Actions of Similar Others as Inducements to Cooperate in Social Dilemmas

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Two studies were conducted to determine whether information about the actions of others in a multitrial social dilemma can influence choice behavior. Participants read about three (fictitious) people who supposedly had already participated in the study and who were either similar or dissimilar to a typical college student. Participants then played several trials of a social dilemma game. Study 1, which used a prisoner's dilemma, showed that participant rates of cooperation conformed to those reported for similar, but not dissimilar, others. Study 2 added outcome information to the person descriptions and changed the game to a public goods dilemma. Cooperation rates were directly influenced by similar others when others' choices were described as having produced large outcomes; when choices were said to have produced small outcomes, rate of cooperation was inversely related to others' behavior. As with Study 1, information about dissimilar others had no effect on choice behavior.

A social dilemma can be defined as a situation of interdependence in which members of a group must each decide whether to maximize selfish interests or collective interests. The dilemma lies in the fact that it is personally more desirable to maximize selfish interests but if all members do so, all are worse off (receive poorer outcomes) than if everyone had maximized collective interests (Komorita & Parks, 1995). According to Komorita and Parks (1995), the major types of social dilemma research paradigms are the prisoner's dilemma (PDG), under which each member of a group must independently (and usually simultaneously) choose between cooperation and noncooperation, with each person's pay-off being determined by the specific combination of choices; the public goods game, under which each group member must decide whether to contribute to the provision of some entity that, if provided, may be used by all members, regardless of whether they contributed toward its provision; and the resource dilemma, under which all group members sample at will from a common, depletable resource pool that is only partially replenished at fixed intervals, with the dilemma being that chronic overuse will result in the "drying up" of the pool.

A voluminous body of research on social dilemmas has shown that people are not terribly cooperative. All else being equal, the typical study produces cooperation rates between 30% and 40% (Komorita & Parks, 1996). If one believes that maximization of collective welfare is important, these are not very encouraging rates of cooperation. Consequently, one primary goal of social dilemma research is to identify interventions that will induce greater rates of cooperation in group members. We can distinguish between two basic types of intervention (Messick & Brewer, 1983). A structural intervention is one that changes the nature of the dilemma so that noncooperation is less attractive and cooperation is more attractive. For example, we might impose a penalty for continuing to consume when the total pool size falls below some threshold in a resource dilemma. Structural solutions have been criticized on theoretical grounds because they remove the dilemma aspect of the social dilemma (Dawes, 1990; Dawes, van de Kragt, & Orbell, 1988) and on practical grounds because real-world implementation of structural change is typically difficult, often impossible, and usually costly (Yamagishi, 1986). By contrast, an individual intervention is directed toward altering the choice behavior of the group members such that they resist the temptation to

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be uncooperative. For example, it is known that people who have been taught, and given the opportunity to practice, resource pool management techniques are very cooperative once they enter a group setting (Allison & Messick, 1985).

In this article, we report on two studies that investigated the effectiveness of an individual intervention, social comparison, at inducing high rates of cooperation in group members who are involved in a multitrial social dilemma. Basically, we were interested in knowing whether information about the choices of other individuals would influence the choices made by our participants.

Social Comparison and Decision Making

There are real-world examples of dilemma-type situations in which there is provision of information about the behavior of others, often with the intent of inducing cooperation by others. The best example involves fund-raising by public television stations. A public television station is a real example of a public good. Group members must decide whether to contribute to the provision of some entity that will be available to the group at large. The dilemma lies in the fact that the entity can be used by all group members, even those who did not contribute to its provision. Hence, it is individually rational not to make a contribution because one will then have both the intended contribution and the collective good available for selfish use. However, if all members act in this way, there will be no contributions at all, the good will not be provided, and all will be worse off than if all had made a contribution. Because public television exists largely due to viewer contributions and programming is available to noncontributors, it fits the definition of a public good.

Many of the fund-raising tactics used by public television stations assume that, if given the chance, viewers will engage in social comparison with those who have already contributed. For example, many stations take part in the national "viewers like you" campaign. Programs are prefaced with an auditory and visual acknowledgement of the financial contributions of "viewers like you" (Blumenthal & Goodenough, 1998). Moreover, many stations use testimonials given by individuals who have already contributed money to the station, with the person describing his or her background and what he or she likes about the station (Bedford, 1996). The goal of these campaigns is to convince viewers that they are quite similar to the typical contributor. The assumption seems to be that the viewers will then engage in social comparison and conclude that they too should give money to the station. In fact, Bedford (1996) quotes a station development director as saying that the goal of personal testimonials is to arouse a reaction on which viewers will then act. Whether these interventions have the intended effects on contribution, however, has never been tested.[1]

Theoretically, there is reason to believe that such an intervention can make people more cooperative. Wood (1989, 1996) argued that social comparison is a complex process by which people use others as the basis for information about the self. One may use this information to evaluate personal abilities and engage in self-improvement by developing new skills or enhancing existing ones. Of importance for our purposes, Wood also suggested that there are cognitive, affective, and behavioral reactions to the comparison process. A good example of a behavioral reaction is the person imitating a behavior of the comparison target. As we have seen, the assumption of public television fund-raisers is that viewers will contribute after learning that similar others have already done so. Hence, Wood's (1989, 1996) arguments provide support for the notion that group members can be induced to cooperate by being told that others are already cooperating. Research on connections between social comparison and decision-making processes provide further support for this hypothesis. Individuals often look to similar others for information about an appropriate course of action in a decision-making situation (e.g., Bandura & Jourden, 1989; Dawes, 1988; Sims & Manz, 1981-1982), especially when the situation is a novel one for which no objective standard of behavior exists (Brockner et al., 1984). For example, Brockner et al. (1984) demonstrated that a model can influence the choices of a person who is confronted with potential entrapment, a situation in which a person continually invests resources but realizes no positive pay-off from that enterprise (e.g., continual investment of money into a social program that has produced no benefit to society). Specifically, Brockner et al. (1984) found that participants patterned their choices after a model. If the model chose to continually commit resources to the failing enterprise, so did the participant. If the model ceased to invest, and avoided entrapment, so did the participant.

Brockner et al.'s (1984) work is important for social dilemma research. Komorita and Parks (1996) argued that the entrapment paradigm shares some features with the basic social dilemma paradigm in that the entrapped person's actions are often detrimental to a larger collective (e.g., continued investment in the failed social program is at the expense of other programs that do work). What sets the two paradigms apart is social interdependence. In the social dilemma paradigm, outcomes are a joint function of everyone's choices, but in the entrapment paradigm, outcomes are determined by the choices of a single decision-making unit. Komorita and Parks thus argued that entrapment phenomena also

might occur within the social dilemma setting. Finally, there is growing evidence that cooperative choice is influenced by social-cognitive processes. de Dreu and McCusker (1997) argued that cognitive-motivational variables qualify the assumptions of rational choice that underlie most theories of mixed-motive behavior. In support of their contention, such factors as first impressions (de Bruin & van Lange, 1999), stereotypes (de Dreu, Yzerbyt, & Leyens, 1995), heuristic thinking (Allison & Messick, 1990), and trust (Brann & Foddy, 1988; Parks, Henager, & Scamahorn, 1996; Parks & Hulbert, 1995; see also Kramer, 1999) are all known to affect rate of cooperation. Social comparison is one of the most ubiquitous of social cognitive processes (Goethals, 1986), and it is important to know what role, if any, social comparison plays in decisions to cooperate.

In sum, similar others are used in real social dilemmas to prompt cooperative response, social comparison is known to affect behavior in settings that share features with social dilemmas, and other cognitive-motivational factors have been shown to influence social dilemma behavior. These facts attest to the importance of formally testing the impact of social comparison on cooperative choice. We designed two studies to test this impact.

STUDY 1

The purpose of Study 1 was to test the idea that people will tailor their cooperation decisions in a social dilemma to match those of another person. The social comparison literature emphasizes the importance of similarity between the object of comparison and the person (Wood, 1989). Behavior is not influenced by those who are dissimilar to us. If social comparison processes are at work, it should be necessary to provide the participant with both behavioral information and similarity information. Hence, our prediction is that participants will tailor their choices to match those of a comparison other, but only when the other is similar to the participant. Information about the choices of dissimilar others will have no effect on participant choice.

Participants

The participants were 144 students enrolled in introductory psychology. Participation was in partial fulfillment of a course requirement.

Design

The design was a 2 (comparison others: similar or dissimilar) × 3 (choices of others: cooperative, competitive, or no information) between-participants design.

Stimulus Materials

The social dilemma game used was a two-person PDG. The pay-off matrix is shown in Table 1. In this game, "A" is defined as the cooperative choice because joint gain is maximized by both persons choosing A and "B" is the noncooperative (or competitive) choice because personal gain is maximized by always choosing B. Note, however, that if both players succumb to personal temptation and choose B, each person's pay-off is poorer (5 points) than if each had chosen A (7 points). The *K* value of a pay-off matrix indicates the rate of cooperation one would expect from a typical person behaving under the matrix (Rapoport, 1967). It is calculated as (AA pay-off – BB pay-off) / (BA pay-off – AB pay-off). The value ranges from 0 to 1.00 and is interpreted as the proportion of cooperative choices one should typically observe given no interventions. Thus, for example, a matrix with a *K* value of .50 is one under which, all else being equal, the typical person will cooperate about 50% of the time. For our matrix, the *K* value is (7 – 5) / (9 – 3) = .33. This low value is desirable for research purposes because it means that high rates of cooperation cannot simply be attributed to the pay-off structure itself.

TABLE 1: Two-Person Prisoner's Dilemma Pay-Off Matrix

	Other	
	A	*B*
You		
A	7\7	3\9
B	9\3	5\5

NOTE: The cell entries below the diagonal are the pay-offs for "you," the value above the diagonals are the pay-offs for "other." $K = .33$.

The comparison others manipulation was introduced by giving participants written descriptions of three persons who supposedly had already participated in the experiment. These descriptions included occupation; year of graduation from high school; and favorite hobby, musical act, and television show. Thirty stimulus persons were created and an independent sample of 50 students rated how similar each stimulus person was to a typical Washington State University college student. The ratings were on a 9-point scale ranging from 1 (*not at all similar*) to 9 (*exactly similar*). We used the two most highly rated ($M = 8.21$ and 8.04) and the two lowest rated ($M = 1.12$ and 1.28) comparison persons. We also used a comparison person who was closest to the midpoint ($M = 5.05$). In the similar others condition, participants read about the two high-rated persons and the midpoint person. In the dissimilar others condition, participants read about the two low-rated persons and the midpoint person. The midpoint person was included on both sheets to minimize suspicion and hypothesis guessing. Table 2 gives example descriptions of the stimulus persons.

The choices of others independent variable also was introduced on the comparison person description sheets. In the no-information condition, participants

TABLE 2: Sample Stimulus Persons Used in Study 1

Person rated very similar to typical Washington State University college student
Student, Washington State University
Graduated high school in 1994
Favorite hobby is skiing
Favorite musical act is Pearl Jam
Favorite television show is "Friends"
Person rated very dissimilar to typical Washington State University college student
Physical plant worker, University of Idaho
Graduated high school in 1974
Favorite hobby is archery
Favorite musical act is Led Zeppelin
Favorite television show is "Home Improvement"
Person rated at midpoint of similarity scale
Assistant manager, Holiday Inn
Graduated high school in 1988; 2 years of college at Central Washington University
Favorite hobby is refinishing furniture
Favorite musical act is Wynton Marsalis
Favorite television show is "Nova"

simply read the descriptions of the three stimulus persons. In the cooperative condition, participants were given the additional piece of information that the highly similar or dissimilar persons "always" or "almost always" chose A. In the competitive condition, participants learned that the highly similar/dissimilar persons always, or almost always, chose B. In the cooperative condition, the midpoint stimulus person was shown as having chosen A half of the time. In the competitive condition, he or she was shown as having chosen B half of the time.

Procedure

Participants worked in groups of four so that they could not identify their supposed game opponent. After entering the lab, each participant was seated at a desk that was surrounded by high partitions. On the desk was a tripole switch that was connected to a lightbox seen only by the experimenter. The up position on the switch was labeled "A," the down position "B," and the center position "OFF." A copy of the matrix shown in Table 1 was taped to the partition that faced the participant.

Participants were told that they would be playing a number of trials of a game (20, although this was left unspecified) with another person in the room, although they would not know who that other person was. The purpose of the game was to accumulate points by choosing between A and B. It was explained that both the participant and his or her game partner would choose between A and B and that the combination of the two choices would determine how many points each person received on that trial. A number of examples were then given. Participants registered their choices by using the tripole switch, moving it either up or down to register an A or B choice. Moving the switch illuminated a light on the experimenter's lightboard that indicated the participant's choice. After everyone made a choice, the experimenter gave each participant a slip of paper indicating his or her pay-off for that trial. Participants were told that for every 10 points they earned, they would receive one ticket in a cash lottery to be conducted after the entire experiment was completed. They were also told that the experiment sign-up sheets would be used to identify the winners and that those sheets would be discarded after the winners were notified. They were then given the opportunity to ask questions about the game procedure.

After the game had been explained, participants were told that the experimenters were interested in the question of how people make decisions in social contexts and what types of information are used to make those decisions. Hence, before the game started, everyone would be given a sheet of information to read. The participants were given 5 minutes to read the information and the experimenter collected the sheets after the 5 minutes had expired. The specific sheet that participants received corresponded to the experimental condition to which they had been assigned.

After the comparison other descriptions were collected, the game began. In reality, participants did not play against each other but rather competed against a tit-for-tat (TFT) strategy that was controlled by the experimenter (Komorita, Hilty, & Parks, 1991). Using a TFT strategy, one cooperates on the first trial and subsequently chooses what the partner chose on the previous trial. To minimize suspicion, the experimenter did not provide the written pay-off feedback until after all participants had registered a choice. This was done because the tripole switches make an audible click whenever they are used. Hence, participants could hear when others made their choices.

After 20 trials of the game, a postsession questionnaire was distributed that assessed participant perceptions of the stimulus persons and of how useful that information was in helping them make their game choices. After a participant completed this questionnaire, he or she was given a written debriefing (including a detailed description of the deception), thanked, and dismissed.

Results

Similarity manipulation check. Participants were asked on the postsession questionnaire to indicate how similar the stimulus others were to themselves on a 7-point scale ranging from 1 (*not at all similar*) to 7 (*extremely similar*). A 2×3 ANOVA of the similarity ratings revealed a main effect for comparison other, $F(1, 138) = 73.59$, $p < .01$.

Similar others were rated as being more similar to the participants ($M = 4.47$) than were the dissimilar others ($M = 2.22$).

Choice behavior. The relative frequency of individual cooperative choice was calculated by dividing the number of cooperative choices by 20. Frequencies also were calculated for four blocks of five trials each. The no-information condition serves as a baseline. The frequencies were analyzed with a $2 \times 3 \times 4$ (block) ANOVA, with repeated measures on the last factor.[2] There were significant main effects for choice, $F(2, 138) = 5.86$, $p < .05$, and block, $F(3, 414) = 8.73$, $p < .01$, and the Choice × Other interaction was significant, $F(2, 138) = 2.97$, $p = .05$. The cell and marginal means are shown in Table 3. Comparison of the choice means with a Tukey HSD value of 0.11 ($MSE = 0.05$) shows that telling participants that other people usually cooperated (chose "A") produced a significantly higher rate of cooperation relative to the baseline. Of interest, information that others were noncooperative (chose "B") did not decrease cooperation from the baseline. Note that the baseline cooperation rate of 0.35 is very close to the matrix's *K* value of .33, as it should be. The block main effect reveals that cooperation was greater during the first block of trials ($M = 0.45$) than during any of the next three blocks (Ms = 0.34, 0.35, and 0.35, respectively). This decline in cooperation is a familiar effect in social dilemma research (Komorita & Parks, 1996).

The cell means were compared with an HSD of 0.18. There are no significant differences in cooperation across the three levels of others' choice when the comparison others are dissimilar to the participant, but when the comparison others and the participant were similar, the difference between the baseline and the others cooperated conditions is significant. The difference between the baseline and the others did not cooperate condition is not significant but in the expected direction. As predicted, cooperation increased above the baseline rate when group members were told that similar other individuals, when faced with the same dilemma, were cooperative.

Usefulness of other information. Participants indicated on the postsession questionnaire how useful the information about the stimulus others was in helping them make choices. As with the similarity data, ratings were made on a 7-point scale ranging from 1 (*not at all useful*) to 7 (*extremely useful*). A 2×3 ANOVA revealed all three effects to be significant. The cell and marginal means are shown in Table 4. Information about similar others was rated as more useful than was information about dissimilar others, $F(1, 138) = 11.48$, $p < .01$. A post hoc analysis of the main effect for others' choice, $F(2, 138) = 14.27$, $p < .01$, revealed that the information was considered more useful when participants were told how the others had behaved, as opposed to getting no behavioral information (HSD = 0.92, $MSE = 3.87$). Finally, the interaction of comparison other and other's choice was significant, $F(2, 138) = 6.28$, $p < .01$. Comparison of the cell means with an HSD of 1.60 revealed no differences in the usefulness ratings of dissimilar others across levels of the others' choice variable, but there was a neat ordering of ratings of similar others: Learning that similar others typically chose "B" (did not cooperate) was considered more useful than not knowing anything about others' choices, but learning that similar others had chosen "A" (cooperated) was rated as more useful than the "chose B" information. The low rating for the no-information condition is as it should be. No behavioral information is provided so there is nothing that participants can apply to the task at hand. However, the difference between the "chose B" and "chose A" conditions is interesting. We suspect that the "chose A" information was rated as highly useful because it called attention to a nonobvious choice scheme and made participants think about why other people would have consistently chosen A when the immediately obvious strategy is to always choose B.

TABLE 3: Mean Rates of Cooperation—Study 1

		Choices of Others		
	No Information	*A*	*B*	*Mean*
Similar others	0.35	0.53	0.20	0.36
Dissimilar others	0.35	0.43	0.38	0.38
Mean	0.35	0.48	0.29	0.37

NOTE: Tukey HSD = 0.11 for choice main effect, 0.18 for cell means.

Summary

Our first study demonstrated that information about the behavior of similar others can influence the choices of participants in a social dilemma. In particular, we showed that informing people that similar others were highly cooperative led to high rates of cooperation by the participants, relative to a no-information control condition. Also, participants reported that comparison information about similar, cooperative others was useful in helping them make their own choices.

STUDY 2

Whereas we showed that information about the cooperativeness of similar others can induce high rates of cooperation in participants, this information did not tell whether the actions of the others resulted in desirable outcomes. The person who is consistently cooperative in a social dilemma may reap either large (if the opponent is cooperative) or small (if the opponent is not cooperative) pay-offs. Hence, a person who is told that similar

TABLE 4: Mean Ratings of the Usefulness of the Information About Others' Choices—Study 1

		Choices of Others		
	No Information	*A*	*B*	*Mean*
Similar others	1.50	5.00	3.38	3.29
Dissimilar others	1.63	2.33	2.58	2.18
Mean	1.56	3.67	2.98	2.74

NOTE: 1 = *not at all useful*, 7 = *extremely useful*. Tukey HSD = 0.92 for choices main effect, 1.60 for cell means.

others were cooperative could discount this information by assuming that the others were exploited and received a poor personal pay-off. Similarly, telling participants that similar others were almost never cooperative seemingly confirms what is apparently obvious: The smart thing to do is to always choose B. No information was conveyed regarding the long-term consequence of always choosing B.

The effects of outcome information can be tested by manipulating it separately from behavioral information, and this was done in Study 2. If our assumptions regarding the ambiguity that results from a lack of outcome information are correct, then it should be the case that explicit statements about the results of similar others' choices will influence behavior over and above the influence provided by the choice information. Specifically, we predicted that participants will adopt a choice strategy that was used by similar others if that strategy resulted in large outcomes for the others and will avoid that strategy if it resulted in poor outcomes for the others.

Also, we wanted to extend the results of Study 1 to a public goods paradigm. The situation from which we drew our hypotheses (public television) is a public goods dilemma, and it is important to demonstrate that the results from Study 1 hold for that type of paradigm. Accordingly, we used a public goods procedure developed by Komorita, Parks, and Hulbert (1992) that allows for direct comparison with results obtained from the PDG. This paradigm also allowed us to extend the results of Study 1 to an *n*-person situation.

Participants

The participants were 216 students enrolled in introductory psychology. Participation was in partial fulfillment of a course requirement.

Design

The design was a 2 (comparison others: similar or dissimilar) × 3 (choices of others: cooperative, competitive, or no information) × 3 (outcomes: large, small, or no information) between-participants design.

Stimulus Materials

Game paradigm. The public goods paradigm presented the situation as a four-person multitrial game. At the start of each trial, each participant was given an endowment of 8 points that could be kept or contributed to a joint account. Contributions to the personal account were the participant's alone, whereas contributions to the joint account were incremented by 50%. The sum of all incremented contributions was divided equally among all four group members. The pay-off matrix is shown in Table 5. The *K* index is an extension of the *K* index to *n*-person games (Komorita, 1976); the value for this matrix is .29, making it comparable with the PDG matrix used in Study 1. The switchboxes were labeled "J" for joint account and "P" for personal account.

Information sheets. The information sheets from the similar others–cooperative choice and similar others–competitive choice conditions of Study 1 were used and modified as needed to incorporate the outcomes manipulation. Specifically, in the large outcome condition, participants learned that the two similar others had received a high point total at the end of the experiment. In the small outcome condition, they learned that the two similar others had received a low point total at the end of the experiment. The moderately similar individual always received a moderate point total.

Postsession questionnaire. One open-ended question pertaining to the usefulness of the information about the others was added to the postsession questionnaire. This question asked participants to explain why the information was or was not useful. This question was added to help us understand the Study 1 finding that "chose A" information was considered to be more useful than "chose B" information.

Procedure

The procedure followed exactly that used in Study 1.

Results

Similarity manipulation check. As in Study 1, participants rated, on a 7-point scale, the extent to which the stimulus participants resembled themselves. A 2 × 2 × 3 ANOVA of these ratings produced only a main effect for comparison other, $F(1, 198) = 82.78$, $p < .01$, with participants in the similar condition rating the stimulus others as being more similar to themselves ($M = 4.21$) than did participants in the dissimilar condition ($M = 2.21$).

Choice behavior. Rates of cooperation were analyzed with a 2 × 2 × 3 × 4 ANOVA, with the last factor being a repeated-measure trial block. There were main effects for comparison other, $F(1, 198) = 7.18$, $p < .01$, and block, $F(3, 594) = 4.70$, $p < .01$, and the three-way Other × Choices × Outcomes interaction was significant, $F(4,$

TABLE 5: Four-Person Public Goods Game

	Number of Other Contributors to Joint Account			
Participant choice	*0*	*1*	*2*	*3*
Joint account	3	6	9	12
Personal account	8	11	14	17

NOTE: $K = .29$.

198) = 13.15, $p < .01$. The main effect for other reveals that cooperation was greater when the others were similar ($M = 0.44$) as opposed to dissimilar ($M = 0.38$). The block effect is the typical decline in cooperation over time (Ms = 0.44, 0.41, 0.40, and 0.37). However, a Tukey HSD test ($\alpha = .05$, $MSE = .03$) revealed that only the first and fourth block differ significantly. Unlike the immediate decline observed in Study 1, the decline was gradual in Study 2.

The three-way interaction addresses our prediction that participants will be influenced by choice and outcome information only when it refers to similar others. The cell means are presented in Table 6. Applying a Tukey HSD of 0.28 ($MSE = 0.07$) to these means suggests that when the stimulus others were dissimilar to participants, rate of cooperation was the same regardless of what participants were told about the others' choices and outcomes. By contrast, when the stimulus others were similar to participants, information about choices and outcomes influenced participant behavior. Specifically, rate of cooperation was significantly greater than no-information conditions when others had chosen J and received large pay-offs and when others had chosen P and received small pay-offs. Each of these is consistent with our prediction: Participants cooperated (chose J) after being shown that it had been successful for similar others and avoided cooperation (i.e., chose P) when it had been shown not to work for similar others. Furthermore, information about the success or failure of these strategies when used by dissimilar others had no effect on participant choice behavior. Note that our prediction also suggests that rate of cooperation should have been low for participants being told that the P choice produced large outcomes for similar others and, although the difference is in the expected direction, it did not differ significantly from the no-information baseline. It is not clear why we did not observe a difference from baseline when the competitive, similar others experienced large pay-offs.

Usefulness of other information. As in Study 1, participants rated, on a 7-point scale, how useful the information about the stimulus others was in helping them make their choices. The ratings were analyzed with a $2 \times 2 \times 3$ ANOVA. All three main effects were significant: others, $F(1, 198) = 7.42$, $p < .01$, choices, $F(2, 198) = 5.01$, $p < .01$,

TABLE 6: Mean Rates of Cooperation—Study 2

	Others' Outcomes Were Small	*Others' Outcomes Were Large*	*No Information*
Similar others			
Others chose J	0.30	0.70	0.34
Others chose P	0.66	0.26	0.38
No choice information	0.40	0.45	0.39
Dissimilar others			
Others chose J	0.33	0.33	0.40
Others chose P	0.39	0.38	0.39
No choice information	0.40	0.41	0.40

NOTE: Tukey HSD for cell means = 0.28.

and outcomes, $F(2, 198) = 11.60$, $p < .01$. The three-way interaction also was significant, $F(4, 198) = 7.07$, $p < .01$. Information about similar others was considered more useful ($M = 3.06$) than was information about dissimilar others ($M = 2.58$). Regarding the main effect for choices, a description of comparison others that contained either type of specific choice information was rated as more useful ($M = 3.05$ and 2.99 for "chose J" and "chose P," respectively) than was a description that contained no choice information ($M = 2.17$). Finally, the outcomes main effect emerged because a description that contained either type of outcome information ($M = 3.46$ and 3.40 for small outcomes and large outcomes, respectively) was considered more useful than a description that contained no outcome information ($M = 2.34$).

More interesting than the main effects are the patterns in the cell means underlying the three-way interaction as shown in Table 7. Comparison of the means with a Tukey HSD value of 1.89 ($MSE = 1.69$, $n = 12$) reveals that when the stimulus others were dissimilar to the participant, no one type of information was considered more useful than any other. However, when the stimulus others were similar to the participant, two types of information were rated as being significantly more useful than the rest: information that "J" choices led to large outcomes and information that "P" choices led to small outcomes. This pattern is interesting because each of these two types of information can be considered counterintuitive. One of the reasons why a social dilemma is a dilemma is because, on any given trial, the "P" choice dominates the "J" choice. It is over the long run that the "J" choice is the more effective one. Solving a social dilemma involves recognition of this long-run aspect, and it is this recognition that so many people fail to achieve. The two statements that were rated as being useful basically conveyed that it is possible to choose "J" and be successful and to choose "P" and be unsuccessful. This information is not immediately apparent after viewing the pay-off matrix.

TABLE 7: Cell-by-Cell Mean Ratings of the Usefulness of the Information About Others' Choices—Study 2

	Others' Outcomes Were Small	*Others' Outcomes Were Large*	*No Information*
Similar others			
Others chose J	2.75	5.25	1.58
Others chose P	5.08	3.00	2.08
No choice information	2.50	2.91	2.42
Dissimilar others			
Others chose J	3.17	2.67	2.92
Others chose P	2.84	2.67	2.25
No choice information	2.33	2.33	2.08

NOTE: 1 = *not at all useful*, 7 = *extremely useful*. Tukey HSD for cell means = 1.89.

DISCUSSION

The results of our two studies provide support for the idea that cooperative behavior can be induced by means of providing information about the actions of others. Specifically, we found that rate of cooperation could be increased by telling people that similar others engaged in frequent cooperation or that similar others who had not been cooperative realized only small pay-offs. The results were consistent across two types of social dilemmas involving differing group sizes.

Importance of Results

The results are important for many reasons. First, they illustrate the importance of considering social context factors in the analysis of cooperative behavior. Recent commentators have pointed out that social dilemma research is bereft of studies that examine how features of the social setting influence cooperative choice (Kerr, 1995; Kramer & Goldman, 1995). Kramer and Goldman (1995), in particular, emphasized the importance of considering how one evaluates the others who are involved in the dilemma and how one forms psychological units with similar others. Our data provide empirical support for the consideration of contextual factors in mixed-motive behavior by showing that social comparison information affects cooperative choice. Relatedly, our data contribute to the growing evidence that cooperative choice is influenced by social-cognitive processes (de Dreu & McCusker, 1997). Our findings highlight the need for more systematic study of how social cognition and information-processing strategies affect cooperation. Many important questions remain unanswered. For example, to what extent is cooperative choice driven by schematic thinking? Schemas are known to exert an influence on how we interact with others (e.g., via self-fulfilling prophecies) and may thus play a part in mixed-motive behavior. Similarly, research on how mood can serve as an input for performance (e.g., Sanna, Turley, & Mark, 1996) suggests that the frequency and amount of cooperation may be a function of one's mood state.

Our studies also demonstrate the value of testing the interventions that are used in real social dilemmas. Social dilemma research has frequently been criticized for focusing on interventions that are not used and could not easily be implemented in the real world (e.g., Kerr, 1990; Komorita & Parks, 1996; Yamagishi, 1986). Greater attention is definitely being paid to real dilemmas but the bulk of this attention is devoted to understanding the factors that affect perception of real dilemmas (e.g., van Lange, van Vugt, Meertens, & Ruiter, 1998). Empirical tests of readily applicable interventions are far less common (see, e.g., van Vugt & Samuelson, 1999; van Vugt, van Lange, Meertens, & Joireman, 1996). Although our work is not field based, the intervention was inspired by and resembles those actually used by public television broadcasters.

Finally, although this study was not intended to probe the underlying dynamics of social comparison, the data can nonetheless inform theory in that area. There has been a long debate among social comparison theorists about dimensions of comparison (e.g., Kruglanski & Mayseless, 1990; Wood, 1996). The issue is whether people compare with similar performances or similar attributes. Performance, or outcome-based, evaluation occurs when one uses as a standard of comparison others who have received similar levels of outcomes, whereas attribute-based comparisons involve comparing oneself with others who share similar nonperformance characteristics. Our research provides evidence that people select as comparison others those with similar attributes. An interesting feature of our results is that none of the manipulated characteristics (occupation, high school graduation rate, favorite hobby, favorite musical act, favorite television show) related directly to the mixed-motive interaction itself. This raises intriguing questions about the underlying dynamics of social comparison processes in mixed-motive interactions and also suggests that social dilemma paradigms may provide an interesting venue for tests of social comparison assumptions.

What Produces Comparison Effects?

We did not examine the underlying mechanisms that might be driving the observed social comparison effects. One could possibly argue that the results are simply attributable to demand characteristics, in that participants inferred that they were supposed to act like similar

others. However, such an argument also suggests that participants should have inferred that they were to act unlike dissimilar others, a pattern of behavior that did not occur in either study. One would thus have to conclude that the hypothesis guessing occurred only in the similar condition, an implausible occurrence.

The situation is novel in that the comparison other is not someone with whom the participant interacted or who observed the participant. Thus, explanations based on interpersonal motivations, such as reciprocation or evaluation apprehension, are not pertinent. There exist many potential explanations, and we suggest a few plausible ones that can readily be tested. First, it may be that learning how similar others have behaved triggers what Kerr (1995) calls a "general interaction norm," which describes how one should generally act in exchange situations. Normative behavior rarely spontaneously arises in mixed-motive settings. Typically, it appears only after some type of prompting occurs (Komorita & Parks, 1999). One explanation for our findings, then, is that similar others act as a norm prompt. Second, it may be that the similar other is creating expectations, perhaps in a manner similar to that described by the Proxy Model of social comparison (Wheeler, Martin, & Suls, 1997). According to this model, similar others can help us anticipate the outcomes of situations by providing examples of what can occur. Individuals may assume that fellow group members are themselves like the similar other and will behave in a manner similar to that person. The similar other thus provides a preview of how at least some group members will behave in the upcoming interaction. Finally, although this is unlikely an explanation for our specific data, in real dilemma settings group members may well have prior experience with the dilemma (e.g., public television station viewers who have experienced pledge drives in the past). In these situations, the similar other may serve an evaluative function, helping the person to determine whether his or her performance (e.g., How often have I cooperated? How much have I given?) is good enough or can be improved. Each of these explanations can be tested and suggest that there is considerable value in studying to what extent mixed-motive behavior is influenced by the interpersonal comparisons regularly made in social settings.

NOTES

1. Data on viewer contributions to public television are virtually nonexistent. In a very thorough review of the research on public television, Hoynes (1994, pp. 58-60) concluded that there is no empirical research on personal contribution decisions. However, see Goetze, Glover, and Biswas (1993) for a recent exception.

2. The arcsine transformations of the relative frequency data reported throughout this article were also analyzed. In no case did the transformed data yield results that were discrepant from the ANOVAs conducted on the raw data. For ease of explanation, we always reported the raw data analyses.

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