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**FURTHER ATTEMPTS TO ESTABLISH DIFFERENCES
BETWEEN PEOPLE WHO COOPERATE AND PEOPLE
WHO DEFECT IN PLAYING AN EXPERIMENTAL
COMMONS DILEMMA GAME**

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**Robyn M. Dawes
Harriet Shaklee
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FURTHER ATTEMPTS TO ESTABLISH DIFFERENCES BETWEEN
PEOPLE WHO COOPERATE AND PEOPLE WHO DEFECT
IN PLAYING AN EXPERIMENTAL COMMONS DILEMMA GAME

by

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In past research, experimenters have set up laboratory prisoner's dilemma and commons dilemma games by having subjects play for monetary values ranging from mills to dollars. One focus of study has been the attempt to correlate personality characteristics with the propensity to cooperate or defect in such experimental games. Past research has been disappointing; a recent thorough review indicates that there is no personality characteristic that predicts unequivocally. For many characteristics that might be expected to predict, the results are entirely negative.

The present research investigated the relationship between (i) cooperation and defection in two laboratory social dilemma games, and (ii) two personality characteristics that would be expected to predict such behavior: the tendency to believe that other people are in general unscrupulous, and the tendency to believe that such behavior is appropriate. The former tendency is assessed by the Wiggins "authority conflict scale," which assesses the degree to which people see life as a jungle and are convinced that others are unscrupulous, dishonest, hypocritical, and motivated only by personal profit. The latter tendency was assessed by Christie's Machiavellian scale, which assesses the degree of belief that such unscrupulous or manipulative behavior is appropriate for oneself. In addition, we investigated a crude rating in belief in the teachings of Jesus Christ.

One hundred ninety nine subjects, in a small groups, were run in a social dilemma game. A prototypical game is one played with a group of five people. Each subject earns \$2 for cooperating with no fine to any group member, or \$10 for defecting, with a \$2 fine to each group member, including the defector. Thus, each subject is individually better off defecting, but if all defect, none receive anything, while if all cooperate, all receive \$2. While negative payoffs to cooperators (who must still pay the fines) are theoretically possible in such a game, all losses were in fact truncated at zero.

After playing the game, all subjects filled out the Wiggins scale, the Machiavellian scale, and the belief in the teachings of Christ scale. In addition, all indicated whether they thought they themselves tended to have a goal of cooperation or competition in the game, and whether they thought people in general would tend to have a goal of cooperation or competition.

Findings and Implications

The results were essentially negative. Only the two questions concerning the game itself correlated with the choice of defection or cooperation; the personality variables did not. One possible explanation for such findings is that the attempts to predict a single behavior from an attitude or personality characteristic is misguided; just as personality and attitude scales consist of many items, perhaps the behavioral criteria that are to be predicted should consist of many behaviors.

Another possibility is that only situational variables predict game behavior. Two such situational variables, the opportunity for group discussion about the game and variations in instructions, have been shown in other reports (Daves, McTavish & Shaklee, in press; Daves, Shaklee and Talarowski, 1976) to have a strong effect on the rate of cooperation.

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Further Attempts to Establish Differences Between
People Who Cooperate and People Who Defect
In Playing an Experimental Commons Dilemma Game

The prisoner's dilemma situation is one based on the following anecdote. A District Attorney (DA) apprehends two bank robbers. The DA knows that they are guilty, but cannot prove it without a confession from at least one. The DA takes each robber into a separate room and gives him an identical proposition: "If you confess and your partner doesn't, I will let you go free and send him to prison for ten years; if he confesses and you don't, he will go free and you will go to prison for ten years; if you both confess, you will both go to prison for five years, while if neither of you confesses, you will both go to prison for one year for carrying concealed weapons." At first glance it appears that neither should confess, but each reasons as follows: "If the other confesses, then I am better off confessing, because then I go to prison for five years rather than ten; if the other does not confess, then I am still better off confessing, because then I will go free rather than go to prison for a year; therefore, no matter what he does, I should confess, and worse yet, I know he is reasoning the same way." Hence both confess. The dilemma occurs because both would prefer mutual silence.

In this choice situation, confession is technically termed a dominating strategy, because no matter what the other prisoner does, each is better off confessing than not confessing. But the choice

of dominating strategies leads to an outcome that is technically termed a deficient equilibrium; it is "deficient" because both prisoners would prefer another outcome (that is, they would both prefer an outcome in which neither confessed to the one in which both confessed); it is an "equilibrium" because neither prisoner is motivated to change his strategy once this outcome is apparent. A prisoner's dilemma situation is precisely defined as one in which two individuals have dominating strategies that lead to a deficient equilibrium.

Dawes (1975), reviewing work of many authors who have proposed to "extend" the prisoner's dilemma to situations involving many people, has proposed that the idea of dominating strategies with deficient equilibria may be very easily generalized to groups of more than two people. Briefly, Dawes proposed that a social dilemma is one in which: (i) each individual in a group has a dominating strategy to defect from some group goal or purpose, yet (ii) the result is a deficient equilibrium, i.e., a group outcome less preferred by everyone than would be the outcome if no one defected from the group goals. For example, in a large battle, each individual soldier may reason that he is best off if he takes no risks; in that way he assures his own personal survival, while the effect of his decision on the outcome of the battle is negligible. Yet if all the soldiers reason that way, the result will be a rout, and all would then be worse off than they would be if they were all willing to take the risks.

Prisoner dilemma games, and more recently social dilemma games, have been played extensively in experimental laboratory situations.

The experimenters construct such games using monetary payoffs ranging from mills to dollars, and subjects make choices--most often repetitively, but occasionally singly. There has been an enormous number of published (and who knows how many unpublished) reports of laboratory studies using prisoner's dilemma games. In their compendium prepared roughly five years ago, Wrightsman, O'Connor and Baker (1972) listed over 2000 references. While prisoner dilemma research has not been as popular as it was in the late '60's and early '70's, it continues to appear in the literature. In addition, several workers have become interested in social dilemma research (or "N-person prisoner's dilemma" research), because it has obvious implications for such matters as over-population, pollution, and group effort and self-sacrifice.

Choice of the dominating strategy in a prisoner's dilemma game is one that may be viewed as exploitive, or self-protective, but definitely one that is less beneficial to the pair qua pair than is choice of the non-dominating (dominated) strategy. Many investigators have hypothesized that the propensity to make this choice is related to certain stable personality characteristics, e.g., trustfulness or altruism. (In what follows, we shall term choice of the dominating strategy the defecting choice, choice of the dominated strategy the cooperative choice.) These investigators have attempted to assess various dimensions of their subjects' personality, usually with paper-and-pencil techniques, and relate these personality variables to behavior in the laboratory game situation. The results have been, in a word, disappointing. In her extensive review of the literature, McTavish (1975) concluded that investigations of 19 variables that

exhortation by the experimenter has been found to increase cooperation (see Dawes, McTavish & Shaklee, 1975; Dawes, Shaklee & Talarowski, 1976). In addition, subjects take the game (which can result in a payment varying from nothing to \$10.50) with great seriousness. As Dawes, McTavish, & Shaklee (1976) wrote:

One of the most significant aspects of this study, however, did not show up in the data analysis. It is the extreme seriousness with which the subjects take the problems. Comments such as 'if you defect on the rest of us, you are going to have to live with it for the rest of your life' were not at all uncommon. Nor was it unusual for people to wish to leave the experimental building by the back door, to claim that they did not wish to see the 'sons of bitches' who doublecrossed them, to become extremely angry at other subjects, or to become tearful. (p. 14).

It is thus compelling to continue the search for some external measure which would correlate with the tendency to cooperate in a commons dilemma game. The present research investigated two personality measures and three other measures.

The first personality characteristic was assessed by Wiggins' (1965) "Authority Conflict Scale." We don't know why he chose that name; what the scale consists of primarily is a set of statements expressing the general philosophy that other people are unscrupulous. A high scorer "sees life as a jungle and is convinced that others are unscrupulous, dishonest, hypocritical, and motivated only by

personal profit in the game." This scale was chosen because previous research has shown a high correlation between tendency to defect in the commons dilemma game used by McTavish and belief that other people will defect in that particular game. What the scale measures is a tendency to believe that other people will defect in general, in real-world situations involving money, power, status, or prestige.

The other personality variable was Machiavellianism. The scale (Christie & Geis, 1976, Form IV) was developed to measure the degree to which one believes it is acceptable for oneself to behave in an unscrupulous manner. Thus, while the Wiggins scale should predict behavior based on the belief that other people will defect, the Machiavellian scale should predict behavior on the basis that it is okay for oneself to defect. The scale items refer to what is generally true in the real world; the hope is that it will then predict what the subject does in this experimental game. Note that the situation itself is "artificial" only in that it is a psychological experiment. The amounts of money involved are fairly substantial for people who volunteer for psychological experiments.

In addition, we included a brief rating about belief in the teachings of Jesus Christ. People were presented with a 9-point scale and asked, "without rating your belief in the divinity or the humanity of Jesus, do you believe the teachings of Jesus concerning the importance of loving your neighbor, and cooperation with mankind?"

Finally, we used two questions that Kelley and Stahelski (1970) had found to differentiate between people who cooperate and people who tend to defect in prisoner's dilemma games. These questions

Results

In Eugene, each subject made one decision, to cooperate or defect; in Santa Barbara each subject made 10 decisions. Hence, the correlations reported for Eugene consist of relationships between a dichotomy (defection scored 1, cooperation 0) and its scale value, while those in Santa Barbara consist of a relationship between the number of defecting choices and the scale values. The results for the Machiavellianism scale, the Wiggins scale, and the question about Christ's teachings are presented in Table 1.

As is clearly seen, these scales--which were specifically chosen to be correlated with behavior in a commons dilemma situation--do not in fact correlate. Nevertheless, the behavior is consistent with introspection about orientation and with expectations about others' behavior. In Eugene, the first Kelley-Stahelski question (whether the goal of the subject himself or herself was to be cooperative or competitive) correlated $-.55$ with defecting behavior, and the second Kelley-Stahelski question (whether the subject judged that "most people" in this situation would have a cooperative or competitive goal) correlated $-.22$. Both these correlations are significant at the $.01$ level. The corresponding correlations in Santa Barbara were $-.25$ and $-.47$. Only the second correlation was significant, and that at the $.01$ level. Moreover, the correlation between defecting behavior and judgment about the number of other people who defect (subjects himself or herself excluded) were $.52$ and $.43$ respectively. Both are significant at the $.01$ level.

Table 1

	Eugene	Santa Barbara
Machiavellian	.01	.21
Wiggins	.10	.15
Christian Ethic	.01	-.02

the specific behavior. In line with this argument, both the Wiggins scale and the Machiavellian scale predict in the right direction in both contexts.

Finally, the fact that the behavior in this laboratory study is not highly correlated with behavior outside does not invalidate the utility of the experiment for investigating the reactions to social dilemmas. There is a high degree of internal consistency in the experimental study, e.g., in the relationship between defection and expectation of others' defection, and the experimental variables investigated (communication and moralization) have very strong effects. For example, the number of people defecting in communicating groups is only one-third the number that defect in groups that do not communicate. Given the strength of the situational manipulations, we would not expect a great deal of variance to be accounted for by intrinsic (e.g., personality) variables.

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APPENDICES

Appendix A

Cooperation-Competition Scale

For each of the following items, choose the statement that best applies to you:

1. (Circle one)

a. In this experiment, my goal was cooperation with the other players. I was concerned with my payoffs and the payoffs to each other player.

b. In this experiment, my goal was working for myself. I chose independently, for myself, competing against the other players. I was concerned only with my payoff.

2. (Circle one)

a. In general, I think that most people in this situation would be concerned with their own payoffs as well as the payoffs to others.

b. In general, I think that most people in this situation would choose independently, competing against the other players. Most people are only concerned with their own payoffs.

Appendix B

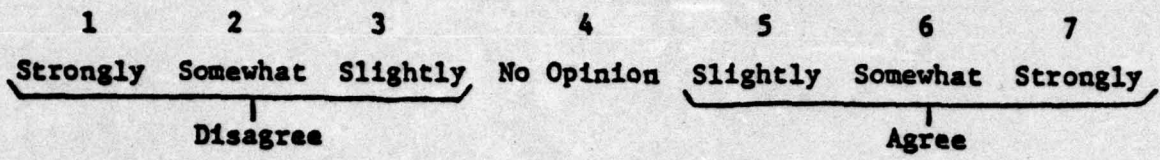
Machiavellian Scale

Please indicate the degree of your agreement or disagreement with the following items using a number from 1 to 7.

1	2	3	4	5	6	7
Strongly	Somewhat	Slightly	No Opinion	Slightly	Somewhat	Strongly
Disagree				Agree		

Note that high numbers indicate agreement, low numbers mean disagreement with the item. For each item, mark your response on the appropriate place on your answer sheet. All answers on this questionnaire are confidential. Identify your answer sheet only by your code number and sex.

1. Never tell anyone the real reason you did something unless it is useful to do so.
2. The best way to handle people is to tell them what they want to hear.
3. One should take action only when sure it is morally right.
4. Most people are basically good and kind.
5. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.
6. Honesty is the best policy in all cases.
7. There is no excuse for lying to someone else.
8. Generally speaking, men won't work hard unless they're forced to do so.
9. All in all, it is better to be humble and honest than important and dishonest.
10. When you ask someone to do something for you, it is best to give the real reason for wanting it rather than giving reasons which might carry more weight.
11. Most people who get ahead in the world lead clean, moral lives.
12. Anyone who completely trusts anyone else is asking for trouble.
13. The biggest difference between most criminals and other people is that criminals are stupid enough to get caught.
14. Most men are brave.



- 15. It is wise to flatter important people.
- 16. It is possible to be good in all respects.
- 17. Barnum was very wrong when he said there's a sucker born every minute.
- 18. It is hard to get ahead without cutting corners here and there.
- 19. People suffering from incurable diseases should have the choice of being put painlessly to death.
- 20. Most men forget more easily the death of their father than the loss of their property.

Appendix C

Wiggins MMPI Scale

Consider each of the following statements and decide whether it is true as applied to you or false as applied to you. Mark all responses on the answer sheet provided. All answers on this questionnaire are confidential. Identify your answer sheet only by your code number and sex.

1. I think most people would lie to get ahead.
2. In school I was sometimes sent to the principal for cutting up.
3. It is safer to trust nobody.
4. Most people make friends because friends are likely to be useful to them.
5. The man who provides temptation by leaving valuable property unprotected is about as much to blame for its theft as the one who steals it.
6. Most people inwardly dislike putting themselves out to help other people.
7. People generally demand more respect for their own rights than they are willing to allow for others.
8. I think a great many people exaggerate their misfortunes in order to gain the sympathy and help of others.
9. I enjoy a race or game better when I bet on it.
10. Most people are honest chiefly through fear of being caught.
11. Most people will use somewhat unfair means to gain profit or an advantage rather than to lose it.
12. I don't blame anyone for trying to grab everything he can get in this world.
13. At times I have been so entertained by the cleverness of a crook that I have hoped he would get by with it.

14. If several people find themselves in trouble, the best thing for them to do is to agree upon a story and stick to it.
15. I think nearly anyone would tell a lie to keep out of trouble.
16. I have often had to take orders from someone who did not know as much as I did.
17. I have never been in trouble with the law.
18. I have often met people who were supposed to be experts who were no better than I.
19. I enjoy gambling for small stakes.
20. It is all right to get around the law if you don't actually break it.

Appendix D

Christian Ethic Scale

Code number _____

Without rating your belief in the divinity or humanity of Jesus, do you believe the teachings of Jesus concerning the importance of love of your neighbor and cooperation with mankind.

_____	_____	_____	_____	_____	_____	_____
totally believe	believe	somewhat believe	indif- ferent	somewhat disbelieve	disbelieve	totally disbelieve

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Subjects playing a laboratory experimental game were also asked to fill out questionnaires assessing personality characteristics. The game required each subject in a group to make either a defecting choice that monetarily rewards the defector but fines the other members of the group, or a cooperating choice. The payoffs were arranged so that each person gains more by deciding to defect than to cooperate, but the group as a whole is better off if all members cooperate. The variables hypothesized to be associated with choice of cooperative or defecting response were: (1) an introspective statement that the game was		

(continued)

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Abstract Continued

→approached in a cooperative or competitive manner, (ii) a belief that other people tend to approach the game in a cooperative or competitive manner, (iii) the Wiggins Authority Conflict Scale, (iv) the Machiavellian Scale and (v) a rating about belief in the ethical teachings of Jesus Christ. The first two variables, which are questions about the game itself, were correlated with responses in the gaming situation, but none of the other measures was correlated with the game behavior. These findings are consistent with past findings that behavior in experimental gaming situations is not related to stable personality characteristics.

