results show that, following within-group communication, the majority of the groups in both the Assurance and Chicken team games (83% and 72%, respectively) chose the competitive strategy of designating all group members as contributors, and practically all players abided by the group decision. As a result, 75% of the participants in both team games contributed their endowment, as compared with a contribution rate of about 40% (in both team games) in a no-communication control condition.

Whereas the structural difference between the Assurance and Chicken games had little effect on either group or individual choice behavior, it did have profound effects on the intragroup processes leading to these decisions. In particular, the rationale for choos-

⁶Unlike the IPD and IPG games, all the cases in which the Assurance game is tied are Nash equilibria, meaning that the best response for each group is to match the number of contributions in the out-group.

ing the competitive strategy (as coded from group discussions) and the beliefs of individual participants following discussion (as reflected in the postdecision questionnaire) differed systematically as a function of game type.

The choice of the competitive group strategy in the Assurance game was based on distrust or fear of the opponent. In-group members expected the out-group to compete by designating all of its members as contributors and decided to protect themselves against losing the game by making the same choice. This “playing it safe” scenario was evident in the group discussions, which included risk-avoidance arguments (e.g., “If we all contribute we are assured of at least a tie”) and symmetric expectations for the in-group and the out-group (e.g., “They must be thinking exactly the same way”). It was also clear in the postdecision questionnaire, where the participants predicted that in-group and out-group members would be about equally likely to contribute, and consequently, they expected the game to be tied.

In contrast, the decision to compete in the Chicken game was motivated by greed. Group discussions contained risk-taking arguments (e.g., “If we all contribute, it’s either all or nothing”) and asymmetric in-group–out-group expectations. Specifically, participants expected the out-group to be less likely to compete (i.e., designate all group members as contributors), and if the out-group did decide to compete, they expected individual out-group members to be less likely to keep the decision (e.g., “Let’s all contribute, at least one of them is bound to defect.”). Following within-group discussion, participants estimated the contribution rate of the out-group as almost 20% lower than that of the in-group and, consequently, assessed the in-group’s chances of winning as much higher than the out-group’s.

Implications. We found that in both the Assurance and Chicken team games group members decided on the most competitive strategy of designating all group members as contributors. However, they did so for very different reasons. In the Assurance game, group members decided to compete because they perceived the out-group as competitive and dangerous. In the Chicken game, they decided to compete because they perceived the out-group as vulnerable and likely to “chicken out.”

Agreeing to compete is not enough, though. To execute this strategy all group members have to actually contribute their endowment. Because they have no way of enforcing the agreement, the in-group members use the opportunity for discussion to tailor their beliefs about the “enemy” so as to rationalize individual contribution in the particular game. In the Assurance game, in-group members assume that the out-group members are as smart and as “patriotic” as

they are. This perceived symmetry between the two groups is highly functional in solving the internal dilemma because, given the strategic structure of this game, it renders the contribution of each group member critical for a tie. Any other scenario can undermine collective action within the group, as it increases the temptation for individual group members to take a free ride. In the Chicken game, on the other hand, group members form differential beliefs about in-group and out-group behavior. Although inconsistent with the notion of mutual rationality, this in-group–out-group bias is again functional in solving the internal problem of free riding. The shared belief that the in-group will win the game, but only by a small margin, makes each member’s contribution seem critical for winning.

The most intriguing implication of these findings is that in-group–out-group bias is not merely a result of group categorization, nor is it a simple consequence of mixed-motive relations between the groups. Rather, in-group–out-group perceptions play a major role in upholding collective group action and, thus, vary predictably with the specific structure of the two-level game. Evidently, given the negligible defection rates in our experiment, these shared group perceptions were highly effective in solving the intragroup dilemma. The inevitable result, however, is that nearly half (45%) of the sessions resulted in full-scale “war”—the outcome least efficient for both groups.

Individual and Collective Rationality

Stimulated by problems of resource depletion, pollution, and overpopulation, much of the research on social dilemmas has been concerned with how to get people to cooperate (e.g., consume less energy, buy recyclable products, have fewer children). However, although cooperation is a good thing in these single-group dilemmas (van de Kragt, Dawes, & Orbell, 1988), in intergroup conflicts cooperation is typically bad from the collective point of view. Reconsidering Dawes’s (1980) previously discussed battle example can help clarify this point. Taking the perspective of one side, Dawes described the battle situation as a social dilemma with defection being the individually rational but collectively deficient choice. However, taking a wider perspective, which includes all soldiers on both sides, defection is both individually rational and collectively optimal. All soldiers in the battle will be better off if they all act selfishly and take no chances. As will be shown later, communication between the groups can facilitate a peaceful (i.e., collectively optimal) solution to the intergroup conflict. However, its effectiveness depends to a large extent on the strategic properties of the two-level game.

The Effect of Between-Group Communication in the IPG and IPD Games

First, let us examine the effects of cheap talk between groups in the IPG and IPD games. These two PD-like team games are similar in the sense that the collectively optimal solution is for all players in both groups to withhold contribution. The games are different, however, in the sense that the collective interest and the individual interest coincide in the IPD game, whereas they oppose each other in the IPG game. Recall that the dominant individual strategy in the IPD game is to withhold contribution, and if all players make the rational choice, the resulting outcome is collectively optimal. In contrast, if Player *i* believes that all other players will withhold contribution in the IPG game, Player *i* can single-handedly win the game by contributing his or her endowment. It is therefore hypothesized that a “peace” agreement to designate no contributors will be more stable (more resistant to individual violation) in the IPD than in the IPG game.

An experiment by Bornstein (1992) that compared the effects of between-group communication in the IPG and IPD team games (operationalized, as usual, as a competition between two teams with 3 players in each) supports this hypothesis. Although between-group discussion reduced contribution rates in both games (as compared with the no-communication control condition), its effectiveness in resolving the intergroup conflict was considerably lower in the IPG than the IPD game. Following between-group communication, 30% of the individual players contributed their endowments in the IPG game as compared with a contribution rate of only 8% in the IPD game. When the two groups managed to reach a cooperative (noncontribution) agreement, individuals were more likely to violate it in the IPG than the IPD game (violation rates were 12% and 4%, respectively). And, most important, the groups playing the IPG game were less successful in negotiating a “peace” agreement to begin with, and whenever negotiation failed, contribution reached a highly inefficient rate of over 70%.

Implications. The collective or universal interest in both the IPG and IPD games is for all players to withhold contribution. Nonetheless, we found that players are more successful in achieving this collectively optimal outcome in the continuous IPD than in the step-level IPG game. This finding suggests that framing intergroup conflict as a “win-some-lose-some” rather than an “all-or-nothing” game, and downplaying the impact of individual contribution, can contribute to a peaceful resolution. Peace initiatives that stress the futility of individual contribution (given the high personal cost and negligible effect on the outcome) have a good chance to succeed, as they

have “the temptations of selfishness on their side” (Campbell, 1972, p. 34). By taking into account the interest of the individual group members, and not only that of the group, the IPD game brings forth the possibility of basing peace between groups on a direct appeal to individual rationality (bolstered, perhaps, by the argument that what is in the individual’s interest is in everyone’s interest), rather than on rationality at the group level.

The Effect of Between-Group Communication in the Assurance and Chicken Games

Previous research has produced inconsistent results concerning the effect of intergroup communication on conflict resolution. Insko and Schopler (1987) and Schopler and Insko (1992) found that communication between groups is relatively ineffective as a means for resolving the conflict. Their research employed the 2-person PD game and allowed group members (or group representatives) to discuss the game with their opponents before each group (as a whole) made its choice of a strategy. Insko and Schopler found that group decisions were highly competitive—much more so than individual decisions under the same conditions (see Schopler & Insko for a review).

Insko and Schopler (1987) offered two explanations for the observed competitiveness of groups. The “schema-based distrust” hypothesis explains group competitiveness in terms of fear. It postulates that group members compete because they expect the out-group to behave competitively and want to defend themselves against the possibility of being exploited. The “social support for shared self-interest” hypothesis explains group competitiveness in terms of greed. It argues that groups are competitive because group members provide one another with support for acting in an exploitative, in-group-oriented way.

In the PD game either fear or greed is sufficient to motivate a competitive choice (Coombs, 1973; Dawes, 1980). Therefore, to distinguish between these two motives for competition, Insko, Schopler, Hoyle, Dardis, and Graetz (1990) and Insko et al. (1993) devised a version of the PD game, called the PD-alt game, which includes a third option of withdrawal for both players. Withdrawal is a safe option that guarantees each side a payoff higher than the payoff for mutual defection, so a player who fears that the other player will defect should withdraw rather than defect. Defection, in other words, is rational only if a player believes that the opponent will cooperate, and it is, therefore, indicative of greed.

Studying the effect of communication between players in the one-shot PD-alt game, Insko et al. (1993) found that, although communication enhanced cooperation between two individuals, it did not improve coop-

eration between two groups (as compared with a no-communication control condition). Different results were reported by Majeski and Fricks (1995), who compared the effect of communication on intergroup cooperation in the repeated PD and PD-alt games. These researchers found that, in general, communication enhanced intergroup cooperation, and the option of withdrawing also had a positive effect.

An experiment by Bornstein and Gilula (in press) uses a different approach to separate fear and greed. Rather than studying the PD-alt game where the groups have a safe withdrawal option (which is seldom available in real-life conflicts), we compared the game of Assurance, where there is no incentive to win (rather than tie) the competition, with the game of Chicken, where there is no incentive to tie (rather than lose) the competition. Thus, with respect to the monetary payoffs, greed is eliminated from the first game and fear from the second.

We have already seen that the majority of the groups in both the Assurance and Chicken team games, when allowed only within-group communication, chose to compete. Can communication between the groups help them reach a cooperative solution to the intergroup conflict? In the Assurance game the answer is a definite yes. The cooperative solution in this game, namely, for all members of both groups to withhold contribution, is symmetric and stable. It is symmetric as it allows both groups to “not lose” the competition, and not losing in the Assurance game (when $s = r$) is as good as winning. It is stable because no group can benefit from unilaterally reneging on a no-contribution agreement.⁷ Recall that the only rational reason to compete in the Assurance game is fear of a competitive or irrational opponent (or fear of the opponent’s fear, etc.). Communication between the groups can diffuse such fears by reassuring each group of the other group’s rationality (its intention to maximize absolute, rather than relative, payoffs). Communication can also be used to verify a common understanding of the game’s payoff structure and to enhance trust through an explicit agreement of mutual cooperation (Majeski & Fricks, 1995).

In the game of Chicken, on the other hand, because winning is all that matters, between-group communication is expected to be practically useless. The collectively optimal outcome in this game is for one group to have a single contributor and the other group to have none. This solution is asymmetric, however, and, thus, inherently unstable. Assume that the groups agreed that the single contributor will be in A. If the members of Group B believe that Group A will keep the agreement and designate only one contributor, they are

tempted to win the game by designating two. Knowing that, Group A should designate all 3 group members as contributors, and Group B should respond by designating none. However, given the expectation that all members of B will withhold contribution, a single contributor is again sufficient to win the game for A, and so on.⁸ This state of affairs renders any nonenforceable agreement between the groups rather futile.

The experiment by Bornstein & Gilula (in press) confirmed these predictions. The team games in this experiment were operationalized as a competition between two teams with 3 players in each. The participants were allowed to discuss the game with other in-group members, after which they met with the members of the out-group for a between-group discussion, and finally they had separate within-group discussions before deciding individually and privately whether to contribute their endowment.

In the Assurance game, all between-group discussions resulted in the collectively optimal (i.e., 0:0) agreement, and all of the agreements were fully kept. In the Chicken game, only 40% of the discussions resulted in the collectively optimal (i.e., 0:1) agreement, 20% resulted in a no-contribution (0:0) agreement, and 40% did not end in an agreement. Moreover, none of the agreements reached were kept. In fact, most of the intergroup agreements were already violated in the subsequent within-group discussions. For example, following a 0:1 between-group agreement in one session, both groups designated 3 contributors. Following a 0:1 agreement between Groups A and B in another session, Group A reneged by designating 3 contributors, and because Group B kept its side of the agreement, Group A ended up winning the game.

Thus, although communication between the groups invariably led to the collectively optimal outcome of zero contribution in the Assurance game, communication between the groups in the Chicken game resulted in a highly inefficient contribution rate of over 78%. This contribution rate was, in fact, as high (and as inefficient) as that found in a previous experiment (Bornstein et al., 1996) where communication between the groups was altogether prohibited. Furthermore, between-group communication did little to change the biased in-group–out-group perceptions; group members still saw themselves as more determined and more cohesive than their rivals and were still confident about their chances to win the game.

Implications. We found that the strategic structure of the game dramatically modified the effect of between-group communication on conflict resolution. In the Assurance game, where competition is motivated by mutual fear, communication was highly effective in

⁷The outcome, in other words, is a Nash equilibrium in the semicooperative Assurance game. Moreover, it is also an equilibrium in the noncooperative game because no individual player can benefit from contributing when all other players do not.

⁸In other words, there is no pure-strategy equilibrium in the (semicooperative) competition between Groups A and B.

bringing about a peaceful resolution. In the Chicken game, where competition is motivated by mutual greed, communication was practically useless. In many real-life conflicts, the definition of the “game” is rather flexible, in the sense that changes in the subjective utilities attached to the outcomes can transform one game into another (e.g., Jervis, 1978; Oye, 1986). The same objective situation can be perceived as a game of Assurance, where both sides can “not lose”, or as a game of Chicken, where one side must win. Clearly, the way the participants perceive or frame the conflict is bound to affect their chances of negotiating a peaceful resolution.

The Effect of Intergroup Conflict on Intragroup Cooperation

The most recurrent hypothesis of the intergroup conflict literature is that intergroup conflict increases intragroup cooperation (Campbell, 1965, 1972; Rabbie, 1982; Stein, 1976; Tajfel, 1982). Stated this way, however, the hypothesis is not sufficiently well defined to be subjected to a meaningful test. Most critically, the hypothesis fails to specify the relevant control condition with which the level of cooperation in intergroup conflict should be compared. Modeling intergroup conflicts as team games enables us to rephrase the hypothesis in a way that makes more sense. Because the intragroup payoff structure in these games is a problem of public goods provision, we can ask whether people are more likely to contribute toward a public good when it is embedded in an intergroup conflict than when it is not.

Cooperation in Intergroup and Single-Group Prisoner's Dilemmas

Intergroup conflict can increase cooperation in two qualitatively different ways: It can change the motivation of individual group members toward a greater concern with the collective group goal, and it can modify the actual incentives so that selfish individuals are induced by consideration of their private interest to act in accordance with the collective interest of their group (Messick & Brewer, 1983). The intergroup conflict literature has typically highlighted the motivational effect, attributing the observed increase in cooperation to “an increase in solidarity and cohesion of the in-group [such that] the group and the people in it come to matter more to the group members” (Brown, 1988, p. 200). However, this literature also recognized that intergroup conflict has profound effects on the actual payoff structure within the group (Campbell, 1965, 1972; Coser, 1956; Sherif, 1966; Stein, 1976).

In intergroup conflicts outside the laboratory, these motivational and structural effects are utterly con-

founded. To distinguish between group-based altruism (or “patriotism”) and narrow self-interest as reasons for individual contribution, the intragroup payoff structure must be kept constant. The IPD game provides an ideal setting for this comparison. This team game is structured so that the intragroup payoff structure is an n -person PD game or a social dilemma, regardless of what the out-group does. This property of the IPD game was used by Bornstein and Ben-Yossef (1994) to assess the net effect of intergroup conflict on intragroup cooperation. Specifically, we compared the IPD game (with 3 players in each group) to a single-group (3-person) PD game with identical payoffs. In addition, to exclude the possibility that the classification of players into groups, rather than the conflict of interests between the groups (Rabbie, 1982; Tajfel & Turner, 1979), is responsible for potential effects, we included two groups in the PD control condition as well. This ensures that the only difference between the two conditions is that in the IPD game the two groups are in competition against each other, and in the PD game each group is engaged in a separate (independent) game.

The results of the Bornstein and Ben-Yossef (1994) experiment clearly support the intergroup conflict–intragroup cooperation hypothesis as stated previously. The level of contribution in the IPD game was twice as high as that in the single-group PD game. Specifically the average rate of contribution was 55% in the IPD game, as compared with only 27% in the PD game. Because there were two groups of players in both conditions, the higher contribution rate in the IPD game can be attributed to the real conflict of interests between the groups, rather than to the mere classification of players into groups. Moreover, because the intergroup conflict did not change the payoff structure within the group (that is, group members were faced with exactly the same intragroup dilemma in both conditions), its effect on the contribution level can be unequivocally construed as motivational rather than structural.

One explanation for this effect is that real intergroup conflict serves as a unit-forming factor that enhances group identification beyond classification and labeling alone (Campbell, 1965; Rabbie, Schot, & Visser, 1989). Group identification in turn increases cooperation, as it leads individual group members to substitute group regard for egoism as the principle guiding their choices (Brewer & Kramer, 1986; Dawes & Messick, 2000; Hardin, 1995; Kramer & Brewer, 1984).

Consistent with this interpretation, we found that participants in the IPD condition viewed themselves as motivated less by self-interest and more by the collective group interest than those in the PD control condition. We also found that the decision to contribute was negatively correlated with the motivation to maximize one's own payoffs and positively correlated with the motivation to maximize the collective payoffs of the in-group. Intergroup competition also increased partic-

icipants' motivation to distinguish themselves positively from the out-group (Turner, Brown, & Tajfel, 1979). The participants in the IPD condition reported a higher motivation to maximize the relative in-group advantage than those in the PD condition, and this competitive orientation was positively correlated with their contribution behavior.

A somewhat different explanation was recently offered by Baron (2001). Baron conducted a World Wide Web experiment using the IPD–PD design. Like Bornstein and Ben-Yossef (1994), Baron (1997) found that in-group contribution was higher in the IPD than the PD condition. Baron attributed this “two-groups vs. one group parochialism effect” to the “illusion of morality as self-interest”—the tendency of people to believe that self-sacrificial behavior on behalf of one's group is in fact in one's self-interest. Baron hypothesized that the self-interest illusion is greater when an in-group is in competition with an out-group. Indeed, he found that participants in the IPD (two-group) condition were more likely than those in the PD (one-group) condition to believe that contribution was in their self-interest and that they would earn more money acting this way. Moreover, contribution decisions were strongly correlated with beliefs in self-interest. That is, individuals who showed a greater tendency to cooperate with their group in competing against the other group also indicated a greater self-interest illusion.

Another recent study that employed the IPD–PD design was conducted by Probst, Carnevale, and Triandis (1999). They were interested in the relations between the players' decision to cooperate or defect and their values. Their main hypothesis involved the distinction between vertical individualists—competitive people who want to do better than others—and vertical collectivists—cooperative people who tend to sacrifice their own interest for the interests of the group. Vertical individualists are predicted to defect in the single-group (PD) dilemma, where the relative payoff is maximized by defection, and to cooperate in the intergroup (IPD) dilemma, where winning is achieved by cooperating with one's own group to defeat the other group. Vertical collectivists, on the other hand, are predicted to cooperate in the single-group dilemma, where contribution serves the collective interest, and to withhold contribution in the intergroup dilemma, where all the participants are better off if none contributes. Consistent with this hypothesis, Probst et al. found that vertical individualists were least cooperative in the PD game and most cooperative in the IPD game. Vertical collectivists showed the opposite pattern, being most cooperative in the PD game and least in the IPD game. Baron (2001) suggested an alternative explanation. He argued that vertical individualists, who value both pursuit of self-interest and competition against others, are especially vulnerable to the illusion

of self-interest. These participants are willing to sacrifice their self-interest on behalf of their group when in competition against another group because, in this context, they do not perceive what they are doing as self-sacrifice.

Implications. The IPD and PD games present participants with identical intragroup social dilemmas. Nevertheless, the experiments described previously show that participants are more likely to contribute to their group's effort when it is competing against another group than when it is playing an isolated, single-group game. This greater willingness to sacrifice on behalf of the group when its gain comes at the expense of the out-group is obviously disturbing from the perspective of the larger society (which includes all members of both groups). Whereas contribution is collectively optimal in single-group dilemmas, it is collectively deficient in intergroup dilemmas.

Baron (2001) pinpointed the problem when he wrote

We might think of actions as potentially affecting the self, the group, and the world. ... Some action helps the group but hurts both the self and the world. Other actions might hurt the self and help the world, and still others might help the self only. One question for future research is what sorts of interventions might reduce parochialism without seriously harming altruistic behavior toward the world. (p. 295)

It should be emphasized that the increased cooperation in intergroup conflict does not mean that the internal problem of free riding is inconsequential and can therefore be ignored. For example, an experiment by Bornstein, Winter, and Goren (1996) investigated whether the difference between the IPD and PD games observed in the context of one-shot games persists when the games are played repeatedly. The results show that participants were initially more likely to contribute in the intergroup than in the single-group game. However, the difference in contribution rates decreased as the games progressed until it eventually disappeared. Thus, although this study reconfirms that individuals have a higher propensity to contribute in the intergroup, it also shows that this “patriotism” dwindles with time. Other variables, such as group size, cost of contribution, and the utility of the public good, are also expected to affect the magnitude of the free-rider problem.

It should be also stressed that intergroup competitions are not always destructive. In some cases increasing individual contribution through competition between groups is beneficial for both the group and the society at large. Constructive competition regularly takes place among different organizations (e.g., firms) as well as subgroups within the same organization (e.g., R&D teams). The groups that win the competi-

tion are those whose members are more cooperative and better coordinated with one another than members of the competing groups. Several experiments (Bornstein & Erev, 1994; Bornstein, Erev, & Rosen, 1990; Bornstein, Gneezy, & Nagel, in press; Erev, Bornstein, & Galili, 1993) demonstrated that, by decreasing free riding and enhancing coordination within the competing groups, intergroup competition can improve overall performance as compared with the single-group case.

Cooperation in Intergroup and Single-Group Games of Chicken

Bornstein, Budescu, and Zamir (1997) conducted an experiment that compared the intergroup Chicken game with a single-group (n -person) game of Chicken. Both games involved 4 players, each of whom received an endowment of e units and had to decide between keeping the endowment and contributing it. In the single-group Chicken game, a reward of $r/2$ ($r/2 > e$) was provided to each of the 4 players if at least one of them contributed. If no one contributed, the players received no reward. In the intergroup Chicken game, the 4 players were divided into two dyads. The members of the dyad with more contributors were paid a reward of r units each, whereas the members of the losing dyad were paid nothing. In case of a tie, all 4 players were paid nothing. In both games, a player who did not contribute his or her endowment kept it.

The single-group and intergroup variants of the Chicken game, as operationalized here, are comparable in an important aspect. The highest joint outcome is achieved when a single player contributes but the other 3 do not. Thus, as a collective, all 4 players have an interest in coordinating their actions on this outcome. However, because any player can assume the role of the single contributor, each game has 4 such outcomes, and the players have to solve the problem of how to coordinate on one of these alternatives.⁹

The participants in our experiment were provided with two coordination devices: The games were played repeatedly, and each repetition was preceded by a pregame period in which players could signal their intentions to contribute or not. Given the opportunity and the means of coordination, we compared the two games for collective efficiency and fairness (i.e., equality of payoffs). In the single-group Chicken game, more than 60% of the rounds resulted in the collectively optimal outcome of a single contributor, and turn-taking among players was quite common. In contrast, only 26% of the rounds resulted in the collectively optimal outcome in the intergroup Chicken game, and practically all of the other rounds resulted in

a higher (and hence less efficient) rate of contribution. Most notably, 12% of the rounds ended up in a full-scale "collision" of all players contributing (and each making a profit of zero). In addition, there was little indication of turn-taking within groups or between the groups.

Implications. The intergroup and the single-group games of Chicken present players with essentially the same problem—to maximize collective payoffs, a single player should contribute on each round of the game, and to obtain fair outcomes the players should alternate in taking this role. Yet, as our results indicate, interaction in the intergroup game was both less efficient and less fair than that in the single-group game. Clearly, the intergroup game was played out much more competitively than the intragroup game.

This finding can be explained by the dynamics of the interaction between and within the competing groups. Assume that the members of Group A are the first to commit themselves to the competitive strategy. To the extent that this commitment is perceived as credible by the members of Group B, they should rationally yield by withholding contribution. Thus victory for A can result from its display of the intention to win and the collective resolve to follow through on that intention. However, the expectation that the members of Group B will back down creates a conflict of interests within Group A. Because only one contributor is now needed to win the game, the members of Group A find themselves in a (2-person) game of Chicken, as each prefers to free ride rather than pay the cost of contribution. Of course, if the members of Group B suspect that Group A's solidarity may unravel, they might then decide to compete in the hope of winning. Yet the possibility of their implementing this strategy depends on their ability to solve their own intragroup Chicken game, and so on. Clearly, the intragroup dilemma makes it difficult for either group to emit a credible signal of solidarity. This makes the intergroup situation very precarious. As observed by Gould (1999), "the general awareness . . . that . . . groups may fail to act together contributes to the likelihood of escalation to violence, and to the extent of the harm that ensues" (p. 357).

The importance of group solidarity is illustrated by the dynamics observed in one of our experimental sessions. In this (rather atypical) session, Group A established its dominance quite early in the game. After a few "collisions" with Group B, Group A began to win one round after another. The scenario became quite predictable; at the beginning of the period all 4 players signaled their intention to contribute, but before long one of the players in B changed his or her signal from C to D, and the other immediately followed. The 2 members of A, however, did not use this opportunity to free ride. Rather than getting involved in the internal game

⁹These outcome are also the Nash equilibria in pure strategies in the intergroup and single-group games.

of Chicken, both contributed their endowments at the end of each period. Although this display of solidarity can be considered wasteful (because only one contributor was needed to win the game), it was rather effective in deterring the other group (and preventing a “war”) for the duration of the game.

Team Games and the Study of Intergroup Relations

Intergroup conflicts are complex—more complex than any other form of social interdependence. The research reviewed in this article attempts to gain valuable insights into this complexity by replacing it with a simplified and well-defined model and using the model, rather than the actual social situation, as the object of investigation. To the extent that the model preserves the essential features of the actual situation (and, not less important, excludes the nonessential details), investigating it can increase our understanding of the real situation in some important ways (Colman, 1995).

First, a game model whose elements—players, strategies, and payoffs—are explicitly defined is a powerful conceptual tool. It increases our understanding of the underlying logical structure of the situation and, by applying principles of rational choice to this structure, can illuminate the functional bases of motivational and behavioral processes that take place in the social situation. Another important advantage of using a game model is generality. An abstract model can be used to represent manifold social interactions and, thus, generalizes our understanding in a way that transcends specific examples. Consequently, a general model greatly facilitates interdisciplinary exchange and cross-facilitation (Kollock, 1998). Recent reviews of the literature on social dilemmas (or the free-rider problem, or the problem of public goods provision, or the problem of collective action) in psychology (Dawes & Messick, 2000; Komorita & Parks, 1995), sociology (Kollock, 1998), economics (Ledyard, 1995), and political science (Ostrom, 1998) all use the PD and other game models as their primary paradigm. Finally, a game is an effective experimental tool. Using monetary incentives, it enables researchers to create an actual conflict in the laboratory, consistent with the structural abstraction of the relevant situation, so as to study under controlled conditions variables that affect behavior in natural circumstances (Dawes, Orbell, Simmons, & van de Kragt, 1986).

It would be difficult, indeed impossible, to imagine the study of cooperation and competition in dyadic relations (e.g., Axelrod, 1984; Kelley & Thibaut, 1978; Rapoport & Chammah, 1965) without the clarity and generality provided by 2-person games. *N*-person games have served a similar role in the study of social dilemmas and problems of public

goods provision (e.g., Dawes, 1980; Hardin, 1982). I believe that team games that incorporate these two paradigms can similarly further the study of intergroup conflict and competition.

The team-game research, with its primary emphasis on the structure of interdependence in intergroup conflict, is firmly rooted in the “realistic” group conflict tradition. Realistic conflict theory, however, as initially formulated by Campbell (1965), Sherif (1966), and others (e.g., Coser, 1956), was rather crude. It drew only a general distinction between competitive and cooperative intergroup relations, failing to specify the payoff structure between and within the competing groups. As this article clearly demonstrates, the strategic properties of the intergroup and intragroup “games” and the conditions of “play” have profound effects on people’s behavior and how they perceive the others with whom they are interdependent.

Unfortunately, the current literature on intergroup relations pays little attention to the structure of these relations. This markedly cognitive literature (Messick & Mackie, 1989) focuses instead on people’s tendency to perceive themselves and others in terms of distinct social categories, attributing behavior to people’s perception of group “entitativity” rather than the nature of their interdependence. A series of so-called minimal group experiments demonstrated that dividing people into distinct social categories affects the way they behave toward each other. However, our own research, as well as research by others (e.g., Gaertner & Insko, 2000; Rabbie et al., 1989; Yamagishi & Kiyonari, 2000), has shown that much of the variability in behavior is accounted for by the nature of the explicit or implicit interdependence between and within these categories and the functional challenges it presents for groups and individuals.

Another difference in emphasis between the team-game approach and social identity theory involves the dependent variables of interest. Social identity theory (Tajfel & Turner, 1979) focused on prejudice, discrimination, and negative stereotyping intended to maintain or achieve positive group distinctiveness. Team-game research, on the other hand, focuses primarily on individuals’ willingness to act on behalf of the collective group goal. Obviously, the cognitions and behaviors considered by the social identity literature are consequential for understanding intergroup relations. But, it is “the willingness to fight and die for the ingroup ... which makes lethal war possible” (Campbell, 1965, p. 293). Campbell was absolutely right in arguing that “the altruistic willingness for self-sacrificial death in group causes may be more significant than the covetous tendency for hostility toward outgroup members” (p. 293).

It should be stressed that a positive group identity is in itself a public good. In fact, it is a rare example of a pure public good, which, in addition to being

Table 2. *A Taxonomy of Games by Type of Players*

Player/Opponent	Nature	Individual (I)	Unitary Team (U)	Noncooperative Group (G)
Individual (I)	I	I-I	I-U	I-G
Unitary team (U)	U	U-I	U-U	U-G
Noncooperative group (G)	G	G-I	G-U	G-G

nonexcludable, is also indivisible in that one person's enhancement of self-esteem following the group's success does not reduce the ability of other group members to enjoy the same "resource." If our own group is perceived as superior to another group, then "we, too, can bask in that reflected glory" (Brown, 2000, p. 312), regardless of whether or how much we contributed to the group's success. Whenever excluding group members from consuming a public good is impossible, there is a temptation to free ride on the efforts of others. In that sense, "social" competition (Turner, 1975) for symbolic resources such as rank, status, and prestige is not different in any fundamental way from "objective" competition for concrete resources, such as land, money, and power. Team games, like other game models, are defined in terms of utilities, or personal values (Dawes, 1988), which are quantitative representations of whatever is truly important for the decision makers, and they are, thus, equally applicable to either type of conflict.

Directions for Future Research

The team-game experiments described previously operationalized the competing sides as noncooperative groups whose members cannot reach binding agreements (although in some experiments they are allowed "cheap talk"). There is, however, an important line of social psychological research that has operationalized the competitors in bilateral conflict as unitary groups (groups that make a joint, single decision) and compared the behavior of such groups with that of individual players.

Rational choice theory does not distinguish between groups and individuals as decision makers, as long as it can be assumed that the members of a group can make a binding agreement concerning a collective strategy (and can, thus, be considered a unitary player). Nevertheless, Insko and his colleagues (Schopler & Insko, 1992) demonstrated that interaction between two unitary groups is dramatically more competitive than interaction between two individuals. This tendency of unitary groups to behave more competitively than individuals was termed the discontinuity effect. A similar phenomenon was documented in experiments on ultimatum bargaining where unitary groups made consistently less generous offers than individuals (Bornstein & Yaniv, 1998; Robert & Carnevale, 1997).

The team-game and "discontinuity" lines of research taken together point to the importance of distinguishing among three basic types of decision makers or players in the study of strategic interaction. These are no-cooperative groups (G), whose members act independently without the ability to make binding agreements; cooperative or unitary groups (U), whose members can reach a binding agreement on a collective strategy; and individuals (I). Pitting these types of players against one another for a (noncooperative) 2-player game, and adding Nature as a potential "opponent," generates the 3 (type of player) \times 4 (type of opponent) matrix depicted in Table 2.

This matrix provides a rather useful tool for mapping the existing (strategic and nonstrategic) decision-making literature and pointing out the gaps that currently exist in this literature. The I cell contains the vast literature on individual decision making, or one-person "games" against Nature (e.g., Camerer, 1995). The U cell includes the literature on group decision making (e.g., Davis, 1992). There is also a substantial social psychological literature that compares I and U cells (e.g., Hill, 1982; Kerr, MacCoun, & Kramer, 1996). The G cell contains the literature on noncooperative n -person games and in particular the social dilemma and public goods literature (e.g., Dawes & Messick, 2000; Ledyard, 1995). The I-I cell encompasses the literature on 2-person games (e.g., Komorita, & Parks, 1995). Insko and his colleagues have studied the U-U case, using the interindividual or I-I game as a control.¹⁰ The research described in this article focuses primarily on the G-G case, often using the single-group case, G, as a control.

Little research has been done so far to directly compare the I-I and G-G games, or the U-U and G-G games (see, however, Bornstein, et al., 1997; Insko et al., 1994). Moreover, I know of no research on the asymmetric cases, where the competition is between agents of different types (i.e., G-I, G-U, and U-I). Examples of such asymmetric competitions are abundant. A strike of an unorganized group of workers against an

¹⁰Insko and colleagues (e.g., Schopler & Insko, 1992) have studied "natural" groups—groups whose members can talk freely among themselves and share information and ideas. However, unitary groups can also be operationalized as nominal groups—groups whose members arrive at a group decision by some imposed public-choice (i.e., voting) mechanism (e.g., majority rule, dictator choice) without an opportunity for face-to-face discussion (e.g., Bornstein, Schram, & Sonnemans, in press).

individual employer or a unitary board of directors, a standoff between a democratic state and a dictatorship, or a clash between a scattered group of demonstrators and a cohesive police force are only a few of the examples that come to mind. What type of player has the advantage? How does this depend on the strategic structure of the game? These are important questions that future research needs to address.

The team-game paradigm is sufficiently broad to include the different cells in the matrix. In their most elaborated G-G form, team games model conflict and competition among noncooperative groups. By compelling the members of one or both groups to make a binding decision, team games can be adapted to cover the U-G and U-U cases, respectively. In the degenerate cases, where there is no competing group, or each “group” consists of a single individual, a team game has the form of an n -person game (G) or a 2-person game (I-I), respectively. Finally, when there is no out-group and the “in-group” is of size one, a “team game” is reduced to a one-person (I) game against Nature.

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