

A THREE-DIMENSIONAL THEORY OF  
GROUP PROCESS IN ADOLESCENT DYADS

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## ABSTRACT

Title of Thesis: A Three-Dimensional Theory of Group  
Process in Adolescent Dyads

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This dissertation tests a three-dimensional theory of group process originally proposed by William Schutz (1958). His theory is that three process variables can account for group interaction: Inclusion, the degree to which persons in a group feel "in," "a part of" the group; Control, the degree to which persons can command and direct the group's resources, means, and goals; and Affection, the degree of relatedness that persons in the group feel for one another.

Eighty-nine tenth grade suburban high school students completed a sociometric rating of their intact homeroom classes, and twenty-four pairs of students were randomly selected to participate in the experimental portion of the study. The dyads were selected along the Inclusion and Affection dimensions, each at two levels. Each pair played eight ten-choice games of "Prisoner's Dilemma," a two-person, two-choice nonzero sum game, under an experimental instruction set of "trust and cooperation." The

eight payoff matrices were systematically varied to provide two levels of Asymmetry and two levels of Fate Control, which are taken as the operational equivalent of the Control dimension. The matrices were randomly ordered for each pair.

The design is a  $2^4$  factorial with repeated measures over two dimensions, analyzed as analysis of variance. The data is analyzed only for those matrices which give less payoff ("go against") the first player in the dyad to make a choice, since these matrices alone offer an incentive to trust the partner.

There are six dependent variables in this study:

(1) one's own number of trusting choices in each ten-choice game; (2) the partner's number of trusting choices; (3) one's total estimate of the partner's trustworthiness; (4) one's total number of years in jail; (5) the partner's total number of years in jail; and (6) the combined number of years in jail for both players.

The results show a significant effect only for Fate Control, and only on three dependent variables: (1) total estimate of the partner's trustworthiness; (2) one's total number of years in jail, and (3) the partner's total number of years in jail. In general, the level of trusting behavior was high across all experimental conditions.

The results are only partial support for the theory of group interaction. Fate Control is the one operational dimension most clearly linked with the experimental task demands, and therefore cannot be seen as strong support of Schutz's theory, especially in view of the lack of significant results on any other dimension. Affection, Inclusion, and Asymmetry of the payoff matrix were not significantly associated with any dependent variable.

Second, factors beyond the experimenter's control may have contributed to the null results. For instance, students may have been "loyally" trusting to other students at a very high level perhaps because of their role vis a vis adult authority as manifested by the experimenter. Moreover, an overall lack of interpersonal interaction in the homeroom setting may have attenuated the results.

Third, there is wide variance for each of the dependent variables, small effect size, and, consequently, the heightened chance of a Type II error. Moreover, the dependent variables are highly correlated, further limiting the potency of this experimental test.

Finally, Schultz's theory is one of process, and the variables used in this study can capture this process only insofar as the dyad's structure reflects the process. To the extent that the structural measurements used in this study may not fully reflect palpable interpersonal process,

the experiment, not the theory, may be held deficient.

In summary, this attempt to empirically assess this three-dimensional theory of group process is not wholly successful. The experimental analogue situation (the Prisoner's Dilemma) gives only partial support to the theory.

## DEDICATION

For James Rath and C. M. Dayton: teachers

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# CHAPTER I

## STATEMENT OF THE PROBLEM

This study is an attempt to demonstrate Schutz's (1958) three-dimensional theory of group process, using a Prisoner's Dilemma experimental analogue situation. The subjects are tenth grade high school students at one of the nation's best and most competitive high schools. The experimental task calls for pairs of students to ignore their personal self interest in favor of their joint interest. At the same time, there are penalties associated with being "tricked" or having one's cooperation abused. Hence, the central focus of the dyad's interaction is "trust." From the theory of group process one can make predictions about the amount of trust the partners in the dyads should show; it is against these predictions that the theory is evaluated.

First, there is a brief discussion of the relevant aspects of Schutz's theory. Not all aspects of it are germane to this study, and not all aspects are testable. The part used in this study concerns group processes as evidenced in dyad interaction. Next, some introductory remarks about game theory are developed. The nature of the problem specific to this study is discussed, and hypotheses are made explicit. Finally, delimitations to

this study are offered in eight areas.

A. A General Description of the Theory of Group Process. Schutz sees interpersonal processes as results of an adult's interpersonal orientations, which themselves are derived from the person's needs. The needs of an adult have historical beginnings in his childhood interactions with primary caretakers. Three basic adult orienting needs in a group setting are: Inclusion, Control, and Affection. The need for Inclusion comes from the level of integration that the child experiences with his family. The need for Control is a function of the child's experiences with guidance, freedom, or control. Finally, the need for Affection comes from his parents' approval or rejection.

The price of not satisfying these needs in childhood is found in terms of adult neurotic anxieties. According to Schutz, a child not integrated into family matters learns to see himself as insignificant and worthless. A child either over- or under-controlled learns that he is incompetent and cannot make decisions, or he does not know what is expected. A child receiving too much or too little affection becomes narcissistic or feels unlovable.

In each of these three areas there are character-

istic "defenses"<sup>1</sup> which develop as a response to the too great or too little fulfillment of the basic needs, defenses which emerge in an adult interpersonal situation. Whenever two or more persons are placed together in a group, therefore, the meshing of these behavioral expressions of fundamental needs leads to a certain amount of compatibility. A corollary of this reasoning is that groups themselves possess a characteristic interpersonal compatibility, either positive or negative.

The assessment of this personal and group compatibility is related by Schutz (1955, 1958) to four basic postulates and theorems of groups and interpersonal behavior. Briefly, they are:

1. Every individual has needs for Inclusion, Control, and Affection; and these needs are a sufficient set for analysis of interpersonal behavior (1958, p. 13).
2. If interpersonal behavior is similar to that experienced in childhood interpersonal relations (usually with parents), then the person responds in the present situation according to two principles of "relational continuity:"

(a) Constancy. When the adult perceives his adult position as similar to that which existed in his relationship with his parents, his adult behavior covaries with his own earlier behavior toward his parents.

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1. These are not "defenses" in the traditional psychoanalytic meaning of intrapsychic forces in conflict which call forth the ego's defensive structure and compromise. Schutz is really talking about interpersonal defensive styles, not "repression," "isolation," etc.

(b) Identification. When the adult perceives his adult position similar to the parents' position of his earlier parent-child relationship, his adult behavior covaries with the behavior of his parents toward him when he was a child (1958, p. 81).

3. If Group M is more compatible than Group N, then the goal attainment of Group M is greater than that of Group N (1958, p. 105).

4. Finally, the formation and development of two or more people into a group follows the same sequence:

(a) Group integration means that group members first interact around issues concerning Inclusion; then, Control; and last, Affection.

(b) Group resolution (or termination) means that group members behave in the opposite sequence: first terminating Affection; then, Control; and last, Inclusion (1958, p. 168).

Schutz's definitions of Inclusion, Control, and Affection for groups form the independent dimensions of this study, so his thoughts about how they arise in childhood, and their adult behavioral manifestations, are briefly described. This description is ancillary to the group process being tested in this study, and is included as subordinate, explanatory material.

"Inclusion" in a group really means "belongingness" and a satisfaction with interactive relationships. To be included means to be taken into account. The principle of "relational continuity" says that the adult interpersonal behavior corresponds to the level of need satisfaction experienced in the parent-child relationship. If the

characteristic relationship as a child is over-inclusion, the adaptive adult mode is to be oversocial. That is, one is an extrovert, seeks out others, and demands reciprocative relationships. It is a form of exhibitionism, and excessive show of knowledge, skills, or "names" with whom one is associated. On the other hand, under-inclusion as a child finds the adult undersocial in interpersonal settings. He avoids associations, and maintains strict emotional distances, nonparticipation, noninvolvement, and a form of passive-aggressive "boredom." In between these two poles of adult adaptive behavior is the adequately integrated person, who decides on the amount of participation appropriate to the situation. He assumes, unlike the first two types, that he is a worthy person, and that persons are interested in him. In contrast, the underlying anxiety of the over- and under-social type is that he is worthless.

"Control" in a group refers to the decision-making capacity, and to the establishing and maintaining of satisfactory interpersonal relationships vis a vis authority and power. The child who relates to parents submissively, who is overcontrolled, finds himself an adult abdicator, preferring subordinate roles, believing himself incapable of responsible decisions. By abdicating responsibility for decisions he can, in fact, conceal his incapacity. The autocrat, on the other hand, dominates others, wants to be on top, to make all decisions, for himself and others. He

needs persistent proof of his capability to make wise and forceful decisions. In between, one finds the democrat, who is comfortable in both leader and subordinate roles. He can both give and take orders. Having been neither over- nor under-controlled as a child, he needs no adaptive over- nor under-control of others in his adulthood. He has no anxieties about his competence.

In terms of "Affection," an underpersonal adult avoids close relationships with other people. Although he may be superficially friendly, there is a profound lack of emotional closeness. An overpersonal person, in contrast, desires extremely close relationships with others. He may be overt in his demands, or subtle, by "devouring" his friends and punishing them for other relationships (Schutz, 1967). At the base of each of these interpersonal extremes is a belief, founded in childhood, that one is essentially unlovable. Standing apart from these two affection-starved or -smothered types is the personable adult, who can both give and take affection, and who does not doubt his lovableness.

Schutz is most interested in how groups function, and he has applied his personal needs and interpersonal compatibilities in the form of six Guttman scales, known as the FIRO-B (Fundamental Interpersonal Relations Orientation -- Behavior) instrument. The scales measure a person's "expressed" and "wanted" behavior in each of the three need

areas, Inclusion, Control, and Affection. Schutz's interest is in seeing whether or not groups can work "in harmony," based on predictions from these measures. These measures and their use constitute the largest application of his theory so far, and the results are briefly reviewed in the next chapter.<sup>2</sup>

The importance of these fundamental interpersonal needs is manifested in the group process. The group behavior engages individuals in each of their three need areas, in order. In the first phase of group life, people decide whether they are "in" or "out". Questions of group membership are raised. Group members have to know their place in the group, the group's importance, its relationship to their identity, and how committed to it they are willing to let themselves become. This is the "Inclusion" phase of group life. The content of the discussion may not even seem to be related to the manifest purpose of the group's meeting, so long as persons are deciding whether they are or are not included in the group.

The second phase of group life is concerned with Control. Roughly, this means that the group members decide who should exercise authority, and how much; where responsibility lies; and what shall be the enforcement patterns.

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2. There are other aspects of Schutz's theory which are not presented here, since they are not germane to this study. One such aspect concerns the origins and types of group compatability.

This phase is analogous to Bennis and Shepard's (1956) "authority" phase of group development.

At its deepest levels, the group members become concerned with Affection (or hostility). This is the point at which the group attempts to assess emotional integration of its members.

There are several points which deserve emphasis. First, phases of group development and interaction are founded upon the emotional needs brought to the group by its members, and are directly analogous to the individual interpersonal orientations concerning Inclusion, Control, and Affection. Second, group compatability varies according to the stage of group development and the specific needs of the individuals in the group. For example, if members are most concerned about Inclusion, group compatability is at a maximum when they have "run through" Inclusion concerns, and is lower at any other time.

Third, and most important, these phases of group development are not discrete. All types of interpersonal behaviors occur at all three stages. But the phases represent periods of a group's history in which a particular problem area is emphasized. Of course, these stages may be repeated, and they are often, inasmuch as problem areas change, or interpersonal behavior is a function of unstable anxieties about self worth, competence, or lovableness.

According to Shaw and Costanzo (1970), Schutz's theory is relatively well supported. In a criterion comparison of eight major theories of group behavior and process, only Schutz's accounts for behavior on a molecular -- as opposed to a molar -- level. It is also the most overall "Highly Rated" of the eight theories compared in regard to internal and external consistency, agreement with known data, testability, simplicity, clarity, economy, interpretability, and research productivity. Of the psychoanalytically based group theories, it is clearly superior on these criteria (to that of Bion, 1949a,b; 1959; and to that of Bennis and Shepard, 1956).

Before describing how the theory may be used for an empirical demonstration, elementary game theory and the Prisoner's Dilemma is considered.

B. A General Description of the Prisoner's Dilemma. A game is a situation in which certain alternatives, or choices, are open to the players. These choices lead to the use of certain rules which, in turn, have specific outcomes. The outcomes determine the payoffs each player receives (McKinsey, 1952).

Games may be classified several ways. First, some games are played alone, against a remorseless Nature, or a random god, like solitaire. Others are played against

one person; and some, against n-other persons, or corporate bodies, or even nations. In social games, there is a unit of exchange, usually money, although sometimes merely prestige, the award of which is determined by the rules of the game. If the sum of all exchange units after the game is finished is zero, the game is a zero-sum game. If the sum is not zero, it is a non-zero sum game. (A zero-sum, one-person game, although possible, is trivial, for the player must always get zero; and he may as well do something else.)

Players may arrange their choices into strategies. That is, they may make several choices, or bring to bear several considerations. Meaningful social games must consist on more than one player, and players may order their choices in relation to each other's possibilities. For example, consider the following two-person zero-sum game:

Table 1

A Game Payoff Matrix  
with a Saddlepoint

Player 1's Alternatives	Player 2's Alternatives		
	1	2	3
1	\$6	\$4	\$2
2	\$4	\$3	\$2
3	\$3	\$2	-\$1

Note: Payoffs go to Player 2.

Both Player 1 and Player 2 make independent choices from their

three alternatives, and  $P_1$  gives  $P_2$  the amount of money equal to the intersection element of the two choices, or receives that amount if the sign is negative. Thus, under  $P_1$ 's choice of {3}, and  $P_2$ 's choice of {1},  $P_1$  pays  $P_2$  \$3.00.

The "most rational" strategy for  $P_1$  is to pick the row in which the largest payoff is smallest, since that is what he will have to pay  $P_2$ .  $P_2$ 's "most rational" strategy, however, is to pick that column in which his minimum income is the largest, since that is what he gets from  $P_1$ . Assuming both players are rational, they will consistently choose the joint alternative Cell {3,1}; and  $P_2$  will get \$3.00 times however many plays of the game there are.

This argument rests on a special property of this matrix, in that each row (column) value is larger than the corresponding element of the next row (column). This matrix has, in other words, a "saddlepoint," an intersection element which clearly is the result of optimal choices for both  $P_1$  and  $P_2$  to play.

Consider the following two-alternative, two-person zero-sum game:

Table 2

A Game Payoff Matrix  
with No Saddlepoint

Player 1's Alternatives	Player 2's Alternatives	
	1	2
1	\$1	-\$1
2	-\$1	\$1

Note: Payoffs go to Player 2

This matrix has no saddlepoint, and there is no way a priori to decide a consistent winning playing strategy, even taking into account expected losses over a long-run series of plays. In short, using Table 2, there is no way to rationally decide how to minimize one's expected losses; or to maximize one's expected gains. This is a two-person game without a minimax solution.

According to Rapoport and Chammah (1965b), A.W. Tucker first described the Prisoner's Dilemma game. The title derives from the anecdote of two prisoners being held in isolation from one another. If they both refuse to confess, they probably will escape conviction. They run a small risk, however, of having the book thrown at them, and having it stick. On the other hand, if they both cooperate and confess, they both get a medium sentence, almost assuredly. If, on another condition, one confesses and implicates the other, the first gets a light prison sentence, and the other gets a long jail term; and vice versa.

This is a non-zero sum game. Since neither player knows the other's intentions, it also is a game of non-perfect information. Moreover, there is no saddlepoint; Rapoport (1967a) showed that there is no minimax strategy available to the players. In fact, the "dilemma" part of the Prisoner's Dilemma stems from the fact that each player's optimal strategy dominates so strongly that they get the

worst possible joint outcome. A rational, minimax decision runs counter to their joint interests. Each player's individual optimal strategy (confessing) gives a worst possible joint outcome (two medium sentences).

In symbolic terms, the payoff matrix for a Prisoner's Dilemma is:

Table 3

The Prisoner's Dilemma Payoff Matrix

Player 1's Alternatives	Player 2's Alternatives	
	Trust Partner: Do not Confess	Do Not Trust Partner: Confess
Trust Partner: Do Not Confess	R	$S_1, T_2$
Do Not Trust Partner: Confess	$T_1, S_2$	P

Note: R = reward for trusting one another  
 $T_1, T_2$  = respective temptations to not trust one another  
 $S_1, S_2$  = respective payoffs to those who chose to trust, and whose trust is not requited  
P = punishment for failing to trust one another.

In the Prisoner's Dilemma, this inequality must hold true:

$$S < P < R < T$$

Specifically, when a player gets an S payoff, he must be motivated to switch to a Not Trust strategy to get at least an equitable P payoff. If the person who Trusts gets a Reward, he must be tempted to get a larger amount (T) by "defecting" to a Not Trust strategy. If a person's

payoff is P he may wish to get R, but he can do that only by Trusting his partner to also Trust. The failure of the partner to realize this trust makes him an S payoff, and he has lost even more.

Another inequality is enforced in this study, which is:

$$2R > S + T$$

Without this inequality, the players can use the following joint strategy to minimize their maximum "earnings":

	Turn					
	1	2	3	4	...	N
Player 1	T	$\sim T$	T	$\sim T$		$\sim T$
Player 2	$\sim T$	T	$\sim T$	T		T

In this case, the measurement of Trust is artificially deflated, because each player gains more by trusting absolutely to alternatively not trust.

C. Statement of the Problem. The intent of this study is to bring under examination Schutz's three-dimensional theory of group process in an experimental situation. There are three general areas of concern. First, the literature search (reported in Chapter II) indicates that the theory has received modest support. Yet it has not been subjected to an experimental test in which Inclusion, Control, and Affection are treated as fixed independent variables. Second, the strength of

the theory has been established primarily through use of its derivative instrumentation (the FIRO-B instrument) on groups from which the theory itself was derived (intact on-going social process or psychotherapy groups). It has not been cross validated extensively, with different instrumentation, different groups, or different experimental manipulations.

The Prisoner's Dilemma lends itself directly to a different manipulation of one of the three variables Schutz holds important, Control. Sociometric selection techniques can be used to manipulate Inclusion and Affection. The task itself requires that persons subordinate their rational self interest for that of the pair, at risk to themselves. The task is a way of measuring "trust" between the pair, that is, the degree of interpersonal rapport and the social process.

The problem, then, is one of assessing the theory via an experimental technique not usually associated with the theory. The empirical tools used in this problem are discussed in Chapter III, which gives operational definitions, design, procedures, and methods.

There are eight delimitations to this work. The literature concerning the Prisoner's Dilemma is huge, and spreads into motivational theory, utility theory, and psychonomics. The literature and its implications must be carefully scrutinized lest one be overwhelmed by the more than four hundred studies that have used the Prisoner's

Dilemma instrumentation in the past twenty years. Though enticing, the following areas are not considered in this study:

--Motivational orientations of the players, e.g., Gallo (1964); Messick and Thorngate (1967), who report on player's motivation as it affects strategy of choices; or O'Connor et al. (1971), who use self report of motivations as independent variables for strategy choice.

--The use of the Prisoner's Dilemma instrumentation to assess implicit or explicit threats with incomplete information or communication. For example, Fischer (1969); Guyer and Rapoport (1970); or Horai et al. (1969b) use contingency threats in a Prisoner's Dilemma game.

--The use of subjective probabilities of the partner's actions, as against the player's actions, to assess for "inaccuracies" in perception, e.g., Kelly and Stahelski (1970); deCharms and Prafulachandra (1965); Feather (1959); Halpin and Pilisuk (1967); or the effect of promises, as in Evans (1964); Gahagan and Tedeschi (1968); or Horai et al. (1969a), who assess the intensity of conflict under partner's promises and subsequent reward.

--The effect of alliances (e.g., Cole, 1971), or player collusion (e.g., Dolbear et al., 1969).

--The place of interpersonal bargaining in the Prisoner's Dilemma (e.g., Bean, 1970; or Harnsanyi, 1962, who assess bargaining behavior in light of opportunity costs).

--Technically advanced areas, such as Monte Carlo Prisoner's Dilemmas, or computer simulation (e.g., Emshoff, 1970).

--The use of the Prisoner's Dilemma with pathological groups (e.g., schizophrenics vs. normals, in Harford, 1965; Kenny, 1969; or in married couples undergoing marital discord, Speer, 1972).

## CHAPTER II

### REVIEW OF THE SELECTED LITERATURE

A. The Prisoner's Dilemma. The literature on the Prisoner's Dilemma is quite large. This chapter touches briefly on some of the major works in the field, to give some idea of the breadth of interests, and to introduce the major notions in the Prisoner's Dilemma literature which bear on this study: cooperation, trust, communication, power, payoffs, and some salient experimental results.

The Prisoner's Dilemma is one of seventy-eight distinguishable two-person, two-alternative games (Guyer and Rapoport, cited in Messick and McClintock, 1967). It is not "separable," that is, it cannot be expressed as the sums of partial payoffs, each of which depends on the strategy choice of only one player (Hamburger, 1969). Therefore, it is called a "constrained" game; both players must participate. Various classificatory systems for different  $2 \times 2$  games have been developed (e.g., Harris, 1969, 1971; Steele, 1967), and attempts have been made to index various Prisoner's Dilemma matrices for homogeneity

(Messick and McClintock, 1967), and for "decomposition" (Pruitt, 1967). Some authors have complained that this emphasis on the mathematical and technical aspects of the dilemma have "taken the dilemma out" of the Prisoner's Dilemma game (Bonacich, 1970), and that players are treated as isolatable units. Others (Knox and Douglas, 1971) have pointed out that higher payoff incentives give higher interdyad variances. The implication of this work is that experimenters must consider how meaningful the payoffs are to the subjects, because meaningless payoffs yield large experimental error.

There are literally hundreds of applied Prisoner's Dilemma studies cited in the three main bibliographic reviews (RAND, 1972, reviewing studies the corporation has conducted relating to game theory; Rapoport and Orwant, 1962; and Gallo and McClintock, 1965) and in the four major books that refer to the Prisoner's Dilemma (Rapoport and Chammah, 1965b; Rapoport, 1969; Rapoport, 1973, which seems the best elementary introduction to game theory available; and Wolf and Zahn, 1972, which describes in detail the theoretical conjunction of value theory, exchange theory, and communication). Various authors have tried elegant applications of the game to ethical systems Schelling (1968); to other interpersonal situations (Sermat, 1970); and to life "in general" (Wolf and Zahn, 1972). As these last point out: "An almost overwhelming set of choices faces interactors in

nonmatrix, environment rich games" (p. 149). The number of investigators and the huge literature testifies that:

"The simplicity of the game is misleading. One has to go 'deeper' to provide an adequate explanation of the complexities and the dynamic aspects of the game"  
(Ammon Rapoport and Mowshowitz, 1966, p. 457).

Not only are the 2 x 2 Prisoner's Dilemma games more complicated than meets the eye, the complications pyramid rapidly. Rapoport and Guyer (in Messick and McClintock, op. cit., 1967) estimate that there are  $2 \times 10^9$  equivalent 3 x 3 games. Bernard (1954) points out that mathematical and game theoretical solutions are not possible in games involving more than four people.

Why, then, are investigators concerned with the Prisoner's Dilemma, as opposed, say, to other 2 x 2 games? First, according to Shubik (1970), as the number of plays goes beyond one for each player, the game theory solution is unstable, and subjects do not make their choices to maximize their social utility, as opposed to their individual utility. The import of the game, then, is in the valuation of individual utility against a two-person social utility, for which there is no dominant strategy or optimal solution. That is, the Prisoner's Dilemma offers a way to generate a model of prescriptive utility (Becker and McClintock, 1967), as contrasted to normative utility. The model is based on internal, psychological considerations of the players. At the most theoretical level, the minimax solution can not

provide the dominant strategy for either player in the Prisoner's Dilemma, and that, in fact, its use is inconsistent with social utility. The players' choices, then, give information about three aspects of utility theory:

--Transitivity. What is a choice worth? If transitivity in utility theory does not hold, persons can be exploited, like money pumps, or Milo Minderbender schemes.

--Relevance. What choices are worth anything, and in relation to what?

--Beliefs. What rewards are "misvalued" because of a belief? For instance, under what conditions can a person be exploited, given a prescriptive model of his utility?

The Prisoner's Dilemma experimental paradigm has generated a large volume of empirical analysis of the mathematical properties of the game, and the utilimetric qualities of the players' choices. These analyses have indicated how deceptively simple the  $2 \times 2$  games can be, and the Prisoner's Dilemma in particular; the depth of analysis necessary to understand players' strategies on even simple levels; and the profound relations of this game with utility theory. Various critics (Knox and Douglas, 1971) have questioned the meaningfulness of the experiment's choices. Others cite the emphasis on the mathematical properties of the Prisoner's Dilemma, such that the dilemma is taken as a reification of conflict in general, assuming a "war of all against all" (Converse, 1968).

1. Cooperation and Competition in the Prisoner's Dilemma Game. Cooperation and competition, like trust and suspicion, are taken to be continuums of a subjective state (Lee and Knox, 1970). Cooperative and competitive behavior can be directed toward the same ends, but the distribution of the goal will determine the cooperativeness or the competitiveness of the behavior (Deutsch, 1949b,c). For cooperative behavior to emerge, one's ego demands are lessened for the moment; in competitive behavior, they are heightened. Cooperation between people assumes promotively interdependent goals (Deutsch, 1962); competitive behavior requires goals which are contriently interdependent.

In terms of the structure of 2 x 2 games, the Prisoner's Dilemma typically elicits the least mutual cooperation, compared to bargaining games and mutual fate control games (Smith, 1968). Nevertheless, various Prisoner's Dilemma studies have tried to manipulate cooperation and competition. Wahba (1971 a,b) finds that power is not effective in generating cooperation, except only in its coercive form, that is, punishment for "wrong" decisions.<sup>3</sup> However, the level of cooperation does vary with asymmetry of the payoff (Swenson, 1967). Cooperation

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3. He also cites other studies in which a "stinger" punishment is used to enforce cooperation. The "stinger" is a punishment of massive proportions that "stings" the non-cooperative partner, but under varying rules of the game, it can be used only once, or after so many warnings, or so forth. This author found that stinger punishments are effective for limited times only, on college-age populations.

decreases as the payoffs become more asymmetric, but the relation is not negatively linear. Generally, there exists a point of asymmetry at which the player who gains most switches to a more cooperative strategy. This finding is found in college-age populations (Gumpert and Epstein, 1969; Bixenstine, Potash, and Wilson, 1963), but has not been reported on younger people. Moreover, this asymmetry effect is tempered by the absolute level of the payoff (Bixenstine and Wilson, 1963; Ellis and Sermat, 1966; Cave, 1969; Jones et al., 1968). These four studies indicate that the asymmetry point at which the cooperation vs. asymmetry curve inflects is a function of the absolute level, scale, and meaningfulness of the payoffs. The implication for this study is that asymmetry effects can vary in the experimental context, and there appears no ratio-level measure of asymmetry applicable across experiments, even though asymmetry effects have been generally reported. Also, there are "carry-over" effects from "real life" into the game situation. Noland and Catron (1969) found students at a highly competitive and selective art school played more competitively in a Prisoner's Dilemma than high school girls in a general curriculum.

In brief, cooperation between players (and trust, its motivational equivalent in a Prisoner's Dilemma game), like competition (suspicion), are seen in terms of the distribution of a valued goal and whether the dyad sees

the goal promotively or contriently. Experimental studies indicate that the level of cooperation in a dyad does vary with the level of the payoff, the asymmetrical distribution of the payoff; and with previous motivational orientation. Power increases cooperation only in coercive situations.

2. Communication and Feedback in the Prisoner's Dilemma Game. In the Prisoner's Dilemma, communication between players is not necessary, because all possible alternatives are enumerated, and all possible outcomes are defined. Only one's actions count, in a sense, so most Prisoner's Dilemma studies do not permit communication between players. Those experiments which do, however, permit communication, have found it raises the number of cooperative (trusting) plays. Deutsch (1960) permitted subjects under different instructional motivational sets to send notes to one another in a one-play Prisoner's Dilemma situation. He found communication fostered cooperation, as did a cooperative motivational set.

Wallace (1969) and Loomis (1959) find that communication between players enhances the development of trust, group loyalty, and cooperative behavior. Just how the communication does this is not clear, however. Two investigators (Gregovich and Sidowski, 1966) have found that task performance and ending strategies of plays are not related to when the players are allowed to interrogate each other. Two studies have found that displaying the

results of the plays can have a large positive effect on the level of cooperation (McClintock and McNeil, 1966; Messick and Thorngate, 1967).

In general, then, cooperation between players is enhanced by communication between them, even in the face of countervailing instructional sets. Tacit communication, like prominent display of results, also fosters cooperation.

3. Power and Payoffs in the Prisoner's Dilemma Game. Most studies have found, as Bonacich (1970) did: "In the absence of communication between players, cooperation decreases as risk and temptation increase; and increases as gain increases." Other studies have documented this in terms of asymmetry of payoff matrices: as it increases, cooperation declines (Sheposh and Gallo, 1973; Burrill, 1968).

The issue of the inverse relation of cooperation to risk and temptation is clouded by several factors. First, players must be able to discriminate the outcomes (Tedeschi, Heister, Lesnick, and Gahagan, 1968). What the discriminable outcomes lead to, however, is open to interpretation. Gumpert, Deutsch, and Epstein (1969) contend that competition increases as the dollar amount of payoff rises. Gallo and Sheposh (1971), on the other hand, find the high incentive leads to cooperation. Given these two results together, there may be ceiling effects for competitive advantage.

Second, Gallo and Winchell (1970) find that in matrices with large rewards the subjects play for average payoffs and do not maximize any competitive advantage. This hypothesis receives important theoretical support from Messick and Thorngate (1971) who point out that utility theory predicts that relative gain is an important payoff dimension, with one's partner's payoffs serving as the norm for relative payoffs. The indication, then, is that the absolute magnitude of payoffs (which helps determine discriminability) is not a unique factor in the level of cooperative behavior, but that the relative gains also are important.

A third feature of payoffs affecting play is the partner's strategy (Wahba, 1971a, b, c) and the level of "fate control" a person has in the game (Wyer and Polen, 1971). Finally, just what is offered as a payoff appears to have an effect. Bixenstine and O'Reilly (1966) compared the effects of electric shock and money, and found shock was a disproportionately strong punishment. Crawford and Sidowski (1964) found that money apparently makes no difference, although others (e.g., McClintock and McNeil, 1967) have found effects. Orwant and Orwant (1970) found that matrices using numbers as payoffs had lower cooperative choices than matrices with "interpreted" verbal payoffs.

In sum, then, the absolute magnitude of the payoffs

appears to have only a relative effect on players' cooperation: the utility curve is not monotonic increasing. As the asymmetry and fate control are more pronounced, cooperation suffers. The issue of monetary payoffs and their level is not fully resolved, but there are respectable indications that payoff modes (currency, shock, points, and so forth) do have some differential effects.

4. Trust and Other Motives in the Prisoner's Dilemma Game. Various experimenters have established "trusting" motivational sets in their studies, by equating "cooperative" plays to "trust" (e.g., Boyle and Bonacich, 1970; Bridges, 1970), or "trust" vs. "temptation" sets (Kershenbaum and Komorita, 1970). Others have sought self reported motivations during and after the game (Gregovich and Sidowski, 1966). The results are generally in favor of motivational sets enhancing cooperative play (Deutsch, 1960), although trusting motivations must be translated into action via the players's intentions which themselves are not measurable (Clifford, 1971).

5. Race and Sex in the Prisoner's Dilemma Game. Sex and race enter into any Prisoner's Dilemma because of normative roles which the players may bring into the

situation. It is clear that these effects are not always present, however, and that they are more or less pronounced, depending on the study. Also, one study found (Wilson and Kayatani, 1968) that these race and sex effects may be more "in group" effects than anything to do with race and sex per se, particularly in studies where the players sit together (as contrasted to mass administered Prisoner's Dilemmas, in which subjects play for themselves against a pre-set "Opponent").

The one recent study on race effects (Cederblom and Diers, 1970) found that white college students made 16% more competitive, non-trusting choices toward "pre-planned" cooperative black students than toward cooperative white students. These same white students were more competitive against these "cooperative" black partners than against "mixed strategy" blacks. One notes, however, that the blacks' strategy was a pre-set variable, and they were not allowed to punish their partner for exploiting them.

Sex differences are slight (Tedeschi, et al., 1968b), with girls tending to make more trusting plays than boys. Other studies support this trend (Lutzker, 1961), which is explained in terms of girls' sex roles, which are taken to be more submissive, naive, and masochistic

than those of the boys. Kahn et al. (1971) also notes that beyond sex differences in trusting plays, physically attractive girls elicit more trusting plays on a boy's part than their less attractive female classmates.

One notes that these effects are relatively slight, and some studies report no sex effects (e.g., Orwant and Orwant, 1970). Other studies of extended play Prisoner's Dilemma games (Rapoport and Chammah, 1965b, Chammah, 1970) report that the initial differences converge as the game proceeds.

In brief, then, it appears that both race and sex have effects on the number of cooperative choices a player may make. Race effects may reflect underlying "in group" and "out group" dimension or socially permitted "exploitiveness" of submissive black players, rather than a race effect per se. Finally, sex effects tend to disappear over the course of a game.

B. The Three-Dimensional Theory. Much of the work on Schutz's theory has been in its practical applications, stemming from the FIRO-B instrument. In general, this work has been aimed at establishing group compatability, not at the group process elements of the theory. For instance, Sapolsky (1964) used FIRO-B measures on groups of seventeen to nineteen-year-old undergraduate women, and generally confirmed its usefulness in helping create

compatible groups. Other studies have used the FIRO-B in assigning music teachers to compatible class-rooms, and found it more useful than a Flanders' interaction analysis (McAdams, 1970). In a two-part experiment, Sapolsky (1960) used the FIRO-B instrument to create six person groups, three members being compatible to the leader, and three members not compatible with the leader. (The group members' compatability was blinded from the leader.) Using differential reinforcement of "hmm-hmm" after members' statements of "I" or "we", the leader increased such statements. The level of increase was related to the members' compatability to the leader.

As for the validity of the instrument, several studies are noted, all of which generally support the construct, convergent, and discriminant validity of the FIRO-B instrument (Coultras, 1971; Froehle, 1970; Kramer, 1967; and Ryan et al., 1970). To date, this author has seen twenty-three reported uses of the FIRO-B, on populations ranging from pencil company salesmen (Bernheimer, n.d.) to Harvard and Radcliffe freshmen (Schutz, 1958). Reliability is measured in terms of reproducibility, not internal consistency, because the FIRO scales are Guttman scales. In one major study with N=1,543 freshman (Schutz, 1967), reproducibility is reported at .94 for all six scales. Test-retest stability over a one month

period ranges from .71 to .82, with a mean coefficient of .76. Using trichotomized scores--high, medium, and low--less than 10% of the subjects changed categories over this one month period. Content validity is usually treated at a face level, with nine questions for each scale being said to measure what they ask. FIRO-B scores have been reported for twelve occupational groups, in which group differences are consistent with salient occupational characteristics. These studies, together with the use of the FIRO-B on marital groups, real-life dyads (e.g., doctor-patient, experimenter-subject, teacher-student, salesman-customer), human relations workshops, and psychotherapy groups "represent the present state of ... construct and predictive validity" (Consulting Psychologists' Press, 1967).

To this writer's knowledge, however, there are no studies which analyze the validity of the three dimensional group process theory itself on intact groups, using instrumentation independent of that theory.

C. The Sociometric Instrument. This study calls for use of a sociometric instrument, the Ohio Social Acceptance Scale (OSAS). The reliability of sociometric instruments is well established (cf. e.g., Chatterjee et al., 1964; Harper, 1968), even with relatively young children (e.g., Ware, 1970). Chatterjee's study indicates that sociometric choices have very high internal consis-

tency, stability, and equivalence, over a five week pre- and post-test interval.

Mouton et al. (in Moreno, 1960) summarize fifty-three studies using sociometric instruments, in an analysis of stability, number of choices received, and the effects of various formats. They find, in general, intact groups (usually of more than one month's duration) do make reliable judgments about one another. Of these fifty-three studies, eight systematically limit the number of choices a subject may make. Subjects' age ranges from nursery school to college; both white and American Indians are subjects. In choice-limited situations, these subjects often do not change their first choice of a friend. Sixty-nine percent to ninety-four percent of the subjects (depending on the study) do not change their first choice in periods ranging from two weeks to eighteen months. The percent of people making no change at all in a two- or three-choice situation ranges from thirty-eight percent to ninety-four percent. For those who do change, they are most often in third choice nominations.

Of the twenty-eight studies assessing test-retest reliability, for unlimited choice sociometric instruments, Mouton et al. find all but three have high reliability, greater than .80. Seeman (1946) using fifth grade

black students found a test-retest reliability on the OSAS of .90. Taylor (1952) used weighted test-retest reliabilities on eighth grade students. With thirty-one students in a "traditional" curriculum, the test-retest correlation was .90 over four months; with "unclassified" students, .89 over three months; and with twenty-seven "progressive" students, .66 over three months. As mentioned above, three studies have reliability of less than .50, but other factors apparently entered into these studies: age and the relevance of the criterion on which the sociometric choices are made (e.g., "Who would you like to help you out of danger?"). Finally, in sixteen studies, different choice criteria are compared against each other, such as "Who would you like for a roommate?" "Who would you like for a friend?" or "Who would you like to go to class with?" In general, the choice of the criterion, or whether the format is hierarchical (ratings on everyone in the group) or not ("best" nominations of one person in the group) apparently have little effect on reliability of the choices made, except, as noted, for the "danger" criterion.

The Ohio Social Acceptance Scale (OSAS) is a six-point hierarchical rating instrument which has well demonstrated concurrent validity. Lorber (1970) cites a study correlating the OSAS with Moreno's sociometric tech-

nique in different classrooms. The median correlation of the two techniques is .89, with a range of .78 to .96. In a second study, the OSAS was correlated with a "Guess Who" technique, with a median correlation of .76, ranging from .66 to .80. In this second study, the internal reliability coefficient was .77, and the average rating variance was .59 parts of an interval. Young (1947) compared the OSAS to the Ohio Reputation Scale (ORS) with a two-choice limit and a composite sociometric score based on several criteria. Using 41 seventh grade students, he found the following correlations:

Table 4  
Correlations Among Three Sociometric Ratings

	OSAS	ORS	Composite Sociometric Score
OSAS	1.00	.83	.90
ORS	----	1.00	.88
Composite Sociometric Score	----	----	1.00

Finally, Wardlow and Greene (1952) compared the OSAS to a variety of other techniques, including the ORS. The other criteria were: "Who would you like to review for a quiz with?" (Mental rating, three-choice limit); "Who

would you like to go with to a weiner roast?" (Social rating, three-choice limit); and "Who would you like to play basketball with?" (Physical category, three-choice limit). The subjects were 37 adolescent girls in a high school homemaking class. The correlations of the various criteria are:

Table 5  
Correlations of the OSAS, ORS, and  
Three Sociometric Criteria

	Mental	Physical	Social	ORS	OSAS
Mental	1.00	.32	.61	.52	.61
Physical	----	1.00	.57	.52	.60
Social	----	----	1.00	.39	.51
ORS	----	----	----	1.00	.50
OSAS	----	----	----	----	1.00
Mean Correlation	.52	.51	.52	.49	.56

(After Wardlow and Green, 1952)

D. Summary. In closing the literature review, a brief summary may be helpful. First, the guiling simplicity of the Prisoner's Dilemma game was considered. Various authors have pointed to its profound connections with utility theory, and how choices can lead to the analysis of cooperative and trusting behavior thorough the distribution of payoffs (goals). Cooperation tends to vary with the level of payoffs, asymmetry of payoffs, the motivational

instructional set, communication between players, display of scores, discriminability of outcomes, "relative" gain of one player over another, the partner's play, fate control, and the nature of the payoffs. Minor effects for race and sex of the players are noted.

Second, Schutz's theory has not been tested, except insofar as the FIRO-B instrument has been found generally useful in assessing group compatibility. The instrument itself has been shown to be reasonably reliable and seems to have some degree of construct validity.

Finally, the Ohio Social Acceptance Scale is shown to be one of a variety of reliable and valid instruments by which to measure sociometric choices.

## CHAPTER III

### PROCEDURES

To this point, the theory under investigation and the nature of the Prisoner's Dilemma have been discussed. In this chapter the empirical variables, the experimental design, the data collection procedures, and other concerns in the experiment are discussed.

There are two theoretical assumptions crucial to this study. The first is that Schutz's three variables -- Inclusion, Control, and Affection -- can be adequately assessed and/or controlled for in an empirical study. Toward justifying this assumption, evidence supporting the validity of the OSAS has been offered, for the OSAS is the operational basis of Inclusion and Affection measurement. The Control dimension is discussed in terms of the Prisoner's Dilemma payoff matrices.

The second assumption underlying this investigation is that interpersonal trust, as measured via the Prisoner's Dilemma game, is an adequate basis on which to assess interpersonal process. In this study "trust" is the amount one is willing to forego one's rational individual choice in favor of a better joint outcome, in the face of the risk that one's partner will not trust. This experiment establishes an explicit motivational set for trust in the instructions.

A. Independent Variables. The Ohio Social Acceptance Scale gives a measurement "of the general social feeling existing between members of a class, club, team, or other children's group, where exact reference to a specific purpose, activity, or relationship is not required" (Lorber, 1970, p. 242). In this study, the OSAS is used to give operational meaning to two of Schutz's variables, Inclusion and Affection.

The OSAS calls for ratings by class members on six-point scales of every person in the class other than the respondent. The six points are:

1. My very, very best friends.
2. My other friends.
3. Not friends, but OK.
4. Not friends, but don't dislike.
5. Don't care for them.
6. Dislike them.

Usually the responses are analyzed on four dimensions of status, expansiveness, accuracy and perceptibility, although this study does not call for this analysis.

"Inclusion" is defined to mean those relationships (either positive or negative in content) which are reciprocated. If two persons in a classroom independently assign the other the same value, within one point above or below on the scale, their relationship is said to be inclusive. Two students who do not score each other within the same  $\pm$  one-point range do not reciprocate, and their relationship is termed Non-inclusion.

Positive "Affect" is determined by scoring one's partner in the top two categories of the OSAS, or in the bottom two categories: my very, very best friends; my other friends; don't care for them; and dislike them. "Non-affect" is seen in the middle two categories: not friends, but OK; and not friends, but don't dislike. These distinctions of Affect and Non-affect are made on the grounds that Schutz's theory makes no distinction as to the content of affection (i.e., either positive regard or hostility) that is expressed in the group, but that the issue of any expressed affect itself is the concern of both the individuals and the group. In his view, group process evolves away from neutrality toward affect, either positive or negative. As Schutz says (1958, p. 171), speaking of group development:

Finally, following a satisfactory resolution of these problems of [inclusion and] control, problems of affection become focal. The individuals have come together to form a group ...and now they must become integrated. At this stage it is characteristic to see such behavior as an expression of positive feelings, direct personal hostility, jealousy, pairing behavior, and, in general, heightened emotional feeling between pairs of people [emphasis added]. Each is deciding...like porcupines, how to get close enough to receive warmth yet far enough away to avoid the pain of sharp quills.

In terms of OSAS scores, then, a four-celled table gives an indication of the operational definitions of Inclusion and Affection:

Table 6

Listing of Paired OSAS Scores Used for  
Assignment of Dyads to One of the  
Four Treatment Conditions

Affection	Inclusion			
	Reciprocated		Not Reciprocated	
Affect	1,1	5,5	1,5	5,1
	2,2	6,6	1,6	6,1
	1,2	5,6	2,5	5,2
	2,1	6,5	2,6	6,2
Non-Affect			1,3	3,1
			1,4	4,1
			2,3	3,2
			2,4	4,2
			3,5	5,3
	3,4	3,3	3,6	6,3
	4,3	4,4	4,5	5,4
			4,6	6,4

Note: Dyads have only one paired score (e.g., [3,4]), but the score may also be reversed (e.g., [4,3]). This table contains all distinguishable reversals, although in practice a reversal had no effect on which treatment a dyad received.

The third variable in Schutz's theory comes from the Prisoner's Dilemma game itself, not from the structure of students' sociometric choices. Control is seen by Schutz as the power and authority relationships between people. In terms of the Prisoner's Dilemma game, control carries two aspects: the asymmetry of the payoff matrix, and fate control.

Asymmetry in any relationship is that which contributes to one's control over another, either through guilt, shame, obligation, contract, physical or instrumental power. Much social interaction is a negotiation about power, its appropriate use, context, limits, and purpose. In terms of the Prisoner's Dilemma relationship, asymmetry of the matrix permits one player to gain relative to the partner, even though the joint payoff may not be changed. Asymmetry is the ratio of the "Sucker's" payoff for the non-fate control player, divided by the Punishment payoff. A player with a large temptation who is not penalized by punishment, relative to the other player, has a large asymmetric power over his partner, since the second cannot really affect the relative gains of the first. Operationally, for this study high asymmetry means that a player can deliver or receive eleven more years in jail than his partner. Low asymmetry is given by a two-year interplayer difference. Since the punishment payoff is constant across all matrices, it need not enter into this definition of asymmetry.

Fate control is the capacity to implement this asymmetry, given knowledge of the other player's choice of Trust or Not Trust. It applies to the Prisoner's Dilemma game in which choices of both players are not simultaneous, but sequential. If the player knows his partner's choice, the decision to implement or not implement his trust is even more poignant. In brief, Fate Control is control over the action. Operationally, the person with positive Fate Control makes the second choice for that move in the game. Negative Fate Control is having to make the first choice for that move. When action is slowed down via a Fate Control dimension, it represents a conscious choice (Rapoport, 1967b), focusing responsibility for the joint outcome on the partner making the later choice, i.e., the positive fate control player.

It is felt that these two variables--Asymmetry and Fate Control--closely approximate Schutz's "Control" in the game situation. Asymmetry sets the limits of one's personal gain relative to the other; and the responsibility for pay-offs tells both players upon whom they both depend.

Specifically, eight payoff matrices are used for each dyad, randomly ordered for each pair of students. Inspection indicates that, in fact, only four payoff matrices are needed to assess for High and Low Asymmetry and Positive and Negative Fate Control. Yet it is also true that Asymmetry can run in two directions, either for or against the person

in Negative Fate Control (i.e., the first player). Rather than have an unbalanced tacit dimension (directionality of asymmetry in regards to Fate Control), the experimental procedure calls for players to play eight matrices, but only the four matrices running against the first player are considered in the analysis.

Both players have equal opportunity for Fate Control and Asymmetry. Since each subject plays under both Asymmetry and Fate Control conditions, neither has a chance of unduly gaining over his partner as an artifact of the experiment itself.

B. Experimental Design. As one can see, this is a  $2^4$  factorial design, with repeated measures over two dimensions, asymmetry and fate control. The factors are:

A--Inclusion. Two levels, reciprocated and unreciprocated, fixed.

B--Control: Asymmetry. Two levels, high and low, fixed.

C--Control: Fate Control. Two levels, positive and negative, fixed.

D--Affection. Two levels, affect and non-affect, fixed.

Since there are two factors containing repeated measures, there is a tacit, fifth dimension, Subjects, nested in the dimensions over which the measurements repeat.

E--Subjects. Twelve "levels," random.

C. Dependent Variables. There are six dependent variables, reflecting the nature of the interpersonal process that takes place across the eight ten-choice games that a dyad plays. They are:

- (1) The number of trusting (cooperative) plays per game.
- (2) The number of trusting (cooperative) plays one's partner makes per game.
- (3) The number of years in jail one earns for the game.
- (4) The number of years in jail for one's partner for the game.
- (5) The total estimate of trust of one's partner per game (as determined by the player's marks on ten seven-inch lines, one for each play, summed across the total of ten plays).
- (6) The total number of years in jail earned by both players, in years.

D. Hypotheses. Schutz's theory is one of group development and termination. As stated before, he sees the group having first to struggle with inclusion, then control, and, last, affection. At any point in a group's history beyond its formation, he expects the group to be handling, in some way, these three concerns. He diagrams it (1958, p. 102): ICA, ICAICAICA...ACI. He sees these dimensions as essentially orthogonal, and not interactive.

Hence, this research study hypothesizes main effects for inclusion, asymmetry, fate control, and affection, but no interaction effects. Although these four main effects hypotheses are independent of one another, his theory implies further that there is an ordering to these main effects, specifically that there should be found a control effect in addition to an inclusion effect, and affect in addition to control and inclusion effects. Deviations from an  $I \rightarrow C \rightarrow A$  main effect pattern demand an interpretation beyond Schutz's theory.

The statistical analysis is accomplished by the joint use of two University of Maryland computer programs, MANOVA and REPEAT, which are referenced at the Computer Science Center.

E. Selection of Subjects. Four school systems in the Cleveland, Ohio, area were contacted for permission to conduct this study, and one system agreed to let the experimenter collect data. The high school is a very competitive academic school, with a national reputation for excellence. The cooperation of six tenth grade teachers was enlisted for permission to collect the sociometric data in their homeroom classes.

In line with recent HEW guidelines for the protection of human subjects, and with the policies of the school, letters were sent to parents of every child in the classes, asking permission to collect data from their child (see

Appendix B). After ten days, non-returns were solicited by phone; and permission was obtained before the child was included in the project.

Responses to the sociometric instrument were placed on punch cards and analyzed on Case Western Reserve University's Univac 1108. Pairs of students were randomly selected without replacement from the four Inclusion-Affection cells. Because of sample size limitations, no restrictions on the basis of race or sex were used. About two weeks after the original data collection, these subjects were contacted via letter through the homeroom teacher (Appendix C), and asked to come to the office at a particular appointment time. The receptionist was given a list of scheduled students, and coached on enlisting the subjects' cooperation.

#### F. Administering the Prisoner's Dilemma.

Subjects were placed across a table from each other, and given the Prisoner's Dilemma instructions. There were two sample games, and eight payoff matrices. After each play, the cumulative years in jail for that game was written on a small blackboard, and a neutral comment was offered. Occasionally, subjects wished to clarify their alternatives or the rules. In these instances, the experimenter tried to maintain a neutral tone and posture.

The experimenter explained the game in the following manner:

The game works like this. You are both my prisoners, and I want to have a trial, to get a conviction. But I don't have enough evidence to gain a conviction by myself, so I need at least one of you to confess and implicate the other. I keep you from talking to one another. If you both hold out--Not Confess--you both get off very lightly. But if one of you confesses, that person will get off very lightly, and the other person will go to jail for a long time, having the book thrown at them. Naturally, this second person may also confess. If the first one doesn't, then the second person is the one to get off lightly, while his partner goes to jail for a long time. Of course, if both of you confess, you both go to jail for a long time, even longer than you would have gone to jail if you had held out and your partner had sold you out.

Let's do an example. (The experimenter asks the subjects to turn to the sample matrix, on the front of their packets; he instructs players as to their respective colors and the order of play. Both players have a file card colored to their color, with their name on it, so they don't forget.)

We are playing for years in jail, so you want to get the smallest payoff. The best way for both of you to get off lightly, as a team, is for both of you to hold out and not confess. Yet there is also a temptation to confess on your partner, because your payoff is even less in that case.

Let's try it with reference to the sample payoff map. Sally, you draw your lines across from your choice, Not Confess. John draws his lines down from Not Confess. The two lines on this map meet in the first box. In that box, the first number, in purple, is the jail time that Sally draws for this Not Confess play. The second number, in green, is the time that John goes to jail for Not Confessing.

Suppose Sally chooses her second alternative, Confess; and John chooses his first alternative, Not Confess. As you can both see from the payoffs, Sally gets 1/2 year, and John goes to jail for five years. This is usually called John's

"sucker's payoff," since he trusted Sally to choose her Not Confess alternative--in which case he would have gotten only one year, not five. But she sold him down the river, and made him into a sucker.

The same can happen to Sally. Suppose she trusts John. She plays the Not Confess alternative. We have shown that when John does play the Not Confess, they both get one-half year. But if he ignores her trust and Confesses, Sally is the sucker, and gets five years, while John has succumbed to temptation, and he gets only one-half year. (Experimenter instructs both players to draw lines from their alternatives to the appropriate cell.)

What happens if you both choose to Confess, not trusting one another? Your hope is to get the one-half year. But you both end up with six years, which is more than what you would have had to be in jail, had you trusted each other to Not Confess, and had you not been "tempted" to get your partner and go to jail for only one-half year.

Each game is for ten plays. I will record your cumulating time in jail on this black-board behind me, so that you may both see how you are doing. At the end of the tenth play, we will erase the running count, and start again.

Also, in front of you, you will find several sheets of paper with five lines on them. There is one line for each play of this sample game.

On the first line, I want you to mark with your pencil how much you trust your partner to Confess or Not Confess. For instance, if you think your partner is very likely to Not Confess, put a mark next to the Not Confess on the first line. If, on the other hand, you think your partner is about to Confess, put a mark under Confess on the line. If you are unsure, and doubt your trust, put a mark next to where your guess might be. If, for instance, you think your partner is slightly more likely to choose Not Confess, but you are not sure, you may mark your card this way: (experimenter demonstrates on a piece of paper.)

Now, take a minute to look at your maps, and to think about what you will do.

Go ahead and mark your trust of your partner's decision to Not Confess or to Confess. This is your estimate of how likely you think it is that your partner will Confess, and be not trustworthy; or that your partner will Not Confess, and therefore be trustworthy.

The experimenter continued in this vein, answering questions and playing the five-play sample game. He then moved to the other eight matrices, after it was clear to him that both players understood the meaning of the alternatives, what they were to do, and the consequences of their choices. The experimenter made efforts to minimize inter-dyad session differences, but did not maintain independent controls or observations. When subjects questioned the experiment, or wanted to know more about the experimenter, or hypotheses, the questions were deferred until the end of the eighth game. The experimenter also did informal debriefing after the experimental sessions.

## CHAPTER IV

### FINDINGS

A. Pretesting. Both the Ohio Social Acceptance Scale and the Prisoner's Dilemma instrumentation were pretested to control for instrumentation errors. The Ohio Social Acceptance Scale was pretested on a classroom of fifteen eighth grade students in Alexandria, Virginia. The Prisoner's Dilemma instrumentation was pretested on six eighth grade students in Washington, D.C.

For the Ohio Social Acceptance Scale six forms of classroom lists were used: (1) Alphabetical; (2) Reversed Alphabetical; (3) Random order; (4) Alphabetical, surname first; (5) Reversed alphabetical, surnames first; (6) Alphabetical with nicknames. Using a Kendall's Concordance ( $w$ ) for two randomly selected class members, it was found that presentation of names has no effect on the ratings the students received ( $p > .05$ ).

The Prisoner's Dilemma game was played by three pairs of students in all eight matrices. At the time of pretesting, the Social Communications Lab was under consideration. Several difficulties were encountered in its use, in that several conceptual rotations are required by students using the consoles. Specifically, students have to translate their payoff matrices, with "player" given by color and Fate Control given by color's position on the matrix. The Social Communications Lab consoles permit only one player to be listed on top, however, and, depending on the matrix, this "top" person on the console may be the positive Fate Control player, listed on the row of the payoff

matrix. Moreover, the colors of the lights used on the consoles conflict or are different from the players' colors. Finally, the spatial position of the levers by which players signal their actions does not conform to the spatial positions on their matrices, especially for the positive Fate Control player. Given these considerations, the use of the Social Communications Laboratory equipment was discontinued.

Apart from these difficulties, it was apparent that these eighth grade students could understand and effectively play the Prisoner's Dilemma. The subjects pointed up several ambiguities in the experimenter's phrasing, and indicated instructions which were difficult to follow. New instructions were implemented which the subjects found easier to follow.

B. Sampling and Subjects. The experimenter's agreement with the school system called for use of six classrooms with a potential number of dyads equal to 1,903. The agreement also called for permission to be gained from the parents of each child. The method of soliciting the permission has been described. Fifty-one of the 154 parents refused, reducing the total number of potential dyads to 850. Reasons for refusing were varied: some parents did not want to have their children out of class, and other said their children simply did not want to participate. Only two parents could not be reached; these students were not included in the study.

Some students were absent the day that the sociometric instrument was administered, and the experimenter tried to follow-up these students twice. Of course, some simply were unavailable, further reducing the number of dyads to 632.

It is apparent from Table 7 that Inclusion and Affection are not independent dimensions ( $\chi^2 = 32.6$ , d.f. = 1,  $p < .001$ ).

Table 7  
Distribution of Sampled Dyads Among the  
Inclusion and Affection Dimensions

Affection	Inclusion		Total	%
	Reciprocated	Not Reciprocated		
Affect	101	6	107	16.9%
Non-Affect	352	173	525	83.1%
Total	453	179	632	
%	71.7%	28.3%		100.0%

Almost 72% of all possible dyads have partners rating each other within one point of one another. Most of the dyads in this study are characterized by reciprocal indifference (352 or 632 = 56%); or unreciprocated indifference (173 or 632 = 27%). Indeed, the correlation, expressed as a Contingency coefficient, between Inclusion and Affection is .22.

While this Contingency coefficient is not exceedingly large, it has implications for sampling. The design calls for six dyads for each of the Inclusion-Affection cells. The decision was made to sample from

the cell with the smallest number of dyads to that with the largest. Also, since sampling of dyads is without replacement, and therefore subjects without replacement, the randomness criteria of equal chance and independence are somewhat unfulfilled. As a cell was sampled, players eliminated through non-replacement were also removed from other cells, which simultaneously lowered the number of dyads available for other cells. When cells had equal numbers of dyads remaining available, sampling was opened to the other cells, also, in an effort to preserve the equal chance criterion. Sampling continued this way until the part-random process had arrived at six dyads for each treatment cell. Inspection of the distribution of dyads by classroom indicates no unusual grouping among the treatment dimensions.

Appointments were made with the 48 players to participate in the Prisoner's Dilemma portion of the experiment, through letters delivered by the homeroom teachers. One or both partners failed to come to this first appointment in 18 of 24 cases; and reappointments were made for these persons. Ten of 18 dyads required third appointments; and two of ten dyads required a fourth appointment. All 24 dyads were accounted for by this fourth appointment.

### C. Results of the Prisoner's Dilemma Game.

There are six dependent variables in the Prisoner's Dilemma game, discussed in order.

1. Number of Own Trusting Responses. Table 8 gives the means and standard deviations for each cell in the  $2^4$  factorial design. Inspection indicates that much of the variability is not between cell means. Table 9, which gives the analysis of variance results, confirms that the great preponderance of variance is associated with Subject terms, not the hypothesized dimensions.

Table 8  
Means and Standard Deviations of  
Number of Own Trusting Responses

Affection and Fate Control	Inclusion			
	High		Low	
	Asymmetry			
	High	Low	High	Low
Affect				
Positive Fate Control	8.58 (1.56)	8.33 (2.42)	8.25 (3.25)	8.50 (2.58)
Negative Fate Control	8.33 (1.88)	7.75 (2.66)	8.58 (2.43)	7.83 (3.16)
Non-Affect				
Positive Fate Control	8.33 (2.43)	8.83 (2.92)	7.17 (2.98)	7.75 (2.26)
Negative Fate Control	7.42 (3.70)	8.75 (2.70)	7.50 (2.61)	7.33 (2.46)

Note: Standard deviations are in parentheses.

Table 9  
Analysis of Variance for  
Number of Own Trusting Responses

Source	Usual d.f.	(Cons. d.f.)	SS	MS	F
A: Inclusion	1		5.04	5.04	.204
D: Affection	1		9.78	9.78	.397
AD	1		9.41	9.41	.382
S	44		1084.92	24.66	---
B: Asymmetry	1		1.56	1.56	.355
AB	1		1.25	1.25	.284
BD	1		12.56	12.56	2.855
ABD	1		5.11	5.11	1.161
BS	44	11	193.75	4.40	---
C: Fate Control	1		2.23	2.23	1.161
AC	1		1.10	1.10	.573
CD	1		.27	.27	.141
ACD	1		.15	.15	.078
CS	44	11	84.25	1.92	---
BC	1		2.33	2.33	1.429
ABC	1		1.45	1.45	.889
BCD	1		.67	.67	.411
ABCD	1		.47	.47	.288
BCS	44	11	71.75	1.63	---

It is apparent, then, that the number of trusting responses one gives is not dependent on any of the predicted dimensions given by Schutz's theory.

## 2. Number of Partner's Trusting Responses.

Another variable thought to be related to the amount of inter-personal trust is the number of trusting responses that one's partner makes. This variable is, also, insensitive to any differences predicted by the independent dimensions.

Table 10  
Means and Standard Deviations of  
Number of Partner's Trusting  
Responses

Affection and Fate Control	Inclusion			
	High		Low	
	Asymmetry			
	High	Low	High	Low
Affect				
Positive Fate Control	8.33 (1.88)	7.75 (2.67)	8.58 (2.43)	7.83 (3.16)
Negative Fate Control	8.58 (1.56)	8.33 (2.42)	8.25 (3.25)	8.50 (2.58)
Non-Affect				
Positive Fate Control	7.42 (3.20)	8.75 (2.70)	7.50 (2.61)	7.33 (2.46)
Negative Fate Control	7.83 (3.69)	8.83 (2.91)	7.17 (2.98)	7.75 (2.26)

Note: Standard Deviations are in parentheses.

Table 11  
Analysis of Variance for  
Number of Partner's Trusting Responses

Source	Usual d.f.	(Cons. d.f.)	SS	MS	F
A:Inclusion	1		5.04	5.04	.219
D:Affection	1		9.78	9.78	.424
AD	1		9.21	9.21	.399
S	44	11	1014.40	23.05	---
B:Asymmetry	1		1.56	1.56	.358
AB	1		1.32	1.32	.303
BD	1		12.44	12.44	2.858
ABD	1		4.78	4.78	1.098
BS	44	11	191.48	4.35	---
C:Fate Control	1		2.37	2.37	1.334
AC	1		.33	.33	.186
CD	1		.26	.26	.146
ACD	1		.03	.03	.017
CS	44	11	78.15	1.77	---
BC	1		2.33	2.33	1.110
ABC	1		3.08	3.08	1.467
BCD	1		.58	.58	.276
ABCD	1		.02	.02	.009
BCS	44	11	92.40	2.10	---

### 3. Total Trust Estimated of One's Partner.

Whether or not a partner behaves trustingly, there are a player's subjective estimates of what he thinks his partner will do as a measure of the interaction between the two players. The minimum score (most trusting) is 10; the maximum score (least trusting) is 70. Clearly, the subjects were

far more trusting of one's partner than not. They were consistently so, except for when the matter of Fate Control is at hand. On this dimension, players who are in Fate Control feel somewhat less distrustful than those who do not exercise the power of Fate Control.

Table 12

Means and Standard Deviations of  
Total Trust Estimated of One's  
Partner

Affection and Fate Control <u>1/</u>	Inclusion			
	High		Low	
	Asymmetry			
	High	Low	High	Low
Affect				
Positive Fate Control	24.67 (9.96)	25.50 (11.53)	26.58 (18.69)	24.75 (15.61)
Negative Fate Control	26.50 (22.45)	28.33 (23.04)	33.42 (18.71)	32.83 (18.19)
Non-Affect				
Positive Fate Control	25.25 (12.64)	25.50 (12.38)	25.00 (18.10)	22.91 (13.43)
Negative Fate Control	20.92 (14.74)	23.00 (20.06)	29.33 (14.93)	27.92 (14.26)

Note: Standard deviations are in parentheses

1./ The means and standard deviations for the Fate Control dimension alone are: Positive Fate Control,  $\bar{X}_p = 27.82$ ,  $SD_p = 17.27$ ; Negative Fate Control,  $\bar{X}_n = 24.98$ ,  $SD_n = 15.06$ . This was the only main or interaction effect found significant in the analysis of variance (cf. Table 13, below):  $F = 4.594$ , d.f. = 1,44,  $p < .05$ .

Table 13  
Analysis of Variance for  
Total Trust Estimated of One's Partner

Source	Usual d.f.	(Cons. d.f.)	SS	MS	F
A:Inclusion	1		399.63	399.63	.589
D:Affection	1		365.75	365.75	.539
AD	1		523.38	523.38	.771
S	44	11	29,868.65	678.83	----
B:Asymmetry	1		.63	.63	.002
AB	1		89.38	89.38	.339
BD	1		16.92	16.92	.064
ABD	1		.63	.63	.002
BS	44	11	11,604.32	263.74	----
C:Fate Control	1		388.17	388.17	4.594*
AC	1		3.26	3.26	.038
CD	1		218.88	218.88	2.590
ACD	1		26.26	26.26	.311
CS	44	11	3,717.81	84.50	----
BC	1		1.51	1.51	.025
ABC	1		.42	.42	.007
BCD	1		.05	.05	.001
ABCD	1		1.51	1.51	.025
BCS	44	11	2,693.14	61.21	----

\* $p < .05$ , d.f. = 1,44. Box's test supports use of the 1,44 F value.

The evaluation of the F test associate with the Fate Control dimension is under the usual degrees of freedom,  $p = .05$ , rather than the conservative degrees of freedom. Homogeneity of variance and covariance assumptions are tenable in this case. Fate Control does appear to have an impact on a person's estimates of the partner's trustworthiness, although this effect surely is not very large.

4. Number of Years in Jail. This variable can be seen to be inversely related to the quality of the interpersonal interaction. The more trust, the more dual cooperative plays, and the fewer years in jail. Only the Fate Control dimension is related to this variable, far beyond the level of the  $\underline{F}$  test required at d.f. = 1,11 or 1,44. Even though this dimension does not distinguish the overall number of trusting plays by either player, it does distinguish the number of years in jail for the player: those exercising Fate Control apparently receive fewer years in jail than their partners not exercising Fate Control (cf. Tables 14, 15).

Table 14  
Means and Standard Deviations of  
Numbers of Years in Jail

Affection and Fate <sub>1/</sub> Control <u>1/</u>	Inclusion			
	High		Low	
	Asymmetry			
	High	Low	High	Low
Affect				
Positive Fate Control	21.08 (11.69)	22.33 (14.29)	17.42 (14.51)	20.58 (15.23)
Negative Fate Control	15.67 (6.58)	16.33 (10.00)	17.92 (15.86)	15.83 (10.21)
Non-Affect				
Positive Fate Control	24.83 (15.02)	16.17 (12.47)	27.58 (18.58)	22.83 (11.47)
Negative Fate Control	15.83 (12.44)	14.75 (12.16)	21.08 (11.93)	18.17 (8.28)

Note: Standard deviations are in parentheses.

1./ The means and standard deviations for the Fate Control dimension alone are:

Positive Fate Control,  $\bar{X}_p = 18.40$ , SD = 12.29

Negative Fate Control,  $\bar{X}_n = 21.41$ , SD = 14.04

This was the only main or interaction effect found significant in the analysis of variance ( $F = 8.81$ , d.f. = 1,44,  $p < .05$ ). Cf. Table 15, below.

Table 15  
Analysis of Variance for  
Number of Years in Jail

Source	Usual d.f.	(Cons. d.f.)	SS	MS	F
A:Inclusion	1		155.88	155.88	.365
D:Affection	1		148.76	148.76	.348
AD	1		354.80	354.80	.830
S	44	11	18,802.25	427.32	---
B:Asymmetry	1		155.88	155.88	1.033
AB	1		1.17	1.17	.008
BD	1		312.63	312.63	2.072
ABD	1		6.38	6.38	.072
BS	44	11	6,639.42	150.90	---
C:Fate Control	1		1,040.67	1,040.67	8.809*
AC	1		30.88	30.88	.261
CD	1		26.26	26.26	.222
ACD	1		47.00	47.00	.398
CS	44	11	5,198.25	118.14	---
BC	1		9.63	9.63	.176
ABC	1		81.38	81.38	1.492
BCD	1		174.42	174.42	3.198
ABCD	1		.88	.88	.016
BCS	44	11	2,399.92	54.54	---

\* $p < .05$ , d.f. = 1,11

#### 5. Number of Years in Jail for the Partner.

This variable, too, is related to the quality of the inter-personal relationship, in that more highly trusting relationships presumably lead to fewer years in jail for the partner.

As Table 16 shows, there is a wide variability in the average number of years that a partner goes to jail.

Table 16  
Means and Standard Deviations of  
Number of Partner's Years in Jail

Affection and Fate Control <u>1/</u>	Inclusion			
	High		Low	
	Asymmetry			
	High	Low	High	Low
Affect				
Positive Fate Control	15.67 (6.58)	16.33 (10.00)	18.08 (16.06)	15.83 (10.24)
Negative Fate Control	21.08 (11.68)	22.33 (14.29)	17.25 (14.29)	20.58 (15.23)
Non-Affect				
Positive Fate Control	15.83 (12.44)	14.75 (12.16)	21.08 (11.93)	18.17 (8.28)
Negative Fate Control	24.83 (25.02)	16.17 (12.48)	27.28 (18.58)	22.83 (11.47)

Note: Standard deviations are in parentheses.

1./ The means and standard deviations for the Fate Control dimension alone are:

Positive Fate Control,  $\bar{X}_p = 13.05$ , SD = 10.96

Negative Fate Control,  $\bar{X}_n = 21.58$ , SD = 15.50

This was the only main or interaction effect found significant in the analysis of variance ( $F = 9.99$ , d.f. = 1,11,  $p < .05$ ). Cf. Table 17, below.

Table 17  
Analysis of Variance for  
Number of Partner's Years in Jail

Source	Usual d.f.	(Cons. d.f.)	SS	MS	F
A:Inclusion	1		155.88	155.88	.321
D:Affection	1		148.76	148.76	.306
AD	1		354.80	354.80	.730
S	44	11	21,382.11	485.96	---
B:Asymmetry	1		155.88	155.88	1.068
AB	1		1.17	1.17	.008
BD	1		312.63	312.63	2.142
ABD	1		6.38	6.38	.044
BS	44	11	6,432.10	145.98	---
C:Fate Control	1		1,022.13	1,022.13	9.993*
AC	1		34.12	34.12	.334
CD	1		29.30	29.30	.286
ACD	1		51.05	51.05	.499
CS	44	11	4,500.44	102.28	---
BC	1		7.92	7.92	.123
ABC	1		86.67	86.67	1.343
BCD	1		182.13	182.13	2.823
ABCD	1		.42	.42	.007
BCS	44	11	2,839.11	64.53	---

\* $p < .05$ , d.f = 1,11.

There is one dimension -- Fate Control -- which again is significant in relation to the partner's years in jail. Those persons exercising Fate Control have partners who receive more years in jail than those who do not exercise Fate Control. That is, players who have the second choice more often succumb to temptation than do players who have to make the first choice (in which case the temptation is unenforceable). This

result really is the converse of the previous variable, for players who receive significantly fewer years in jail (Fate Controllers) should also have partners who go to jail for longer times.

6. Combined Number of Years in Jail, for Both Players. As Tables 18 and 19 indicate, the independent dimensions do not account for any of the variance beyond that expected by chance. This dependent variable is, in fact, a

Table 18

Means and Standard Deviations of  
Combined Numbers of Years in Jail, for Both Players

Affection and Fate Control	Inclusion			
	High		Low	
	Asymmetry			
	High	Low	High	Low
Affect				
Positive Fate Control	36.75 (17.83)	38.67 (22.90)	35.17 (26.21)	36.42 (24.49)
Negative Fate Control	36.75 (17.83)	38.67 (22.90)	35.17 (26.21)	36.42 (24.49)
Non-Affect				
Positive Fate Control	40.67 (29.49)	30.92 (22.48)	46.17 (26.50)	41.00 (18.26)
Negative Fate Control	40.67 (29.49)	30.92 (22.47)	48.67 (26.46)	41.00 (18.26)

Note: Standard deviations are in parentheses.

combination of the two variables concerning one's own and the partner's years in jail, and both had significant effects for Fate Control. These previous results indicate that the person exercising Fate Control went to jail less than the partner. Clearly, when the years in jail for both players are summed, the significant result is attenuated.

Table 19  
Analysis of Variance for  
Combined Number of Years in Jail, for Both Players

Source	Usual d.f.	(Cons. d.f.)	SS	MS	F
A:Inclusion	1		507.00	507.00	.318
D:Affection	1		507.00	507.00	.318
AD	1		1,281.33	1,281.33	.809
S	44	11	70,239.30	1,596.35	---
B:Asymmetry	1		507.00	507.00	1.171
AB	1		21.33	21.33	.049
BD	1		1,121.33	1,121.33	2.590
ABD	1		48.00	48.00	.111
BS	44	11	19,051.62	432.99	---
C:Fate Control	1		4.69	4.69	.025
AC	1		4.69	4.69	.025
CD	1		4.69	4.69	.025
ACD	1		4.69	4.69	.025
CS	44	11	8,325.96	189.22	---
BC	1		4.69	4.69	.034
ABC	1		4.69	4.69	.034
BCD	1		4.69	4.69	.034
ABCD	1		4.69	4.69	.034
BCS	44	11	6,038.80	137.25	---

Examination of the correlations between the six dependent variables indicates that they are very highly related to one another (See Table 20, page 68). In a sense, then, they are to some degree, proxy measures of each other, and may reflect an insensitivity to dimensions other than Fate Control; or that Fate Control is an artifact-producing independent variable. The implication of these results is discussed in the following chapter.

D. Summary. In this chapter the results of the Prisoner's Dilemma Game have been presented. This experiment is intended as a test of Schutz's three-dimensional theory of group processes. The principle finding concerns the Fate Control dimension. Only for this independent variable were there significant results, and then on only three dependent variables: Total Estimated Trust of One's Partner; Years in Jail; and Partner's Years in Jail.

Table 20  
Correlations Between the Six Dependent  
Variables

	Number of Trusting Responses	Partner's Trusting Responses	Estimate of Partner's Trust- worthiness	Number of Years in Jail	Partner's Years in Jail	Combined Years in Jail
Number of Trusting Responses	1.00	.82	-.58	-.59	-.86	-.85
Partner's Trusting Responses		1.00	-.54	-.81	-.61	-.80
Estimate of Partner's Trust- worthiness			1.00	.50	.52	.60
Number of Years in Jail				1.00	.44	.84
Partner's Years in Jail					1.00	.84
Combined Years in Jail						1.00

## CHAPTER V

## DISCUSSION AND CONCLUSIONS

This experiment is intended as a one-time test of Schutz's three-dimensional theory of group processes. The theory has received some support from a variety of studies using the FIRO-B instrument, which were mentioned in Chapter II. Except for one of the experimental dimensions, Fate Control, this study does not support, in general, the theory. This relatively large null result requires some discussion.

The experiment is discussed from several points of view: the relationships of the students; possible difficulties in experimental technique and circumstance; statistical concerns; the Prisoner's Dilemma game itself; and the use of the Prisoner's Dilemma instrumentation in assessing interpersonal process.

A. Relationships of the Students. In Chapter III it was stated that six tenth grade homerooms were used as the subject pool from which to select dyads. The homerooms do not appear to form the basis of spontaneous groups of students in the school, however. All homerooms are made up on the basis of an alphabetical listing of the tenth grade classes, and, in groups of twenty-five,

students are divided into the 22 tenth grade classes. In a sense, these homeroom groupings are purely arbitrary. There is little to indicate that these classes are on-going, functioning groups of people with common interests and goals.

This view is supported by informal observations. There are no hierarchically or mutually organized tasks which go on at homeroom period, except for the teacher's attendance taking. There is no sharing or competition which makes a group into something more than a collection of people occupying the same physical room.

The experimenter did observe several informal, reasonably stable groupings of students in the classrooms he visited. The dominant picture, however, was of a homeroom as a collection of individuals waiting for the next class.

This view is reflected in the distribution of responses from the sociometric instrument (Table 7, p. 52). Four out of five dyads had at least one partner largely indifferent to the other. In over half of the dyads, the indifference was reciprocal. Whatever engagement there may be appears to be informal, small groups of students, not in the homeroom as a whole.

One suspects that these student activities contrast with the intensity of other student involvements. While walking around the school and chatting with a number of students, the experimenter noted deep commitments of various groups of students to mutual tasks and social

interaction. Physics labs, extra-curricular drama, or just "standing around" seemed to have qualities of mutual engagement not observed in the homeroom periods. Not only are students more energetic in their other school activities, their relaxed moments do not seem to have the lethargic qualities of homeroom periods.

A final comment on the lack of student engagement in homerooms is that some tenth grade students had requested that the school administration abolish homeroom, because it appeared superfluous to them. At the time of the experiment, the author was not aware of this concern. For some time the administration opposed the students, and in the week before the data collection began, the administration lectured the students on how important homeroom is. On the last day of the Prisoner's Dilemma dyad testing, however, the administration capitulated, and cancelled tenth grade homeroom periods.

The implication of this line of argument is that the dyads were sampled from a skewed, largely indifferent population.

B. Experimental Technique and Possible Biases.

The experimenter was careful in portraying his relationship to the school authority structure. In the letter to parents, the study was said to be "in cooperation with"

the school administration, not for it; and the Institute's logo was used to convey further independence. During the instructions for the sociometric instrument and the Prisoner's Dilemma, the experimenter explained carefully that all results were confidential, and that no "tricks" were involved. The experimenter purposely dressed more casually than the teachers in the school when conducting the Prisoner's Dilemma portion of the experiment, in an effort to distinguish himself from the faculty.

It is indisputable, however, that the experimenter is twelve years older than the subjects, and is clearly on the far side of college. It is also clear that he was bent on administering his experiment, and that the gathering was for that purpose.

The experimenter observed that teachers and students have their own communications networks which cross and interconnect primarily in the formal, manifest content of the high school. The two groups are, to some degree, independent of one another, and there are mechanisms for distributing power and legitimacy among the two groups. In large measure, the students relinquish some amount of formal autonomy in conforming to the school's rules and the teaching process, which is accompanied by a heightened in-group solidarity among the students.

In this experiment the students were requested by an older man (the experimenter) to come in pairs (and half the pairs were largely indifferent to one another) to the experimenter's room, located in the main office complex (see Appendix D). In view of their in-group solidarity, their general lack of engagement with each other, and lack of explicit knowledge about the experimenter, individual students may have entertained somewhat suspicious attitudes about the project, the disclaimers and experimenter's manner notwithstanding.

In the introduction to the Prisoner's Dilemma game, the experimenter attempted to foster a friendly, cooperative, and trusting atmosphere. There is evidence, however, of some hostile and defensive attitudes on the part of some students, directed at the experimenter. To the experimenter's introductory "How are you?" one female subject replied, "That's a rhetorical question, and I don't answer rhetorical questions." Another student wanted to know explicitly before the game what the experimenter's hypotheses were. A third student thought the game was "arbitrary."

In summary, then, despite the experimenter's efforts to dissociate himself from the authority-bound image of the school administration and to align himself with the students' interests and defenses in order to generate a trusting experimental atmosphere, several factors may have interfered. First, the experimental room was located in the main office suite. Second, the experimenter was undeniably an adult. Finally, the "in-groupness" of the students may have augmented the level of indifference brought by the usual non-inclusive dyad, in the students' eyes. All three of these factors could have been operating to produce an unrealistically high level of "trust", even among dyads that should have been least so.<sup>4</sup>

Beyond the problems of implicit control vested with the experimenter, one is astounded at the high level of cooperation between players, and the negatively skewed distribution of trusting choices. This comes from students at an intensely competitive high school, to which parents from neighboring districts are willing to pay up to \$1500 to have their child attend, so good is its national reputation for rigor and excellence. In a population of usually competitive students, how does one explain the high trust levels?

---

4. After all, the task was to decide whether or not to confess to a "District Attorney," an older person, certainly not a fellow student. Some students may have been loathe to confess under any circumstances, as part of the role of being a student -- particularly since the game is imaginary, but the role is not.

One facet of an explanation comes from students' comments during the game. Some of them said after the game was over that the gain offered by the temptation to sell out was not really too much different from that reward for mutual trusting. In other words, many students found themselves indifferent to the alternative payoffs, and did not discriminate between, say, one-half year in jail or one year in jail.

Second, some students commented afterward that they sought to maximize their gain only to a certain point, after which they switched to a more cooperative policy. Apparently these ceiling effects for relative gain are very low, because very little difference is attributable to the independent dimensions of the study, two of which (Asymmetry and Fate Control) stem directly from the Prisoner's Dilemma instrumentation.

Third, previous research shows that the game is remarkably sensitive to instructional sets. It is conceivable that the experimenter's instructional set may have been far too successful in establishing a cooperative and trusting bias.

C. Statistical Concerns. Cohen (1969) points out that the power of a statistical test is related to three things: the alpha level ( $\alpha = .05$ , the probability of incorrectly rejecting a true null hypothesis); the reliability of the sample results; and the effect size. The power is .16; and  $P$  (Type II) = .84.

D. The Prisoner's Dilemma Game. The game itself implies the concept of power and control, by virtue of the distribution of payoffs. Thibaut and Kelly (1959) point out the most obvious form of control, Fate Control. In Fate Control, a player may have leverage over what another person does, as in the following table, where Player 1 has no payoff, but Player 2 does.

Table 21

Pure Fate Control in a Prisoner's  
Dilemma Payoff  
Matrix

Player 2's Alternatives	Player 1's Alternatives	
	Alternative A	Alternative B
Alternative A	<div> <div>0</div> <div>\$1</div> </div>	<div> <div>0</div> <div>\$4</div> </div>
Alternative B	<div> <div>0</div> <div>\$1</div> </div>	<div> <div>0</div> <div>\$4</div> </div>

Note: Only Player 2 receives a payoff. Player 1 receives nothing.

In this case, Player #1 has Fate Control over Player #2, because he can decide for Player #2 whether his payoffs shall be \$1.00 or \$4.00.

It is apparent that in the four matrices analyzed for this study the second player also had Fate Control, even though the first player did receive some payoff. In addition, beyond Fate Control, the second player also had the power of relative gain maximization, since the asymmetry always went against the first player (Jones and Gerard, 1967). Another kind of control implicit in these matrices is called Behavior Control, in that Player #1 and Player #2 must negotiate (via punishment) for control of the payoffs. The player with Fate Control also controls the other's behavior, insofar as the latter succumbs to his own temptation and is willing to punish the first player for his distrusting choices.

It is evident that the major element of these matrices is power and control -- Fate Control, Behavior Control, and Comparison Level. The actual levels of outcome depend on a coordination of values -- the value of conflict and affiliation for the two players, and the value of Control. Schutz's theory makes predictions concerning the valuation process in a group under conditions of Inclusion, Control, and Affection. The major finding of this study is that Fate Control is the only variable supporting the predictions based on the theory. It is also the variable most clearly linked to the experimental and paradigmatic nature of the Prisoner's Dilemma studies.

E. On Interpersonal Theory. It is apparent, then, that the complex interactions and exchanges from which Schutz's theory comes have not received full support in this experiment. The unique support comes from the Fate Control dimension, a variable intimately linked to the experimental, analogue nature of the Prisoner's Dilemma in measuring interpersonal exchange and to the sensitivities of the experimental design. That we should find so little support for Schutz's theory is, perhaps, disappointing, and one's first impulse is to conclude that either Schutz's theory is weak, or the Prisoner's Dilemma is inadequate.

Both conclusions may be in order. It is evident from the sociometric sampling that two of the dimensions are not independent of one another. Moreover, his belief that Affection in an interpersonal exchange -- meaning non-neutral affection -- does not appear to aid his theory. Indeed, the intrapsychic equivalence of both love and hate is based on a theory of infantile instinctual vicissitudes, which in adults is seen as pathological. In retrospect, one is not surprised to find the results not significant on this dimension. Indeed, a suggested re-analysis would be to analyze for positive and negative affection, vs. inclusion and non-inclusion. This conforms to a more conventional view of affectional exchange between normal

people, rather than an intrapsychic equivalence of affectional energies. Under these conditions, one might more reasonably look for differences in amounts of trust between members of a dyad.

Even though the experimental results do not bear on the theory's statements about the origins of one's fundamental interpersonal orientations, a comment is offered. The positing of, for example, an under- vs. over-social childhood as the basis for one's later Inclusion needs seems, on the surface, very appealing. Intuitively the argument makes sense. We all have felt, at one time or another, included or excluded, and we "remember" our childhood experiences with our parents, also. Yet when compared to the extensive psychodynamic literature on the attachment of children (e.g. Bowlby, 1969, 1973), Schutz's comments seem quite superficial, and unrelated to the study of children. An "over-included" child can manifest many different adult phenotypic behaviors, ranging from passive-dependent and narcissistic behaviors, character traits, defenses such as denial or projection, or symptoms ranging from phobic to hysterical. The connection between childhood experiences and adult behavior is long, tortuous, and subject to many cognitive and emotional transformations. This writer believes that Schutz's work on the origins of interpersonal process are the results of analogic reasoning, drawing inappropriate conclusions from his beliefs

about infantile experiences of love and pleasure. It is to his credit that the major result of his work -- the FIRO-B instrument and statements of group compatability -- are not dependent on this argument about the origins of adult interpersonal orientations. It is also fortuitous that his group work and the instrument appear to be relatively useful in spite of the lack of theoretical support for the origins of these orientations.

As for the Prisoner's Dilemma, it simplifies the exchange between people. Since it is simplified, the exchange itself is telescoped, as Wolf and Zahn (1972) point out in their brilliant essay:

"The fewer the choices determined by the interactor himself, the less applicable are the concepts of exchange (in terms of variety of exchange, complexity, and volition) to a given interaction, and the more applicable the social psychology of dependency, coercion, or force" (p. 149).

In this study, the choices of the players are limited to two. The complexity of what transpires between them is limited to a handful of outcomes, usually framed by the "District Attorney's" hostile intent. Finally, the players must make choices, no matter how repugnant they may have found the task of "selling" a classmate "down the river." In sum, the task presented to the subjects, beyond the problem of in-group loyalty, so simplifies whatever may exist between persons that the interpersonal exchange may be without meaning. This, combined with the explicit experimental emphasis on interpersonal Fate Control, may be sufficient explanation of the results of this study.

F. Summary. This study found significant results on only one of the predicted four dimensions, that one being most obviously linked to the nature of the payoff matrices and the Prisoner's Dilemma experimental tasks. These results -- for subjectively estimated trustworthiness, number of years in jail for oneself, and number of years in jail for the partner -- are somewhat disappointing. Yet it is clear that several factors may have contributed to these results:

First, there is the nature of student in-group loyalty in a high school situation, as compensation for and defense against the administration's authority, and the moralistic trends of some teachers. This in-group loyalty also can result from the school's natural social climate. This in-group loyalty appears to have been an extra-experimental phenomenon which impinged on the experimental tasks.

Second, it is apparent that this study, which is a test of interpersonal processes, sampled a group of students largely uninvolved with each other. It is believed that this lack of involvement was situational to the sampling itself, and is not intrinsic to other pairs or groups of students. As a result, any results which may have been present (or could have been found) were not encountered. Observation suggests a higher level of interpersonal involvement in other school

activities. Other, additional explanations for these results are students' comments after the experimental sessions: indifference to alternatives, ceiling effects on relative gain, and perhaps too cooperative instructional sets.

Third, the design had lower statistical power than was anticipated. The effect size was far lower than had been thought. The total amount of variance accounted for by reference to the one significant independent dimension (Fate Control) is only about 1% of the variable of Own Years in Jail, for example. Moreover, the six dependent variables are highly intercorrelated with one another, and appear to act as proxy measures of one another.

Fourth, the problems presented by Schutz's theory in any attempted verification are discussed. The definition of Affection, which seems based on the psychodynamic relationship of love and hate, can lead to a grievous confounding of the dimension, when considered on an interpersonal basis.

Finally, the collapsing of interpersonal processes in a Prisoner's Dilemma matrix is questioned, especially since Fate Control so dominates the play of a game, and the subtleties of interpersonal process are lost. The use of this experimental analogue in testing the adequacy of Schutz's theory does not seem fully justified in this case.

APPENDIX A  
MATRICES USED IN THE PRISONER'S DILEMMA

06012

2. If Player 1 draws a line down from your chosen side, then Player 2 draws a line across from your chosen alternative.

3. If the line drawn by Player 1 is the same as the line drawn by Player 2, then the outcome will go to jail.

First Player:

Alternative A:  
Trust My Partner:  
Do Not Confess

Alternative B:  
Do Not Trust  
My Partner:  
Confess

Alternative A:  
Trust My  
Partner:  
Do Not Confess

1

1

1/2

5

Alternative B:  
Do Not Trust  
My Partner:  
Confess

5

1/2

6

6

## Instructions:

First Player: draw a line across from your partner's  
 Second Player: Draw a line across from your partner's

where the two lines meet is the number  
 of years you will go to jail.

## First Player:

Alternative 1: Treat My Partner  
 Do Not Confess  
 Alternative 2: Treat My Partner  
 Do Not Confess

Alternative A:  
 Treat My Partner  
 Do Not Confess

1 1

1/2

Alternative B:  
 Do Not Treat My  
 Partner  
 Confess

3 1/2

2 1





## THE PRISONER'S DILEMMA GAME

## Instructions:

First Player: Draw a line down from your chosen alternative.

Second Player: Draw a line across from your chosen alternative.

Where the two lines meet is the number of years you will go to jail.

First Player:

Alternative A:  
Trust My Partner  
Do Not Confess

Alternative B:  
Do Not Trust My  
Partner  
Confess

Alternative A:  
Trust My Partner  
Do Not Confess

1	1	1/2	5
5	1/2	5	5

Alternative B:  
Do Not Trust My  
Partner  
Confess

# THE PRISONER'S DILEMMA

## Instructions:

First Player: Draw a line down from your chosen alternative.

Second Player: Draw a line across from your chosen alternative.

There: The two lines meet at the number of years you will go to jail.

First Player: \_\_\_\_\_

Alternative A:  
Trust My Partner  
Do Not Confess

Alternative B:  
Do Not Trust My  
Partner  
Confess

Second  
Player: \_\_\_\_\_

Alternative A:  
Trust My Partner  
Do Not Confess

Alternative B:  
Do Not Trust MY  
Partner  
Confess

1	1	1/2	6
16	1/2	5	5

Player 1: Draw a card from the deck.

Second Player: Draw a card from the deck.

Player 1: Draw a card from the deck.

Second Player: Draw a card from the deck.

Player 1: Draw a card from the deck.

### First Player:

Alternative A: Do Not Confess

Confess: 4 Points

Do Not Confess: 0 Points

Alternative A:

Do Not Confess

Do Not Confess

1

1

1/2

Alternative B:

Do Not Confess My

Partner

Confess

6

1/2

1/2

## THE PRISONER'S DILEMMA

Instructions:

First Player: Go over to the board and draw a line across the alternative.

Second Player: Draw a line across from your own alternative.

Where the two lines meet is the number of years you will go to jail.

First Player:

Alternative A:

Trust My Partner  
Do Not Confess

Alternative B:

Do Not Trust My  
Partner  
Confess

Alternative A:  
Trust My Partner  
Do Not Confess

1	1	1/2	3
6	1/2	5	4

Alternative B:  
Do Not Trust My  
Partner  
Confess



APPENDIX B

LETTER TO PARENTS

INFORMED CONSENT FORMS

UNIVERSITY OF MARYLAND

93

COLLEGE OF EDUCATION

COLLEGE PARK 20742

INSTITUTE FOR CHILD STUDY

November 13, 1973

Dear Parent:

In cooperation with the Shaker Heights school administration, I would like to invite your consent for your child, \_\_\_\_\_, to participate in a study of how adolescents in groups come to agreements in a natural situation. The study is a form of "Prisoner's Dilemma" and involves how much two people can trust one another. I want to find out how much two adolescents can trust each other.

The procedures for this study have been approved by the Doctoral Dissertation Committee at the University of Maryland; and have been reviewed by the Shaker Heights school administration. The procedures have been pre-tested on youths in the Washington, D.C., area.

They are completely safe and involve no psychological stress or manipulation.

Two specific procedures are used. The first is a five-minute form which will ask your child with whom he or she is friends. Clearly, this information is confidential and will not be given to other students, teachers, or administrators. Then, if your child meets several selection criteria, I would like him or her to participate in the Prisoner's Dilemma portion of the study, with a partner from his or her classroom. The total involvement of each student is no more than forty minutes.

Of course, all data are strictly confidential. No one will be able to match particular responses with particular persons.

I have arranged with the school administration to conduct the study the week before the Winter Recess period, so as not to conflict with your child's study plans for the examination period.

In addition, I would like to send you a digest of the results of the study, if you are interested.

On the enclosed postcard Consent Form, would you please indicate your willingness to have your child participate, and return the card to me?

Thank you for your consideration.

Sincerely yours,

*Stephen H. Armstrong*

Stephen H. Armstrong  
Shaker Heights High School

Approved: Dr. Fritz M. Overs, Principal  
Shaker Heights High School

## PARENTS' INFORMED CONSENT FORM

☐ I hereby grant permission to Mr. Armstrong to include my son/daughter in the research study under the terms stated in his letter.

☐ I am interested in receiving a digest of the results of this study.

\_\_\_\_\_  
Parent's Name

☐ Permission is not granted to include my son or daughter in this research study.

## APPENDIX C

COMPUTER PROGRAM WRITTEN FOR  
SELECTING DYADS, WITH  
SAMPLE RESULTS FOR  
ONE CLASSROOM

@FOR,IS DYAD  
FOR S11A-01/16/74-20:54:21 (,0)

# MAIN PROGRAM

STORAGE USED: CODE(1) 000425; DATA(0) 010134; BLANK COMMON(2) 000000

## EXTERNAL REFERENCES (BLOCK, NAME)

0003 NINTR5  
0004 NRDU5  
0005 N1025  
0006 NWDU5  
0007 N1015  
0010 NERR25  
0011 NSTOPS

## STORAGE ASSIGNMENT (BLOCK, TYPE, RELATIVE LOCATION, NAME)

0001	000002	1L	0001	000264	10L	0000	010073	101F	0001	000267	11L	0001	000034	116G
0001	000272	12L	0001	000040	123G	0001	000045	127G	0001	000275	13L	0001	000277	14L
0001	000076	145G	0001	000126	151G	0000	010106	19F	0000	010033	2F	0001	000406	20L
0001	000331	230G	0001	000355	243G	0000	010052	5F	0001	000175	50L	0000	010057	51F
0001	000203	52L	0000	010064	53F	0000	010023	55F	0001	000210	6L	0000	010022	66F
0001	000223	7L	0000	010113	71F	0000	010115	77F	0000	010071	78F	0001	000236	8L
0000	010034	88F	0000	010042	89F	0001	000251	9L	0000	010012	1	0000	010021	11
0000	010014	111J	0000	010020	1N	0000	004704	10I	0000	006344	10K	0000	000000	1X
0000	010013	J	0000	010015	K	0000	010016	L	0000	010017	M	0000	010004	N
0000	010011	NDY	0000	010010	NX									

```

00101 1*      DIMENSION IX(50,50)
00103 2*      DIMENSION IOI(4,200),IOK(4,200),N(4)
00104 3*      1 READ(5,66)NX
00107 4*      66 FORMAT(12)
00110 5*      NDY=((NX)*(NX-1))/2
00111 6*      WRITE(6,55)NDY
00114 7*      55 FORMAT(' THE NUMBER OF POSSIBLE DYADS IS ',15//)
00115 8*      DO 100 I=1,4
00120 9*      100 N(I)=0
00122 10*     DO 34 J=1,NX
00125 11*     34 READ(5,2)(IX(I,J),J=1,NX)
00134 12*     2 FORMAT(50I1)
00135 13*     WRITE(6,88)
00137 14*     88 FORMAT(4X,' DYAD ',13X,' RESPONSES ')
00140 15*     WRITE(6,89)
00142 16*     89 FORMAT(' ..... ')
00143 17*     IIIJ=IX-1
00144 18*     DO 3 I=1,IIIJ
00147 19*     J=I+1
00150 20*     DO 3 K=J,NX
00153 21*     L=IX(I,K)
00154 22*     M=IX(K,I)

```

```

00155 23*      WRITE(6,19)I,K,L,M
00163 24*      IF(IX(1,1).EQ.2.AND.IX(K,K).EQ.2) GO TO 50
00165 25*      IF(IX(1,1).EQ.1.AND.IX(K,K).EQ.1) GO TO 52
00167 26*      WRITE(6,5)
00171 27*      5  FORMAT(' ABOVE IS A MIXED DYAD ')
00172 28*      GO TO 6
00173 29*      50 WRITE(6,51)
00175 30*      51 FORMAT(' ABOVE IS A MALE DYAD ')
00176 31*      GO TO 6
00177 32*      52 WRITE(6,53)
00201 33*      53 FORMAT(' ABOVE IS A FEMALE DYAD ')
00202 34*      6  GO TO (7,7,8,8,9,9),L
00203 35*      7  GO TO (10,10,13,13,12,12),M
00204 36*      8  GO TO (13,13,11,11,13,13),M
00205 37*      9  GO TO (12,12,13,13,10,10),M
00206 38*      10 IN=1
00207 39*      GO TO 14
00210 40*      11 IN=2
00211 41*      GO TO 14
00212 42*      12 IN=3
00213 43*      GO TO 14
00214 44*      13 IN=4
00215 45*      14 N(IN)=N(IN)+1
00216 46*      I1=N(IN)
00217 47*      IOI(IN,I1)=1
00220 48*      IOK(IN,I1)=K
00221 49*      3  CONTINUE
00224 50*      WRITE(6,78)
00226 51*      78 FORMAT(' ',//)
00227 52*      DO 20 I=1,4
00232 53*      I1=N(I)
00233 54*      WRITE(6,101)I1,I
00237 55*      101 FORMAT('D',' LISTING OF ',I2,' ', ' DYADS FALLING IN CELL ',I2)
00240 56*      IF(I1.EQ.0) GO TO 20
00242 57*      DO 18 J=1,I1
00245 58*      L=IOI(I,J)
00246 59*      M=IOK(I,J)
00247 60*      18 WRITE(6,19)IOI(I,J),IOK(I,J),IX(L,M),IX(M,L)
00256 61*      19 FORMAT(' ',I3,5X,I3,10X,I3,5X,I3)
00257 62*      20 CONTINUE
00261 63*      WRITE(6,71)
00263 64*      71 FORMAT(' ')
00264 65*      WRITE(6,77)
00266 66*      77 FORMAT(' ', ' DO IT---G.B.SHAW ')
00267 67*      GO TO 1
00270 68*      END

```

END OF COMPILATION:

NO DIAGNOSTICS.

SYSS•RL1B5• LEVEL 032273  
END MAP 4836 HSEC•

QXQT DYAD

QADD,P SS  
THE NUMBER OF POSSIBLE DYADS IS 153

DYAD	RESPONSES
1 2	2 3
ABOVE IS A MIXED DYAD	
1 3	3 4
ABOVE IS A FEMALE DYAD	
1 4	3 6
ABOVE IS A MIXED DYAD	
1 5	3 5
ABOVE IS A MIXED DYAD	
1 6	2 5
ABOVE IS A MIXED DYAD	
1 7	2 2
ABOVE IS A FEMALE DYAD	
1 8	2 3
ABOVE IS A FEMALE DYAD	
1 9	3 4
ABOVE IS A FEMALE DYAD	
1 10	2 3
ABOVE IS A MIXED DYAD	
1 11	2 3
ABOVE IS A FEMALE DYAD	
1 12	2 4
ABOVE IS A MIXED DYAD	
1 13	2 3
ABOVE IS A FEMALE DYAD	
1 14	2 2
ABOVE IS A MIXED DYAD	
1 15	2 2
ABOVE IS A MIXED DYAD	
1 16	2 3
ABOVE IS A MIXED DYAD	
1 17	3 4
ABOVE IS A FEMALE DYAD	
1 18	3 3
ABOVE IS A FEMALE DYAD	
2 3	2 3
ABOVE IS A MIXED DYAD	
2 4	4 3
ABOVE IS A MALE DYAD	
2 5	4 2
ABOVE IS A MALE DYAD	
2 6	2 2

ABOVE 1S A MALE DYAD	2	3
2 7		
ABOVE 1S A MIXED DYAD	4	3
2 8		
ABOVE 1S A MIXED DYAD	2	2
2 9		
ABOVE 1S A MIXED DYAD	4	4
2 10		
ABOVE 1S A MALE DYAD	3	3
2 11		
ABOVE 1S A MIXED DYAD	3	1
2 12		
ABOVE 1S A MALE DYAD	3	4
2 13		
ABOVE 1S A MIXED DYAD	4	4
2 14		
ABOVE 1S A MALE DYAD	5	2
2 15		
ABOVE 1S A MALE DYAD	5	4
2 16		
ABOVE 1S A MALE DYAD	2	2
2 17		
ABOVE 1S A MIXED DYAD	4	2
2 18		
ABOVE 1S A MIXED DYAD	4	4
3 4		
ABOVE 1S A MIXED DYAD	3	2
3 5		
ABOVE 1S A MIXED DYAD	3	5
3 6		
ABOVE 1S A MIXED DYAD	3	3
3 7		
ABOVE 1S A FEMALE DYAD	4	3
3 8		
ABOVE 1S A FEMALE DYAD	3	3
3 9		
ABOVE 1S A FEMALE DYAD	3	3
3 10		
ABOVE 1S A MIXED DYAD	4	4
3 11		
ABOVE 1S A FEMALE DYAD	4	4
3 12		
ABOVE 1S A MIXED DYAD	4	5
3 13		
ABOVE 1S A FEMALE DYAD	4	5
3 14		
ABOVE 1S A MIXED DYAD	4	3
3 15		
ABOVE 1S A MIXED DYAD	3	3
3 16		
ABOVE 1S A MIXED DYAD	3	5
3 17		
ABOVE 1S A FEMALE DYAD	2	2
3 18		
ABOVE 1S A FEMALE DYAD	4	4
4 5		
ABOVE 1S A MALE DYAD		

4	ABOVE	IS	A	MALE	DYAD	4	4
4	ABOVE	IS	A	MIXED	DYAD	4	3
4	ABOVE	IS	A	MIXED	DYAD	4	3
4	ABOVE	IS	A	MIXED	DYAD	4	4
4	ABOVE	IS	A	MALE	DYAD	3	3
4	ABOVE	IS	A	MIXED	DYAD	4	4
4	ABOVE	IS	A	MALE	DYAD	5	3
4	ABOVE	IS	A	MIXED	DYAD	4	4
4	ABOVE	IS	A	MALE	DYAD	4	5
4	ABOVE	IS	A	MALE	DYAD	6	4
4	ABOVE	IS	A	MALE	DYAD	4	4
4	ABOVE	IS	A	MIXED	DYAD	4	4
4	ABOVE	IS	A	MIXED	DYAD	4	4
5	ABOVE	IS	A	MALE	DYAD	3	5
5	ABOVE	IS	A	MIXED	DYAD	5	4
5	ABOVE	IS	A	MIXED	DYAD	4	3
5	ABOVE	IS	A	MIXED	DYAD	4	4
5	ABOVE	IS	A	MALE	DYAD	2	2
5	ABOVE	IS	A	MIXED	DYAD	4	4
5	ABOVE	IS	A	MALE	DYAD	4	4
5	ABOVE	IS	A	MIXED	DYAD	4	4
5	ABOVE	IS	A	MALE	DYAD	4	4
5	ABOVE	IS	A	MIXED	DYAD	3	3
5	ABOVE	IS	A	MIXED	DYAD	3	4
5	ABOVE	IS	A	MIXED	DYAD	4	5
6	ABOVE	IS	A	MIXED	DYAD	3	3
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6	ABOVE	IS	A	MIXED	DYAD	3	3

ABOVE IS A MIXED DYAD	3	2
6 10		
ABOVE IS A MALE DYAD	3	2
6 11		
ABOVE IS A MIXED DYAD	3	3
6 12		
ABOVE IS A MALE DYAD	3	2
6 13		
ABOVE IS A MIXED DYAD	4	4
6 14		
ABOVE IS A MALE DYAD	3	3
6 15		
ABOVE IS A MALE DYAD	5	4
6 16		
ABOVE IS A MALE DYAD	3	2
6 17		
ABOVE IS A MIXED DYAD	4	3
6 18		
ABOVE IS A MIXED DYAD	3	4
7 8		
ABOVE IS A FEMALE DYAD	4	3
7 9		
ABOVE IS A FEMALE DYAD	3	3
7 10		
ABOVE IS A MIXED DYAD	2	2
7 11		
ABOVE IS A FEMALE DYAD	2	2
7 12		
ABOVE IS A MIXED DYAD	4	5
7 13		
ABOVE IS A FEMALE DYAD	2	2
7 14		
ABOVE IS A MIXED DYAD	3	4
7 15		
ABOVE IS A MIXED DYAD	2	2
7 16		
ABOVE IS A MIXED DYAD	4	3
7 17		
ABOVE IS A FEMALE DYAD	2	1
7 18		
ABOVE IS A FEMALE DYAD	2	2
8 9		
ABOVE IS A FEMALE DYAD	2	3
8 10		
ABOVE IS A MIXED DYAD	3	4
8 11		
ABOVE IS A FEMALE DYAD	5	3
8 12		
ABOVE IS A MIXED DYAD	3	4
8 13		
ABOVE IS A FEMALE DYAD	2	2
8 14		
ABOVE IS A MIXED DYAD	2	1
8 15		
ABOVE IS A MIXED DYAD	3	3
8 16		
ABOVE IS A MIXED DYAD	3	3

8	ABOVE	IS	17	A FEMALE DYAD	3	4
8	ABOVE	IS	18	A FEMALE DYAD	2	2
9	ABOVE	IS	10	A MIXED DYAD	4	4
9	ABOVE	IS	11	A FEMALE DYAD	3	3
9	ABOVE	IS	12	A MIXED DYAD	3	1
9	ABOVE	IS	13	A FEMALE DYAD	4	3
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9	ABOVE	IS	15	A MIXED DYAD	4	3
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9	ABOVE	IS	17	A FEMALE DYAD	2	2
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10	ABOVE	IS	11	A MIXED DYAD	4	4
10	ABOVE	IS	12	A MALE DYAD	5	3
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10	ABOVE	IS	17	A MIXED DYAD	3	2
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12	ABOVE	IS	14	A MALE DYAD	3	5
12	ABOVE	IS	15		5	4

ABOVE IS A MALE DYAD		
12 16	3	4
ABOVE IS A MALE DYAD		
12 17	2	3
ABOVE IS A MIXED DYAD		
12 18	3	4
ABOVE IS A MIXED DYAD		
13 14	2	2
ABOVE IS A MIXED DYAD		
13 15	6	3
ABOVE IS A MIXED DYAD		
13 16	5	3
ABOVE IS A MIXED DYAD		
13 17	4	3
ABOVE IS A FEMALE DYAD		
13 18	4	5
ABOVE IS A FEMALE DYAD		
14 15	5	3
ABOVE IS A MALE DYAD		
14 16	4	3
ABOVE IS A MALE DYAD		
14 17	5	4
ABOVE IS A MIXED DYAD		
14 18	3	3
ABOVE IS A MIXED DYAD		
15 16	4	3
ABOVE IS A MALE DYAD		
15 17	3	5
ABOVE IS A MIXED DYAD		
15 18	4	5
ABOVE IS A MIXED DYAD		
16 17	3	2
ABOVE IS A MIXED DYAD		
16 18	3	3
ABOVE IS A MIXED DYAD		
17 18	2	2
ABOVE IS A FEMALE DYAD		

LISTING OF 22 DYADS FALLING IN CELL 1

1	7	2	2
1	14	2	2
1	15	2	2
2	6	2	2
2	9	2	2
2	17	2	2
3	18	2	2
5	10	2	2
7	10	2	2
7	11	2	2
7	13	2	2
7	15	2	2
7	17	2	1
7	18	2	2
8	13	2	2



7	9		
7	14	3	3
7	16	3	4
8	10	4	3
8	12	3	4
8	15	3	4
8	16	3	3
8	17	3	3
9	10	4	4
9	11	3	4
9	13	3	3
9	14	4	3
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9	16	4	3
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10	13	4	4
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11	12	4	4
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11	16	3	3
11	17	4	3
12	13	4	4
12	16	4	3
12	18	3	4
13	17	3	4
14	16	4	3
14	18	4	3
15	16	3	3
16	18	4	3
		3	3

LISTING OF 2 DYADS FALLING IN CELL 3

1	6	2	5
2	15	5	2

LISTING OF 52 DYADS FALLING IN CELL 4

1	2	2	3
1	4	3	6
1	5	3	5
1	8	2	3
1	10	2	3
1	11	2	3
1	12	2	4
1	13	2	3
1	16	2	3
2	3	2	3
2	5	2	3
2	7	4	2
2	12	2	3
2	16	3	1
2	18	5	4
3	5	4	2
3	6	3	2
3	13	3	5
3	14	4	5
3	17	4	5
4	12	3	5
4	14	5	3
		4	5

4 5 4 5 2 2 4 2 5 3 3 1 3 5 4 2 2 5 4 5 4 3 3 3 5 3 4 5 5 2

6 3 5 4 3 3 5 3 4 2 5 3 3 3 5 3 3 3 5 2 6 5 4 5 5 3 4 3

15 6 7 18 10 12 15 16 12 9 11 12 12 14 15 16 17 14 15 14 15 17 15 16 18 15 17 17 18 17

4 5 5 5 6 6 6 6 7 8 8 9 10 10 10 10 11 11 12 12 12 13 13 14 14 15 15 16

APPENDIX D  
LETTERS AND INSTRUCTIONS TO SELECTED STUDENTS

UNIVERSITY OF MARYLAND

COLLEGE OF EDUCATION  
COLLEGE PARK 20742

INSTITUTE FOR CHILD STUDY

Dear \_\_\_\_\_:

I want to thank you for participating in this research study on trusting behavior.

You have been selected to participate in the second phase of this research by answering eighty hypothetical questions. These questions concern what you might do under certain conditions. There is no stress or manipulation involved in these questions.

I am making arrangements to interview you and 79 other students this week. Since the scheduling of this is very "tight", I would like to ask you to come to the Interview Room for one-half hour at:

\_\_\_\_\_ time

\_\_\_\_\_ day and date

It will be very helpful to the project if you can come exactly at this time. I know some people will be inconvenienced, but your cooperation will help things run smoothly.

Two things:

\*\*1. You are excused from class at this time. Give the accompanying Note To Teachers to the teacher whose class you will miss. Since the interviews are scheduled on the hour and half hour, I am enclosing two notes in case your time cuts across two periods.

These notes give you permission to be absent from your class. You will get validation tickets at the interview so that the teacher will be able to validate your absence.

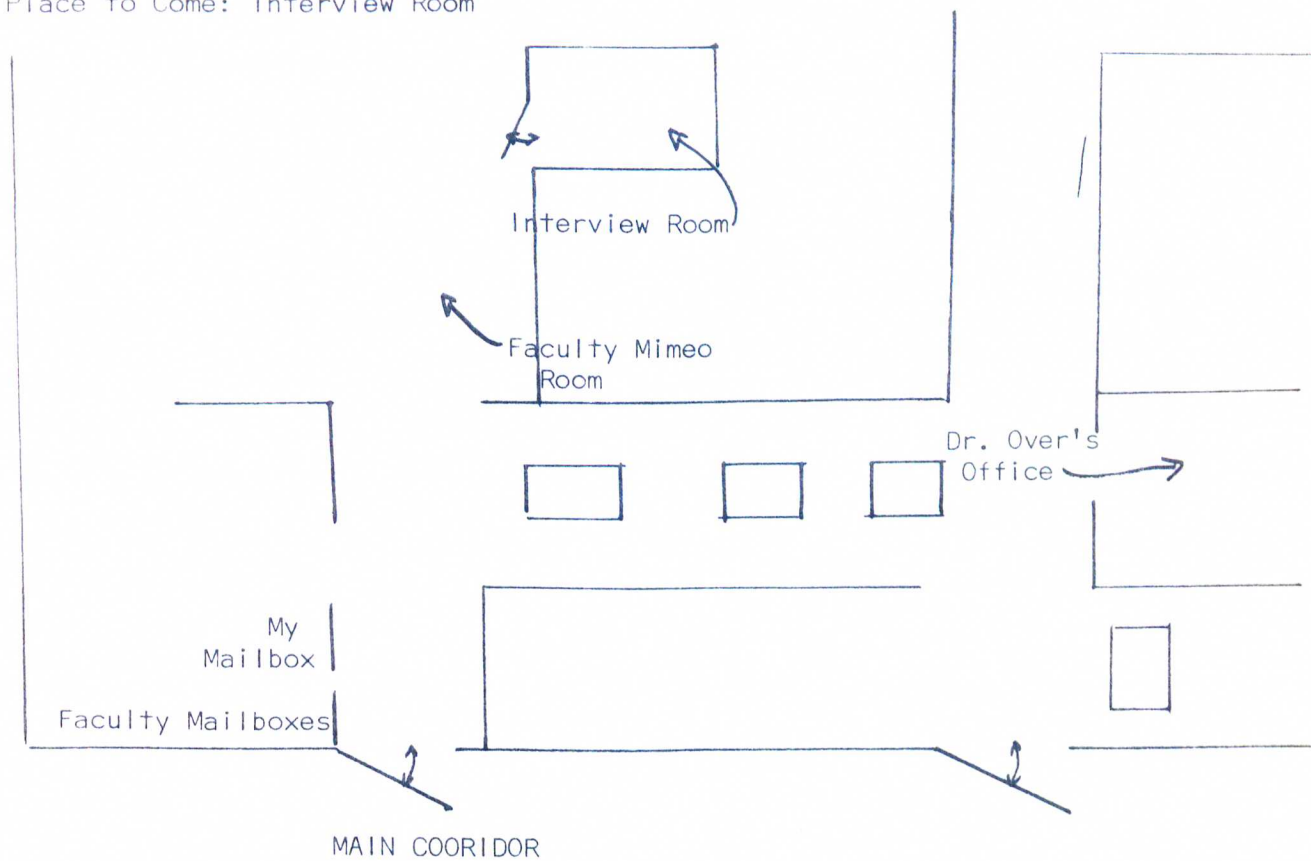
\*\*2. In case you cannot come at the requested time, please let me know so that I may rechedule. No-shows will really bo-lux things up. The way to let me know is to put the bottom of this note in my mailbox in the main office (see diagram). I shall make new arrangements. (Even if you are feeling particularly uncooperative on that day, please come anyway. Your lack of cooperation will help this project, because your answers will contribute to the results.)

  
Stephen H. Armstrong  
Principal Investigator

(If you cannot make the assigned time for your interview, please leave this section in my mailbox.)

\_\_\_\_\_  
Your Name

Place to Come: Interview Room



## APPENDIX E

## LISTING OF THE DATA

1. For an Analysis under MANOVA
2. For an Analysis under DYAD

\*ELT, 11L FST  
ELT 60-01/18-23:27 FST

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--For analysis on MANOVA

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-- For an analysis on DYAD

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@ELT,DIL SS
ELT 68-01/16-20:54 SS
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000088	332313413441
000089	3544332363233
000090	3234642253466
000091	4443316313432
000092	4444443342444
000093	2424332443223
000094	4454246444214
000095	4443313544441

## APPENDIX F

## CODEBOOK FOR DATA UNDER MANOVA DATA SET-UP

Column	Data	Codes
1	A dimension	1=high, 2=low
2	D dimension	1=affect, 2=non-affect
3	B dimension	1=high asymm, 2=low asymm
4	C dimension	1=high fate con., 2=low fate con.
5,6	Subject number	1 to 48
7	Matrix number	1 to 8
8	Order in which this game was presented	1 to 8
9	Sex of dyad	1=female, 2=male, 3=mixed
10	Race of dyad	1=Cauc., 2=Negro, 3=mixed
11,12	subject number	1 to 48
13	blank	
14	Sex person	1=female, 2=male
15	Race person	1=Cauc., 2=Negro
16,17,18	blank	
19,20	# trusting plays	00 to 10
21,22	# partner's trusts	00 to 100
23,24	Total trust estimate	10 to 70
25,26	Own years in jail	00 to 99
27,28	Partner's years in jail	00 to 99
29,30,31	Combined years in jail	000 to 999
32,33,34,35	blank	
36 to 45	responses to the game on individual plays	1=trust/2=not trust

APPENDIX G  
INSTRUCTIONS FOR THE PRISONER'S  
DILEMMA

After having introduced himself, the experimenter escorts the subjects to the interview room, gives them their seats, explains the nature of the study, and the no-communication rule. He then describes the dilemma:

The game works like this. You are both my prisoners, and I want to have a trial, to get a conviction. But I don't have enough evidence to gain a conviction by myself, so I need at least one of you to confess and implicate the other. I keep you from talking to one another. If you both hold out -- Not Confess -- you both get off very lightly. But if one of you confesses, that person will get off very lightly, and the other person will go to jail for a long time, having the book thrown at them. Naturally, this second person may also confess. If the first one doesn't, then the second person is the one to get off lightly, while his partner goes to jail for a long time. Of course, if both of you confess, you both go to jail for a long time, even longer than you would have gone to jail if you had held out and your partner had sold you out.

Let's do an example. (The experimenter asks the subjects to turn to the sample matrix, on the front of their packets; he instructs players as to their respective colors and the order of play. Both players have a file card colored to their color, with their name on it, so they don't forget.)

We are playing for years in jail, so you want to get the smallest payoff. The best way for both of you to get off lightly, as a team, is for both of you to hold out and not confess. Yet there is also a temptation to confess on your partner, because your payoff is even less in that case.

Let's try it with reference to the sample payoff map. Sally, you draw your lines acrosss from your choice, Not Confess. John draws his lines down from Not Confess. The two lines on this map meet in the first box. In that box, the first number, in purple, is the jail time that Sally draws for this Not Confess play. The second number, in green, is the time that

John goes to jail for Not Confessing.

Suppose Sally chooses her second alternative, Confess; and John chooses his first alternative, Not Confess. As you can both see from the payoffs, Sally gets 1/2 year, and John goes to jail for five years. This is usually called John's "sucker's payoff," since he trusted Sally to choose her Not Confess alternative -- in which case he would have gotten only one year, not five. But she sold him down the river, and made him into a sucker.

The same can happen to Sally. Suppose she trusts John. She plays the Not Confess alternative. We have shown that when John does play the Not Confess, they both get one-half year. But if he ignores her trust and Confesses, Sally is the sucker, and gets five years, while John has succumbed to temptation, and he gets only one-half year. (Experimenter instructs both players to draw lines from their alternatives to the appropriate cell.)

What happens if you both choose to Confess, not trusting one another? Your hope is to get the one-half year. But you both end up with six years, which is more than what you would have had to be in jail, had you trusted each other to Not Confess, and had you not been "tempted" to get your partner and go to jail for only one-half year.

Each game is for ten plays. I will record your cumulating time in jail on this blackboard behind me, so that you may both see how you are doing. At the end of the tenth play, we will erase the running count, and start again.

Also, in front of you, you will find several sheets of paper with five lines on them. There is one line for each play of this sample game.

On the first line, I want you to mark with your pencil how much you trust your partner to Confess or Not Confess. For instance, if you think your partner is very likely to Not Confess, put a mark next to the Not Confess on the first line. If, on the other hand, you think your partner is about to Confess, put a mark under Confess on the line. If you are unsure, and doubt your trust, put a mark next to where your guess might be. If, for instance, you think your partner is slightly more likely to choose Not Confess, but you are not sure, you may mark your card this way: (experimenter demonstrates on a piece of paper.)

Now, take a minute to look at your maps, and to think about what you will do.

Go ahead and mark your trust of your partner's decision to Not Confess or to Confess. This is your estimate of how likely you think it is that your partner will Confess, and be not trustworthy; or that your partner will Not Confess, and therefore be trustworthy.

(The experimenter continues in this vein, answering questions and playing the five-play sample game. He then moves to the other eight matrices, after it is clear to him that both players understand the meaning of the alternatives, what they are to do, and the consequences of their choices.)

## APPENDIX H

LISTING OF MEANS AND STANDARD DEVIATIONS  
 FOR ALL SIX DEPENDENT VARIABLES,  
 FOR EACH LEVEL OF THE FOUR  
 INDEPENDENT VARIABLES

MEANS AND STANDARD DEVIATIONS

FACTOR						# trust plays	# part- ner's trust plays	Est. of partner trust- worth	Own years in jail	Part- ner's years in jail	Combined years in jail for both
A	D	B	C								
1	1	2	2	12 OBS							
					M	7.750	8.333	25.500	16.333	22.333	38.667
					SD	2.667	2.425	12.377	10.003	14.285	22.900
1	2	2	2	12 OBS							
					M	8.750	8.833	23.000	14.750	16.167	30.917
					SD	2.701	2.918	20.064	12.159	12.467	22.472
1	2	2	1	12 OBS							
					M	8.833	8.750	28.333	16.167	14.750	30.917
					SD	2.918	2.701	23.035	12.467	12.159	22.472
1	1	2	1	12 OBS							
					M	8.333	7.750	25.500	22.333	16.333	38.667
					SD	2.425	2.667	11.525	14.285	10.003	22.900
2	2	2	2	12 OBS							
					M	7.333	7.750	27.917	18.167	22.833	41.000
					SD	2.462	2.261	14.254	8.277	11.472	18.256
2	2	2	1	12 OBS							
					M	7.750	7.333	32.633	22.833	18.167	41.000
					SD	2.261	2.462	18.185	11.472	8.277	18.256
2	1	2	2	12 OBS							
					M	7.833	8.500	22.917	15.833	20.583	34.417
					SD	3.157	2.576	13.433	10.241	15.234	24.489
2	1	2	1	12 OBS							
					M	8.500	7.833	24.750	20.583	15.833	34.417
					SD	2.576	3.157	15.610	15.234	10.241	24.489
1	1	1	2	12 OBS							
					M	8.333	8.583	25.250	15.667	21.083	34.750
					SD	1.875	1.564	12.636	6.583	11.681	17.833
1	1	1	1	12 OBS							
					M	8.583	8.333	24.667	21.083	15.667	34.750
					SD	1.564	1.875	9.957	11.681	6.583	17.833
2	2	1	2	12 OBS							
					M	7.500	7.167	29.333	21.083	27.583	48.667
					SD	2.611	2.980	14.926	11.927	18.579	26.455
2	2	1	1	12 OBS							
					M	7.167	7.500	33.417	27.583	21.083	48.667
					SD	2.980	2.611	18.711	18.579	11.927	26.498
1	2	1	2	12 OBS							
					M	7.417	7.833	20.917	15.833	24.833	40.667
					SD	3.704	3.689	14.724	12.438	25.019	29.488
1	2	1	1	12 OBS							
					M	7.833	7.417	26.500	24.833	15.833	40.667
					SD	3.689	3.704	22.448	25.019	12.438	29.488
2	1	1	2	12 OBS							
					M	8.583	8.250	25.000	17.917	17.250	35.167
					SD	2.429	3.251	18.101	15.866	14.290	26.205
2	1	1	1	12 OBS							
					M	8.250	8.583	26.583	17.417	18.083	35.167
					SD	3.251	2.429	18.686	14.513	16.059	26.205

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