# "LEADER" VERSUS "PRISONER'S DILEMMA":

# AN EXPLORATORY COMPARISON

# OF

# TWO MIXED-MOTIVE GAME SITUATIONS

By

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TO FOUR GREAT TEACHERS:

| | |
|---|---|
| MOM | who taught me the essence of poetry and the art of romantic vision; |
| DAD | who taught me to integrate strength and gentleness; |
| LAURIE | who taught me the value and beauty inherent in things practical; |
| NOREEN | who taught me about myself, love, friendship, and humanness. |

I had planned to erect something other than this rather esoteric and diminutive empirical monument in recognition of their roles as mentors, just as I had always planned to be a more apt pupil than I turned out to be . . . but I have come to agree with Tom Robbins (and I ask my four mentors to recognize with me) that ". . . plans are one thing and fate another. When they coincide, success results. Yet success musn't be considered the absolute. It is questionable, for that matter, whether success is an adequate response to life. Success can eliminate as many options as failure" (Even Cowgirls Get The Blues [Boston: Houghton Mifflin Co., 1976], p. 10).

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# CHAPTER I

# INTRODUCTION AND RATIONALE

The primary purpose of this project was to compare two matrices utilized in games experiments in an effort to map possible biases inherent to them. There were two secondary purposes: (1) to explore possible gender-related differences in dyads' responses to the games; and (2) to determine the relationship between a computational index of cooperative and competitive orientations and subjects' self-reports of their orientations. As the brief review of selected literature below will demonstrate, each of these purposes encompassed an issue critical to the clarification of previous research.

## Prisoner's Dilemma and Leader

The Prisoner's Dilemma Game (PDG) and the Leader Game (LDR) are mixed-motive, matrix games which have been utilized in experimental investigations of conflict behavior. As the PDG has been much more extensively used, its characteristics and applications will be reviewed first.

Luce and Raiffa (1957) attribute the formalization of the PDG to the mathematician A. W. Tucker. A representative payoff matrix for the PDG is shown in Appendix A. A verbal characterization of the general mixed-motive situation posed by the matrix is something like the following:

> Two suspects are arrested and separated. The prosecutor suspects that they are guilty of a crime, but lacks sufficient

evidence for conviction. When interrogating each suspect, therefore, he points out two choices: to confess to the crime the prosecutor knows has been committed, or not to confess. If both refuse to admit their guilt, the prosecutor states that he will convict them on a minor charge and both will receive minimal punishments (Combination #1, PDG matrix); if both give in, the prosecutor will convict them, but will recommend a reduced sentence (Combination #4, PDG matrix); but if one gives in while the other does not, the confessor will receive very lenient treatment for providing evidence to the state, while the reticent partner will be given the maximum sentence (Combinations #2 & #3, PDG matrix). The problem confronting each prisoner is whether to confess or remain silent.

As Mack (1972) notes, "The PDG is thus a typical illustration of how lack of mutual trust, coupled with perfectly rational considerations, may lead to a disaster" (p. 245).

The PDG has been used in a variety of gaming experiments. Rapoport and Chammah (1965) and Rapoport, Guyer, and Gordon (1976) provide extensive reviews of major investigations that have utilized the PDG. One early precedent for the popularity of the matrix may have been its use as an illustration in Luce and Raiffa's (1957) discussion of the formal properties of a "non-cooperative" (i.e., no pre-play communication) mixed-motive game (Ch. 5). This text is invariably cited as an impetus and source for theoretical and computational schema by those researchers employing the PDG who do not regard the matrix and its properties (as elucidated by Luce and Raiffa) as public domain. Another precedent may have been the PDG's suitability for use in experimental situations where control of the complex and potentially confounding variable of inter-opponent communication was desired. By definition, the PDG is played under conditions of "no communication;" the behaviors of ideal, rational players, which serve as the referent for the analysis of choices made by subjects, are posited for circumstances where communication between players is absent or severely curtailed (see Luce and Raiffa, 1957; Rapoport, 1966; and Schelling, 1960). Finally, the popularity of the PDG may have been enhanced by two less formal factors: the performance of systematic replications of gaming experiments, which demanded as a minimum the use of identical or equivalent matrices; and the inability (or lack of interest) on the part of behavioral scientists to create and formalize new matrices congruent with the mathematical tenets and tone of formal game theory.

Whatever the essential reason (or reasons) for the widespread popularity of the PDG may be, it appears that it may not be suitable for use in attempts to assess the character and dynamics of the two most basic orientations to conflict: competition and cooperation. The first argument against the use of the PDG for such purposes may be extracted from the formal game theoretic parameters of the matrix. Consider the following PDG matrix:

| | $B_1$ | $B_2$ |
|---|---|---|
| $A_1$ | (0.9, 0.9) | (0, 1) |
| $A_2$ | (1, 0) | (0.1, 0.1) |

In this matrix, as in all PDG matrices, strategy $A_2$ strictly dominates strategy $A_1$ and strategy $B_2$ strictly dominates strategy $B_1$. The only choices employed by two strictly rational players, therefore, are $A_2$ and $B_2$, respectively. In addition, as Luce and Raiffa establish (1957, p. 96), the pair $[A_2,B_2]$ is the unique equilibrium pair of the game and $A_2$ and $B_2$ are the unique maximin strategies for players 1 and 2 respectively.

Unless it is assumed that experimental subjects are completely irrational (which would undermine utility theory and render games experimentation futile), it must be assumed that to the extent that subjects approach the game theoretic ideal of rationality (maximization of utility), they will emphasize use of the strategy normally operationalized as "competitive" (either $A_2$ or $B_2$). At the level of formal characteristics, therefore, a bias toward competition is inherent in the PDG. There have been indications that this bias may not simply operate in the abstract realm of game theory, but may also be a salient demand characteristic for subjects playing the PDG. This position is supported to some extent by the repetitive finding that initial levels of cooperative responding in the PDG are low and that cooperative responses decrease across repeated trials (for representative examples, see Komorita, 1965; McNeel, McClintock, & Nuttin, 1972; Miller & Pyke, 1973; Rapoport, Guyer, & Gordon, 1976; and Smith Vernon, & Tarte, 1975). The position is further strengthened by Mack's research (1972) utilizing the Leader Game, the results of which indicated that the PDG may bias subjects toward competitive responding. For necessary background, the nature and limited theory of the Leader Game is sketched below; the discussion will then return to Mack's findings.

The Leader Game was first formalized by Anatol Rapoport (1967) in his discussion of "four archetypes of the 2 X 2 game" (p. 81). Like the PDG, Leader is a mixed-motive game; a representative matrix is shown in Appendix A. As in the PDG, each player is confronted with two alternatives. The strategies chosen by players who are rational (in the game theoretic sense) are $A_1$ and $B_1$. This combination of choices (#1 in the LDR matrix in Appendix A) yields payoffs of zero for both players. Subjects are motivated to switch strategies, however, in hopes of receiving the larger payoffs reflected by Combinations #2 and #3. In cases where both players switch, they each receive the least desirable payoff (Combination #4). When only one player switches, he increases the payoff to both himself and his opponent. His own increase is greater in magnitude, however, than the increase for his opponent. Mack (1972) notes that "such a switcher could be called a Leader, hence the name of the game" (p. 247). Leader, then, is a preemption game. There is a pressure on each player in the experimental situation to switch (to preempt); it is confounded, however, by the threat that the other player may switch simultaneously and precipitate the worst possible payoff combination (#4).

There is little behavioral data available that clarifies the functional implications of the Leader matrix for experimental research. Rapoport, Guyer, and Gordon (1976) included the Leader matrix in their comprehensive survey of the properties of 2 X 2 games, yet the data they furnish appears to have been contaminated by the "curious finding that, with one exception, the cooperating pairs are all those who played last, which leads to the suspicion that information about the nature of the game and how to 'beat it' might have leaked out" (p. 160). Hurst, et al., (1969) used the Leader Game in research involving the effects of drugs on gaming behavior and Guyer and Rapoport (1969) used it in a study of information effects. In each of these two studies, however, the presence of the Leader matrix was merely incidental; because of confounding by various aspects of treatment conditions, the reports do not furnish necessary baseline data regarding the demand characteristics of the matrix. It was for the purpose of establishing such a set of benchmarks that Mack (1972) undertook an investigation in which twenty male and twenty female dyads played 100 trials of the Leader Game under conditions of perfect information and no inter-opponent communication. Members of each dyad were seated in separate cubicles, received tape recorded instructions, and indicated their choices on each trial through an automated system. This system recorded their choices and furnished feedback about the opponent's choice and cumulative score information (for both members of the dyad) to each subject. As the primary focus of the study was the accrual of baseline data, only one hypothesis was tested: "On the basis of previous research with the PDG, it is hypothesized that male dyads will choose more cooperatively than will female dyads" (p. 248). This hypothesis was not confirmed; females responded more cooperatively than males at a level that just failed to reach statistical significance (employing a Mann-Whitney U test, alpha = .05, one tailed). The most important finding of the investigation was that the level of cooperative responding (as measured by the Index of Cooperation, Guyer & Rapoport, 1969) did not decay during the course of the game. As Mack subsequently argued, "The observed stability of degree of cooperation would seem to indicate that the 'learning effect' consistently found in PDG research does not occur over time in the Leader Game, and that the game contains no inherent bias toward a particular outcome" (p. 249).

The primary purpose of the study reported herein was to directly compare the PDG and the Leader Game as a test of Mack's arguments regarding the relative levels of bias inherent in the two matrices. The means by which the test was carried out are summarized in Chapter 2 of this report. The rationale for undertaking the test was simple. If Mack's finding that the Leader Game contained no inherent bias toward the selection of either a cooperative or competitive strategy of choice-making was replicated, then it could have been argued that: (1) the Leader Matrix is preferable to the PDG matrix for the purpose of games research into cooperative and competitive orientations; and (2) that the results of previous research involving the use of the PDG could be called into question to the extent that they might be re-explained as a function of that matrix's demand characteristics.

## Gender-Related Differences

In research involving the PDG matrix, it has consistently been observed that the sex composition of the dyads affects their choice-making behavior (see Wiley, 1973, for a summary of the literature). The most stable findings are that: (1) mixed-sex dyads (MSD) manifest the lowest level of competitive responding; (2) male dyads (MD) are significantly more competitive than are MSD; and (3) female dyads (FD) are significantly the most competitive combination possible. Gender-related differences were explored in this study for two purposes. The first was to accrue baseline data about responses to the Leader Game by MSD, a combination not included in Mack's (1972) design, and their relation to data from MD and FD. The second was to provide comparisons of potential gender-related differences in responses to the Leader Game and the PDG, respectively.

Cooperative and Competitive Orientations

This writer's primary interest, in terms of an ongoing line of research, is the clarification of the nature of individuals' orientations to conflict (see Beisecker & McClearey, 1976). As research into the motivations underlying individuals' choice-making has progressed, more and more elaborate schema for operationalizing different motivational sets have been developed. At present, there is a trend toward mathematical models for multi-faceted orientations that will allow for prediction of behavior in the experimental game situation (cf. Griesinger & Livingston, 1973; McClintock, et al., 1973; Messick & McClintock, 1968; Rapoport, Guyer, & Gordon, 1976; and Wyer, 1969, 1971). This line of research constitutes a valuable contribution to the method and theory of experimental games, but utilizes operational definitions that often appear to be only marginally analogous to the orientations operating in mixed-motive conflicts outside the laboratory. Our eventual interest must be in seeking the motivational bases for choice-making during conflicts in extensive form; otherwise, the artificiality and sterility of the games experiment serves only the purpose of strengthening internal validity for a series of esoteric investigations. The strict controls imposed upon gaming experiments should not eviscerate the conflict situation of its essential elements, but rather should fulfill the purpose of rendering mixed-motive conflicts sufficiently manageable to allow for relatively precise observation and intepretation. It seems, however, that current investigations have compromised this purpose by ignoring the importance of a critical aspect of "real life" conflicts: the participants' perceptions of the character of their own behavior and the course of the conflict. A person's orientation toward a conflict will arise and be modified subsequently by her/his perception of the nature of her/his choices, the other's choices, and the effect of those interacting choices upon the dynamics and potential outcomes of the conflict. The labels imposed upon computational indices of orientations may be methodologically efficient, yet they have no necessary relevance nor relationship to what a subject perceives the motivational basis for her/his and the opponent's choices to be. And, beyond the confines of the laboratory, it is often an individual's perceptions of the motivations for behavior that most heavily influence her/his activities.

Given this state of affairs, it was deemed important in this study to undertake an exploratory comparison of the relationship between: (1) the computational index utilized to label and define the basic orientations encompassed by the design (cooperation and competition); and (2) subjects' self-reports as to the cooperative or competitive nature of their own choices. It was felt that if a meaningful relationship was found, it would lend impetus to the translation of empirical techniques and jargon into methods and guidelines useful for assessment of and intervention into conflicts outside the experimental laboratory. On the other hand, the absence of a meaningful relationship would indicate that the external validity and general "state of the art" in games research could begin to be questioned.

This interest in exploring orientations to conflict completes the rationale for this investigation. The formal hypotheses that were tested are stated below; in the next chapter, the research method and procedures for this project will be considered.

## Hypotheses

The hypotheses tested to explore possible biases in the PDG and the Leader Game were combined with hypotheses addressing possible gender-related differences in choice-making behavior:

I. There will be no difference between the responses (level of cooperation and pattern) of dyads (MSD, MD, and FD) playing repeated trials of a PDG and the responses of dyads with equivalent sex-composition playing repeated trials of a Leader Game.

II. There will be no differences among the responses (level of cooperation and pattern) of MSD, MD, and FD, respectively, playing repeated trials of a PDG.

III. There will be no differences among the responses (level of cooperation and pattern) of MSD, MD, and FD, respectively, playing repeated trials of a Leader Game.

The hypotheses tested to explore the potential relationship between computationally derived orientations and subjects' self-reports of orientations were:

IV. In a PDG there will be no relationship between the orientations attributed to subjects through a computational index and the orientations attributed to subjects by themselves.

V. In a Leader Game there will be no relationship between the orientations attributed to subjects through a computational index and the orientations attributed to subjects by themselves.

Finally, the following hypotheses explored potential differences among subjects' perceptions of the two matrix games. They were derived from the self-report instrument that was utilized and were included to facilitate a posteriori analysis of questionnaire data:

VI. There will be no differences between subjects' reports about selected features of a PDG (character of game, orientation of self, orientation of opponent, locus of control of game, and tacit communication) and subjects' reports about the same features of a Leader Game.

VII. There will be no differences among subjects' reports about selected features (above) of a PDG.

VIII. There will be no differences among subjects' reports about selected features (above) of a Leader Game.

# CHAPTER II

# METHOD

## Subjects

Subjects were students from the Basic Communication Program (Speech 130, 140, & 150) at the University of Kansas. Their activities in the project were voluntary, but also served to fulfill a "Research Participation" requirement. The experimental design required 36 males and 36 females; there were no other specific requirements for subject attributes.

## Design

The experiment was a 2 X 3 repeated measures design. There were two type of game matrices: Leader (LDR) and Prisoner's Dilemma (PDG). There were three types of dyads: female-female (FD), male-male (MD), and female-male (MSD). Trials were forty plays of the game and were blocked into groups of ten trials each to facilitate derivation of a computational index of cooperation and subsequent analyses. The design is represented schematically below:

| | | 1 - 10 | 11 - 20 | 21 - 30 | 31 - 40 |
|---|---|---|---|---|---|
| LDR | MSD | | | | |
| | MD | | | | |
| | FD | | | | |
| PDG | MSD | | | | |
| | MD | | | | |
| | FD | | | | |

There were six dyads assigned to each cell of the design (N = 72).

Instrumentation and Environment

Instrumentation was minimal: an intercom system was utilized to link three small rooms (4024a, b, & c, Wescoe Hall, University of Kansas) and a calculator was used by the experimenter to compute scoring information.

The two experimental rooms were of identical size and furnishing. Subjects sat at a table on which rested the intercom unit and a copy of the appropriate game matrix. Lighting of the two rooms was adequate and both rooms were free of extraneous noise because of their "nesting" within a larger experimental area. In brief, there were no problems with nor apparent contamination of results by the nature of the setting.

Procedure

Students signed up for participation in dyads. The sign-up sheets mandated that friends/acquaintances not form a dyad and the use of double sign-up sheets (one each distributed to a different class to acquire one-half of a dyad) helped insure that dyad partners were strangers. Two dyads were dropped prior to participation in the experiment (one MD and one FD) because the partners were acquainted; those dyads were replaced in the design by addition of appropriate slots (at random) to later sign-up sheets. A priori specification of the gender required for each time slot insured the appropriate balance and randomization across times of MSD, MD, and FD.

When a dyad arrived at the experimental site, they were greeted and each person was given an informed consent statement to read and sign (see

Appendix B). While the subjects were thus engaged, the experimenter used a table of random numbers to assign the dyad to one of the two game matrices. When subjects returned the consent statement, they were given instructions about the experiment. These instructions were uniform, but not strictly standardized. Pilot work indicated that subjects varied widely in their abilities to comprehend the procedures and scoring system when a standardized set of instructions was read to them over the intercom system; it was decided, therefore, to seek after "standardization of understanding" rather than standardization of recitation. Subjects were given their instructions in the experimental room and the instructions were centered around the standard PDG instructions (modified for LDR when appropriate) established by Rapoport and Chammah (1965); these instructions are reproduced in Appendix C. Along with delivering these instructions (with repetition and expansion, as necessary, to insure understanding), the experimenter demonstrated how the score for an individual trial was derived by pointing to the appropriate cells of the subjects' matrices. In each case, the double "cooperative" choice was used for illustration; replicas of the matrices used by subjects are shown in Appendix D. Subjects were then shown to their individual rooms and the use of the intercom was demonstrated. Two "practice trials" of the game were then played as a check for understanding of the procedures, scoring system, and use of the intercom. On each practice trial, the experimenter asked each dyad member (referred to as Player #1 and Player #2) to compute the score that would result if (a) she/he chose "1" and the other chose "2" (first practice trial) and (b) she/he chose "2" and the other chose "1" (second practice trial). No subject failed to give the correct answer on each practice trial or to use the intercom correctly, so it is assumed that all subjects understood the procedures before the beginning of the record trials. At the completion of the practice trials, subjects were told:

(1) That they would be playing several trials;

(2) That on each trial they would have five seconds to make their choice between "1" and "2" for that trial;

(3) That they would be called individually for their choice on each trial, the choice combination and resulting trial and cumulative scores would be computed, and the experimenter would then report to both of them simultaneously the trial combination, trial score, and total scores for each person up to that point in the game;

(4) That they should report to the experimenter, via the intercom, anytime they could hear the other person reporting her/his choice.

In essence, these instructions provided conditions where subjects played the trials under conditions of "perfect information" and "no inter-opponent communication." In only one case, due to a jammed switch, was the "no communication" condition compromised; this dyad, which had played six trials when the switch jammed, was dropped from the experiment and replaced at random. A watch with a sweep second hand was used to time the trials; five seconds were allowed for decision-making and ten seconds for gathering choices and computing and reporting back score information. Each trial, therefore, lasted 15 seconds; there was no deviation from this standard at any time during the course of the experiment. Subjects' choices and the resulting dyadic outcomes were recorded, on a trial-by-trial basis, on Fortran coding sheets.

After completing the 40 trials, subjects were stopped and told to remain in their rooms in order to fill out a brief questionnaire. The questionnaire (see Appendix E) was patterned after one employed by Garner and Deutsch (1974) and was accompanied by a sheet asking for demographic information. These materials were given to the subjects by the experimenter along with instructions to bring them to the experimental room when they were completed. When both persons in each dyad had completed the questionnaire, the dyad was given a debriefing that completely explained the purpose of the experiment and its procedures and asked them not to discuss the project with anyone (to insure that results from subsequent dyads were not contaminated). The debriefing began with two questions: (1) "Were you able to hear the other person at any time?"; and (2) "What did you think of the experiment?". Responses to the first question were negative in all cases. Responses to the second question (which were followed up with appropriate secondary probes) indicated: (1) that subjects' interest in the experiment ranged from mild (most cases) to high (eight to ten individuals); (2) that the experiment was involving for all subjects (i.e., no subject indicated or reported "boredom" and most reported a high degree of involvement and concentration across the forty trials); and (3) that no subject (with the exception of one dyad that was dropped and randomly replaced) had participated in a similar situation or had prior information about game theory or games experimentation.

Summary

The method used in this project was of the standard type employed in experiments where automatic scoring equipment is not utilized. Feedback from subjects gave no indication that any aspect of the procedures was either reactive or compromised due to prior information. In conclusion, therefore, it may be stated that the design and procedures of this investigation were methodologically sound and in conformity with the traditions of prior games experimentation.

# CHAPTER III

# RESULTS

In this chapter each of the eight null hypotheses tested in this investigation is restated and results pertinent to it are summarized. All tables have been confined to appropriate appendices.

## The Computational Index

Several of the data analyses in this section refer to a level of cooperation that was determined according to the following computational index: (a) the level of cooperation for an individual player was taken as the number of times she/he chose "1" across either a 10-trial block or the 40-trial game (as appropriate to the analysis reported); (b) the level of cooperation for a dyad was taken as the number of times the individual players' choices resulted in one of the three dyadic combinations that either left the dyadic payoff at stasis (Combinations #2 & #3 in the PDG and Combination #1 in LDR) or increased the dyadic payoff (Combination #1 in the PDG and Combinations #2 & #3 in LDR). The index for individuals is the standard "level of C [cooperative] responding" established by Rapoport and Chammah (1965) and endorsed as recently as 1976 (by Rapoport, Guyer, & Gordon) as the simplest, most widely used index. The index for dyads, however, is not similarly standard. In reviewing the reports of games experiments in which an index of cooperation was computed, a simple index could not be located that would allow for comparison of levels of dyadic cooperation across the two games used in this study. In other words, the indexes in the literature were all formulated with either a particular game or class of games in mind. In this study, games from different classes were used --- Leader, with a double equilibrium point, and Prisoner's Dilemma, with a single equilibrium point --- and, therefore, a new index had to be created to allow for comparisons. The index finally chosen is based on the notion that dyadic cooperation can be said to have occurred in a mixed-motive situation whenever the dyad successfully avoids an outcome (Combination #4 in both PDG and LDR) that would result in a loss for the dyad. This "state" defining dyadic cooperation can be achieved, therefore, by a choice combination that either enhances the dyadic payoff (#2 & #3 in LDR and #1 in PDG) or leaves the dyadic payoff at its previous level (#1 in LDR and #2 & #3 in PDG).

## Hypothesis I

This hypothesis stated that there would be no differences between the level and pattern of cooperation of mixed-sex dyads (MSD), male dyads (MD), and female dyads (FD) playing repeated trials of a PDG and the level and pattern of cooperation of similar dyads playing repeated trials of LDR. The mean levels of cooperation across forty trials for dyads playing the PDG (expressed as the percentage of dyadic outcomes that were cooperative according to the index discussed above) were: MSD, 39.58; MD, 32.50; and FD, 47.08. The mean levels for dyads playing LDR were: MSD, 29.58; MD, 52.54; and FD, 54.17. These results were not significant at the .05 level of confidence due to variations within each cell of the design. The reader should examine, at this point, the summary game protocols in Appendix F in order to note the variability of responses within any particular experimental condition.

Evidence from this study, therefore, did not allow for rejection of the null hypothesis that there is no difference in the level of cooperation of dyads playing PDG versus dyads playing LDR. When the data were blocked into groups of 10 trials and Chi-square contingency tables were constructed to check for differences in pattern of cooperation across trials between the two games, results were similarly non-significant. The null hypothesis of no difference in pattern of co-operation between dyads playing PDG and dyads playing LDR, therefore, was not rejected.

## Hypothesis II

This hypothesis stated that there would be no differences among the levels and patterns of cooperation of MSD, MD, and FD playing repeated trials of PDG. The mean levels of cooperation found were: MSD, 39.58; MD, 32.50; and FD, 47.08. As was the case in testing Hypothesis I, variation within each of the particular classes of dyads rendered the differences among means non-significant and Chi-square contingency tables for blocked trials did not reveal any significant differences in pattern of cooperative responding. The evidence was insufficient, therefore, to allow for rejection of this null hypothesis.

## Hypothesis III

This statement was the same as the one formulated for Hypothesis II, but in this case the matrix of interest was LDR. The mean levels of cooperation found for LDR were: MSD, 29.58; MD, 52.54; and FD, 54.17. Again, variations within each dyad class leveled these differences and Chi-square contingency tables for blocked trials did not reveal any significant differences in pattern of cooperation. The results, then, did not allow for rejection of the null hypothesis that there is no difference in the level and pattern of cooperative responding among MSD, MD, and FD playing LDR.

Hypothesis IV

This hypothesis stated that in PDG there would be no relationship between the orientations attributed to subjects through a computational index and the orientations attributed to subjects by themselves. To test this hypothesis, a Pearson product-moment correlation coefficient was computed between the number of cooperative responses (choices of #1) across 40 trials of PDG and the response to Item #3 on the questionnaire made by each subject. Item #3 (see the questionnaire, Appendix E) asked for the subject's perception of the character of her/his choice-making behavior on a five-point scale ranging from "competitive" through "cooperative." The correlation for all subjects playing PDG was .2776; for males playing PDG, .1526; and for females playing PDG, .4464. None of these correlations was significant at the .05 level of confidence. The null hypothesis of no relationship between orientations attributed by a computational index and by subjects themselves for individuals playing PDG, therefore, was not rejected. [The reader may refer to Appendix G for tables of correlations between the index and Item #3 for various subgroups, as well as intercorrelations of all continuously scaled items.]

Hypothesis V

This hypothesis was the same as Hypothesis IV above, but relationships were tested in this case in the context of LDR. The correlations between the computational index and subjects' perceptions in LDR was .3739, which was significant at the .05 level of confidence ($t = 2.3507$, two-tailed, $df = 34$). The correlation for males playing LDR was .7579, which was also significant at the .05 level ($t = 4.6470$, two-tailed, $df = 16$). However, the correlation for females playing LDR was -.1051, which was not significant at the .05 level ($t = .4227$, two-tailed, $df = 16$). The null hypothesis, therefore, was rejected; there was a moderate, significant relationship between the number of cooperative choices made by subjects playing LDR and their perception of the character of their own choice-making behavior. An a posteriori check for sex differences, however, revealed that this relationship appears to hold true only for males playing LDR. Future testing of an a priori null hypothesis positing no difference in the strength of the relationship as a function of sex differences is necessary, of course, to strictly establish this "apparent difference."

## Hypotheses VI, VII, and VIII

These three hypotheses were included at the outset of the study to facilitate tests for differences in responses to the six-item, self-report questionnaire. They are collapsed together, for purposes of reporting results, because none of the tests yielded significant differences. There were no significant differences between subjects' reports about features of PDG (i.e., character of game, orientation of self, orientation of opponent, locus of control of game, and tacit communication) and subjects' reports about the same features of LDR. Hypothesis VI, the statement of which in null form posited no difference, was therefore not rejected. There was a similar lack of significant differences when each game was considered in isolation and data was further blocked to check for sex differences. Hypotheses VII and VIII, therefore, were not rejected. In Appendix H the reader will find: (1) means and standard deviations for responses by various sub-groupings of subjects to the three scaled items (#1, #3, and #4); and (2) frequency data for the three non-scaled items (#2, #5, and #6). It should be noted here, in regard to this latter group of items, that only the response distribution for Item #2 (locus of control of game) departed significantly from what would be expected by chance (Item #2, Chi-square = 19.78, df = 3, $p < .001$). The response distributions for Items #5 and #6 (tacit communication) did not deviate significantly from a random array of responses. Furthermore, when responses to Items #5 and #6 were compared within dyads to check for agreement as to the presence or absence of tacit communication, response distributions again failed to depart significantly from randomness (see Appendix H).

Overall, then, subjects saw <u>both</u> games as "moderately competitive" (Item #1, Mean = 2.18, SD = .99); a significant number of subjects saw both games as controlled by both dyad partners equally (Item #2); subjects saw their opponents' choices as "moderately competitive" (Item #4, Mean = 2.16, SD = 1.06); subjects saw their own choices as similarly "moderately competitive" (Item #3, Mean = 2.24, SD = 1.09); and, while some subjects indicated that they did try to tacitly communicate with their partners (Item #5) and/or that their partners had tried to tacitly communicate with them (Item #6), the response distributions for these items did not depart significantly from chance expectations. It appears, therefore, that subjects' statements about tacit communication were simply projections or inferences spurred by an active search for cues in the game situation, rather than assessments of any true inter-opponent communication process.

## Additonal Analysis of Questionnaire Items

In addition to correlating the computational index and Item #3 for each subject, pair-wise correlations were computed between Items #1, #3, and #4. The correlations, with results blocked by matrix and sex of subject, are presented in Appendix G. The correlation between Item #1 (character of game) and Item #3 (own orientation) was significant in all cases. The correlation between these two items, taking into account all subjects, was .6573; correlations for subgroups ranged from a high of .8469 (for males playing LDR) to a low of .4428 (for males playing PDG). The correlation between Item #3 (own orientation) and Item #4 (orientation of other) attained significance in only four cases: the overall correlation was .3086; the correlation for subjects playing LDR was .4365; the correlation for males was .4214; and the correlation for males playing LDR was .7131. This pattern of relationships appears to be similar to the one found when the computational index was correlated with Item #3: a high correlation for males playing LDR is the primary source for the relationship found at higher levels of data blocking. Finally, the correlation between Item #1 (character of game) and Item #4 (orientation of other) was significant in all but two cases. The overall correlation was .5078 and other significant correlations ranged from a high of .6944 (for males playing LDR) to a low of .4511 (for all subjects playing PDG). The two non-significant relationships were for males playing PDG ($r$ = .0965) and females playing LDR ($r$ = .3694).

## Summary

The results of testing the eight null hypotheses that guided the conduct of this study indicated that only one of those statements, Hypothesis VI (which posited no relationship between a computational index of orientations and self-reports of orientations for subjects playing the Leader Game), can be rejected. In the next chapter, these results and their implications will be discussed.

# CHAPTER IV

# DISCUSSION

The major result of this study was that no difference was found between responses evoked by a Leader Game matrix and a Prisoner's Dilemma Game matrix, respectively. Two secondary results were that gender-related differences in choice-making behavior did not attain significance and computational indices of cooperation bore little relationship to subjects' self-reported orientations. These results and their implications will be discussed in the initial portions of this chapter. Suggestions for further research will then be made and, finally, limitations of this study will be noted.

## Leader and Prisoner's Dilemma

When levels and patterns of cooperation were compared among all subgroups defined by the design of the experiment, no differences emerged that were a function of the game matrices compared. In essence, this pattern of results argues that the LDR and PDG matrices are similar in respect to their influence on cooperative responding, despite their theoreticial dissimilarity. This argument is strengthened by the subjects' responses to the self-report questionnaire. When asked to assess five features of the situation (i.e., character of game, character of own choices, character of opponent's choices, locus of control of game, and tacit communication dynamics), the responses by subjects who played LDR did not differ significantly from those given by subjects who played PDG. In other words, this study accrued data indicating that subjects exposed to one of the matrices did not view the mixed-motive situation any differently than did subjects exposed to the other matrix.

This set of findings contradicts Mack's (1972) results which indicated that the LDR matrix should have been much less biased toward competitive responding than was the PDG matrix. This failure to replicate calls Mack's arguments regarding the cooperative dynamics of the LDR game into question. The results from the present study demonstrated that when LDR and PDG were directly compared, subjects perceived and responded to them as if they were similar. The conclusion drawn from this study, therefore, is that there are no differences between the Leader and Prisoner's Dilemma Game matrices in their effects upon level and pattern of cooperative responding. The differences proposed by Mack (1972) cannot be assumed to be veridical until such time as those differences can be reliably demonstrated.

## Gender-Related Differences

Results from this study do not indicate any systematic effect of the sex composition of a dyad upon its level or pattern of cooperative responding. Within each particular type of dyad (male, female, or mixed-sex) it appears that individual differences in response patterns masked any possible effect of manipulating gender as an assignment category. The results indicate that dyadic sex composition is a very weak parameter of the overall gaming situation when there is no communication allowed and no sex-role related behaviors are manipulated. While evidence for sex differences in responses to Prisoner's Dilemma games exists, much of this research was conducted seven to twelve years ago (see Wiley, 1973). Given possible changes in the importance and impact of sex roles on subject populations (cf. Carrocci, 1976) and data from this study, it may be concluded that the importance of gender-related differences in gaming behavior is, perhaps, diminishing; any such differences assumed in future research should be reliably demonstrated for current subject populations.

## Computationally Derived and Self-Reported Orientations

The results of this study indicated that there was little relationship between a computational index of cooperation and the extent to which subjects perceived their own choices as cooperative. The one exception to this trend was for males playing the Leader Game. Given the results regarding matrix- and sex-related differences discussed above, this exception cannot be explained on the basis of any "main effects." There is a possibility, however, that this exception indicates the presence of an interaction effect between the dynamics of the Leader Game and the orientation and behavior of male subjects. An examination of individual game protocols and questionnaires for males who played Leader did not yield any information that would aid in determining the reason for such an interaction. For the present, then, the possibility of this interaction must simply be noted and retained as a question for testing in future research. It is also possible, of course, that the high correlation for males playing Leader is simply spurious; given the number of correlations computed and tested, one would expect at least two correlations to spuriously attain significance at the .05 level of confidence (see Winer's discussion, 1971, of experimentwise error).

Finding no relationship between the two measures of orientations for most subjects was not surprising. As was noted in the first chapter of this report, computational orientations are merely labeled by experimenters and there is no necessary reason that those labels should relate to the labels subjects impose upon their own behavioral repertoires. The results argue strongly for the necessity of taking into account the subject's perception of the character of her/his own choice-making behavior before generalizing too readily from the labels attached to computational indices. This aspect of the study requires replication before it can be accepted as reliable, but it does indicate the possibility that we need to define and investigate orientations to conflict from the perspective of the subject, rather than from our own intuitions as researchers about the correct semantic interpretation of mathematical formulas.

## Implications of the Results

The general implication of the results from this study is that structural features of an experimental game (the matrix, the sex composition of the dyads, etc.) may simply not be as important as sources of variance in responses as are the subjects themselves. An examination of the game protocols and self-report instruments revealed that subjects' perceptions of the situation and their related behaviors were highly variable even within one cell of the experimental design. The current trend in games research seems to be to regard such variation as bothersome and to seek to increase sample sizes to the point that differences between conditions become statistically significant, although of little practical significance. This trend may culminate in the perspective adopted by Rapoport, Guyer, and Gordon (1976) in their comprehensive treatise on the 2 X 2 game. These authors argue that games research is and should continue to be focused on understanding the "psychology" of the "composite individual" (Ch. 25). This composite individual, they acknowledge, has a psychology ". that no 'real' individual can be considered to be endowed with ." (p. 434). In essence, they argue for ignoring the pragmatics of conflict and the behavior of "real" individuals within it in favor of refining the esoterics of the mathematical theory of games as applied to "unreal," statistical entities (pp. 434-436). Given this perspective, the major conclusion of this study would be that one should seek to drastically increase one's sample size in hopes of eradicating the effects of individual differences and, thereby, letting any of the potential effects of the formal game situation (matrix, dyadic composition, etc.) emerge as salient. These latter effects, in other words, are systematic yet weak and one would therefore seek to level or counterbalance other effects so as to let them emerge.

While such a conclusion would be tenable, it does not provide the most favorable options for the social scientist who is concerned with "real" individuals and their behavior in conflict situations. It can be argued, on the basis of this study, that the game paradigm may provide an almost ideal experimental environment within which to study individual differences in perceptions of and responses to conflict situations. This argument is in one sense an observation that has been made before; there is a large body of literature related to the impact of differences in various psychological "traits" upon game playing behavior (see Rapoport and Chammah, 1965, and Rapoport, Guyer, and Gordon, 1976, for summaries of the research). Within this group of experiments, however, there are two general weaknesses: a very low level of replicability of findings and the unquestioned acceptance of computational orientations as representative of subjects' orientations. The former problem may reflect both difficulties in reliably measuring individual "trait" differences and the unwillingness of researchers to perform direct replications of previous experiments prior to introducing substantive modifications in procedure, design, etc. The latter problem has already been addressed; it is most probably the result of the pervasive use of highly variable experimenter intuition in labeling and computationally defining orientations. This lack of rigor and refinement, however, must not be allowed to mask the power of the game model for revealing individual differences in responses to conflict situations. As was the case in this study, those differences emerge as "self-evident" against the background of the highly controlled experimental environment. The problem that must be addressed, therefore, is the nature of these differences, the sources for the variations in responses that "clutter up" results and mask the weak effects of attempted manipulations of game parameters. The major conclusion of this study, then, is that there are salient and, hopefully, systematic individual differences in responses to experimental conflict situations that can be investigated within the game paradigm if we make them our focus of interest.

## Suggestions for Further Research

Given the results of this study, there are two broad lines of research that could be established and pursued with the expectation of increasing our understanding of behavior in mixed-motive conflict situations. The first program can be generated by attempting to answer the question, "What is an orientation to conflict?" This study demonstrated that an established and popular computational index (Rapoport's "level of C responding") does not necessarily reflect what the subject perceives as her/his orientation during a conflict. It would be fruitful, then, to re-examine computational indexes and begin a systematic investigation to determine whether any of them correspond to subjects' perceptions in a given situation. As necessary, one could go beyond these indexes both to create new, more accurate computational operationalizations and to investigate other, non-computational methods of determining orientations. The second program of research is potentially much broader than the investigation of orientations (which could eventually be subsumed by it); it can be generated by seeking to answer the question, "What are the sources of observed individual differences in behavior in mixed-motive game situations?" Tackling this question is not quite the awesome task it may seem at first, since the methods and procedures associated with games experimentation allow for relatively strict controls of extraneous sources of variance. By systematically manipulating or tapping various subject-related aspects of a conflict within a standardized situation (such as perception of the opponent, perception of strategies, perception of outcomes, etc.), one could begin to isolate and test explanations for observed differences in behavior.

## Limitations of the Study

The major limitation of this study is that it was not an exact replication of Mack's (1972) experiment. In this study, a different set of subjects was used, score information was reported verbally rather than by automated equipment, and instructions were delivered face-to-face rather than by tape recording. It appears justifiable, however to argue that these differences should not have made any difference if, in fact, the LDR and PDG matrices consistently evoke dissimilar patterns of play.

Rapoport and Chammah (1965) argue that the instructions given to subjects are of little importance and that the mode of instruction has no noticeable effect on results. After surveying the literature in regard to the PDG, they note that a wide variety of basic sets of instructions and techniques of delivery had no apparent impact on gaming behavior. The exceptions, of course, were those cases in which researchers went beyond basic, "how to play it," instructions and sought to introduce different motivational sets, status heirarchies, etc. In neither Mack's study nor this investigation were any such manipulations undertaken, so this difference should not explain the failure to replicate.

The difference between methods of reporting scores similarly lacks explanatory power. No investigation has been reported that manipulated this feature of the experimental procedures as an independent variable. Simply scanning the literature on games experimentation, however, produces a simple argument against the importance of this variation in procedure. Automated equipment is a relatively recent innovation, yet results accrued using this equipment do not depart from the trends established previously by experimenters who reported scores verbally, passed notes, employed a scoreboard, etc. (see Rapoport, Guyer, and Gordon, 1976, for several automated replications of previous experiments).

The final difference between the method of this study and Mack's investigation, the subject samples respectively employed, is somewhat more difficult to dismiss. It is possible that the failure to replicate Mack's findings about the Leader matrix was a result of substantial differences in subject samples. This speculation, however, is impossible to test. Mack merely reports that he used 40 males and 40 females from an introductory psychology course, while this study utilized 18 males and 18 females [for the Leader portion of the design] from introductory speech courses. No test for "differences" is possible, given this minimal information. It should be remembered, however, that Mack proposed merely a difference between matrices, not a difference between matrix-by-subject interactions; in other words, he argued for a pervasive difference between LDR and PDG. In essence, then, this "limitation" was both an unavoidable aspect of the research situation and a necessary test of the generality of Mack's results.

No other significant limitations of the methodology of this study are apparent. The procedures remained standardized throughout the course of the experiment, the subjects reported an acceptable degree of concentration and involvement, and all subjects whose prior or intra-session experiences (e.g., a jammed intercom switch) would have biased their responses were dropped from the design and randomly replaced.

The self-report instrument, of course, has only face validity at this time. There is no opportunity within the context of a study such as this to perform a meaningful check for test-retest reliability. Given subjects' reports of their involvement with the experiment, there is no reason to suspect that they did not respond to the questionnaire honestly. The generally low level of correlations between items #3 and #4, which were similarly scaled, argues against any pervasive presence of response bias. And, finally, there is no reason to suspect that social desirability was a salient demand characteristic since subjects were aware that their responses were completely anonymous. The instrument, then, still awaits formal validation, but had sufficient face validity to be deemed acceptable for use and subseqent interpretation in an exploratory study such as the one reported herein.

## Summary

In this study three types of dyads played either a Prisoner's Dilemma or Leader Game under conditions of perfect information and no inter-opponent communication. Results indicated that neither the game matrix nor the sex composition of the dyads differentially affected subjects' levels or patterns of cooperative responding. Results also indicated virtually no correspondence between a computational index of orientations to conflict and subjects' self-reports of orientations. Data from a self-report instrument was used to support the arguments that the lack of matrix- and sex-related differences was veridical and that further research should focus on mapping individual differences in responses to mixed-motive situations. Limitations of the study were noted, yet were not sufficient to prohibit acceptance and interpretation of the data.

# REFERENCES


Beisecker, T., & McClearey, K. Orientation to conflict: a neglected variable in research. Paper presented at the meeting of the Central States Speech Association, Chicago, April 1976.

Carrocci, N. M. An exploratory study of interpersonal trust between the sexes. Unpublished M.A. thesis, University of Kansas, 1976.

Garner, K., & Deutsch, M. Cooperative behavior in dyads: effects of dissimilar goal orientations and differing expectations about the partner. Journal of Conflict Resolution, 1974, 18, 634-645.

Griesinger, D. W., & Livingston, J. W. Toward a model of interpersonal motivation in experimental games. Behavioral Science, 1973, 18, 173-188.

Guyer, M., & Rapoport, A. Information effects in two mixed-motive games. Behavioral Science, 1969, 14, 467-482.

Hurst, P. M., Radlow, R., Chubb, N. C., & Bagley, S. K. Drug effects upon choice behavior in mixed-motive games. Behavioral Science, 1969, 14, 443-452.

Komorita, S. S. Cooperative choice in a prisoner's dilemma game. Journal of Personality and Social Psychology, 1965, 2, 741-745.

Luce, R. D., & Raiffa, H. Games and decisions: introduction and critical survey. New York: John Wiley & Sons, 1957.

Mack, D. "Leader": an unbiased mixed-motive game?. Psychologische Beitrage, 1972, 14, 244-252.

McClintock, C. G., Messick, D. M., Kuhlman, D. M., & Campos, F. T. Motivational bases of choice in three-choice decomposed games. Journal of Experimental Social Psychology, 1973, 9, 572-590.

McNeel, S. P., McClintock, C. G., & Nuttin, J. M. Effects of sex role in a two-person mixed-motive game. Journal of Personality and Social Psychology, 1972, 24, 372-380.

Messick, D. M., & McClintock, C. G. Motivational bases of choice in experimental games. Journal of Experimental Social Psychology, 1968, 4, 1-25.

Miller, G. H., & Pyke, S. W. Sex, matrix variations, and perceived personality effects in mixed-motive games. Journal of Conflict Resolution, 1973, 17, 335-349.

Rapoport, A. Two-person game theory: the essential ideas. Ann Arbor: University of Michigan Press, 1966.

Rapoport, A. Exploiter, leader, hero, and martyr: the four archetypes of the 2 X 2 game. Behavioral Science, 1967, 12, 81-84.

Rapoport, A., & Chammah, A. M. Prisoner's Dilemma. Ann Arbor: University of Michigan Press, 1965.

Rapoport, A., Guyer, M. J., & Gordon, D. G. The 2 X 2 game. Ann Arbor: University of Michigan Press, 1976.

Schelling, T. C. The strategy of conflict. New York: Oxford University Press, 1960.

Smith, N. S., Vernon, C. R., & Tarte, R. D. Random strategies and sex differences in the prisoner's dilemma game. Journal of Conflict Resolution, 1975, 19, 643-650.

Wiley, M. G. Sex roles in games. Sociometry, 1973, 36, 526-541.

Winer, B. J. Statistical principles in experimental design (2d Ed.). New York: McGraw-Hill, 1971.

Wyer, R. S. Prediction of behavior in two-person games. Journal of Personality and Social Psychology, 1969, 13, 222-238.

Wyer, R. S. Effects of outcome matrix and partner's behavior in two-person games. Journal of Experimental Social Psychology, 1971, 7, 190-210.

# APPENDIX A

## THE GAME MATRICES

PRISONER'S DILEMMA GAME MATRIX

| | | Player #2 | |
|---|---|---|---|
| | | $B_1$ | $B_2$ |
| Player #1 | $A_1$ | 3, 3<br>(Combination #1) | -5, 5<br>(Combination #2) |
| | $A_2$ | 5, -5<br>(Combination #3) | -1, -1<br>(Combination #4) |

LEADER GAME MATRIX

| | | Player #2 | |
|---|---|---|---|
| | | $B_1$ | $B_2$ |
| Player #1 | $A_1$ | 0, 0<br>(Combination #1) | 1, 2<br>(Combination #2) |
| | $A_2$ | 2, 1<br>(Combination #3) | -1, -1<br>(Combination #4) |

# APPENDIX B

## INFORMED CONSENT STATEMENT

The Department of Speech and Drama supports the practice of protection for human subjects participating in research. The following information is provided so that you can decide whether you wish to participate in the present study. You should be aware that even if you agree to participate you are free to withdraw at any time.

The study is concerned with the way people behave in different experimental game situations. You and another individual will be asked to participate in an experimental game and furnish us with a record of your play and other pertinent information. Your record will be identified only by a code number that allows us to keep materials organized --- your responses will be completely anonymous.

Your participation is solicited, but is strictly voluntary. Do not hesitate to ask any questions about the study; you will be provided with an explanation of the purposes of our research at the end of the session. Again, be assured that your name will not be associated with the research findings in any way. We appreciate your cooperation very much.

Sincerely,

Kevin McClearey
Principal Investigator

Signature of student agreeing to participate DATE

# APPENDIX C

INSTRUCTIONS

"You will be playing a game which has certain payoffs. You cannot by yourself control the specific payoff for a given game. Rather, the outcome will depend on what your partner does, as well as on what you do. Each of you has a payoff matrix in front of you.

The game is played as follows: You are players #1 and #2 respectively. The matrix in front of you shows that you have two choices each time you play      in other words, on each trial of the game you may choose either #1 or #2. Any decision is final --- you cannot change your mind once you have told me your choice. The payoffs resulting from each possible combination of choices is shown on your matrix. For example, if Player #1 chooses '1' and Player #2 chooses '1', both of you receive _____ points --- that is Combination #1 on your matrix. [And so on through each possible Combination.]

I will tell you after each trial the number of points gained and lost by each person and the total number of points received by each person at that point in the game.

It is important that you do not communicate with each other the reason for this is that the experiment becomes useless for our purposes should any communication take place. For that reason, each of you will be in a separate room, able to communicate only with me over the intercom. Let's step around the corner and I will show you those rooms and how to work the intercom."

[This set of instructions is an abbreviation, with minor variations to conform to the procedures of this study, of the "Instructions given to subjects playing Prisoner's Dilemma in the pure matrix condition," Rapoport and Chammah, 1965, pp. 228-229.]

# APPENDIX D

THE SUBJECTS' MATRICES

## LEADER GAME MATRICES

PLAYER #1:

| | | YOU | |
|---|---|---|---|
| | | $\underline{1}$ | $\underline{2}$ |
| OTHER | 1 | 0, $\underline{0}$ (1) | 1, $\underline{2}$ (2) |
| | 2 | 2, $\underline{1}$ (3) | -1, $\underline{-1}$ (4) |

PLAYER #2:

| | | OTHER | |
|---|---|---|---|
| | | 1 | 2 |
| YOU | $\underline{1}$ | $\underline{0}$, 0 (1) | $\underline{1}$, 2 (2) |
| | $\underline{2}$ | $\underline{2}$, 1 (3) | $\underline{-1}$, -1 (4) |

## PRISONER'S DILEMMA GAME MATRICES

PLAYER #1:

| | | YOU | |
|---|---|---|---|
| | | $\underline{1}$ | $\underline{2}$ |
| OTHER | 1 | 3, $\underline{3}$ (1) | -5, $\underline{5}$ (2) |
| | 2 | 5, $\underline{-5}$ (3) | -1, $\underline{-1}$ (4) |

PLAYER #2:

| | | OTHER | |
|---|---|---|---|
| | | 1 | 2 |
| YOU | $\underline{1}$ | $\underline{3}$, 3 (1) | $\underline{-5}$, 5 (2) |
| | $\underline{2}$ | $\underline{5}$, -5 (3) | $\underline{-1}$, -1 (4) |

# APPENDIX E

QUESTIONNAIRE

("Conflict Orientation Inventory")

## C O I

Think about the game you just played when you answer the questions below. The questions ask for your perception of that game situation. there are no "right" or "wrong" answers. Circle the alternative that most closely agrees with your perception of the situation. Then briefly explain the reasons for your answer in the space provided. Your answers are completely anonymous. Please answer every question and remember to explain your answer.

1. I think that the overall character of the game was:

   a. Competitive  b. Moderately Competitive  c. Neutral  d. Moderately Cooperative  e. Cooperative

----- ----- ----- ----- ----- ----- ----- -----

2. I think that the course of the game was controlled by:

   a. Me  b. The other person  c. Both of us equally  d. Neither of us

----- ----- ----- ----- ----- ----- ----- -----

3. I think that the choices I made during the game were:

   a. Competitive  b. Moderately Competitive  c. Neutral  d. Moderately Cooperative  e. Cooperative

----- ----- ----- ----- ----- ----- ----- -----

4. I think that the choices the other person made during the game were:

   a. Competitive  b. Moderately Competitive  c. Neutral  d. Moderately Cooperative  e. Cooperative

----- ----- ----- ----- ----- ----- ----- -----

5. I used some of my choices to attempt to communicate with the other person:

   a. Yes  b. No

----- ----- ----- ----- ----- ----- ----- -----

6. I think some of the other person's choices were attempts to communicate with me:

   a. Yes  b. No

[The inventory actually given to subjects was mimeographed on legal size paper. Items 1, 2, & 3 were on the front of the inventory, along with the instructions. The remaining items were on the back of the same sheet. Response alternatives were equally spaced to give a Likert-type format to the scales.]

# APPENDIX F

## SUMMARY GAME PROTOCOLS

[1. Entries for individuals reflect the number of "c" choices --- choices of #1 --- expressed both as a raw number and as the percentage of such choices per 10-trial block and 40-trial game.

2. Entries for dyads reflect the number of choice combinations that avoided the mutually destructive outcome (Combination #4) --- i.e., that left the dyadic payoff at stasis or increased it --- expressed both as a raw number and as the percentage of such combinations per 10-trial block and 40-trial game.]

## PRISONER'S DILEMMA GAME: MIXED-SEX DYADS

| UNIT | TRIAL BLOCK: I | II | III | IV | TOTAL COOPERATIVE RESPONSES | SEX OF SUBJECT |
|---|---|---|---|---|---|---|
| PLAYER #1 | 4 (40%) | 4 (40%) | 1 (10%) | 2 (20%) | 11 (27.5%) | MALE |
| PLAYER #2 | 6 (60%) | 3 (30%) | 4 (40%) | 5 (50%) | 18 (45.0%) | FEMALE |
| DYAD | 7 (70%) | 4 (40%) | 4 (40%) | 6 (60%) | 21 (52.5%) | |
| PLAYER #1 | 3 (30%) | 2 (20%) | 1 (10%) | 0 ( 0%) | 6 (15.0%) | FEMALE |
| PLAYER #2 | 3 (30%) | 2 (20%) | 2 (20%) | 2 (20%) | 9 (22.5%) | MALE |
| DYAD | 5 (50%) | 4 (40%) | 3 (30%) | 2 (20%) | 14 (35.0%) | |
| PLAYER #1 | 3 (30%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 3 ( 7.5%) | FEMALE |
| PLAYER #2 | 4 (40%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 4 (10.0%) | MALE |
| DYAD | 6 (60%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 6 (15.0%) | |
| PLAYER #1 | 5 (50%) | 4 (40%) | 4 (40%) | 1 (10%) | 14 (35.0%) | MALE |
| PLAYER #2 | 1 (10%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 1 ( 2.5%) | FEMALE |
| DYAD | 6 (60%) | 4 (40%) | 4 (40%) | 1 (10%) | 15 (57.5%) | |
| PLAYER #1 | 2 (20%) | 4 (40%) | 3 (30%) | 6 (60%) | 15 (37.5%) | FEMALE |
| PLAYER #2 | 4 (40%) | 2 (20%) | 2 (20%) | 5 (50%) | 13 (32.5%) | MALE |
| DYAD | 5 (50%) | 6 (60%) | 5 (50%) | 10 (100%) | 26 (65.0%) | |
| PLAYER #1 | 3 (30%) | 2 (20%) | 2 (20%) | 0 ( 0%) | 7 (17.5%) | MALE |
| PLAYER #2 | 5 (50%) | 1 (10%) | 1 (10%) | 0 ( 0%) | 7 (17.5%) | FEMALE |
| DYAD | 7 (70%) | 3 (30%) | 3 (30%) | 0 ( 0%) | 13 (32.5%) | |

## PRISONER'S DILEMMA GAME: MALE DYADS

| UNIT | TRIAL BLOCK: I | II | III | IV | TOTAL COOPERATIVE RESPONSES |
|---|---|---|---|---|---|
| PLAYER #1 | 4 (40%) | 5 (50%) | 3 (30%) | 2 (20%) | 14 (35.0%) |
| PLAYER #2 | 4 (40%) | 4 (40%) | 5 (50%) | 3 (30%) | 16 (40.0%) |
| DYAD | 6 (60%) | 7 (70%) | 6 (60%) | 4 (40%) | 23 (57.5%) |
| PLAYER #1 | 3 (30%) | 3 (30%) | 3 (30%) | 7 (70%) | 16 (40.0%) |
| PLAYER #2 | 6 (60%) | 4 (40%) | 4 (40%) | 8 (80%) | 22 (55.0%) |
| DYAD | 8 (80%) | 7 (70%) | 6 (60%) | 10 (100%) | 31 (77.5%) |
| PLAYER #1 | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0.0%) |
| PLAYER #2 | 1 (10%) | 0 ( 0%) | 0 ( 0%) | 7 (70%) | 8 (20.0%) |
| DYAD | 1 (10%) | 0 ( 0%) | 0 ( 0%) | 7 (70%) | 8 (20.0%) |
| PLAYER #1 | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0.0%) |
| PLAYER #2 | 0 ( 0%) | 1 (10%) | 0 ( 0%) | 0 ( 0%) | 1 ( 2.5%) |
| DYAD | 0 ( 0%) | 1 (10%) | 0 ( 0%) | 0 ( 0%) | 1 ( 2.5%) |
| PLAYER #1 | 5 (50%) | 0 ( 0%) | 2 (20%) | 0 ( 0%) | 7 (17.5%) |
| PLAYER #2 | 7 (70%) | 1 (10%) | 0 ( 0%) | 0 ( 0%) | 8 (20.0%) |
| DYAD | 8 (80%) | 1 (10%) | 2 (20%) | 0 ( 0%) | 11 (27.5%) |
| PLAYER #1 | 3 (30%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 3 ( 7.5%) |
| PLAYER #2 | 1 (10%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 1 ( 2.5%) |
| DYAD | 4 (40%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 4 (10.0%) |

PRISONER'S DILEMMA GAME: FEMALE DYADS

| UNIT | TRIAL BLOCK: I | II | III | IV | TOTAL COOPERATIVE RESPONSES |
|---|---|---|---|---|---|
| PLAYER #1 | 2 (20%) | 2 (20%) | 2 (20%) | 0 ( 0%) | 6 (15.0%) |
| PLAYER #2 | 3 (30%) | 3 (30%) | 1 (10%) | 3 (30%) | 10 (25.0%) |
| DYAD | 5 (50%) | 5 (50%) | 3 (30%) | 3 (30%) | 16 (40.0%) |
| | | | | | |
| PLAYER #1 | 3 (30%) | 1 (10%) | 1 (10%) | 3 (30%) | 8 (20.0%) |
| PLAYER #2 | 4 (40%) | 4 (40%) | 5 (50%) | 2 (20%) | 15 (37.5%) |
| DYAD | 7 (70%) | 5 (50%) | 6 (60%) | 4 (40%) | 22 (55.0%) |
| | | | | | |
| PLAYER #1 | 0 ( 0%) | 4 (40%) | 3 (30%) | 4 (40%) | 11 (27.5%) |
| PLAYER #2 | 7 (70%) | 6 (60%) | 4 (40%) | 2 (20%) | 19 (47.5%) |
| DYAD | 7 (70%) | 6 (60%) | 5 (50%) | 5 (50%) | 23 (57.5%) |
| | | | | | |
| PLAYER #1 | 3 (30%) | 3 (30%) | 7 (70%) | 2 (20%) | 15 (37.5%) |
| PLAYER #2 | 4 (40%) | 3 (30%) | 3 (30%) | 3 (30%) | 13 (32.5%) |
| DYAD | 7 (70%) | 6 (60%) | 8 (80%) | 5 (50%) | 26 (65.0%) |
| | | | | | |
| PLAYER #1 | 2 (20%) | 2 (20%) | 1 (10%) | 1 (10%) | 6 (15.0%) |
| PLAYER #2 | 1 (10%) | 4 (40%) | 1 (10%) | 0 ( 0%) | 6 (15.0%) |
| DYAD | 3 (30%) | 6 (60%) | 2 (20%) | 1 (10%) | 12 (30.0%) |
| | | | | | |
| PLAYER #1 | 3 (30%) | 1 (10%) | 0 ( 0%) | 7 (70%) | 11 (27.5%) |
| PLAYER #2 | 1 (10%) | 1 (10%) | 0 ( 0%) | 5 (50%) | 7 (17.5%) |
| DYAD | 4 (40%) | 2 (20%) | 0 ( 0%) | 8 (80%) | 14 (35.0%) |

# LEADER GAME: MIXED-SEX DYADS

| UNIT | TRIAL BLOCK: I | II | III | IV | TOTAL COOPERATIVE RESPONSES | SEX OF SUBJECT |
|---|---|---|---|---|---|---|
| PLAYER #1 | 1 (10%) | 1 (10%) | 1 (10%) | 1 (10%) | 4 (10.0%) | FEMALE |
| PLAYER #2 | 0 ( 0%) | 0 ( 0%) | 1 (10%) | 0 ( 0%) | 1 ( 2.5%) | MALE |
| DYAD | 1 (10%) | 1 (10%) | 2 (20%) | 1 (10%) | 5 (12.5%) | |
| | | | | | | |
| PLAYER #1 | 2 (20%) | 3 (30%) | 3 (30%) | 3 (30%) | 11 (27.5%) | MALE |
| PLAYER #2 | 3 (30%) | 2 (20%) | 1 (10%) | 2 (20%) | 8 (20.0%) | FEMALE |
| DYAD | 5 (50%) | 3 (30%) | 3 (30%) | 5 (50%) | 16 (40.0%) | |
| | | | | | | |
| PLAYER #1 | 3 (30%) | 1 (10%) | 2 (20%) | 1 (10%) | 7 (17.5%) | FEMALE |
| PLAYER #2 | 3 (30%) | 1 (10%) | 1 (10%) | 0 ( 0%) | 5 (12.5%) | MALE |
| DYAD | 6 (60%) | 2 (20%) | 3 (30%) | 1 (10%) | 12 (30.0%) | |
| | | | | | | |
| PLAYER #1 | 4 (40%) | 2 (20%) | 0 ( 0%) | 0 ( 0%) | 6 (15.0%) | FEMALE |
| PLAYER #2 | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0.0%) | MALE |
| DYAD | 4 (40%) | 2 (20%) | 0 ( 0%) | 0 ( 0%) | 6 (15.0%) | |
| | | | | | | |
| PLAYER #1 | 2 (20%) | 2 (20%) | 1 (10%) | 3 (30%) | 8 (20.0%) | FEMALE |
| PLAYER #2 | 2 (20%) | 1 (10%) | 2 (20%) | 2 (20%) | 7 (17.5%) | MALE |
| DYAD | 4 (40%) | 3 (30%) | 3 (30%) | 5 (50%) | 15 (37.5%) | |
| | | | | | | |
| PLAYER #1 | 4 (40%) | 5 (50%) | 3 (30%) | 3 (30%) | 15 (37.5%) | FEMALE |
| PLAYER #2 | 1 (10%) | 1 (10%) | 0 ( 0%) | 1 (10%) | 3 ( 7.5%) | MALE |
| DYAD | 5 (50%) | 5 (50%) | 3 (30%) | 4 (40%) | 17 (37.5%) | |

## LEADER GAME: MALE DYADS

TRIAL BLOCK:

| UNIT | I | II | III | IV | TOTAL COOPERATIVE RESPONSES |
|---|---|---|---|---|---|
| PLAYER #1 | 2 (20%) | 3 (30%) | 4 (40%) | 4 (40%) | 13 (32.5%) |
| PLAYER #2 | 4 (40%) | 4 (40%) | 4 (40%) | 4 (40%) | 16 (40.0%) |
| DYAD | 5 (50%) | 7 (70%) | 8 (80%) | 8 (80%) | 28 (70.0%) |
| PLAYER #1 | 3 (30%) | 2 (20%) | 3 (30%) | 4 (40%) | 12 (30.0%) |
| PLAYER #2 | 1 (10%) | 3 (30%) | 5 (50%) | 4 (40%) | 13 (32.5%) |
| DYAD | 4 (40%) | 4 (40%) | 7 (70%) | 8 (80%) | 23 (57.5%) |
| PLAYER #1 | 1 (10%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 1 ( 2.5%) |
| PLAYER #2 | 2 (20%) | 1 (10%) | 0 ( 0%) | 0 ( 0%) | 3 ( 7.5%) |
| DYAD | 3 (30%) | 1 (10%) | 0 ( 0%) | 0 ( 0%) | 4 (10.0%) |
| PLAYER #1 | 2 (20%) | 7 (70%) | 5 (50%) | 5 (50%) | 19 (47.5%) |
| PLAYER #2 | 2 (20%) | 5 (50%) | 3 (30%) | 5 (50%) | 15 (37.5%) |
| DYAD | 4 (40%) | 10 (100%) | 7 (70%) | 7 (70%) | 28 (70.0%) |
| PLAYER #1 | 5 (50%) | 5 (50%) | 5 (50%) | 4 (40%) | 19 (47.5%) |
| PLAYER #2 | 1 (10%) | 4 (40%) | 6 (60%) | 4 (40%) | 15 (37.5%) |
| DYAD | 6 (60%) | 7 (70%) | 8 (80%) | 7 (70%) | 28 (70.0%) |
| PLAYER #1 | 2 (20%) | 5 (50%) | 3 (30%) | 3 (30%) | 13 (32.5%) |
| PLAYER #2 | 1 (10%) | 1 (10%) | 0 ( 0%) | 1 (10%) | 3 ( 7.5%) |
| DYAD | 3 (30%) | 5 (50%) | 3 (30%) | 4 (40%) | 15 (37.5%) |

## LEADER GAME: FEMALE DYADS

| UNIT | TRIAL BLOCK: I | II | III | IV | TOTAL COOPERATIVE RESPONSES |
|---|---|---|---|---|---|
| PLAYER #1 | 3 (30%) | 2 (20%) | 2 (20%) | 0 ( 0%) | 7 (17.5%) |
| PLAYER #2 | 6 (60%) | 3 (30%) | 0 ( 0%) | 0 ( 0%) | 9 (22.5%) |
| DYAD | 9 (90%) | 5 (50%) | 2 (20%) | 0 ( 0%) | 16 (40.0%) |
| | | | | | |
| PLAYER #1 | 4 (40%) | 4 (40%) | 6 (60%) | 4 (40%) | 18 (45.0%) |
| PLAYER #2 | 6 (60%) | 4 (40%) | 5 (50%) | 3 (30%) | 18 (45.0%) |
| DYAD | 7 (70%) | 7 (70%) | 8 (80%) | 7 (70%) | 29 (72.5%) |
| | | | | | |
| PLAYER #1 | 10 (100%) | 8 (80%) | 9 (90%) | 2 (20%) | 29 (72.5%) |
| PLAYER #2 | 4 (40%) | 5 (50%) | 5 (50%) | 0 ( 0%) | 14 (35.0%) |
| DYAD | 10 (100%) | 10 (100%) | 10 (100%) | 2 (20%) | 32 (80.0%) |
| | | | | | |
| PLAYER #1 | 4 (40%) | 1 (10%) | 0 ( 0%) | 1 (10%) | 6 (15.0%) |
| PLAYER #2 | 6 (60%) | 4 (40%) | 0 ( 0%) | 0 ( 0%) | 10 (25.0%) |
| DYAD | 7 (70%) | 4 (40%) | 0 ( 0%) | 1 (10%) | 12 (30.0%) |
| | | | | | |
| PLAYER #1 | 3 (30%) | 0 ( 0%) | 0 ( 0%) | 0 ( 0%) | 3 ( 7.5%) |
| PLAYER #2 | 4 (40%) | 2 (20%) | 3 (30%) | 3 (30%) | 12 (30.0%) |
| DYAD | 5 (50%) | 2 (20%) | 3 (30%) | 3 (30%) | 13 (32.5%) |
| | | | | | |
| PLAYER #1 | 4 (40%) | 5 (50%) | 6 (60%) | 6 (60%) | 21 (52.5%) |
| PLAYER #2 | 3 (30%) | 2 (20%) | 5 (50%) | 3 (30%) | 13 (32.5%) |
| DYAD | 7 (70%) | 6 (60%) | 7 (70%) | 8 (80%) | 28 (70.0%) |

# APPENDIX G

## PAIR-WISE CORRELATIONS

COMPUTATIONAL INDEX WITH COI ITEM #3

| UNIT | N | r | t | df | p* | $r^2$ |
|---|---|---|---|---|---|---|
| OVERALL | 72 | .3373 | 2.9977 | 70 | <.05 | .1138 |
| PDG | 36 | .2776 | 1.7539 | 34 | ns | .0771 |
| LDR | 36 | .3739 | 2.3507 | 34 | <.05 | .1398 |
| MALES | 36 | .5069 | 3.4288 | 34 | <.05 | .2569 |
| FEMALES | 36 | .1285 | .7555 | 34 | ns | .0165 |
| MALES, LDR | 18 | .7579 | 4.6470 | 16 | <.05 | .5744 |
| MALES, PDG | 18 | .1526 | .6176 | 16 | ns | .0233 |
| FEMALES, LDR | 18 | -.1051 | .4227 | 16 | ns | .0110 |
| FEMALES, PDG | 18 | .4464 | 1.9955 | 16 | ns | .1993 |

[*all tests reported in this appendix were two-tailed]

COI ITEM #1 WITH COI ITEM #3

| UNIT | N | r | t | df | p | $r^2$ |
|---|---|---|---|---|---|---|
| OVERALL | 72 | .6573 | 7.2969 | 70 | <.05 | .4320 |
| PDG | 36 | .5171 | 3.5227 | 34 | <.05 | .2674 |
| LDR | 36 | .7564 | 6.7425 | 34 | <.05 | .5721 |
| MALES | 36 | .7085 | 5.8542 | 34 | <.05 | .5020 |
| FEMALES | 36 | .6205 | 4.6136 | 34 | <.05 | .3850 |
| MALES, LDR | 18 | .8469 | 11.9788 | 16 | <.05 | .7172 |
| MALES, PDG | 18 | .4428 | 2.2033 | 16 | <.05 | .1961 |
| FEMALES, LDR | 18 | .6867 | 3.7787 | 16 | <.05 | .4716 |
| FEMALES, PDG | 18 | .6022 | 3.0171 | 16 | <.05 | .3626 |

COI ITEM #3 WITH COI ITEM #4

| UNIT | N | r | t | df | p | $r^2$ |
|---|---|---|---|---|---|---|
| OVERALL | 72 | .3086 | 2.7144 | 70 | $<.05$ | .0952 |
| PDG | 36 | .1714 | 1.0144 | 34 | ns | .0294 |
| LDR | 36 | .4365 | 2.8289 | 34 | $<.05$ | .1905 |
| MALES | 36 | .4214 | 2.7095 | 34 | $<.05$ | .1776 |
| FEMALES | 36 | .2285 | 1.3686 | 34 | ns | .0522 |
| MALES, LDR | 18 | .7131 | 4.0686 | 16 | $<.05$ | .5085 |
| MALES, PDG | 18 | -.0649 | .2602 | 16 | ns | .0042 |
| FEMALES, LDR | 18 | .1347 | .5437 | 16 | ns | .1081 |
| FEMALES, PDG | 18 | .3656 | 1.5712 | 16 | ns | .1337 |

COI ITEM #1 WITH COI ITEM #4

| UNIT | N | r | t | df | p | $r^2$ |
|---|---|---|---|---|---|---|
| OVERALL | 72 | .5078 | 4.9319 | 70 | $<.05$ | .2579 |
| PDG | 36 | .4511 | 2.9973 | 34 | $<.05$ | .2035 |
| LDR | 36 | .5486 | 3.8261 | 34 | $<.05$ | .3010 |
| MALES | 36 | .5100 | 3.4572 | 34 | $<.05$ | .2601 |
| FEMALES | 36 | .5061 | 3.4215 | 34 | $<.05$ | .2561 |
| MALES, LDR | 18 | .6944 | 3.8600 | 16 | $<.05$ | .4822 |
| MALES, PDG | 18 | .0965 | .3878 | 16 | ns | .0093 |
| FEMALES, LDR | 18 | .3694 | 1.5901 | 16 | ns | .1365 |
| FEMALES, PDG | 18 | .6165 | 2.9646 | 16 | $<.05$ | .3801 |

# APPENDIX H

QUESTIONNAIRE RESULTS

| UNIT | ITEM #1: MEAN | SD | ITEM #3: MEAN | SD | ITEM #4: MEAN | SD |
|---|---|---|---|---|---|---|
| OVERALL | 2.1806 | .9976 | 2.2362 | 1.0941 | 2.1528 | 1.0570 |
| PDG | 2.2223 | .8656 | 2.1667 | 1.0000 | 2.1667 | 1.0000 |
| LDR | 2.1389 | 1.1251 | 2.3056 | 1.1909 | 2.1389 | 1.1251 |
| MALES | 2.1945 | .9508 | 2.1965 | 1.2147 | 2.1945 | .9804 |
| FEMALES | 2.1667 | 1.0556 | 2.2778 | .9743 | 2.1112 | 1.1409 |
| MALES, LDR | 2.3334 | 1.1376 | 2.2778 | 1.3637 | 2.3889 | 1.0922 |
| MALES, PDG | 2.0556 | .7254 | 2.1112 | 1.0786 | 2.0000 | .8402 |
| FEMALES, LDR | 1.9445 | 1.1099 | 2.3334 | 1.0290 | 1.8889 | 1.3183 |
| FEMALES, PDG | 2.3889 | .9785 | 2.2223 | .9428 | 2.3334 | 1.1376 |

FREQUENCIES: ITEM #2

| UNIT | N | SELF | OTHER | BOTH | NEITHER |
|---|---|---|---|---|---|
| OVERALL | 72 | 15 | 17 | 33 | 7 |
| PDG | 36 | 7 | 9 | 16 | 4 |
| LDR | 36 | 8 | 8 | 17 | 3 |
| MALES | 36 | 11 | 7 | 14 | 4 |
| FEMALES | 36 | 4 | 10 | 19 | 3 |

FREQUENCIES: ITEMS #5 & #6

| UNIT | ITEM 5: | YES | NO | ITEM 6: | YES | NO |
|---|---|---|---|---|---|---|
| OVERALL | N = 72 | 42 | 30 | N = 72 | 41 | 31 |
| PDG | N = 36 | 20 | 16 | N = 36 | 19 | 17 |
| LDR | N = 36 | 22 | 14 | N = 36 | 22 | 14 |
| MALES | N = 36 | 18 | 18 | N = 36 | 22 | 14 |
| FEMALES | N = 36 | 24 | 12 | N = 36 | 19 | 17 |

## AGREEMENT AS TO TACIT COMMUNICATION

[Cross-comparison of Items #5 & #6
within each dyad]

| UNIT | N | AGREEMENT | DISAGREEMENT |
|---|---|---|---|
| OVERALL | 36 | 16 | 20 |
| MIXED-SEX DYADS | 12 | 6 | 6 |
| MALE DYADS | 12 | 6 | 6 |
| FEMALE DYADS | 12 | 4 | 8 |