AD-A021 143

ANTI-GROUP BEHAVIOR

Robyn M. Dawes

Oregon Research Institute

Prepared for:

Office of Naval Research

31 August 1975

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE

Best possible scan

063162

ONR Technical Report

DA021143

DNW

ANTI-GROUP BEHAVIOR: FINAL REPORT

Robyn M. Dawes

DISTRIBUTION STATEMENT A
Approved for public release
Distribution Unlimited

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
US Department of Commerce
Springfield, VA. 22151

Unclassified
Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Oregon Research Institute ✓ Eugene, Oregon	2a. REPORT SECURITY CLASSIFICATION Unclassified 2b. GROUP

3. REPORT TITLE

Anti-Group Behavior: Final Report

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Technical Report FINAL ✓

5. AUTHOR(S) (First name, middle initial, last name)

Robyr M. Dawes

6. REPORT DATE August 21, 1975	7a. TOTAL NO. OF PAGES 12	7b. NO. OF REFS none
8a. CONTRACT OR GRANT NO. N00014-75-C-0093 ✓ b. PROJECT NO. NR (170-770) c. ARPA Order No. 2449 d.	9a. ORIGINATOR'S REPORT NUMBER(S)	
	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	

10. DISTRIBUTION STATEMENT

This document has been approved for public release and sale; its distribution is unlimited.

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY Office of Naval Research Code 455 Arlington, Virginia 22217

13. ABSTRACT

The project analyzed the structure of an apparently wide variety of situations in which anti-group behavior was shown to be identical. An empirical game was devised on the basis of this structure and it was used empirically to investigate the roles of communication and assumptions about other peoples' behavior on the individual's own propensity to behave in an anti-group manner. Behavior varies widely as a function of both communication (more cooperation among group members who can communicate with each other) and expectations about others (subjects who do engage in a behavior have strong beliefs that others will do the same). Mere "humanization" did not affect behavior--at least when it resulted from discussion on an irrelevant topic for a short period of time. Further studies have been designed to assess the causal relationship underlying the correlation of subjects' own behavior and their expectations about others.

DDC
RECEIVED
SEP 24 1976
C

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
ANTI-GROUP BEHAVIOR						
ASSUMPTIONS ABOUT OTHERS						
HUMANIZATION						
COMMONS DILEMMA						
PRISONERS DILEMMA						

ACCESSION for
NTIS White Section
DDC Buff Section
UNANNOUNCED
JUSTIFICATION
BY
DISTRIBUTION/AVAILABILITY CODES
Dist. AVAIL. and/or
A

Anti-Group Behavior: Final Report

Robyn M. Dawes

Oregon Research Institute

Anti-group behavior frequently occurs in situations in which it is to the individual interest of each group member to defect from a group goal or purpose, yet everyone in the group is better off if all cooperate than if all defect. For example, each individual soldier on a battlefield may reason that he is best off not risking his life; yet if all are willing to take a risk, they all have a higher probability of surviving than they do if none is willing to take a risk--in which case there is a rout. Cheating on income tax is another example. Each individual may reason that he or she is better off; yet we are all clearly better off if no one cheats than if everyone does (e.g. less money goes toward paying interest on the national debt, toward enforcement of income tax laws, etc.). The purpose of the present project was to investigate anti-group behaviors in such situations.

The first step of the investigation was an analysis of the ways in which previous authors have described the structural characteristics of such situations. This analysis led to the conclusion that a wide variety of descriptions were in fact structurally identical; these descriptions include those of "N-person separable prisoners dilemmas," "commons dilemmas," "dilemmas with linear payoffs with equal slopes for cooperation and defection." These situations can be described quite briefly in terms of a gain-for-self-loss-spread-out principle. (For example, the soldier who refuses to take a risk gains directly, but the loss in fighting potential to the group is spread out among all its members; the loss <u>in toto</u>, however, is greater than the gain, so that when everyone defects everyone loses.) This principle

was enumerated in a theoretical paper presented at two conferences and to be published in a book concerning formal representation of human judgment and decision making. Further, this analysis led to the construction of a very simple experimental game that embodies the situation in which we investigated anti-group behavior.

The game. Each person who cooperates receives a positive amount of money, c. Each person who defects receives an additional amount of money, d, but a fine of $d + \lambda$ is assessed to the group as a whole (including the defector), with each player paying his or her fraction (equals $\frac{1}{N}$ with N players). Provided that the $d > \frac{\lambda}{(N-1)}$, each player is better off defecting than cooperating because his or her earnings are incremented by the amount d, whereas the share of the fine is only $\frac{(d+\lambda)}{N}$. But all players are better off if all cooperate than if all defect, because the payoff for cooperation is c--while universal defection leads to payoffs of $c - \lambda$. For example, each of eight players may be offered \$2.50 for cooperation, be given an additional \$9.50 incentive for defection, with a fine of \$12.00 for each defecting choice. All players are better off if all cooperate than if all defect, because then each will receive \$2.50--while universal defection results in no payoff to anyone. On the other hand, each player may reason that he or she should defect because the increment for defection is \$9.50 while the share of the fine is only \$1.50.

Construction of the experimental game led to the second phase of the research, which was to see how people responded when placed in the game situation, and to develop hypotheses that could later be tested systematically concerning variables important to eliciting cooperation or defection. A great many pilot groups were run under different conditions of size, ability to communicate, and heterogeneity or homogeneity of group membership. These tests indicated that there may be two extremely important variables. (i) the

ability to communicate, (ii) the belief that other people will cooperate or defect. Third stage of the project involved investigating these variables systematically, as well as an additional variable which might be termed "humanization"--simply getting to know the other group members in a context other than playing the game.

Groups of four friends came to the research projects, and then each friend participated in a different eight-person decision making group, using the payoffs described above. (Often, the groups consisted of fewer people due to the fact that not all potential subjects showed up as they had agreed to; the payoffs were altered accordingly.) There were four communication conditions in these groups; each member of the original group of friends participated in one: (i) no communication whatsoever, (ii) communication about an irrelevant topic, (iii) communication about the game, and (iv) communication with a structured roll-call at the end when subjects announced their intentions. Final choices were made privately, and even subjects who indicated that they would cooperate in the roll-call condition were free to defect if they wished to do so. In addition to making the choice, each subject predicted the choices of the other members of the group. There were two quite clear findings. First, ability to communicate about the game increased the amount of cooperation from a level of roughly 25% to a level of roughly 75%. The humanization condition (irrelevant communication) did not do anything to elicit cooperation; people who had previously known each other in a context of estimating distribution of income levels in Eugene, Oregon did not cooperate with each other any more than did the people who couldn't communicate about anything. Nor did the roll-call improve cooperation. In point of fact, everyone in the roll-call conditions pledged to cooperate, but nevertheless one-quarter defected. The other main finding was that there was a very high positive correlation between the number of other people judged to be defectors

and the propensity to defect. This correlation held up whether the individual within the group was considered as a unit of analysis, whether the group itself was considered as a unit, or whether the entire condition was considered as a unit. Defectors predicted defection and cooperators predicted cooperation.

The predictions of the subjects were accurate in the sense that the conditions eliciting cooperation led to predictions of high levels of cooperation, whereas the conditions leading to defection (those in which the subjects could not talk about the game) led to predictions of low levels of cooperation. The predictions were not accurate, however, in the sense that subjects could do a good job of determining who specifically would cooperate or defect in their groups. In fact, when the predictions are corrected for base-line accuracy (i.e., the proportion of correct "hits" if the predictions were made randomly across the group), they are only three percent better than chance. As one of the research assistants on the project put it, "subjects in these groups are sensitive to the smell of defection, but cannot locate the source of the odor."

(The subjects in the four-person "friendship groups" pooled their earnings at the end of the experiment and divided them equally. The purpose of having such groups was to allow individual subjects to lose money in their decision making groups. This possibility was systematically varied across the four levels of communication; subjects could either lose money if they cooperated and two or more other group members defected or their losses were truncated at zero; thus there were really eight types of groups run rather than four. This manipulation had absolutely no effect on either the behavior of the subjects or their predictions about others' behavior. Thus, in all future experiments we were able to truncate at zero.)

Subjects in this study also filled out an extensive questionnaire concerning their behavior in group situations structurally similar to the

game. For example, they were asked whether in a recent pollution alert they nevertheless drove their car or whether they cooperated by walking or riding bicycles--thereby breathing the exhaust fumes of the defectors. The purpose of these questions was to develop a questionnaire based on items that appeared to have relevance to the game situation. This development was the basis of a doctoral dissertation by Jeanne McTavish, who received her Ph.D. degree in late May. Past research has attempted--rather unsuccessfully--to relate personality characteristics to behavior in such game situations. McTavish argued that this failure may be due to the loose relationship between personality and <u>any single</u> act, such as choosing to cooperate or defect in a game situation--rather than to lack of ecological validity of the games studied. She proposed that a more direct test of the generalizeability of gaming behavior would be to relate it to <u>behaviors</u> outside the laboratory, rather than to attempt to relate it to a general personality disposition. While many items did relate to the behavior of our subjects, it must be remembered that there is a large possible "capitalization on chance" because the items were chosen post hoc from a much larger pool. The questionnaire developed had to be applied to a new set of subjects before any firm conclusions about the relationship between the behavior in the game and behavior outside the laboratory can be drawn.

The results of these studies were presented at the 1975 West Coast Conference on Small Group Research and were written up in a technical report by Dawes and McTavish.

The relationship between the behavior, the situation and the prediction of others' behavior is intriguing, but since it was purely correlational it is not possible to draw a causal inference about the <u>directionality</u> of this relationship. It is possible that beliefs that other people will defect or cooperate exerted a causal influence on the subjects' decisions to cooperate

or defect themselves; it is possible that these decisions exerted a causal influence on their judgment about what other people would do; or both possibilities could be operating simultaneously. The causal influence from beliefs about others to one's own behavior is quite reasonable. People often justify anti-group behavior on the grounds that "everyone does it," or that it is necessary to "do unto others before they do unto you." The causal influence the other way is also quite reasonable. Subjects who cooperate in a group situation clearly have a motive to perceive that other people are cooperating--or otherwise they are damn fools; people who defect clearly have a motive to see others defecting--otherwise they may see themselves as immoral. Finally, there are cognitive explanations as well; people may use their own behavior as a guide to predict what other people like them would do in the same situation, or they may tend to believe that whatever reason compelled them to cooperate or defect will be most salient for others as well.

The final effort in the project involved looking at the directionality of the relationship between behavior and prediction, and "cross-validating" the questionnaire developed by McTavish. The first aim was achieved by comparing the predictions of subjects in the groups with observers who merely watched. The argument is that if cooperators are biased to predict cooperation <u>because they cooperate</u> and defectors <u>because they defect</u>, then the predictions of the actual participants in such a decision should have a greater variance than the predictions of the observers, because the cooperators would be biased in one direction and the defectors in the other. The observers should contain the same number of <u>potential</u> cooperators as defectors, and if the actual necessity of making a choice has no effect on predictions about others' behavior, then the predictions of the observers should be distributed in the same way as the predictions of the actors.

Because the previous experiments indicated that no communication and irrelevant communication produced virtually identical results, and that the roll-call had no effect, this study involved only an irrelevant communication condition and one with communication, no roll-call structure by the experimenters.

The study was not completed and written up during the period of the current contract, but has been since that time. The results are quite clear. First, all the previous phenomena were replicated; the irrelevant communications condition produced approximately 25% cooperation, the communication condition approximately 75%, there was a very large correlation between behavior and prediction about others' behavior, prediction of defection was highly correlated across groups with actual amount of defection, but people could not accurately predict who would and would not defect. The distributions of predictions of observers and participants redistributions were not identical; as predicted, the variance of the predictions of the participants was greater than that of the predictions of the observers--thereby indicating a causal influence of behavior on prediction. Finally, the questionnaire constructed by (now Dr.) McTavish did not cross-validate. While there is great internal consistency of behavior in the game situation (witness the relationship between choice and prediction of others' choices), there is no evidence for generalization of inter-individual differences in the game situation to such differences outside the laboratory. These results have been written up by McTavish in her doctoral dissertation, which is also being distributed as a technical report, and in a paper by Dawes, McTavish and Shaklee--soon to be submitted for formal journal publication, and which will also be distributed as a technical report.

The following papers summarize the work done under Contract N00014-73-C-0438:

1. Dawes, R. M. Formal models of dilemmas in social decision-making. To appear in S. Schwartz & M. F. Kaplan (Eds.), Human judgment and decision processes: Formal and mathematical approaches, in press. Also presented at Social Science Research Institute, University of Southern California, Feburary 6, 1975 and Human Judgment and Decision Processes Symposium, Northern Illinois University, October 16, 1974.

2. Dawes, R. M., & McTavish, J. Effect of communication and assumptions about other people on pro-social and anti-social behavior in a commons dilemma situation. Presented at 1975 West Coast Conference on Small Group Research, Victoria, B. C., April 16, 1975.

3. McTavish, Jeanne. Is behavior in a commons dilemma game related to real world behavior? ONR Technical Report and doctoral dissertation, University of Oregon, May, 1975.

4. Dawes, R. M., McTavish, J., & Shaklee, H. Behavior, communication, and assumptions about other peoples' behavior in a commons dilemma situation. To be submitted to Journal of Personality and Social Psychology.