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## Gender Roles and Behavior in Social Dilemmas: Are there Sex Differences in Cooperation and in its Justification?\*

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*Data from two experimental social dilemmas—a set of 66 nine-person dilemmas and a set of 64 seven-person dilemmas—were used to examine sex differences in cooperation. Women were only slightly more likely than men to cooperate with others, and variables related to the experimental setting were much more important influences on behavior than sex. Whether or not the women cooperated, they were more likely than men to justify their behavior as being altruistic and principled, to believe that they were more oriented toward harmonious group relations, and to be less nervous and upset at the end of the experiment. It is suggested that those who speculate on sex differences in cooperation may have overstated these differences and that the relationship between self-schema and behavior may vary depending on the extent to which the attributes studied relate to gender identity.*

In recent years, a number of theorists and researchers have examined differences between men and women in personality orientations and social behavior. Some have suggested that few sex differences appear when traits are grouped into broad categories. Maccoby and Jacklin (1974), for instance, maintain that girls are no more compliant, conforming, or suggestive than boys (generally children were studied) and that there are no overall differences between the two sex groups in patterns of dominance or submission. The major area in which Maccoby and Jacklin reported sex differences was in aggression, which they defined as action (either physical or verbal, direct or indirect) with the intent to hurt. Even here, however,

sex differences disappeared in certain circumstances, including quarreling over scarce resources (Frodi, Macauley, and Thome 1977; Maccoby 1980).

Others tend to focus on differences between males and females. Theoretical arguments, for instance, such as those proffered by David Guttman (1965, 1970), David Bakan (1966), Talcott Parsons (1954a, b; 1955), and Nancy Chodorow (1974, 1978), as well as empirical studies of self-described personality traits and world views (e.g. Bennett and Cohen 1959; Johnson, Stockard, Acker, and Nofziger 1975; Miller, 1976; Stockard and Dougherty 1983) imply that in contrast to those of men, women's social roles, personality traits, and/or world views more often embody concerns with relations with others and interactions within a group, and thus greater cooperation with others. Some writers have extended this reasoning to suggest that females actually have a unique culture and orientation toward others which, in contrast to that of males, stresses caring, compassion, cooperative relationships, giving, and self-sacrifice (e.g. Bernard 1981; Gilligan 1982, 1986; Miller 1976).

Studies of sex differences in actual behavior, however, are relatively rare. In this paper we examine sex differences in cooperative behavior, representing the culture and orien-

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tation that Bernard, Gilligan, and Miller imply are more typical of females than of males. We do this by examining the actions of men and of women in experimental social dilemmas, settings especially suited to examine cooperation.

#### SOCIAL DILEMMAS AND COOPERATIVE BEHAVIOR

Social dilemmas are situations in which individuals must decide whether they will cooperate with others within a group, thus benefiting the group as a whole, or defect from the group, thus maximizing their own personal gain (Dawes 1980). Classic examples are Hardin's overgrazing of the commons (1968), the prisoner's dilemma (Luce and Raiffa 1957), and such common problems as pollution and overpopulation (Dawes 1980; Dawes, Delay, and Chaplin 1974). In each of these situations individuals benefit by maximizing their personal gain, but the group as a whole suffers when they do so.

Descriptions of women's unique culture and orientation focus extensively on how established relationships among participants in a situation affect choices and actions, especially those in "private" realms such as the family. The public-private distinction has been used extensively in feminist theory to distinguish between the traditional worlds of males and of females (e.g. Chodorow 1971; Rosaldo 1974). We recognize that social dilemma experiments are artificial settings with potentially limited applicability to the real world. Moreover, social dilemmas usually test only cooperation in public settings, which are characterized by anonymous, short-term relationships. This observation could suggest that experimental social dilemmas are more compatible with traditional "masculine" than traditional "feminine" orientations. If so, our results may provide a relatively strict and limited test of theories regarding sex differences in cooperation.

On the other hand, some recent research indicates that patterns of sex differences in concerns about public and private affairs may be changing (Aidala and Greenblat 1986, pp. 228-29). Moreover, Gilligan (1986, p. 326) implies that women's more cooperative and more self-sacrificial moral orientation should affect their behavior in both public and private settings. (In informal debriefing sessions in our study, both male and female

subjects often commented that the choices they encountered in the experiments paralleled those found in their everyday lives.) Studies of sex differences in behavior are rare, and it is difficult to study behavior systematically in private settings. Thus we believe that our results are an important first step in understanding sex differences in cooperation.

We address the following general questions: 1) Do women behave differently from men in experimental social dilemmas? 2) Do men and women report different motivations for their behavior in these settings? 3) Do men and women respond differently to the result of their decisions after they know how it affects them as individuals and as a group?

#### METHODS

To examine our research questions, we used data from two social dilemma experiments conducted initially for different purposes.<sup>1</sup> One, conducted in 1983-84, involved 66 step-level dilemmas (van de Kragt, Orbell, and Dawes 1986); the other, conducted in 1984, involved 64 continuous social dilemmas (Orbell, van de Kragt, and Dawes forthcoming). Participants were recruited by advertisements in newspapers and from undergraduate classes. All were at least of college age, with an average age in the early to mid 20s. None had participated in earlier experiments of the project. They were predominantly white, about half were students, and the majority of the nonstudents were unemployed. About half the participants were women; very few groups contained a disproportionate number of either sex. The respondents reported having relatively little spending money available each week, an indication that most subjects participated to earn extra money.

#### *Experimental Designs and Measures*

Both experiments involved procedures used commonly in social dilemmas: individuals had to decide whether or not to donate some of their own resources, in this case money. If they chose to donate the money, it would

<sup>1</sup> Additional details on the experiments and their original purpose are given in an appendix, which is available from Professor Stockard, Department of Sociology, University of Oregon, Eugene, OR 97403.

benefit others (Smith 1976). All participants were given a promissory note for a sum of money (either five or six dollars) and were told that they had to decide either to keep the money or to turn it in. Generally, a decision to return the money meant that others would have a chance to obtain more money. All decisions were made confidentially, and none were disclosed to others in the experiment. Because real-life decisions are made in different types of settings, each experiment had characteristics that varied among groups of subjects, who were assigned randomly to the experimental conditions.

The first experiment varied three factors: 1) whether or not subjects could perceive their own decision to cooperate as critical; that is, whether or not the group payoff and their private payoff were contingent upon their own choice to cooperate; 2) whether or not subjects discussed the dilemma before making their choice; and 3) whether or not a set group of subjects was designated as those who had to provide the public good. Each of these factors was crossed with the others, resulting in eight different experimental conditions. Each replication in the first experiment had nine players. If enough people returned (in this case) the five dollars (i.e., cooperated), all players would receive an extra 10 dollars. In games with a "designated set," only the decisions of those in the set were crucial to provision of the public good, and only the decisions of those people were analyzed.

Fourteen subjects were included in each of the replications in the second experiment; at the beginning of the session they were divided by lot into two groups of seven subjects each. In all conditions subjects were told that if they chose to keep (in this case) the six dollars, they would have that money at the end of the game, but if they chose to give away the money, six other people in the experiment would receive two dollars each, for a group benefit of 12 dollars. Subjects' individual payoff (beyond the four dollars that all subjects received for participating) would be a function of their own decision to "keep" or to "give" and of the simultaneous decisions of others in the experiment. The second experiment also had three crossed factors, producing a total of eight conditions: 1) subjects' prior understandings about who would receive the 12 dollars generated by a decision to cooperate; half the groups were told that it would go to individuals in the other group and

the other half were told that it would go to people in their own group; 2) whether or not the subjects discussed the decision they were to make; and 3) the subjects' final understandings (after discussion when that was required) at the time of decision making, about who would receive the 12 dollars generated by a decision to cooperate. In half the groups, understandings about who the recipients would be were left as stated originally. In the other half, it was announced that "for experimental purposes" there would be a "switch" in beneficiaries: among subjects who believed originally that beneficiaries would be in their own group, beneficiaries now would be in the other group, and vice versa. Eight replications were run in each of the eight conditions.

As is common in such experiments, the terms "cooperate" and "defect" were not used in the instructions given the subjects. It was clear, however, both from the comments made in groups with discussion and in the debriefing sessions, that the subjects were quite aware that a decision to donate money would be a "group-regarding" decision and would benefit others.

In both experiments, after the subjects had indicated their choices confidentially, they were asked to evaluate the importance of different motivating factors in making their decisions. The format of the questionnaire form differed between the two experiments, but each included measures of the importance of principled, altruistic, and selfish motives. The first experiment also measured the importance of risk as a motive. In the first experiment subjects ranked the importance of aspects of each of these motives on a seven-point scale. In the second experiment various aspects of the motives were matched with one another and subjects were asked to tell how much relative weight they gave to each aspect. Factor analyses of the responses to these scale items resulted in the development of additive scales, which were used in the analysis. Scores on all the scales were averaged, when appropriate, to yield comparable ranges for each dimension.<sup>2</sup>

<sup>2</sup> In Experiment One, factor analysis revealed four dimensions consisting of the following elements: 1) principled (fairness, trust, self-esteem, honesty, morality, conscience, and justice); 2) altruistic (group pay and concern for others); 3) selfish (own pay, concern for self); and 4) risk (distrust, risk). Experiment Two

In the second experiment the subjects also were asked to rate themselves on a series of qualities as expressed by descriptive adjectives. Two scales were used: one measured relationality, or orientation toward others, and the other measured assertive and aggressive characteristics (see Gill, Stockard, Johnson, and Williams 1987; Johnson et al., 1975).<sup>3</sup> The first scale is found commonly to differentiate between males and females and is used to bolster the argument that women are more oriented toward cooperative relations than men. Although the second scale commonly does not differentiate between males and females, it could be hypothesized that this scale would be related to a tendency for subjects to act in their own interests and to defect.

After completing these questions, the players left the experiment room one at a time to be paid. To ensure confidentiality, those who were left behind were asked not to discuss their decisions with each other. In the payoff room they were paid according to the outcome of the game and were told of the decisions that the other players made as a group, but not who did what individually. Then they were asked to complete one more form, which was identical for both experiments; this form asked the subjects to rank their feelings on nine bipolar items, on a seven-point scale. Responses to these items were factor analyzed; three dimensions resulted. Items on these dimensions were combined in additive scales, which were averaged to produce comparable ranges in scores. The scales measured reactions or moods, signifying the extent to which the subjects reported that they were upset, satisfied, and nervous.<sup>4</sup> The subjects also

were asked, "Had you known what you know now, would you still have made the same decision?" Answers of "yes" and "no" were the only possible choices.

### Analysis

To analyze the first research question, we used a logit analysis, which examined the influence of the subjects' sex and the experimental design variables on the decision to cooperate or to defect. In addressing the second question, we analyzed the responses given to the series of items on the post-decision form; in a multivariate analysis of variance we used the scales as the dependent variables and the subjects' sex and their choice as independent variables. With the data from the second experiment, we subjected the scores on the two self-rated personality dimensions to a similar multivariate analysis of variance. Finally, we made two analyses of answers to the third research question. First, we subjected the scales developed from items on the post-payoff form to multivariate analysis of variance. Then we analyzed the responses that the subjects gave when asked whether they would make the same choice when they knew the outcome of the experiment; we used a logit regression, with the subjects' sex and their original choice as independent variables.<sup>5</sup>

## RESULTS

### *Sex Differences in Choice*

Table 1 gives the results of the analysis of the subjects' choice in both experiments. The models which fit the data best were relatively simple, and indicated that the most important influences on subjects' decisions were those associated with the experimental design.<sup>6</sup> Re-

produced two elements for each of three dimensions: 1) principled (doing the right thing and being fair); 2) altruistic (increasing others' pay and concern for others); and 3) selfish (self-interest and increasing own pay). On the postdecision form, each of these elements was matched with the elements in other dimensions, resulting in a total of 12 bipolar items. Summated scales were developed from the pairings of elements in each dimension; they represent the extent to which subjects report one set of motives as more important than another set in their decisions.

<sup>3</sup> Subjects were asked to mark how much each adjective described him or her, on a four-point scale. Adjectives used in the "relationality" scale were considerate, good-natured, warm, obliging, sympathetic, pleasant, and understanding. Adjectives used in the "assertive" scale were assertive, aggressive, stern, forceful, and outgoing.

<sup>4</sup> Bipolar items used on the "upset" scale were

angry-pleased, cheated-treated fairly, betrayed-dealt with honestly, foolish-clever, and disillusioned-pleasantly surprised. Items on the "satisfied" scale were happy-sad and better off-worse off. Items on the "nervous" scale were anxious-relaxed and tense-calm.

<sup>5</sup> As discussed in the text below, the only variable that interacted with sex in influencing choice was discussion in Experiment One. This variable also was entered as an independent variable in the analyses of the second and third research questions. Because we found no significant interaction of this experimental variable with sex in any of these analyses, these results are not reported in the text but are available from the authors on request.

<sup>6</sup> We used standard procedures of model fitting to

Table 1. Results of Logit Analysis of Influence of Gender and Design Variables on Choice by Experiment

Variable (Predicted Category)	Experiment One		Experiment Two	
	Effect Parameter <sup>a</sup>	(Z) <sup>b</sup>	Effect Parameter <sup>a</sup>	(Z) <sup>b</sup>
<i>Constant</i>				
Choice (cooperate)	.57	(7.41)	-.17	(-3.28)
<i>Main Effects</i>				
Gender (female)	.12	(1.94)	.10	(1.95)
Discussion (yes)	.55	(8.36)	.19	(3.57)
Designated set of contributors [set] (yes)	.31	(4.28)		
Group and own pay contingent on actions [contingent] (yes)	.36	(4.99)		
Initial beneficiary of choice [benefit] (own group)			.22	(4.24)
Beneficiary switched to other group [switch] (no)			-.002	(-0.03)
<i>Interactions</i>				
Set by contingent (yes, yes; no, no)	.20	(2.75)		
Gender by discussion (female, discussion; male, no discussion)	.14	(2.15)		
Discussion by benefit (yes, own; no, other)			.19	(3.64)
Discussion by switch (yes, no; no, yes)			.11	(2.07)
Benefit by switch (own, no; other, yes)			.16	(3.06)
Likelihood ratio chi-square	8.80		1.63	
degrees of freedom	9		8	
probability	0.46		0.99	

<sup>a</sup> The effect parameters associated with the independent variables represent the log of the odds that an individual in the predicted category of an independent variable would cooperate. The effect parameter associated with the dependent variable is the log of the odds associated with cooperation as opposed to defection.

<sup>b</sup> The z-scores are interpreted in the standard way:  $z \geq 1.96$  has an associated  $p \leq .05$ ;  $z \geq 2.58$  has an associated  $p \leq .01$ ;  $z \geq 3.29$  has an associated  $p \leq .001$ .

sults with the first experiment indicated a preponderance of cooperation and showed that subjects were more likely to cooperate in groups where discussion took place, where there was a designated set of contributors, and where production of the public good was contingent on subjects' contribution. In the second experiment, defection occurred more often; subjects were more likely to cooperate in groups where discussion took place, when they believed that the benefits would accrue to their own group, and when the beneficiary was not changed to the other group during the experiment.

Females were slightly more likely than males to cooperate in both experiments (69% of the females versus 66% of the males in Experiment One and 47% of the females versus 37% of the males in Experiment Two). In the first experiment, however, the effect of sex interacted with the effect of discussion; slightly fewer females than males cooperated

in groups without discussion (46% of the females versus 52% of the males), but more females than males cooperated in groups with discussion (92% of the females versus 80% of the males). Sex did not interact with any other experimental variable in its effect on choice in either experiment.

#### *Sex Differences in Reported Motivations*

Panels A and B of Table 2 show the analyses of the subjects' reasons for making their choice. For the first experiment (Panel A) the multivariate effects were significant for the main effects of both choice and sex and for the interaction effect. Thus it is appropriate to consider only the interaction effect. This effect was significant for the altruism dimension, and there was a trend towards significance for the principled dimension. Subjects who cooperated (both males and females) were more likely than those who defected to cite principled and altruistic motives, but the difference was much larger for males than for females. Among defectors, females were much more likely than males to cite principled and altruistic reasons for their decision, but among cooperators the sex difference was much smaller. Neither the

determine the most parsimonious and best-fitting models. These procedures involve comparing models of increasing complexity that use the likelihood ratio chi-square values to determine parameters which can increase the fit of the model (see Knoke and Burke 1980). Details on the models examined are available on request from the authors.

Table 2. Results of Multivariate Analyses of Variance

Dimensions Studied	F-Ratios <sup>1</sup>			Mean Scores and Standard Deviations <sup>2</sup>			
	Main Effects of Choice	Main Effects of Sex	Interaction Effects	Cooperators		Defectors	
				Males	Females	Males	Females
<b>A. Reasons Given for Choice in Experiment One</b>							
Manova	26.43***	2.73*	2.43*	—	—	—	—
Principles	67.56***	8.52**	2.69	5.4(1.2)	5.6(1.1)	4.0(1.4)	4.6(1.3)
Altruism	38.82***	6.74**	6.56*	5.5(1.2)	5.6(1.0)	4.2(1.5)	5.0(1.3)
Selfishness	26.48***	1.12	0.21	5.4(1.4)	5.3(1.6)	6.2(1.0)	6.2(0.9)
Risk	8.97**	0.15	1.62	4.2(1.5)	4.4(1.5)	5.0(1.4)	4.8(1.4)
<b>B. Reasons Given for Choice in Experiment Two</b>							
Manova	76.83***	2.45	1.90	—	—	—	—
Altruism vs. selfishness	190.2***	4.62*	0.12	15.4(5.8)	15.2(5.7)	22.4(4.5)	21.9(4.9)
Principles vs. altruism	2.76	0.84	2.39	13.2(4.8)	12.1(5.2)	13.3(4.3)	13.5(3.9)
Selfishness vs. principles	186.79***	6.81**	2.52	18.7(7.1)	20.6(6.1)	11.4(6.0)	11.4(5.8)
<b>C. Self-Ratings in Relationality and Aggressive-Assertive Traits in Experiment Two</b>							
Manova	2.58	5.94**	0.07	—	—	—	—
Relational	0.94	11.91***	0.00	1.75(.48)	1.61(.43)	1.80(.45)	1.65(.40)
Assertive	3.80*	0.11	0.12	2.38(.56)	2.34(.52)	2.26(.56)	2.25(.56)
<b>D. Reactions to Experiment One</b>							
Manova	0.82	2.49	0.51	—	—	—	—
Upset	0.01	0.51	0.16	5.1(1.2)	5.2(1.2)	5.1(1.0)	5.2(1.1)
Satisfied	0.96	4.22*	1.01	2.5(1.4)	2.3(1.3)	2.8(1.3)	2.4(1.2)
Nervous	0.68	3.15	0.53	4.0(1.6)	4.2(1.5)	3.8(1.4)	4.2(1.6)
<b>E. Reactions to Experiment Two</b>							
Manova	21.24***	3.51*	0.82	—	—	—	—
Upset	38.38***	0.76	0.14	4.6(1.2)	4.6(1.3)	5.3(0.8)	5.2(1.0)
Satisfied	24.34***	0.75	0.07	2.9(1.4)	2.8(1.4)	2.4(1.0)	2.2(1.0)
Nervous	3.67	4.26*	1.31	4.8(1.4)	4.9(1.5)	4.4(1.4)	4.8(1.3)

<sup>1</sup> Degrees of freedom for the multivariate results are 4 and 364 in Panel A, 3 and 437 in Panel B, 2 and 426 in Panel C, 3 and 442 in Panel D, and 3 and 433 in Panel E. Degrees of freedom for the univariate results are 1 and 367 in Panel A, 1 and 439 in Panel B, 1 and 427 in Panel C, 1 and 444 in Panel D, and 1 and 435 in Panel E.

<sup>2</sup> Standard deviations are shown in parentheses. In Panels A and B a higher score indicates that a dimension was rated more important by the subjects. In Panels C, D, and E a higher score indicates that subjects rated themselves as less like the attributes on the dimension.

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$ .

interaction effects nor the sex effects were significant for the selfish and risk dimensions.

The second experiment (Panel B) showed no more than a trend toward significance for the multivariate interaction effect. This finding involved the univariate results for the principles versus altruism and the selfishness versus principles dimensions. The multivariate results and those for the altruism versus selfishness and the selfishness versus principles scales were significant for both choice and sex. Females were more likely than males to describe themselves as acting for altruistic rather than for selfish motives; as in the first experiment, this difference was somewhat larger among defectors than among cooperators. Similarly, females were more likely than

males to describe themselves as acting for principled rather than for selfish reasons, but in contrast to the other results, this difference appeared only among cooperators.

Panel C of Table 2 gives the results for the analysis of the relationships among self-rated personality traits and the subjects' choice and sex in the second experiment. Significant effects by choice appeared for the self-rating on the "assertive" scale; significant effects by sex appeared for the self-rating on the "relational" scale. Subjects who defected saw themselves as more assertive than those who cooperated, but did not rate themselves differently in respect to relationality. Females, whether they cooperated or defected, saw themselves as more oriented toward

harmonious group relations than males. There were no significant sex differences in self-ratings of assertiveness.

### *Sex Differences in Reactions to the Results*

Panels D and E of Table 2 give the results of the analysis of the subjects' reactions to their experiences after receiving their payments. In the first experiment the only significant result was the main effect of sex, with a significant difference on the individual "satisfied" scale and a trend toward significance on the "nervous" scale. The women reported themselves as more satisfied and less nervous than the men after the experiment. Results for Experiment Two showed significant main effects for both choice and sex. Those who cooperated were more upset and less satisfied, but also less nervous, than those who did not. The significant univariate effect for sex involved the nervous scale; again, males reported themselves as more nervous than females.

Table 3 gives the results of the logit

Table 3. Logit Analysis of Desire to Make Same Choice by Gender, Original Choice, and Discussion in Experiment

Variable (Predicted Category)	Experiment One		Experiment Two	
	Effect Param- eter <sup>a</sup>	(Z) <sup>b</sup>	Effect Param- eter <sup>a</sup>	(Z) <sup>b</sup>
<i>Constant</i>				
Same choice (yes)	1.09	(12.47)	.97	(12.75)
<i>Main Effects</i>				
Original choice (cooperate)	.15	(1.69)	-.24	(3.11)
Sex (female)	.02	(0.26)	+.02	(0.22)
<i>Interaction</i>				
Choice by sex (cooperate, female; defect, male)			-.12	(1.64)
<i>Likelihood ratio</i>				
chi-square	0.74		0.00	
df	1		2	
p	.39		1.00	

<sup>a</sup> The effect parameters associated with the independent variables represent the log of the odds that an individual in the predicted category of an independent variable would make the same decision at the end of the experiment as she or he did originally. The effect parameter associated with the dependent variable is the log of the odds associated with making the same choice, as opposed to not making the same choice.

<sup>b</sup> The z-scores are interpreted in the standard way:  $z \geq 1.96$  has an associated  $p \leq .05$ ;  $z \geq 2.58$  has an associated  $p \leq .01$ ;  $z \geq 3.29$  has an associated  $p \leq .001$ .

analysis of influences on the subjects' willingness to repeat their original choice. In both experiments, the subjects' original choice was the most important influence on whether or not they would make the same choice. In the first experiment, those who had cooperated showed a slight trend toward wanting to repeat their choice; in the second experiment, however, those who had defected clearly wanted to repeat their choice. Sex had no significant main effect in either experiment, but in the second experiment we noted a trend toward an interaction between choice and sex. This trend results from a tendency for females who had cooperated to be less likely than males who had cooperated to want to repeat their choice (78% of cooperating females would make the same choice again, compared to 84% of the cooperating males), whereas females who had defected were more likely than defecting males to want to make the same choice (94% of defecting females and 89% of defecting males).

The net result of this difference is that if the subjects were to make their choices at the end of the experiment, knowing the results, the sex difference in choices observed originally in the second experiment would disappear (38% of both sex groups would choose to cooperate). Although we noted no significant interaction effects regarding sex in the first experiment, analysis of responses from that data set indicated a similar trend.<sup>7</sup>

### SUMMARY AND DISCUSSION

The results related to the first research question indicate that women tend to cooperate only slightly more than men in social dilemmas. Because discussion interacted with sex in affecting behavior in one of the experiments but not in the other, this is probably a chance result rather than a special susceptibility of females to discussion. No other experimental variable interacted with sex in influencing choice behavior. This finding indicates that *males and females usually reacted in similar*

<sup>7</sup> As noted above, significant gender differences in behavior in the first experiment involved an interaction with discussion. If the subjects were to make their choices at the end of the experiment, knowing the results, these gender differences would become somewhat smaller: 87 percent of the females and 83 percent of the males in groups with discussion and 50 percent of the females and 49 percent of the males in groups without discussions chose to cooperate.



ways to conditions which were designed to promote cooperative behavior, including those which made their cooperation essential to the well-being of the group (the set and the contingent aspects of the first experiment). Most important, the influence of sex was much smaller than the influence of the various experimental variables.

Results related to the second and third research questions indicate that sex differences in choice were relatively unassociated with sex differences in the motivations reported to underlie the decision or with reactions to the results of the experiments. Although subjects who cooperated were much more likely than those who defected to cite principled and altruistic motives for their decisions, women were more likely than men, even among defectors, to describe their decision as motivated by principles and altruism. Similarly, in the second experiment female defectors were more likely than male defectors to describe themselves as oriented toward promoting harmonious group relations. In contrast to what could be expected if women were more inclined than men to cooperate, women who defected did not regret their decision more than men who defected, and women reported being *less* nervous than men after the experiment, regardless of their behavior. In addition, if the subjects' decisions were governed by hindsight, the trend for women to cooperate more often, which was observed in the original choices, would become even smaller and virtually would disappear.

The results related to the first research question can be seen as lending some support to the work of Bernard (1975, 1981), Gilligan (1982, 1986), Miller (1976), and others who posit a distinct culture or world of women that incorporates notions of caring and cooperation with others. Except for the condition of no discussion in the first experiment, women cooperated slightly more often than men in all the experimental settings tested (cf. Bonacich 1972). In contrast, the results from the third research question do not support the notion of a unique women's culture: women who did not cooperate did not express more anxiety than men and in fact were less nervous. In addition, if the subjects could make their decisions after knowing the results of the experiment, the reported sex differences would be much smaller. (See Caldwell 1976 and Goehr-

ing and Kahan 1976 for reports of no sex differences in behavior in social dilemmas.)

Taken together, these results suggest that those who speculate on gender differences in cooperative behavior may have overstated these differences. Given the much larger effect of the experimental design variables on cooperation, we suspect that those who are interested in enhancing cooperative behavior in the general population might want to focus more on developing optimal settings for this behavior than on the participants' sex. This finding is not unlike the "structural" or "situational" approach advocated by some theorists (e.g. Kanter 1976).

The findings from the second research question support this conclusion and lead to further theoretical speculations. Our results support earlier findings of sex differences in motivations reported for moral behavior (see Constantine and Craik 1972, Freeman 1975, Harris 1972, for discussions of sex differences in reported motives for political activities) and in self-described personality traits (e.g. Bennett and Cohen 1959, Gill et al. 1987, Johnson et al. 1975). We, however, found such sex differences regardless of the subjects' behavior. Whether or not they actually cooperated with others within the experiment, women described themselves more often than men as altruistic, principled, and oriented toward group relations. We believe that this finding may indicate different relationships between cooperative behavior and the attitudes and personality traits which men and women report.<sup>8</sup>

Why, specifically, may there be less congruence between females' cooperative behavior and reports of motivation and personality traits than that of males? We suspect that this difference is related to the nature of the behavior examined: cooperation, an area in which women are expected to specialize. That is, traditional gender roles prescribe that women should cooperate with others and should con-

<sup>8</sup> In a *post hoc* analysis we computed correlation ratios ( $E^2$ ) between behavior and the scales measuring altruistic and principled motives. The results indicated higher associations for males than for females in both the ethics and the principled scales in the first experiment ( $E^2$  (ethics) = .21 for males, .11 for females;  $E^2$  (principles) = .15 for males, .04 for females) and for the altruism versus the selfish dimension in the second experiment ( $E^2$  = .32 for males, .29 for females), but not for the selfish versus the principled dimension in the second experiment ( $E^2$  = .23 for males, .38 for females).

tribute to the social good. Numerous studies of gender stereotypes document these perceptions (e.g., Broverman, Vogel, Broverman, Clarkson, and Rosenkrantz 1972), and studies of self-perceived personality traits indicate that women generally believe that these traits describe themselves (Gill et al. 1987; Johnson et al. 1975). Dawes (1985) suggests that the culturally accepted self-schema of females may lead them to believe that they have greater concern with interpersonal relationships than does that of males. We suggest further that females' views of themselves as cooperative and group-oriented may be linked so closely with their gender identity—their view of themselves as female—that when their behavior contradicts this “self-schema” they may be less likely to recognize it and may justify it with notions that conform to their self-concept and their view of socially defined roles.

We also believe that these results point to a need for careful distinctions among analyses of behavior, social roles, gender stereotypes, and self-descriptions of personality traits. This need may be especially compelling when these areas are linked closely with deeply held self-views such as gender identity and when they may lead to alternative interpretations of some of the theories of sex differences. It is possible, for instance, that Gilligan's (1982) view of females' moral reasoning and Bernard's (1975, 1981) description of females' unique culture may reflect females' acceptance of gender differences in social roles and their views of gender stereotypes and of their own personality traits more strongly than they reflect any extensive or actual male-female difference in group-oriented cooperative behavior (cf. Brabeck 1983).

Further research is needed in this area. Although studies of social dilemmas are becoming more common, few include an explicit analysis of gender differences in behaviors. Studies should be conducted to examine sex differences in moral behavior and in motivations in social dilemmas with “public goods” other than money. A dilemma requiring the provision of a public good associated traditionally with masculine qualities (such as strength) might result in greater cooperation from males than from females (cf. Kerr and MacCoun 1985), while a dilemma requiring the provision of a stereotypically feminine quality (such as nurturance or caretaking) might result in greater cooperation from females (cf. Eagly and Crowley

[1986] for a discussion of sex differences in helping behavior). Such procedures also could counter the alleged “masculine bias” of social dilemma experiments.

Perhaps most important would be studies which extend the examination of moral behavior beyond the social dilemma framework and perhaps examine behavior in nonexperimental settings with long-standing relationships typical of those described by Bernard, Gilligan, and Miller. Only with such extensive examination of a broad range of settings are we likely to learn more about the relationship among the motivations, moral behavior, and self-perceived personality traits of men and women.

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